DEPARTMENT OF LABOR

Occupational Safety and Health Administration

29 CFR Part 1910

[Docket No. OSHA–2020–0004]

RIN 1218–AD36

Occupational Exposure to COVID–19; Emergency Temporary Standard

AGENCY: Occupational Safety and Health Administration (OSHA), Department of Labor.

ACTION: Interim final rule; request for comments.

SUMMARY: The Occupational Safety and Health Administration (OSHA) is issuing an emergency temporary standard (ETS) to protect healthcare and healthcare support service workers from occupational exposure to COVID–19 in settings where people with COVID–19 are reasonably expected to be present. During the period of the emergency standard, covered healthcare employers must develop and implement a COVID–19 plan to identify and control COVID–19 hazards in the workplace. Covered employers must also implement other requirements to reduce transmission of COVID–19 in their workplaces, related to the following: Patient screening and management; Standard and Transmission-Based Precautions; personal protective equipment (PPE), including facemasks or respirators; controls for aerosol-generating procedures; physical distancing of at least six feet, when feasible; physical barriers; cleaning and disinfection; ventilation; health screening and medical management; training; anti-retaliation; recordkeeping; and reporting. The standard encourages vaccination by requiring employers to provide reasonable time and paid leave for employee vaccinations and any side effects. It also encourages use of respirators, where respirators are used in lieu of required facemasks, by including a mini respiratory protection program that applies to such use. Finally, the standard exempts from coverage certain workplaces where all employees are fully vaccinated and individuals with possible COVID–19 are prohibited from entry; and it exempts from some of the requirements of the standard fully vaccinated employees in well-defined areas where there is no reasonable expectation that individuals with COVID–19 will be present.

DATES:

Effective dates: The rule is effective June 21, 2021. The incorporation by reference of certain publications listed in the rule is approved by the Director of the Federal Register as of June 21, 2021.

Compliance dates: Compliance dates for specific provisions are in 29 CFR 1910.502(s). Employers must comply with all requirements of this section, except for requirements in paragraphs (i), (k), and (n) by July 6, 2021. Employers must comply with the requirements in paragraphs (i), (k), and (n) by July 21, 2021.

Comments due: Written comments, including comments on any aspect of this ETS and whether this ETS should become a final rule, must be submitted by July 21, 2021 in Docket No. OSHA–2020–0004. Comments on the information collection determination described in Section VII.K of the preamble (OMB Review under the Paperwork Reduction Act of 1995) may be submitted by August 20, 2021 in Docket Number OSHA–2021–003.

ADDRESSES: In accordance with 28 U.S.C. 2112(a), the agency designates Edmund C. Baird, Associate Solicitor of Labor for Occupational Safety and Health, Office of the Solicitor, U.S. Department of Labor, to receive petitions for review of the ETS. Service can be accomplished by email to *zzSOL-Covid19-ETS@dol.gov.*

Written comments: You may submit comments and attachments, identified by Docket No. OSHA–2020–0004, electronically at *www.regulations.gov,* which is the Federal e-Rulemaking Portal. Follow the online instructions for making electronic submissions.

Instructions: All submissions must include the agency's name and the docket number for this rulemaking (Docket No. OSHA–2020–0004). All comments, including any personal information you provide, are placed in the public docket without change and may be made available online at *www.regulations.gov.* Therefore, OSHA cautions commenters about submitting information they do not want made available to the public or submitting materials that contain personal information (either about themselves or others), such as Social Security Numbers and birthdates.

Docket: To read or download comments or other material in the docket, go to Docket No. OSHA–2020–0004 at *www.regulations.gov.* All comments and submissions are listed in the *www.regulations.gov* index; however, some information (e.g., copyrighted material) is not publicly available to read or download through that website. All comments and submissions, including copyrighted material, are available for inspection through the OSHA Docket Office. Documents submitted to the docket by OSHA or stakeholders are assigned document identification numbers (Document ID) for easy identification and retrieval. The full Document ID is the docket number plus a unique four-digit code. OSHA is identifying supporting information in this ETS by author name and publication year, when appropriate. This information can be used to search for a supporting document in the docket at *http://www.regulations.gov.* Contact the OSHA Docket Office at 202–693–2350 (TTY number: 877–889–5627) for assistance in locating docket submissions.

FOR FURTHER INFORMATION CONTACT:

General information and press inquiries: Contact Frank Meilinger, Director, Office of Communications, U.S. Department of Labor; telephone (202) 693–1999; email *meilinger.francis2@dol.gov.*

For technical inquiries: Contact Andrew Levinson, Directorate of Standards and Guidance, U.S. Department of Labor; telephone (202) 693–1950.

SUPPLEMENTARY INFORMATION: The preamble to the ETS on occupational exposure to COVID–19 follows this outline:

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I. Executive Summary

This ETS is based on the requirements of the Occupational Safety and Health Act (OSH Act or Act) and legal precedent arising under the Act. Under section 6(c)(1) of the OSH Act, 29 U.S.C. 655(c)(1), OSHA shall issue an ETS if the agency determines that employees are exposed to grave danger from exposure to substances or agents determined to be toxic or physically harmful or from new hazards, and an ETS is necessary to protect employees from such danger. These legal requirements are more fully discussed in *Pertinent Legal Authority* (Section III of this preamble).

For the first time in its 50-year history, OSHA faces a new hazard so grave that it has killed nearly 600,000

people in the United States in barely over a year, and infected millions more (CDC, May 24, 2021a). And the impact of this new illness has been borne disproportionately by the healthcare and healthcare support workers tasked with caring for those infected by this disease. As of May 24, 2021, over 491,816 healthcare workers have contracted COVID–19, and more than 1,600 of those workers have died (CDC, May 24, 2021b). OSHA has determined that employee exposure to this new hazard, SARS–CoV–2 (the virus that causes COVID–19), presents a grave danger to workers in all healthcare settings in the United States and its territories where people with COVID–19 are reasonably expected to be present. This finding of grave danger is based on the science of how the virus spreads and the elevated risk in workplaces where COVID–19 patients are cared for, as well as the adverse health effects suffered by those diagnosed with COVID–19, as discussed in *Grave Danger* (Section IV.A. of this preamble).

OSHA has also determined that an ETS is necessary to protect healthcare and healthcare support employees in covered healthcare settings from exposures to SARS–CoV–2, as discussed in *Need for the ETS* (Section IV.B. of this preamble). Workers face a particularly elevated risk of exposure to SARS–CoV–2 in settings where patients with suspected or confirmed COVID–19 receive treatment or where patients with undiagnosed illnesses come for treatment (*e.g.,* emergency rooms, urgent care centers), especially when providing care or services directly to those patients. Through its enforcement efforts to date, OSHA has encountered significant obstacles, revealing that existing standards, regulations, and the OSH Act's General Duty Clause are inadequate to address the COVID–19 hazard for employees covered by this ETS. The agency has determined that a COVID–19 ETS is necessary to address these inadequacies. Additionally, as states and localities have taken increasingly more divergent approaches to COVID–19 workplace regulation—ranging from states with their own COVID–19 ETSs to states with no workplace protections at all—it has become clear that a Federal standard is needed to ensure sufficient protection for healthcare employees in all states.

The development of safe and highly effective vaccines and the on-going nationwide distribution of these vaccines are encouraging milestones in the nation's response to COVID–19. OSHA recognizes the promise of vaccines to protect workers, but as of the time of the promulgation of the ETS, vaccination has not eliminated the grave danger presented by the SARS–CoV–2 virus to the entire healthcare workforce. Indeed, approximately a quarter of healthcare workers have not yet completed COVID–19 vaccination (King et al., April 24, 2021). Nonetheless, vaccination is critical in combatting COVID–19, and the standard requires employers to provide paid leave to employees so that they can be vaccinated and recover from any side effects. Additionally, certain workplaces and well-defined areas where all employees are fully vaccinated are exempted from all of the standard's requirements, and certain fully vaccinated workers are exempted from several of the standard's requirements. OSHA will continue to monitor trends in COVID–19 infections and deaths as more of the workforce and the general population become vaccinated and the pandemic continues to evolve. Where OSHA finds a grave danger from the virus no longer exists for the covered workforce (or some portion thereof), or new information indicates a change in measures necessary to address the grave danger, OSHA will update the ETS, as appropriate.

To protect workers in the meantime, however, a multi-layered approach to controlling occupational exposures to SARS–CoV–2 in healthcare workplaces is required. As discussed in the *Need for Specific Provisions* (Section V of this preamble), OSHA relied on the best available science for its decisions concerning appropriate provisions for the ETS and its determinations regarding the kind and degree of protective actions needed to protect against exposure to SARS–CoV–2 at work and the feasibility of instituting these provisions. More specifically, the agency's analysis demonstrates that an effective COVID–19 control program must utilize a suite of overlapping controls in a layered approach to protect workers from workplace exposure to SARS–CoV–2. OSHA emphasizes that the infection control practices required by the ETS are most effective when used together; however, they are also each individually protective.

The agency has also evaluated the feasibility of this ETS and has determined that the requirements of the ETS are both economically and technologically feasible, as outlined in *Feasibility* (Section VI of this preamble). Table I.–1, which is derived from material presented in Section VI of this preamble, provides a summary of OSHA's best estimate of the costs and benefits of the rule using a discount rate of 3 percent. The specific requirements of the ETS are outlined and described in the *Summary and Explanation* (Section VIII of this preamble). OSHA requests comments on the provisions of the ETS and whether it should be adopted as a permanent standard.

Table I.-1: Benefits, Costs, and Net Benefits of OSHA's COVID-19 Healthcare ETS

Costs		
COVID-19 Plan		$1,198,482,522
Patient Screening and Management		$1,245,401,751
Respiratory Protection		$732,594,291
Training		$396,046,226
Ventilation		$30,554,935
Health Screening and Medical Management Costs		$83,121,853
Physical Barriers and Plexiglass		$57,407,631
Physical Distancing		$11,270,696
Cleaning and Disinfecting		$5,902,432
Hand Hygiene		$5,800,000
Recordkeeping		$13,207,068
Reporting		$129,467
MRP Costs		$189,726,559
Total Costs		**$3,969,645,432**
Benefits	**Cases**	
Infections Prevented	295,284	19,300,929,013
Deaths Prevented	776	7,550,800,224
		$26,851,729,237
Net Benefits		**$22,882,083,805**

Note: In a true benefit-cost analysis, the costs to all parties (e.g., employers, employees, governments) are included. Throughout OSHA's economic feasibility analysis in this rule, there are places where OSHA estimates there are no costs borne by employers. This does not necessarily mean that there are no costs or burdens imposed on others as might be considered in a true benefit-cost analysis, but these potential other costs do not need to be considered as part of OSHA's analysis of the economic feasibility to *employers*.

II. History of COVID–19

The global pandemic of respiratory disease (coronavirus disease 2019 or ''COVID–19'') caused by a novel coronavirus (SARS–CoV–2) has been taking an enormous toll on individuals, workplaces, and governments around the world since early 2020. According to the World Health Organization (WHO), as of May 24, 2021, there had been 166,860,081 confirmed cases of COVID–19 globally, resulting in more than 3,459,996 deaths (WHO, May 24, 2021). In the United States as of the same date, the CDC reported over 32,947,548 cases in the United States and over 587,342 deaths due to the disease (CDC, May 24, 2021a; CDC, May 24, 2021c). Among healthcare workers specifically, as of May 24, 2021, 491,816 healthcare workers in the United States had contracted COVID–19, and at least 1,611 of those workers had died; both of those figures are likely an undercount (CDC, May 24, 2021b).

The first confirmed case of COVID–19 was identified in the Hubei Province of China in December of 2019 (Chen et al., August 6, 2020). On December 31, 2019, China reported to the WHO that it had identified several influenza-like cases of unknown cause in Wuhan, China (WHO, January 5, 2020). Soon, COVID–19 infections had spread throughout Asia, Europe, and North and South America. By February 2020, 58 other countries had reported COVID–19 cases (WHO, March 1, 2020). By March 2020, widespread local transmission of the virus was established in 88 countries. Because of the widespread transmission and severity of the disease, along with what the WHO described as alarming levels of inaction, the WHO officially declared COVID–19 a pandemic on March 11, 2020 (WHO, March 11, 2020).

The first reported case of COVID–19 in the United States was in the state of Washington, on January 21, 2020, in a person who had returned from Wuhan, China on January 15, 2020 (CDC, January 21, 2020). On January 31, 2020, the COVID–19 outbreak was declared to be a U.S. public health emergency (US DHHS, January 31, 2020). After the initial report of the virus in January 2020, a steep increase in COVID–19 cases in the U.S. was observed though March and early April. In the six weeks between March 1, 2020 and April 12, 2020, the 7-day moving average of new cases rose from only 57 to 31,779 (CDC, May 24, 2021d). The President declared the COVID–19 outbreak a national emergency on March 13, 2020 (The White House, March 13, 2020). As of March 19, 2020, all 50 states and the District of Columbia had declared emergencies related to the pandemic

(NGA, March 19, 2020; NGA, December 4, 2020; Ayanian, June 3, 2020).

The U.S. Food and Drug Administration (FDA) issued or expanded emergency use authorizations (EUAs) for three COVID–19 vaccines between December 2020 and May 2021. Currently, everyone in the United States age 12 and older is eligible to receive a COVID–19 vaccine. As of May 24, 2021, the CDC reported that 163,907,827 people had received at least one dose of vaccine and 130,615,797 people were fully vaccinated, representing 45 percent and 32.8 percent of the total U.S. population, respectively (CDC, May 24, 2021e). Vaccination rates are higher among people ages 65 and older than among the rest of the population.

Despite the relatively rapid distribution of vaccines in many areas of the U.S., a substantial proportion of the working age population remains unvaccinated and susceptible to COVID–19 infection, including approximately a quarter of all healthcare and healthcare support workers (King et al., April 24, 2021). And, as discussed in more detail in *Grave Danger* (Section IV.A. of this preamble), because workers in healthcare settings where COVID–19 patients are treated continue to have regular exposure to SARS–CoV–2 and any variants that develop, they remain at an elevated risk of contracting COVID–19 regardless of vaccination status. Therefore, OSHA has determined that a grave danger to healthcare and healthcare support workers remains, despite the fully-vaccinated status of some workers, and that an ETS is necessary to address this danger (see *Grave Danger* and *Need for the ETS* (Sections IV.A. and IV.B. of this preamble)).

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III. Pertinent Legal Authority

The purpose of the Occupational Safety and Health Act of 1970 (OSH Act), 29 U.S.C. 651 *et seq.,* is ''to assure so far as possible every working man and woman in the Nation safe and healthful working conditions and to preserve our human resources.'' 29 U.S.C. 651(b). To this end, Congress authorized the Secretary of Labor (Secretary) to promulgate and enforce occupational safety and health standards under sections 6(b) and (c) of the OSH Act.[1] 29 U.S.C. 655(b). These provisions provide bases for issuing occupational safety and health standards under the Act. Once OSHA has established as a threshold matter that a health standard is necessary under section 6(b) or (c)—*i.e.,* to reduce a significant risk of material health impairment, or a grave danger to employee health—the Act gives the Secretary ''almost unlimited discretion to devise means to achieve the congressionally mandated goal'' of protecting employee health, subject to the constraints of feasibility. See *United Steelworkers of Am.* v. *Marshall,* 647 F.2d 1189, 1230 (D.C. Cir. 1981). A standard's individual requirements need only be ''reasonably related'' to the purpose of ensuring a safe and healthful working environment. Id. at 1237, 1241; see also *Forging Industry Ass'n* v. *Sec'y of Labor,* 773 F.2d 1436, 1447 (4th Cir. 1985). OSHA's authority to regulate employers is hedged by constitutional considerations and, pursuant to section 4(b)(1) of the OSH Act, the regulations and enforcement policies of other

[1] The Secretary has delegated most of his duties under the OSH Act to the Assistant Secretary of Labor for Occupational Safety and Health. Secretary's Order 08–2020, 85 FR 58393 (Sept. 18, 2020). This section uses the terms Secretary and OSHA interchangeably.

federal agencies. *Chao* v. *Mallard Bay Drilling, Inc.,* 534 U.S. 235, 241 (2002).

The OSH Act reflects Congress's determination that the costs of compliance with the Act and OSHA standards are part of the cost of doing business and OSHA may foreclose employers from shifting those costs to employees. See *Am. Textile Mfrs. Inst., Inc.* v. *Donovan,* 452 U.S. 490, 514 (1981); *Phelps Dodge Corp.* v. *OSHRC,* 725 F.2d 1237, 1239–40 (9th Cir. 1984); see also *Sec'y of Labor* v. *Beverly Healthcare-Hillview,* 541 F.3d 193 (3d Cir. 2008). Furthermore, the Act and its legislative history ''both demonstrate unmistakably'' OSHA's authority to require employers to temporarily remove workers from the workplace to prevent exposure to a health hazard. *United Steelworkers of Am.,* 647 F.2d at 1230.

The OSH Act states that the Secretary ''shall'' issue an emergency temporary standard (ETS) if he finds that the ETS is necessary to address a grave danger to workers. See 29 U.S.C. 655(c). In particular, the Secretary shall provide, without regard to the requirements of chapter 5, title 5, United States Code, for an emergency temporary standard to take immediate effect upon publication in the **Federal Register** if he determines that employees are exposed to grave danger from exposure to substances or agents determined to be toxic or physically harmful or from new hazards, and that such emergency standard is necessary to protect employees from such danger. 29 U.S.C. 655(c)(1).

A separate section of the OSH Act, section 8(c), authorizes the Secretary to prescribe regulations requiring employers to make, keep, and preserve records that are necessary or appropriate for the enforcement of the Act. 29 U.S.C. 657(c)(1). Section 8(c) also provides that the Secretary shall require employers to keep records of, and report, work-related deaths and illnesses. 29 U.S.C. 657(c)(2).

The ETS provision, section 6(c)(1), exempts the Secretary from procedural requirements contained in the OSH Act and the Administrative Procedure Act, including those for public notice, comments, and a rulemaking hearing. See, *e.g.,* 29 U.S.C. 655(b)(3); 5 U.S.C. 552, 553. For that reason, ETSs have been referred to as the ''most dramatic weapon in [OSHA's] arsenal.'' *Asbestos Info. Ass'n/N. Am.* v. *OSHA,* 727 F.2d 415, 426 (5th Cir. 1984).

The Secretary must issue an ETS in situations where employees are exposed to a ''grave danger'' and immediate action is necessary to protect those employees from such danger. 29 U.S.C. 655(c)(1); *Pub. Citizen Health Research Grp.* v. *Auchter,* 702 F.2d 1150, 1156 (D.C. Cir. 1983). The determination of what exact level of risk constitutes a ''grave danger'' is a ''policy consideration that belongs, in the first instance, to the Agency.'' *Asbestos Info. Ass'n,* 727 F.2d at 425 (accepting OSHA's determination that eighty lives at risk over six months was a grave danger); *Indus. Union Dep't, AFL–CIO* v. *Am. Petroleum Inst.,* 448 U.S. 607, 655 n.62 (1980). However, a ''grave danger'' represents a risk greater than the ''significant risk'' that OSHA must show in order to promulgate a permanent standard under section 6(b) of the OSH Act, 29 U.S.C. 655(b). *Int'l Union, United Auto., Aerospace, & Agr. Implement Workers of Am., UAW* v. *Donovan,* 590 F. Supp. 747, 755–56 (D.D.C. 1984), adopted, 756 F.2d 162 (D.C. Cir. 1985); see also *Indus. Union Dep't, AFL–CIO,* 448 U.S. at 640 n.45 (noting the distinction between the standard for risk findings in permanent standards and ETSs).

In determining the type of health effects that may constitute a ''grave danger'' under the OSH Act, the Fifth Circuit emphasized ''the danger of incurable, permanent, or fatal consequences to workers, as opposed to easily curable and fleeting effects on their health.'' *Fla. Peach Growers Ass'n, Inc.* v. *U.S. Dep't of Labor,* 489 F.2d 120, 132 (5th Cir. 1974). Although the findings of grave danger and necessity must be based on evidence of ''*actual,* prevailing industrial conditions,'' see *Int'l Union,* 590 F. Supp. at 751, OSHA need not wait for deaths to occur before promulgating an ETS, see *Fla. Peach Growers Ass'n.,* 489 F.2d at 130. When OSHA determines that exposure to a particular hazard would pose a grave danger to workers, OSHA can assume an exposure to a grave danger wherever that hazard is present in a workplace. *Dry Color Mfrs. Ass'n, Inc.* v. *Department of Labor,* 486 F.2d 98, 102 n.3 (3d Cir. 1973). In demonstrating that an ETS is necessary, the Fifth Circuit considered whether OSHA had shown that there were no other means of addressing the risk than an ETS. *Asbestos Info. Ass'n,* 727 F.2d at 426 (holding that necessity had not been proven where OSHA could have increased enforcement of already-existing standards to address the grave risk to workers from asbestos exposure).

On judicial review of an ETS, OSHA is entitled to great deference on the determinations of grave danger and necessity required under section 6(c)(1). See, *e.g., Pub. Citizen Health Research Grp.,* 702 F.2d at 1156; *Asbestos Info. Ass'n,* 727 F.2d at 422 (judicial review of these legislative determinations requires deference to the agency); cf. *American Dental Ass'n* v. *Martin,* 984 F.2d 823, 831 (7th Cir. 1993) (''the duty of a reviewing court of generalist judges is merely to patrol the boundary of reasonableness''). These determinations are ''essentially legislative and rooted in inferences from complex scientific and factual data.'' *Pub. Citizen Health Research Grp.,* 702 F.2d at 1156. The agency is not required to support its conclusions ''with anything approaching scientific certainty'' and has the ''prerogative to choose between conflicting evidence.'' *Indus. Union Dep't, AFL–CIO,* 448 U.S. at 656; *Asbestos Info. Ass'n,* 727 F.2d at 425.

The determinations of the Secretary in issuing standards under section 6 of the OSH Act, including ETSs, must be affirmed if supported by ''substantial evidence in the record considered as a whole.'' 29 U.S.C. 655(f). The Supreme Court described substantial evidence as '' 'such relevant evidence as a reasonable mind might accept as adequate to support a conclusion.' '' *Am. Textile Mfrs. Inst.,* 452 U.S. at 522–23 (quoting *Universal Camera Corp.* v. *NLRB,* 340 U.S. 474, 477 (1951)). The Court also noted that '' 'the possibility of drawing two inconsistent conclusions from the evidence does not prevent an administrative agency's finding from being supported by substantial evidence.' '' *Am. Textile Mfrs. Inst.,* 452 U.S. at 523 (quoting *Consolo* v. *FMC,* 383 U.S. 607, 620 (1966)). The Fifth Circuit, recognizing the size and complexity of the rulemaking record before it in the case of OSHA's ETS for organophosphorus pesticides, stated that a court's function in reviewing an ETS to determine whether it meets the substantial evidence standard is ''basically [to] determine whether the Secretary carried out his essentially legislative task in a manner reasonable under the state of the record before him.'' *Fla Peach Growers Ass'n.,* 489 F.2d at 129.

Although Congress waived the ordinary rulemaking procedures in the interest of ''permitting rapid action to meet emergencies,'' section 6(e) of the OSH Act, 29 U.S.C. 655(e), requires OSHA to include a statement of reasons for its action when it issues any standard. *Dry Color Mfrs.,* 486 F.2d at 105–06 (finding OSHA's statement of reasons inadequate). By requiring the agency to articulate its reasons for issuing an ETS, the requirement acts as ''an essential safeguard to emergency temporary standard-setting.'' Id. at 106. However, the Third Circuit noted that it did not require justification of ''every substance, type of use or production

technique,'' but rather a ''general explanation'' of why the standard is necessary. Id. at 107.

ETSs are, by design, temporary in nature. Under section 6(c)(3), an ETS serves as a proposal for a permanent standard in accordance with section 6(b) of the OSH Act (permanent standards), and the Act calls for the permanent standard to be finalized within six months after publication of the ETS. 29 U.S.C. 655(c)(3); see *Fla. Peach Growers Ass'n.,* 489 F.2d at 124. The ETS is effective ''until superseded by a standard promulgated in accordance with'' section 6(c)(3). 29 U.S.C. 655(c)(2).

It is crucial to note that the language of section 6(c)(1) is not discretionary: The Secretary ''shall'' provide for an ETS when OSHA makes the prerequisite findings of grave danger and necessity. *Pub. Citizen Health Research Grp.,* 702 F.2d at 1156 (noting the mandatory language of section 6(c)). OSHA is entitled to great deference in its determinations, and it must also account for ''the fact that 'the interests at stake are not merely economic interests in a license or a rate structure, but personal interests in life and health.' '' Id. (quoting *Wellford* v. *Ruckelshaus,* 439 F.2d 598, 601 (D.C. Cir. 1971)).

IV. Rationale for the ETS

A. Grave Danger

I. Introduction

On January 31, 2020, the Secretary of Health and Human Services (HHS) declared COVID–19 to be a public health emergency in the U.S. under section 319 of the Public Health Service Act. The World Health Organization declared COVID–19 to be a global health emergency on the same day. President Donald Trump declared the COVID–19 outbreak to be a national emergency on March 13, 2020 (The White House, March 13, 2020). HHS renewed its declaration of COVID–19 as a public health emergency effective April 21, 2021 (HHS, April 15, 2021).[2]

Consistent with these declarations, and in carrying out its legal duties under the OSH Act, OSHA has determined that healthcare employees face a grave danger from the new hazard of workplace exposures to SARS–CoV–2 except under a limited number of situations (*e.g.,* a fully vaccinated workforce in a breakroom).[3] The virus is both a physically harmful agent and a new hazard, and it can cause severe illness, persistent health effects, and death (morbidity and mortality, respectively) from the subsequent development of the disease, COVID–19.[4] OSHA bases its grave danger determination on evidence demonstrating the lethality of the disease, the serious physical and psychiatric health effects of COVID–19 morbidity (in mild-to-moderate as well as in severe cases), and the transmissibility of the disease in healthcare settings where people with COVID–19 are reasonably expected to be present. The protections of this ETS—which will apply, with some exceptions, to healthcare settings where people may share space with COVID–19 patients or interact with others who do—are designed to protect employees from infection with SARS–CoV–2 and from the dire, sometimes fatal, consequences of such infection.

The fact that COVID–19 is not a uniquely work-related hazard does not change the determination that it is a grave danger to which employees are exposed, nor does it excuse employers from their duty to protect employees from the occupational transmission of SARS–CoV–2. The OSH Act is intended to ''assure so far as possible every working man and woman in the Nation safe and healthful working conditions,'' 29 U.S.C. 651(b), and there is nothing in the Act to suggest that its protections do not extend to hazards which might occur outside of the workplace as well as within. Indeed, COVID–19 is not the first hazard that OSHA has regulated that occurs both inside and outside the workplace. For example, the hazard of noise is not unique to the workplace, but the Fourth Circuit has upheld OSHA's Occupational Noise Exposure standard, 29 CFR 1910.95 (*Forging Industry Ass'n* v. *Secretary,* 773 F.2d 1437, 1444 (4th Cir. 1985)). Diseases caused by bloodborne pathogens, including HIV/AIDS and hepatitis B, are also not unique to the workplace, but the Seventh Circuit upheld the majority of OSHA's Bloodborne Pathogens standard, 29 CFR 1910.1030 (*Am. Dental Ass'n* v. *Martin,* 984 F.2d 823 (7th Cir. 1993)). Moreover, employees have more freedom to control their environment outside of work, and to make decisions about their behavior and their contact with others to better minimize their risk of exposure. However, during the workday, while under the control of their employer, healthcare employees providing care directly to known or suspected COVID–19 patients are required to have close contact with infected individuals, and other employees in those settings also work in an environment in which they have little control over their ability to limit contact with individuals who may be infected with COVID–19 even when not engaged in direct patient care. Accordingly, even though SARS–CoV–2 is a hazard to which employees are exposed both inside and outside the workplace, healthcare employees in workplaces where individuals with suspected or confirmed COVID–19 receive care have limited ability to avoid exposure resulting from a work setting where those individuals are present. OSHA has a mandate to protect employees from hazards they are exposed to at work, even if they may be exposed to similar hazards before and after work.

As described above in Section III, Legal Authority, ''grave danger'' indicates a risk that is more than ''significant'' (*Int'l Union, United Auto., Aerospace, & Agr. Implement Workers of Am., UAW* v. *Donovan,* 590 F. Supp. 747, 755–56 (D.D.C. 1984); *Indus. Union Dep't, AFL–CIO* v. *Am. Petroleum Inst.,* 448 U.S. 607, 640 n.45, 655 (1980) (stating that a rate of 1 worker in 1,000 workers suffering a given health effect constitutes a ''significant'' risk)). ''Grave danger,'' according to one court, refers to ''the danger of incurable, permanent, or fatal consequences to workers, as opposed to easily curable and fleeting effects on their health'' (*Fla. Peach Growers Ass'n, Inc.* v. *U. S. Dep't of Labor,* 489 F.2d 120, 132 (5th Cir. 1974)). Fleeting effects were described as nausea, excessive salivation, perspiration, or blurred vision and were considered so minor that they often went unreported, which is in contrast to the adverse health effects of cases of COVID–19, which are formally referenced as ranging from ''mild'' to ''critical.'' [5] Beyond this, however, ''the determination of what constitutes a risk worthy of Agency action is a policy consideration that belongs, in the first instance, to the Agency'' (*Asbestos Info.*

[2] HHS declarations of public health emergencies last for 90 days and then can be considered for renewal (*https://www.phe.gov/emergency/news/healthactions/phe/Pages/default.aspx*).

[3] References in this preamble to healthcare employees and healthcare workers indicate those employees covered by the protections in the ETS, including employees providing healthcare support services.

[4] OSHA is defining the grave danger as workplace exposure to SARS–CoV–2, the virus that causes the development of COVID–19. COVID–19 is the disease that can occur in people exposed to SARS–CoV–2, and that leads to the health effects described in this section. This distinction applies despite OSHA's use of these two terms interchangeably in some parts of this preamble.

[5] Definitions of severity of COVID–19 illness used in this document are found in the National Institutes of Health's COVID–19 treatment guidelines (*https://www.covid19treatmentguidelines.nih.gov/overview/clinical-spectrum/*) (NIH, December 17, 2020).

Ass'n/N. Am. v. *OSHA,* 727 F.2d 415, 425 (5th Cir. 1984)).

In the context of ordinary 6(b) rulemaking, the Supreme Court has said that the OSH Act is not a ''mathematical straitjacket,'' nor does it require the agency to support its findings ''with anything approaching scientific certainty,'' particularly when operating on the ''frontiers of scientific knowledge'' (*Indus. Union Dep't, AFL–CIO* v. *Am. Petroleum Inst.,* 448 U.S. 607, 656, 100 S. Ct. 2844, 2871, 65 L. Ed. 2d 1010 (1980)). Courts reviewing OSHA's determination of grave danger do so with ''great deference'' (*Pub. Citizen Health Research Grp.* v. *Auchter,* 702 F.2d 1150, 1156 (D.C. Cir. 1983)). In one case, the Fifth Circuit, in reviewing an OSHA ETS for asbestos, declined to question the agency's finding that 80 worker lives at risk over six months constituted a grave danger (*Asbestos Info. Ass'n/N. Am.,* 727 F.2d at 424). In stark contrast, as of May 24, 2021, 1,611 healthcare personnel have died (out of 491,816 healthcare COVID–19 cases where healthcare personnel status and death status is known by the CDC) (May 24, 2021a). This is likely an undercount of cases and deaths as the healthcare personnel status is not known for 81.63% of cases and death status is unknown in 20.42% of cases where healthcare personnel status is known. OSHA estimates that this rule would save almost 800 worker lives over the course of the next six months as noted in Table I.-1 in the *Executive Summary.* Here, the mortality and morbidity risk to employees from COVID–19 is so dire that the grave danger from exposures to SARS–CoV–2 is clear.

OSHA's previous ETSs addressed physically harmful agents that had been familiar to the agency for many years prior to the ETS. In most cases, the ETSs were issued in response to new information about substances that had been used in workplaces for decades (*e.g.,* Vinyl Chloride (39 FR 12342 (April 5, 1974)); Benzene (42 FR 22516 (May 3, 1977)); 1,2-Dibromo-3-chloropropane (42 FR 45536 (Sept. 9, 1977))). In some cases, the hazards of the toxic substance were already so well established that OSHA promulgated an ETS simply to update an existing standard (*e.g.,* Vinyl cyanide (43 FR 2586 (Jan. 17, 1978)). In no case did OSHA claim that an ETS was required to address a grave danger from a substance that had only recently come into existence. Thus, no court has had occasion to separately examine OSHA's authority under section (6)(c) of the OSH Act (29 U.S.C. 655(c)) to address a grave danger from a ''new hazard.'' Yet by any measure, SARS–CoV–2 is a new hazard. Unlike any of the hazards addressed in previous ETSs, SARS–CoV–2 was not known to exist until January 2020. Since then, more than 3 million people have died worldwide and nearly 600,000 people have died in the U.S. alone (WHO, May 24, 2021; CDC, May 24, 2021b). This monumental tragedy is largely handled by healthcare employees who provide care for those who are ill and dying, leading to introduction of the virus not only in their daily lives in the community but also in their workplace, and more than a thousand healthcare workers have died from COVID–19. Clearly, exposure to SARS–CoV–2 is a new hazard that presents a grave danger to workers in the U.S.

In the following sections within *Grave Danger,* OSHA summarizes the best available scientific evidence on employee exposure to SARS–CoV–2 and shows how that evidence establishes COVID–19 to be a grave danger to healthcare employees. OSHA's determination that there is a grave danger to healthcare employees rests on the severe health consequences of COVID–19, the high risk to employees of developing the disease as a result of transmission of SARS–CoV–2 in the workplace, and that these workplace settings provide direct care to known or suspected COVID–19 cases. With respect to the health consequences of COVID–19, OSHA finds a grave danger to employees based on mortality data showing unvaccinated people of working age (18–64 years old) have a 1 in 217 chance of dying when they contract the disease (May 24, 2021c; May 24, 2021d). When broken down by age range, that includes a 1 in 788 chance of dying for those aged 30–39, a 1 in 292 chance of dying for those aged 40–49, and as much as a 1 in 78 chance of dying for those aged 50–64 (May 24, 2021c; May 24, 2021d). Furthermore, workers in racial and ethnic minority groups are often over-represented in many healthcare occupations and face higher risks for SARS–CoV–2 exposure and infection, as noted in a study on workers in Massachusetts (Hawkins, June 15, 2020) and discussed in more detail in the section ''Observed Disparities in Risk Based on Race and Ethnicity,'' below. While vaccination greatly reduces adverse health outcomes to healthcare workers, it does not eliminate the grave danger faced by vaccinated healthcare workers in settings where patients with suspected or confirmed COVID–19 receive treatment (CDC, April 27, 2021; Howard, May 22, 2021).

OSHA also finds a grave danger based on the severity and prevalence of other health effects caused by COVID–19, short of death. While some SARS–CoV–2 infections are asymptomatic, even the cases labeled ''mild'' by the CDC involve symptoms that far exceed in severity the group of symptoms dismissed in the *Florida Peach Growers Ass'n* decision as not rising to the level of grave danger required by the OSH Act (*i.e.,* minor cases of nausea, excessive salivation, perspiration, or blurred vision) (489 F.2d at 132). Even ''mild'' cases of COVID–19—where hypoxia (low oxygen in the tissues) is not present—require isolation and may require medical intervention and multiple weeks of recuperation, while severe cases of COVID–19 typically require hospitalization and a long recovery period (see the section on ''Health Effects,'' below). For example, in a study of 1,733 patients, three quarters of remaining hospitalized cases and approximately half of all symptomatic cases resulted in the individual continuing to experience at least one symptom (*e.g.,* fatigue, breathing difficulties) at least six months after initial infection (Huang et al., January 8, 2021; Klein et al., February 15, 2021). These cases might be referred to as ''long COVID'' because symptoms persist long after recovery from the initial illness, and could potentially be significant enough to negatively affect an individual's ability to work or perform other everyday activities.

Finally, OSHA concludes that the serious and potentially fatal consequences of COVID–19 pose a particular threat to employees, as the nature of SARS–CoV–2 transmission readily enables the virus to spread when employees are working in spaces shared with others (*e.g.,* co-workers, patients, visitors), a common characteristic of healthcare settings where direct care is provided. While not every setting is represented in the evidence that OSHA has assembled, the best available evidence illustrates that clusters and outbreaks [6] of COVID–19 have occurred in a wide variety of occupations in healthcare settings. The scientific

[6] ''Outbreaks'' are generally defined as an increase, often sudden, in the number of cases of a disease above what is normally expected in a limited geographic area. ''Clusters'' are generally defined as an unusual number of cases grouped in one place that is more than expected to occur (CDC, May 18, 2012). Researchers investigating outbreaks and have to decide how to define the geographic area, while researchers investigating clusters may use a variety of strategies to determine what is ''unusual.'' While the terms are slightly different, their overall significance to the grave danger discussion is the same. For the studies and reports relied upon in this section, OSHA will generally use whichever term is used in the study or report itself.

evidence of SARS–CoV–2 transmission, presented below, makes clear that the virus can be spread wherever an infectious person is present and shares space with other people, and OSHA therefore expects transmission across healthcare workplaces where known or suspected COVID–19 patients are treated (see *Dry Color Mfrs. Ass'n, Inc.* v. *Dep't of Labor,* 486 F.2d 98, 102 n.3 (3d Cir. 1973) (holding that when OSHA determines a substance poses a grave danger to workers, OSHA can assume an exposure to a grave danger wherever that substance is present in a workplace)). OSHA's conclusion that there is a grave danger to which employees are specifically exposed is further supported by evidence demonstrating the widespread prevalence of the disease across the country generally. As of May 2021, over 32 million cases of COVID–19 have been reported in the United States (CDC, May 24, 2021e). Over 1 in 11 people of working age have been reported infected (cases for individuals age 18–64, CDC, May 24, 2021d; estimated number of people ages 15–64, Census Bureau, June 25, 2020). And data shows that employees across a myriad of workplace settings have suffered death and serious illness from COVID–19 through the duration of the pandemic (WSDH and WLNI, December 17, 2020; Allan-Blitz et al., December 11, 2020; Marshall et al., June 30, 2020).[7] From May 18, 2021 to May 24, 2021, COVID–19 resulted in 4,216 cases and nine deaths for healthcare personnel each day (CDC, May 18, 2021; CDC, May 24, 2021a). Thus, COVID–19 continues to present a grave danger to the nation's healthcare employees.

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II. Nature of the Disease

a. Health and Other Adverse Effects of COVID–19

Death From COVID–19

COVID–19 is a potentially fatal disease. As of May 24, 2021, there had been 587,432 deaths from the disease out of 32,947,548 million infections in the United States alone (CDC, May 24, 2021a; CDC, May 24, 2021b). For the U.S. population as a whole (*i.e.,* unlinked to known SARS–CoV–2

[7] Of note, on February 25, 2021, the Superior Court of California issued a decision denying a motion for a preliminary injunction seeking to restrain the California Occupational Safety and Health Standards Board from enforcing a COVID–19 ETS promulgated on November 30, 2020 (*Nat'l Retail Fed'n* v. *Cal. Dep't of Indus. Relations, Div. of Occupational Safety & Health,* Case Nos. CGC–20–588367, CPF–21–517344 (Cal. Super. Ct., Feb. 25, 2021)). In its decision, the court found that COVID–19 presents an emergency to employees, noting that any argument to the contrary was ''fatuous'' (id. at 17). The court found that ''the virus spreads *any place* where persons gather and come into contact with one another—whether it happens to be an office building, a meatpacking plant, a wedding reception, a business conference, or an event in the Rose Garden of the White House. Workplaces, where employees often spend eight hours a day or more in close proximity to one another, are no exception, which of course is why the pandemic has emptied innumerable office buildings, stores, shopping centers, restaurants, and bars around the world'' (id. at 17–18 (emphasis in original) (footnotes omitted)).

infections) as of May 24, 2021, 1.8 out of every 1,000 people have died from COVID–19 (CDC, May 24, 2021a). COVID–19 was the third leading cause of death in the United States in 2020 among those aged 45 to 84, trailing only heart disease and cancer (Woolf, January 12, 2021). During the surges in the spring and fall/winter of 2020, COVID–19 was the leading cause of death. Despite a decrease in recent weeks, the death rate remains high (7-day moving average death rate of 500 on May 23, 2021) (CDC, May 24, 2021c). Not only are healthcare employees included in these staggering figures, they are exposed to COVID–19 at a much higher frequency than the general population while providing direct care for both sick and dying COVID–19 patients during their most infectious moments.

The impact of morbidity and mortality on healthcare employees might also be underreported. The information associated with cases and deaths are incomplete. Only 18.37% of cases were reported with information on whether or not the infected individual was a healthcare employee (CDC, May 24, 2021d). For those who were identified as healthcare personnel, only 79.58% of these cases noted whether the individual survived the illness (CDC, May 24, 2021d). Despite the incomplete data, the toll on healthcare personal is clear. As of May 24, 2021, CDC reported 491,816 healthcare personnel cases (10% of cases that included information on healthcare personnel status) and 1,611 fatalities (0.4% of healthcare employee cases with known death status). This number is staggering when compared with, for example, the 2018–2019 influenza season, during which only 0.1% of known influenza infections were estimated to be fatal for the entire population (CDC, October 5, 2020).

The risk of mortality and morbidity from COVID–19 has changed, and may continue to change over time. Viruses mutate and those mutations can result in variants of concern that may be more transmissible, cause more severe illness, or impact diagnostics, treatments, or vaccines (CDC, May 5, 2021). For example, the UK's New and Emerging Respiratory Virus Threats Advisory Group (NERVTAG) issued a report on how risk might have changed with the development of a new variant there called ''B.1.1.7'' (February 11, 2021). The group determined that analysis from multiple different datasets indicated that B.1.1.7 infections resulted in an increased risk of hospitalization and death compared with the ancestral virus and other variants in circulation. Challen et al., (March 10, 2021) found that B.1.1.7 increased mortality risk by 64%. As virus mutations result in variants of concern, the effectiveness of medical countermeasures such as therapeutics and vaccines might be affected. Lastly, depending on the variant, potential immune escape properties of the virus may increase a person's susceptibility to reinfection.

Severe and Critical Cases of COVID–19

Apart from mortality, COVID–19 causes significant morbidity that can result in incurable, permanent, and non-fleeting consequences. As discussed below, people who become ill with COVID–19 might require hospitalization and specialized treatment, and can suffer respiratory failure, blood clots, long-term cardiovascular effects, organ damage, and significant neurological and psychiatric effects. Approximately 6.7% of COVID–19 cases are severe and require hospitalization and more specialized care (total hospitalizations and total cases, CDC, May 24, 2021e; CDC, May 24, 2021f). Given that this is a novel virus, long-term effects are still unknown. A severe case of COVID–19 is described as when the patient presents with hypoxia and is in need of oxygen therapy (NIH, April 21, 2021a). Cases become critical when respiratory failure, septic shock, and/or multiple organ dysfunction occurs.

The majority of the data currently available on the health outcomes for hospitalized patients is derived from the first surge of the pandemic between March and May of 2020. However, newer data indicates that health outcomes for hospitalized patients have changed over the course of the pandemic. A study from Emory University reviewed COVID–19 patient data from a large multi-hospital healthcare network and compared the data from the first surge early in the pandemic (March 1 to May 30, 2020) with the second surge that occurred in the summer of 2020 (June 1 to September 13, 2020) (Meena et al., March 1, 2021). The study found that during the second surge, ICU admission decreased from 38% to 30%, ventilator use decreased from 26% to 15%, and mortality decreased from 15% to 9%. The study authors postulated that improved patient outcomes during the second stage may have resulted in part from aggressive anticoagulation therapies to prevent venous thromboembolism.

Similar findings were reported in a retrospective study of 20,736 COVID–19 patients admitted to 107 hospitals in 31 states from March through November 2020 (Roth et al., May 3, 2021). The proportions of patients placed on mechanical ventilation dropped from 23.3% in March and April 2020 to 13.9% in September through November 2020. During those same respective time periods, mortality rates dropped from 19.1% to 10.8%. The reasons for the reductions in mechanical ventilation and mortality are not known, but study authors postulated that reductions in mechanical ventilation may have resulted from increased use of noninvasive ventilation, high flow nasal oxygen, and prone positioning. They hypothesized that the high patient count and staff unfamiliarity with infection control procedures that were being rapidly implemented in March and April could have accounted for the high mortality rate during that period. In addition, the authors noted that changes in pharmacology treatments occurred during that time period, but their impact on improved outcomes is not known.

This data on improvements in health outcomes between earlier and later stages of the pandemic is significant, but also demonstrates that overall health outcomes for hospitalized COVID–19 patients still remain poor. Even with these improvements in health outcomes, COVID–19 still results in considerable loss of life and significant adverse health outcomes for patients hospitalized with COVID–19. The COVID–19-Associated Hospitalization Surveillance Network (COVID–NET), which conducts population-based surveillance in select U.S. counties, reported a cumulative hospitalization rate of 1 in 255 people between the ages of 18 and 49 as well as 1 in 123 people between the ages of 50 and 64 between March 1, 2020, and May 15, 2021 (CDC, May 24, 2021g).

Patients hospitalized with COVID–19 frequently need supplemental oxygen and supportive management of the disease's most common complications, which are discussed in further detail below and include pneumonia, respiratory failure, acute respiratory distress syndrome (ARDS), acute kidney injury, sepsis, myocardial injury, arrhythmias, and blood clots. Among 35,302 inpatients in a nationwide U.S. study, median length of stay was 6 days overall (Rosenthal, et al., December 10, 2020). When cases required treatment in the ICU, ICU stays were on median 5 days in addition to time spent hospitalized outside of the ICU. The Roth et al., (May 3, 2021) study described above reported that mean length of hospital stays decreased from 10.7 days in April and May 2020 to 7.5 days from September to November 2020, and the respective values for ICU stays over the same time period decreased from 13.9 days to 6.6 days. As discussed

in more detail above, improvements in infection control and treatment interventions might be responsible for the improved outcome, but the specific reason is not known, and the numbers of individuals hospitalized with COVID–19 remains high.

The pneumonia associated with the SARS–CoV–2 virus can become severe, resulting in respiratory failure and ARDS, a life-threatening lung injury. In a U.S. study of 35,302 COVID–19 inpatients, 55.8% suffered respiratory failure with 8.1% experiencing ARDS (Rosenthal, et al., December 10, 2020). Thus, the need for oxygen therapy is a key reason for hospitalization. The specific therapy received during hospitalization often depends on the severity of lung distress and can include supplemental oxygen, noninvasive ventilation, intubation for invasive mechanical ventilation, and extracorporeal membrane oxygenation when mechanical ventilation is insufficient (NIH, April 21, 2021a).

Although COVID–19 was initially considered to be primarily a respiratory disease, adverse effects in numerous organs have now been reported. For example, in a New York City area study of 9,657 COVID–19 patients, 39.9% of patients developed acute kidney injury (AKI), a sudden episode of kidney failure or kidney damage; of the approximately 40% of patients who developed AKI, 17% required dialysis (Ng et al., September 19, 2020). AKI similarly occurred in 33.9% of 35,302 inpatients in a nationwide U.S. study (Rosenthal et al., December 10, 2020). For patients who experience AKI associated with COVID–19, a study of patients in the New York area reported a median length of stay in the hospital of 11.6 days for patients who did not require dialysis, but for those who did, the median length of stay almost tripled to 29.2 days (Ng et al., September 19, 2020). Many critically ill COVID–19 patients require renal replacement therapy (NIH, April 21, 2021a). For example, one study including 67 U.S. hospitals found that 20.6% of critically ill COVID–19 patients developed AKI that requires renal replacement therapy (Gupta et al., 2021).

COVID–19 is also capable of causing viral sepsis, a condition where the immune response dysregulates and causes life-threatening harm to organs (*e.g.,* lungs, brain, kidneys, heart, and liver). In Rosenthal et al.'s, (December 10, 2020) U.S. study through May 31, 2020, 33.7% of COVID–19 inpatients developed sepsis. A study of 18–49 year olds in the COVID–NET surveillance system found that 16.6% of patients in that age range developed sepsis (Owusu et al., December 3, 2020). In a study of VA hospitals, sepsis was found to be the most common complication that resulted in readmission within 60 days of being discharged (Donnelly et al., January 19, 2020).

COVID–19 patients have also been reported to experience a number of adverse cardiac complications, including arrhythmias, myocardial injury with elevated troponin levels, and myocarditis (Caforio, December 2, 2020). Acute ischemic heart disease occurred in 8% of 35,302 inpatients in a nationwide U.S. study (Rosenthal et al., December 10, 2020). Patients hospitalized with COVID–19 may also experience shock, a critical condition caused by a sudden drop in blood pressure that can lead to fatal cardiac complications. Shock occurred in 4,028 of 35,302 (11.4%) inpatients in a nationwide U.S. study (Rosenthal et al., December 10, 2020). And a study of 70 COVID–19 patients in a Freiburg ICU found that shock was a complicating factor in 24% of fatal cases (Rieg et al., November 12, 2020). A New York City area study reported that 21.5% of the study's 9,657 patients experience serious drops in blood pressure that required medical intervention during their hospital stay (Ng et al., September 19, 2020).

In addition to its adverse effects on specific organs, COVID–19 may cause patients to develop a hypercoagulable state, a condition in which blood clots can develop in someone's legs and embolize to their lungs, further worsening oxygenation. Blood clots in COVID–19 patients have also been reported in arteries, resulting in strokes—even in young people—as well as heart attacks and acute ischemia from lack of oxygen in limbs in which arterial clots have occurred (Cuker and Peyvandi, November 19, 2020; Oxley et al., May 14, 2020). Blood clots have been reported even in COVID–19 patients on prophylactic-dose anticoagulation. A systematic review of more than 28,000 COVID–19 patients found that venous thromboembolism (deep vein thrombosis, pulmonary embolism or catheter-related thrombosis) occurred in 14% of hospitalized patients overall and 22.7% of ICU patients (Nopp et al., September 25, 2020). Pulmonary embolism was reported in 3.5% of non-ICU and 13.7% of ICU patients. Embolism and thrombosis can cause death. COVID–19 poses such a threat of blood clots that NIH guidelines now recommend that hospitalized non-pregnant adults with COVID–19 should receive prophylactic dose anticoagulation (NIH, April 21, 2021a).

These health effects are particularly relevant to healthcare workers because there is evidence that healthcare workers are more likely to develop more severe COVID–19 symptoms than workers in non-healthcare settings. While the reason for this is not certain, one cause could be that healthcare workers are exposed to higher viral loads (more viral particles entering the body) because of the nature of their work often involving frequent and sustained close contact with COVID–19 patients. For example, a British study compared healthcare workers to other ''essential'' and ''non-essential'' workers and found that healthcare workers were more than 7 times as likely to experience severe COVID–19 disease following infection (*i.e.,* disease requiring hospitalization) than infected non-essential workers (Mutambudzi et al., 2020).

Mild to Moderate Cases of COVID–19

Even the less severe health effects of COVID–19 cover a wide range of symptoms and severity, from serious illness to milder symptomatic illness to asymptomatic cases. The most common symptoms include fever or chills, cough, shortness of breath or difficulty breathing, fatigue, muscle or body aches, headache, developing a loss of taste or smell, sore throat, congestion or runny nose, nausea, vomiting, and/or diarrhea (CDC, February 22, 2021).

Approximately 80% of symptomatic COVID–19 cases are mild to moderate (Wu and McGoogan, April 7, 2020), which is defined as having any symptom of COVID–19 but without substantially decreased oxygen levels, shortness of breath, or difficulty breathing (NIH, April 21, 2021b). Moderate cases, however, also show evidence of lower respiratory disease, although these cases largely do not require admission into hospitals (CDC, February 16, 2021). While deaths and severe health consequences of COVID–19 are sufficiently robust in support of OSHA's finding that COVID–19 presents a grave danger, even many of the typical mild or moderate cases surpass the *Florida Peach Growers* threshold of ''fleeting effects . . . so minor that they often went unreported'' (supra). Mild and moderate cases can be treated at home but may still require medical intervention (typically through telehealth visits) (Wu and McGoogan, April 7, 2020). Individuals with mild cases often need at least one to two weeks to recover enough to resume work, but effects can potentially last for months. Fatigue, headache, and muscle aches are among the most commonly-reported symptoms in people who are

not hospitalized (CDC, February 16, 2021), and their effects are not fleeting and often linger. In a multistate telephone survey of 292 adults with COVID–19, the majority of whom did not eventually require hospitalization, 274 (94%) of the survey respondents were symptomatic at the time of their SARS–CoV–2 test, reporting illness for a median of three days prior to the positive test (Tenforde et al., July 24, 2020). Around one third of symptomatic respondents (95 of 274) reported that they still had not returned to their usual state of health 2–3 weeks after testing positive. Even among the young adults (aged 18–34 years) with no chronic medical conditions, nearly one in five had not returned to their usual state of health 2–3 weeks after testing.

Even though these cases rarely result in hospitalization, individuals with mild to moderate cases of COVID–19 are also significantly impacted by their illness as a result of CDC isolation recommendations. According to the current CDC criteria, a person with symptomatic COVID–19 should generally discontinue isolation only when all three of the following conditions have been met: (1) At least 10 days have passed since symptom onset; (2) at least 24 hours have passed since experiencing a fever without the use of fever-reducing medications; and (3) other symptoms have improved (other than loss of taste or smell) (CDC, February 18, 2021). And the CDC notes with respect to the first criteria that individuals with severe illness or with compromised immunity might require up to 20 days of isolation. Even those with mild or moderate cases of COVID–19 may be prevented by their illness from working from home during the period of isolation.

Longer-Term Health Effects

Recovery from acute infection with the SARS–CoV–2 virus can be prolonged. Three categories of patients in particular are known to require ongoing care after resolution of their acute viral infection: Those with a severe illness requiring hospitalization (especially ICU care); those with a specific medical complication from the infection, such as a stroke; and those with milder acute illnesses who experience persistent symptoms such as fatigue and breathlessness. The lingering of, or development of, related health effects after a SARS–CoV–2 infection is known as post-acute sequelae. Dr. Francis Collins, Director of the National Institutes of Health, testified that recovery can be prolonged even in previously healthy young adults with milder infections. Some people experience persistent symptoms for weeks or even months after the acute infection (Collins, April 28, 2021). Post-Acute COVID–19 syndrome has been proposed as a diagnostic term for these patients, although the term ''long COVID'' is more common outside the medical community. According to the CDC, the most common symptoms of Post-Acute COVID–19 syndrome are fatigue, shortness of breath, cough, and joint and chest pain (CDC, April 8, 2020). Other symptoms reported by these patients include decreased memory and concentration, depression, muscle pain, headache, intermittent fever, and racing heart (CDC, April 8, 2021). Additional common symptoms, as reported by Dr. Collins, are abnormal sleep patterns and persistent loss of taste or smell (Collins, April 28, 2021). The cause of these long-term effects and effective treatments have yet to be established. The report from the Pulmonary Breakout Session of the National Institute of Allergy and Infectious Diseases (NIAID) Workshop on Post-Acute Sequelae of COVID–19 stated that the ''burden of post-acute sequelae overall could be enormous'' (NIAID, December 4, 2020). Dr. John Brooks, the chief medical officer for the CDC's COVID–19 response, said he expected long-term symptoms would affect ''on the order of tens of thousands in the United States and possibly hundreds of thousands'' (Belluck, December 5, 2020). Dr. Collins testified that longer-term health impairments may occur in up to 30% of recovered COVID–19 patients (Collins, April 28, 2021).

Prolonged illness is common in patients who required hospitalization because of COVID–19, and particularly in those who required ICU admission. In a large nationwide U.S. study, 18.5% of hospitalized patients were discharged to a long-term care or rehabilitation facility (Rosenthal et al., December 10, 2020). Of 1,250 patients in a Michigan study, 12.6% were discharged to a skilled nursing or rehabilitation facility and 15.1% of hospital survivors were re-hospitalized within 60 days of discharge (Chopra et al., November 11, 2020). Of the 195 who were employed prior to hospitalization, 23% were unable to return to work due to health reasons and 26% of those who returned to work required reduced hours or modified duties (Chopra et al., November 11, 2020). Those who returned to work did so a median of 27 days after hospital discharge (Chopra et al., November 11, 2020). Existing evidence indicates that COVID–19 patients requiring ICU care and mechanical ventilation may experience Post Intensive Care Syndrome (PICS), which is a constellation of cognitive dysfunction, psychiatric conditions, and/or physical disability that persists after patients leave the ICU (Society of Critical Care Medicine, 2013). In a study at 3 months post-discharge of 19 COVID–19 patients who required mechanical ventilation while hospitalized, 89% reported pain or discomfort, 47% experienced decreased mobility, and 42% experienced anxiety/depression (Valent, October 10, 2020). The authors noted that these results are similar to those reported in follow-up studies of patients who survived ARDS due to other viral infections. Many employees hospitalized with COVID–19 may require a long period of recovery should this trajectory continue to hold. In a 5-year follow-up of 67 previously-employed ARDS survivors, 34 had not returned to work within one year of discharge and 21 had not returned at five years (Kamdar, February 1, 2018). ARDS is a serious complication that may have an impact on employees' ability to return to work after a COVID–19 diagnosis.

Several studies conducted outside the U.S. have also noted the persistence of COVID–19 symptoms after hospital discharge. In a study of 1,733 discharged patients in China, 76% reported at least one symptom of COVID–19 six months after hospital discharge with 63% experiencing persistent fatigue or muscle weakness (Huang et al., January 8, 2021). Similarly, an Irish study found 52% of 128 patients reported persistent fatigue a median of 10 weeks after initial symptoms first appeared (Townsend et al., November 9, 2020). A study of 991 pregnant women (5% hospitalized) in the U.S. found that the median time for symptoms to resolve was 37 days and that 25% had persistent symptoms (mainly cough, fatigue, headache, and shortness of breath) eight weeks after onset (Afshar et al., December, 2020). A study of 86 previously-hospitalized Austrian patients observed that 88% had CT scans still indicating lung damage at 6 weeks after their hospital discharge; at 12 weeks, 56% of CT scans still revealed damage (European Respiratory Society, September 7, 2020). A study of 152 previously-hospitalized patients with laboratory-confirmed COVID–19 disease who required at least 6 liters of oxygen during admission found that 30 to 40 days after discharge, 74% reported shortness of breath and 13.5% still required oxygen at home (Weerahandi et al., August 14, 2020). A UK study found that among 100

hospitalized patients (32% required ICU care), 72% of the ICU patients and 60% of the non-ICU patients reported fatigue a mean of 48 days after discharge (Halpin et al., July 27, 2020). Breathlessness was also common, affecting 65.6% of ICU patients and 42.6% of non-ICU patients.

In a New York City study, of the 638 COVID–19 patients who required dialysis for AKI while hospitalized, only 108 survived. Of those 108, 33 still needed dialysis at discharge (Ng et al., September 19, 2020). A study of Chinese patients reported that 11% of 333 hospitalized patients with COVID–19 pneumonia developed AKI (Pei et al., June, 2020). Only half (45.7%) experienced complete recovery of kidney function with a median follow up of 12 days. A similar study in Spain also found only half (45.72%) experienced complete recovery with a median follow up of 11 days (Procaccini et al., February 14, 2021). A Hong Kong study provided a longer follow-up period including 30 and 90 days after the initial AKI event. At 7, 30, and 90 days after the initial AKI event, recovery was observed in 84.6, 87.3% and 92.1%, respectively (Teoh et al., 2021). A study in New York City found that 77.1% of patients with AKI experienced complete recovery during the follow up period, excluding those who died or were sent to hospice (Charytan et al., January 25, 2021). While 88% of these AKI cases were in March and April with a final follow-up date of August 25, it is uncertain how long it took for recovery to occur.

Long-term cardiovascular effects also appear to be common after SARS–CoV–2 infections, even among those who did not require hospital care. A German study evaluated the presence of myocardial injury in 100 patients a median of 71 days after COVID–19 diagnosis (Puntmann et al., July 27, 2020). While only a third (33%) of study participants required hospitalization, cardiovascular magnetic resonance (CMR) imaging was abnormal in 78%. In the U.S., a study of COVID–19 cases in college athletes, of whom 16 of 54 (30%) were asymptomatic, identified abnormal findings in 27 (56.3%) of the 48 athletes who completed both imaging studies, with 39.5% consistent with resolving pericardial inflammation (Brito et al., November 4, 2020). A small number remained symptomatic with fatigue and shortness of breath at 5 weeks and were referred to cardiac rehabilitation (Lowry, November 12, 2020).

A database for clinicians in the UK to report COVID–19 patients with neurological complications revealed that 62% of the initial 125 patients enrolled presented with a cerebrovascular event including ischemic strokes and intracerebral hemorrhages (Varatharaj et al., June 25, 2020). A UK study comparing COVID–19 ischemic stroke and intracerebral cases with similar non-COVID–19 cases found a fatality rate of 19.8% for COVID–19 patients in comparison to a fatality rate of 6.9% for non-COVID–19 patients (Perry et al., 2021). As discussed above, PICS, involving prolonged impairments in cognition, physical health, and/or mental health, may also occur. Other neurologic diagnoses, including encephalopathy, Guillain-Barre syndrome, and a range of other less-common diagnoses, may cause morbidity that persists during recovery (Elkind et al., April 9, 2021; Sharifian-Dorche et al., August 7, 2020). A recent autopsy study of brain tissue from 18 COVID–19 patients reported the presence of small blood vessel inflammation and damage in multiple different brain areas (Lee et al., February 4, 2021). Persistent abnormalities in brain imaging have also been reported in patients after discharge (Lu et al., August 3, 2020). A study of 509 hospitalized patients in the Chicago area early in the pandemic reported that a third had encephalopathy, resulting in symptoms such as confusion or decreased levels of consciousness (Liotta et al., October 5, 2020). Encephalopathy was associated with worse functional outcomes at discharge (only 32% were able to handle their own affairs without assistance) and higher deaths in the 30 days post-discharge.

COVID–19 also impacts mental health, both as a result of the toll of living and working through such a disruptive pandemic, but also because of actual medical impacts the virus might have on the brain itself. As de Erausquin et al., (January 5, 2021) notes, SARS–CoV–2 is a suspected neurotropic virus and ''neurotropic respiratory viruses have long been known to result in chronic brain pathology including emerging cognitive decline and dementia, movement disorders, and psychotic illness. Because brain inflammation accompanies the most common neurodegenerative disorders and may contribute to major psychiatric disorders, the neurological and psychiatric sequelae of COVID-19 need to be carefully tracked.'' An international consortium guided by WHO is attempting to determine these long-term neurodegenerative consequences more definitively, with follow up studies ending in 2022 (de Erausquin et al., January 5, 2021).

In the short term, a number of studies have already demonstrated the potential mental health effects caused by COVID–19. In the UK database mentioned above, 21 of 125 COVID–19 patients had new psychiatric diagnoses, including 10 who became psychotic and others with dementia-like symptoms or depression (Varatharaj et al., June 25, 2020). An Italian study screened 402 adults with COVID–19 for psychiatric symptoms with clinical interviews and self-report questionnaires at one month follow-up after hospital treatment for COVID–19. Patients rated in the psychopathological range as follows: 28% for post-traumatic stress disorder (PTSD), 31% for depression, 42% for anxiety, 20% for obsessive-compulsive symptoms, and 40% for insomnia. Overall, 56% scored in the pathological range in at least one clinical dimension (Mazza et al., July 30, 2020). The TriNetX analytics network was used to capture de-identified data from electronic health records of a total of 69.8 million patients from 54 healthcare organizations in the United States (Taquet et al., November 9, 2020). Of those patients, 62,354 adults were diagnosed with COVID–19 between January 20 and August 1, 2020. Within 14 to 90 days after being diagnosed with COVID–19, 5.8% of those patients received a first recorded diagnosis of psychiatric illness, which was measured as significantly greater than psychiatric onset incidence during the same time period after diagnoses of other medical issues including influenza (2.8%), other respiratory diseases (3.4%), skin infections (3.3%), cholelithiasis (3.2%), urolithiasis (2.5%), and fractures (2.5%). At the NIAID Workshop on Post-Acute Sequelae of COVID–19, medical personnel discussed their experiences treating COVID–19 patients in the Johns Hopkins Post-Acute COVID–19 Team (PACT) Clinic. Among 49 patients in the Clinic, more than 50% had some form of cognitive impairment 3 months after acute illness (Parker, December 3, 2020). Both ICU and non-ICU patients were affected, but impairment was more pronounced in ICU survivors (Parker, December 3, 2020). The medical personnel also reported mental health impairments among patients treated at the PACT Clinic.

The studies and evidence discussed above give some indication of the many serious long-term health effects COVID–19 patients might experience, including respiratory, cardiovascular, neurological, and psychiatric complications. However, the full extent of the long-term health consequences of COVID–19 is unknown because the

virus has only been transmitted between humans since the end of 2019. Therefore, to fully appreciate the likely long-term risks to individuals with COVID–19, it is important to consider the long-term impacts of similar coronaviruses found among human populations where there has been more time to gather data.

The previous SARS outbreak in 2002 to 2003, caused by the SARS–CoV–1 virus, is one such example, and it indicates long-term impacts to infection survivors, which might result from the viral infection, medications used, or a combination of those factors. Patients who survived a SARS–CoV–1 infection report that they have a reduced quality of life at least 6 months after illness (Hui et al., October 1, 2005). These patients were found to have reduced exercise capacity; some had abnormal chest radiographs and lung function, and weak respiratory muscles at least 6 months after illness (Hui et al., October 1, 2005). Survivors reported experiencing depression, insomnia, anxiety, PTSD, chronic fatigue, and decreased lung capacity with patient follow up as long as four years after infection (Lam et al., December 14, 2009; Lee et al., April 1, 2007; Hui et al., October 1, 2005). Long term studies have revealed that some survivors of SARS–CoV–1 infections have chronic pulmonary and skeletal damage after a 15 year follow up (Zhang et al., February 14, 2020). Zhang et al., found that approximately half of the area of ground glass opacities present after infection in a 2003 CT scan (9.4%) remained after 15 years (4.6%). The study also found significant femoral head loss (25.52%) remained in 2018. Bone loss was likely an indirect effect caused by the high pulse steroid therapies used to treat the infection in many patients with severe disease. Survivors also suffer long-term neurologic complications, deficits in cognitive function, musculoskeletal pain, fatigue, depression, and disordered sleep up to at least three years after infection (Moldofsky and Patcai, March 24, 2011).

Individuals at Increased Risk From COVID–19

Many members of the workforce are at increased risk of death and severe disease from COVID–19 because of their age or pre-existing health conditions. Comorbidities are fairly common among adults of working age in the U.S. For instance, 46.1% of individuals with cancer are in the 20–64 year old age range (NCI, April 29, 2015), and over 40% of working age adults are obese (Hales et al., February 2020). Furthermore, over a quarter of those between 65 and 74 years old remain in the workforce, as well as almost 10% of those 75 and older (BLS, May 29, 2019). In hospitals and other health services (*e.g.,* physician offices, residential care facilities), 1,078,000 workers are employed who are 65 years old and older (BLS, January 22, 2021). Individuals who are at increased risk of severe infection (hospitalization, admission to the ICU, or death) include: Individuals who have cancer, chronic kidney disease, chronic lung disease (*e.g.,* chronic obstructive pulmonary disease (COPD), asthma (moderate-to-severe), interstitial lung disease, cystic fibrosis, and pulmonary hypertension), serious heart conditions, obesity, pregnancy, sickle cell disease, type 2 diabetes, and individuals who are over 65 years of age, immunocompromised and/or smokers (CDC, May 13, 2021). Of 5,700 COVID–19 patients hospitalized from March 1 to April 4, 2020 in the New York City area, the most common comorbidities were hypertension (56.6%), obesity (41.7%), and diabetes (33.8%), excluding age (Richardson et al., April 22, 2020).

Observed Disparities in Risk Based on Race and Ethnicity

During the COVID–19 pandemic, research has found that employees in racial and ethnic minority groups, and especially Black and Latinx employees, have often faced substantially higher risks of SARS–CoV–2 exposure and infection through the workplace than have non-Hispanic White employees (Hawkins, June 15, 2020; Hertel-Fernandez et al., June 2020; Roberts et al., November 26, 2020). Among the general U.S. population, American Indian, Alaskan Native, Latinx, and Black populations are more likely than White populations to be infected with SARS–CoV–2 (CDC, April 23, 2021). Once infected, people in these demographics are also more likely than their White counterparts to be hospitalized for and/or die from COVID–19 (CDC, April 23, 2021). These observed disparities in risk of infection, risk of adverse health consequences, and risk of death may be attributable to a number of factors, including that people from racial and ethnic minority groups are often disproportionately represented in essential frontline occupations that require close contact with the public and that offer limited ability to work from home or take paid sick days. Disease severity is also likely exacerbated by long-standing healthcare inequities (CDC, April 19, 2021).

Hawkins (June 15, 2020) compared data on worker demographics from the Bureau of Labor Statistics' 2019 Current Population Survey and O*NET (a Department of Labor database that contains detailed occupational information on the nature of work for more than 900 occupations across the U.S.) to determine occupation-specific COVID–19 risks. The model found that among O*NET's 57 physical and social factors related to work, the two predictive variables of COVID–19 risk were frequency of exposure to diseases and physical proximity to other people. The author found that Black individuals were overwhelmingly employed in essential industries and that people of color—which in this study included Black, Asian, and Hispanic populations—were more likely than White individuals to work in essential occupations (*e.g.,* healthcare and social assistance, personal care aids) that were identified as having greater disease exposure risk characteristics. A similar evaluation of workers employed in frontline industries (*e.g.,* healthcare) found that people of color—defined in this study to include individuals who are Black, Hispanic, Asian-American/Pacific Islander, or some category other than White—are well represented in these types of work (Rho et al., April 7, 2020). These studies suggest that people in racial and ethnic minority groups are greatly represented among the American workforce in jobs associated with greater risk of exposure to SARS–CoV–2, including those in healthcare and related industries.

Through April 2021, infection rates compared to White, Non-Hispanic persons in the United States are 60% greater for American Indian or Alaskan Native persons, 100% greater for Latinx persons, and 10% greater for Black persons (CDC, April 23, 2021). This disparity is also reflected in studies addressing infections by occupation, race, and ethnicity. In a large study of healthcare employees in Los Angeles, researchers found that increased risk of infection was significantly related to whether an employee was Latinx or Black (Ebinger et al., February 12, 2021). Another study of frontline healthcare workers in the U.S. and UK found that Black, Asian, and minority ethnic workers were more likely to report a positive COVID–19 test than non-Hispanic, White workers (Nguyen et al., September 1, 2020). The study also found that Black, Asian, and minority ethnic healthcare workers were more likely to report reuse of or inadequate PPE, were more likely to work in higher-risk clinical settings (*e.g.,* in-patient hospitals or nursing homes), and were more likely to care for patients with

suspected or documented COVID–19. These studies illustrate that racial and ethnic minorities are likely to be at increased risk of occupational SARS–CoV–2 exposures and related infections.

In addition to an increased likelihood of exposures and potential infection, Native American, Alaskan Native, Latinx, and Black populations all have increased risk of hospitalization and/or death from COVID–19 in comparison to White populations (CDC, April 23, 2021). Chen et al., (January 22, 2021) studied increased mortality risk between different racial and ethnic minority groups and occupations for working age Californians in pre-pandemic and pandemic time frames. Measured mortality risks increased during the pandemic for all races and ethnicities, but White populations had lower increased risk (6% increase) compared to Asian populations (18%), Black populations (28%) and Latinx populations (36%). A similar disparity in excess mortality was also observed between races and ethnicities within the same occupational sector (Chen et al., January 22, 2021). In the ''health or emergency'' sector, risk ratios were far greater for Asian (1.40), Black (1.27), and Latinx (1.32) workers in comparison to White workers (1.02).

Health equity is a major concern in assessing the pandemic's effects (CDC, April 19, 2021). Some of the factors that contribute to increased risk of morbidity and mortality from COVID–19 include: Discrimination, healthcare access/utilization, economic issues, and housing (CDC, April 23, 2021). And although racial and ethnic minority groups are more likely to be exposed to and infected with SARS–CoV–2, research indicates that testing for the virus is not markedly higher for these demographic groups (Rubin-Miller et al., September 16, 2020). Rubin-Miller et al., note that there may be barriers to testing that decrease access or delay testing to a greater degree than in White populations. These barriers to testing can delay needed medical care and lead to worse outcomes. And even when able to seek care, other barriers may exist. In discussing widespread health inequities, studies have noted that American Indian communities lacked sufficient facilities to respond to COVID–19 (Hatcher et al., August 28, 2020; van Dorn et al., April 18, 2020).

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b. Transmission of SARS–CoV–2

SARS–CoV–2 is a highly transmissible virus. Since the first case was detected in the U.S., there have been over 32 million reported cases of COVID–19, affecting every state and territory, with thousands more infected each day. According to the CDC, the primary way the SARS–CoV–2 virus spreads from an infected person to others is through the respiratory droplets that are produced when an infected person coughs, sneezes, sings, talks, or breathes (CDC, May 7, 2021).[8] Infection could then occur when another person breathes in the virus. Most commonly this occurs when people are in close contact with one another in indoor spaces (within approximately six feet for at least fifteen minutes) (CDC, May, 2021).

The best available current scientific evidence demonstrates that the farther a person is away from the source of the respiratory droplets, the fewer infectious viral particles will reach that person's eyes, nose, or mouth because gravity pulls the droplets to the ground (see the *Need for Specific Provisions,* Section V of the preamble, on Physical Distancing). For example, a systematic review of SARS–CoV–2 (up to early May 2020) and similar coronaviruses (*i.e.,* SARS–CoV–1 (a virus related to SARS–CoV–2) and Middle Eastern Respiratory Syndrome (MERS) (a disease caused by a virus that is similar to SARS–CoV–2 and spreads through droplet transmission)) found 38 studies, containing 18,518 individuals, to use in a meta-analysis that found that the risk of viral infection decreased significantly as distance increased (Chu et al., June 27, 2020). A second COVID–19 study from Thailand reviewed physical distancing information collected from 1,006 individuals who had an exposure to infected individuals (Doung-ngern et al., September 14, 2020). The study revealed that the group with direct physical contact and the group within one meter but without physical contact were equally likely to become infected with SARS–CoV–2. However, the group that remained more than one meter away had an 85% lower infection risk than the other two groups. The studies' findings on physical distancing combined with expert opinion firmly establish the importance of droplet transmission as a driver of SARS–CoV–2 infections and COVID–19 disease.

COVID–19 may also be spread through airborne particles under certain conditions (Schoen, May 2020; CDC, May 7, 2020; Honein et al., December 11, 2020). That airborne transmission can occur during aerosol-generating procedures (AGPs) in healthcare (such as when intubating an infected patient) is a reasonable concern (see CDC, March 12, 2020). CDC provides recommendations for infection prevention and control practices when caring for a patient with suspected or confirmed SARS–CoV–2 infection that include the use of a respirator (CDC, February 23, 2021). There are several studies examining the risks associated with AGPs. For example, a publication detailing one of the first known SARS–CoV–2 occupational transmission events in U.S. healthcare providers reported a statistically significant increased risk from AGPs (Heinzerling et al., April 17, 2020). However, the currently available information specifically related to SARS–CoV–2 exposure during AGPs is limited (Harding et al., June 1, 2020).

Data from the Respiratory Protection Effectiveness Trial (ResPECT), designed to assess effectiveness of PPE to prevent respiratory infections, were analyzed to identify risk factors for endemic coronavirus infections among healthcare personnel (Cummings et al., July 9, 2020). This study found that AGPs may double the risk of infection among healthcare providers. Although the infectious agents studied were surrogate coronaviruses and not the SARS–CoV–2 virus, the study indicates increased risk from such procedures for infections from the coronavirus family, and thus the study is relevant. In addition, a systematic review of research on transmission of acute respiratory infections from patients to healthcare employees focused on publications from the first SARS virus outbreak (Tran et al., April 26, 2012). Risks of SARS–CoV–1 infection in those performing AGPs were several times higher than in healthcare workers not exposed to AGPs. Workers may also be exposed to the SARS–CoV–2 virus during AGPs conducted outside of the hospital setting, including certain dental surgical procedures (Leong et al., December 2020), cardiopulmonary resuscitation (CPR) provided by homecare workers (Payne and Peache, February 4, 2021), and endoscopy (Teng et al., September 16, 2020; Sagami et al., January 2021).

Risk from AGPs during autopsies is evident from reports of staff infections during autopsies on decedents infected with tuberculosis, which is a well-known airborne infectious agent (Nolte et al., December 14, 2020). Additionally, research that measured airborne particles released during the use of an oscillating saw with variable saw blade frequencies and different saw blade contact loads concluded that, even in the best-case scenario tested on dry bone, the number of aerosol particles produced was still high enough to provide a potential health risk to forensic practitioners (Pluim et al., June 6, 2018). Other reports from healthcare settings have raised the possibility of spread of airborne particles from suspected or confirmed COVID–19 patients, absent AGPs. For example, infectious viral particles were collected from in the room of a COVID–19 patient from distances as far as 4.8 meters away in non-AGP hospital settings (Lednicky et al., September 11, 2020), and transmission via aerosol was suspected in a Massachusetts hospital (Klompas et al., February 9, 2021). For more discussion of this subject, see the *Need for Specific Provisions* (Section V of the preamble) on Respirators.

The extent to which COVID–19 may spread through airborne particles in other contexts is less clear. CDC has noted that in some circumstances airborne particles can remain suspended in the air and be breathed in by others, and travel distances beyond 6 feet (for example, during choir practice, in restaurants, or in fitness classes) in situations that would not be defined as involving close contact:

> With increasing distance from the source, the role of inhalation likewise increases. Although infections through inhalation at distances greater than six feet from an infectious source are less likely than at closer distances, the phenomenon has been repeatedly documented under certain preventable circumstances. These transmission events have involved the presence of an infectious person exhaling virus indoors for an extended time (more than 15 minutes and in some cases hours) leading to virus concentrations in the air space sufficient to transmit infections to people more than 6 feet away, and in some cases to people who have passed through that space soon after the infectious person left.

[8] On May 7, 2021, the CDC updated its guidance regarding airborne transmission (CDC, May 7, 2021; *https://www.cdc.gov/coronavirus/2019-ncov/science/science-briefs/sars-cov-2-transmission.html*). OSHA notes that this change does not alleviate the need for any of the controls in this ETS. Because OSHA has determined that the controls in this ETS are necessary to address a grave danger as quickly as possible, the agency determined that it was appropriate to issue the ETS while it continues to evaluate the new evidence to determine whether additional controls may be necessary at a later date.

(CDC, May 7, 2021).

In general, enclosed environments, particularly those without good ventilation, increase the risk of airborne transmission (CDC, May 7, 2021; Tang et al., August 7, 2020; Fennelly, July 24, 2020). In one scientific brief, CDC provides a basic overview of how airborne transmission occurs in indoor spaces. Once respiratory droplets are exhaled, CDC explains, they move outward from the source and their concentration decreases through fallout from the air (largest droplets first, smaller later) combined with dilution of the remaining smaller droplets and particles into the growing volume of air they encounter (CDC, May 7, 2020). Without adequate ventilation, continued exhalation can cause the amount of infectious smaller droplets and particles produced by people with COVID–19 to become concentrated enough in the air to spread the virus to other people (CDC, May 7, 2020). For example, an investigation of a cluster of cases among meat processing employees in Germany found that inadequate ventilation within the facility, including low air exchange rates and constant air recirculation, was one key factor that led to transmission of SARS–CoV–2 within the workplace (Gunther et al., October 27, 2020). An epidemiological investigation of a cluster of COVID–19 cases in an indoor athletic court in Slovenia demonstrated that the humid and warm environment of the setting, combined with the turbulent air flow that resulted from the physical activity of the players, allowed COVID–19 particles to remain suspended in the air for hours (Brlek et al., June 16, 2020). A cluster of cases in a restaurant in China also suggested transmission of SARS–CoV–2 via airborne particles because of little mixing of air throughout the restaurant (Li et al., November 3, 2020). Infections have been observed with as little as five minutes of exposure in an enclosed room (Kwon et al., November 23, 2020). Outdoor settings (*i.e.,* open air or structures with one wall) typically have a lower risk of transmission (Bulfone et al., November 29, 2020), which is likely due to increased ventilation with fresh air and a greater ability to maintain physical distancing. For more discussion of this subject, see the *Need for Specific Provisions* (Section V of the preamble) on Ventilation.

Transmission of SARS–CoV–2 is also possible via contact transmission (both direct contact as well as surface contact), though this risk is generally considered to be low compared to other forms of transmission (CDC, April 5, 2021). Infectious droplets produced by an infected person can land on and contaminate surfaces. Surface, or indirect, transmission can then occur if another person touches the contaminated surface and then touches their own mouth, nose, or eyes (CDC, April 5, 2021). Contact transmission can also occur through direct contact with someone who is infectious. In direct contact transmission, the hands of a person who has COVID–19 can become contaminated with the virus when the person touches their face, blows their nose, coughs, or sneezes. The virus can then spread to another person through direct contact such as a handshake or a hug.

The risk posed by contact transmission depends on a number of factors, including airflow and ventilation, as well as environmental factors (*e.g.,* heat, humidity), time between surface contamination and a person touching those surfaces, the efficiency of transference of virus particles, and the dose of virus needed to cause infection. Studies show that the virus can remain viable on surfaces in experimental conditions for hours to days, but that under typical environment conditions 99% of the virus is no longer viable after three days (Riddell et al., October 7, 2020; van Doremalen, April 16, 2020; CDC, April 5, 2021). At this time, it is not clear what proportion of SARS–CoV–2 infection are acquired through contact transmission and infections can often be attributed to multiple transmission pathways.

In recognition of the potential for contact transmission, CDC recommends cleaning, hand hygiene, and, under certain circumstances, disinfection for helping to prevent transmission of SARS–CoV–2 (CDC, May 17, 2020; CDC, April 5, 2021). These are long established recommendations to prevent the transmission of viruses that cause respiratory illnesses (Siegel et al., 2007). The potential for contact transmission was demonstrated in one study that reviewed cleaning and disinfection in households (Wang et al., May 11, 2020). The study found that the transmission of SARS–CoV–2 to family members was 77% lower when chlorine- or ethanol-based disinfectants were used on a daily basis compared to use only once in two or more days, irrespective of other protective measures taken such as mask wearing and physical distancing. For more discussion of this subject, see the *Need for Specific Provisions* (Section V of the preamble) on Cleaning and Disinfection.

These methods of transmission are not mutually exclusive, and each can present a risk to employees in healthcare settings. Based on these methods of transmission, there are a number of factors—often present in healthcare settings—that can increase the risk of transmission: Indoor settings, prolonged exposure to respiratory particles, and lack of proper ventilation (CDC, May 7, 2020). First, and most significantly, healthcare employees in settings where patients with suspected or confirmed COVID–19 receive treatment may be required to have frequent close contact with infectious individuals, these settings are typically not designed for physical distancing, and many areas in these facilities are not ventilated for the purpose of minimizing infectious diseases capable of droplet or airborne transmission. Employees frequently touch shared surfaces and use shared items. Even in healthcare settings where employees have their own offices or equipment, they often share a number of common spaces with other workers, including bathrooms, break rooms, and elevators. Based on these characteristics, SARS–CoV–2 appears to be transmissible in healthcare environments, a conclusion supported by existing data (Howard, May 22, 2021). COVID–19 incidence rates have increased significantly for adults of working age as the pandemic has progressed in comparison with other age groups, with researchers noting that occupational status might be a driver (Boehmer et al., September 23, 2020). Currently, case rates continue to be predominantly higher in working age groups in comparison to children and those over the age of 65 (CDC, May 24, 2021).

Given the high transmissibility expected in healthcare environments, the exposure risk that employees face is high. This risk is related to some extent to viral prevalence, which refers to the number of individuals in healthcare settings who may be infectious at any moment. As explained below, current data indicates that viral prevalence in the population is based on a number of factors, including the virus's existing reproductive number, the prevalence of pre-symptomatic and asymptomatic transmission, and the recent documentation of mutations of the virus that appear to be more infectious.

The transmissibility of viruses is measured in part by their reproductive number or ''R0.'' This number represents the average number of subsequently-infected people (or secondary cases) that are expected to occur from each existing case, which includes low transmission events as well as super-spreading phenomenon. Thus, an R0 of ''1'' indicates that on average every one case of infection will

lead to one additional case. As long as a virus has an R0 of more than 1, it is expected to continue to spread throughout the population. The observed R0 (also known as simply R) must be below 1 to prevent sustained spread; such a reduction can be achieved through infection control interventions (*e.g.,* vaccination, non-pharmaceutical interventions) that either reduce the susceptibility of the population to the virus or reduce the likelihood of transmission within the population (Delamater et al., 2019). During the early part of the COVID–19 outbreak in China, before consistent protective measures were put into place, the R0 for SARS–CoV–2 was estimated as 2.2 (Riou and Althaus, January 30, 2020). Higher estimates of the R0 early in China (5.7) have also been published (Sanche et al., April 7, 2020). R0 ranges from 2 to 5 have been published for earlier MERS and SARS–CoV–1 coronavirus outbreaks (WHO, May 2003; Choi et al., September 25, 2017). Since the start of the COVID–19 pandemic, the R0 has varied depending on the natural ebb and flow of rolling infection surges as well as the fluctuating non-pharmaceutical interventions (NPIs) put in place, such as face coverings, nonessential business shutdowns, and testing with follow-up isolation and quarantining. The R0 value in the U.S. early in the pandemic was estimated to be approximately 2 (Li et al., October 22, 2020), and this value has generally remained above 1 for the country as a whole throughout the pandemic, with various states well above and below this value at various times (Harvard Chan School of Public Health, February 26, 2021; Shi et al., May 18, 2021).

Pre-symptomatic and asymptomatic transmission are significant drivers of the continued spread of COVID–19 (Johansson et al., January 7, 2021). Individuals are considered most infectious in the 48 hours before experiencing symptoms and during the first few symptomatic days (Cevik et al., October 23, 2020). The time it takes for a person to be infected and then transmit the virus to another individual is called the serial interval. Several studies have indicated that the serial interval for COVID–19 is shorter than the time for symptoms to develop, meaning that many individuals can transmit SARS–CoV–2 before they begin to feel ill (Nishiura et al., March 4, 2020; Tindale et al., June 22, 2020). It is also possible for individuals to be infected and subsequently transmit the virus without ever exhibiting symptoms. This is called asymptomatic transmission. As noted earlier, a recent meta-analysis reviewed 13 studies in which the asymptomatic prevalence ranged from 4% to up to 41% (Byambasuren et al., December 11, 2020).

The existence of both pre-symptomatic transmission and asymptomatic infection and transmission pose serious challenges to containing the spread of the virus. Although the risk of asymptomatic transmission is 42% lower than from symptomatic COVID–19 patients (Byambasuren et al., December 11, 2020), asymptomatic transmission may result in more transmissions than symptomatic cases, perhaps because asymptomatic persons are less likely to be aware of their infection and can unknowingly continue to spread the disease to others. Similarly, pre-symptomatic individuals can transmit the virus to others before they know they are sick and should isolate, assuming they are aware of their exposure. Existing evidence demonstrates that asymptomatic transmission is a significant contributor to the spread of COVID–19 in the United States. Johansson et al., (January 7, 2021) conducted a study to assess the proportion of SARS–CoV–2 transmission from pre-symptomatic, never symptomatic, and symptomatic individuals in the community. Based on their modeling, they found 59% of transmission came from asymptomatic transmission, including 35% from pre-symptomatic individuals and 24% from individuals who never develop symptoms (Johansson et al., January 7, 2021).

The SARS–CoV–2 virus also regularly mutates over time into different genetic variants. Many of these variants results in no increase in transmission or disease severity. However, the CDC monitors for variants of interest, variants of concern, and variants of high consequence (CDC, May 5, 2021). A variant of interest is one ''with specific genetic markers that have been associated with changes to receptor binding, reduced neutralization by antibodies generated against previous infection or vaccination, reduced efficacy of treatments, potential diagnostic impact, or predicted increase in transmissibility or disease severity'' (CDC, May 5, 2021). CDC-listed variants of interest include strains first identified in the United States (*e.g.,* B.1.526, B.1.526.1), the United Kingdom (*e.g.,* B.1.525), and Brazil (*e.g.,* P.2). A variant of concern is one for which there is ''evidence of an increase in transmissibility, more severe disease (*e.g.,* increased hospitalizations or deaths), significant reduction in neutralization by antibodies generated during previous infection or vaccination, reduced effectiveness of treatments or vaccines, or diagnostic detection failures'' (CDC, May 5, 2021). CDC-listed variants of concern include strains first identified in the United States (*e.g.,* B.1.427, B.1.429), United Kingdom (*e.g.,* B.1.17), Brazil (*e.g.,* P.1), and South Africa (*e.g.,* B.1.351). As of April 24, B.1.1.7 made up 60% of infections in the United States (CDC, May 11, 2021). CDC notes that B.1.1.7 is associated with a 50% increase in transmission, as well as potentially increased incidence of hospitalizations and fatalities (CDC, May 5, 2021). As new strains with increased transmissibility or more severe effects enter the U.S. population, healthcare workers may be among the first to be exposed to them when those who are infected seek medical care (Howard, May 22, 2021).

OSHA also recognizes that reported cases of SARS–CoV–2 likely undercount actual infections in the U.S. population. This finding is based on seroprevalence data, which measure the presence of specific antibodies in the blood that are typically developed when an individual is infected with SARS–CoV–2. Reported cases, in contrast, are based on COVID–19 tests that measure active infections. Recent reported case numbers suggest that approximately 10% of the US population has been infected. However, only seven states reported seroprevalence below 10% (*i.e.,* Alaska, Hawaii, Maine, New Hampshire, Oregon, Vermont, Washington) and 23 states plus Washington DC and Puerto Rico exceeded 20% (CDC, May 14, 2021). The likely reason for this difference is that serological tests measure antibodies in the blood that can be detected for a longer period of time than can an active COVID–19 infection. As such, serological testing may be able to detect past COVID–19 infections in individuals who never sought out a viral test. A sampling of states from the Nationwide Commercial Laboratory Seroprevalence Survey illustrates this (CDC, May 14, 2021). On March 30, 2021, California had reported 3,564,431 cases, but seroprevalence estimates indicate that there have been 7,986,000 cases in the state (95% CI: 7,023,000–8,965,000). Similarly, Texas has reported 2,780,903 cases, but seroprevalence data indicate 6,692,000 cases (95% CI: 5,624,000–7,819,000). Given the very real possibility of higher numbers of cases than are reported in national case counts, the disease burden discussed in this document may well be underestimated.

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c. The Effect of Vaccines on the Grave Danger Presented by SARS–CoV–2

The development of safe and highly effective vaccines and the on-going nation-wide distribution of these vaccines are encouraging milestones in the nation's response to COVID–19. Although there was initial uncertainty attached to the performance of authorized vaccines outside of clinical trials, vaccines have been in use for several months and they have proven effective in reducing transmission as well as the severity of COVID–19 cases. Data now available clearly establish that fully-vaccinated persons (defined as two weeks after the second dose of the mRNA vaccines or two weeks after the single dose vaccine) have a greatly reduced risk compared to unvaccinated individuals. This includes reductions in deaths, severe infections requiring hospitalization, and less severe symptomatic infections. The combination of data from clinical trials and data from mass vaccination efforts points increasingly to a significantly lower risk in settings where all workers are fully vaccinated and are not providing direct care for individuals with suspected or confirmed COVID–19. OSHA has therefore determined that there is insufficient evidence in the record to support a grave danger finding for employees in non-healthcare workplaces (or discrete segments of workplaces) where all employees are vaccinated. However, in healthcare settings where workers are vaccinated, as discussed below, the best available evidence establishes a grave danger still exists, given the greater potential for breakthrough cases in light of the greater frequency of exposure to suspected and confirmed COVID–19 patients in those settings (Birhane et al., May 28, 2021). In addition, the best available evidence shows that vaccination has not eliminated the grave danger in mixed healthcare workplaces (*i.e.,* those where some workers are fully vaccinated and some are unvaccinated) or in those healthcare workplaces where no one has yet been vaccinated.

The Effectiveness of Authorized Vaccines

There are currently three vaccines for the prevention of COVID–19 that have received EUAs from the FDA, allowing for their distribution in the U.S.: The Pfizer-BioNTech COVID–19 vaccine, the Moderna COVID–19 vaccine, and the Janssen COVID–19 vaccine. Pfizer-BioNTech and Moderna are mRNA vaccines that require two doses administered three weeks and one month apart, respectively. Janssen is a viral vector vaccine that requires a single dose (CDC, April 2, 2021). The vaccines were shown to greatly exceed minimum efficacy standards in preventing COVID–19 in clinical trial participants (FDA, December 11, 2020; FDA, December 18, 2020; FDA, February 26, 2021). Data from clinical trials for all three vaccines and observational studies for the two mRNA vaccines clearly establish that fully vaccinated persons have a greatly reduced risk of SARS–CoV–2 infection compared to unvaccinated individuals. This includes severe infections

requiring hospitalization and those resulting in death, as well as less severe symptomatic infections.

As stated above, the three authorized vaccine were shown to be highly efficacious in clinical trials. Clinical trial results are commonly considered a best case scenario (*e.g.,* conducted in relatively young and healthy populations), while evidence from follow-up observational studies provides insight on a more diverse population. This essential data from observational studies in populations who were vaccinated outside of clinical trials is emerging and shows that the mRNA vaccines are highly effective. At this time, observational studies for the single dose, viral vector vaccine are not available. Some of the studies for mRNA vaccines examined high-risk populations, such as healthcare workers. Thus, the degree of protection in these studies can be extrapolated to a wide range of workplace settings in healthcare. The results from these studies are very encouraging.

A study of 3,950 health care personnel, first responders, and other essential workers who completed weekly SARS–CoV–2 testing for 13 consecutive weeks reported 90% effectiveness (95% confidence interval [CI] = 68%–97%) after full vaccination with either mRNA vaccine (Thompson et al., April 2, 2021). Still, 22.9% of PCR-confirmed infections required medical care; these included two hospitalizations but no deaths. A study of more than 8,000 individuals in the U.S. general population found that two doses of either mRNA vaccine were 88.7% effective in preventing SARS–CoV–2 infection (Pawlowski et al., February 27, 2021). Similar to the above results in essential workers, although breakthrough infection occurred, vaccinated patients in this study who were subsequently diagnosed with COVID–19 had significantly lower 14-day hospital admission rates than matched unvaccinated participants (3.7% vs. 9.2%). Hall et al., (April 23, 2021), in a study of U.K. healthcare workers with bi-weekly testing, documented an 85% effectiveness of the Pfizer-BioNTech vaccine, though those authors required only one week after dose two for classification as fully vaccinated. Research from Israel provides additional evidence of high effectiveness for the Pfizer-BioNTech vaccine (Dagan et al., February 24, 2021).

Data available regarding vaccine efficacy against some SARS–CoV–2 variants of concern illustrate that the vaccines remain effective at reducing symptomatic infections. Two doses of the Pfizer-BioNTech COVID–19 vaccine was highly effective (85–86%) against SARS–CoV–2 infection and symptomatic COVID–19 during a period when B.1.1.7 was the predominant circulating strain in the UK (Hall et al., April 23, 2021). In Israel, the Pfizer-BioNTech vaccine was 92% effective even with the proportion of cases due to the B.1.1.7 becoming the dominant virus in circulation towards the end of the evaluation period (Dagan et al., February 24, 2021). Another study testing the Pfizer-BioNTech COVID–19 vaccine found that it was equally capable of neutralizing the notable variants from the United Kingdom and South Africa (Xie et al., February 8, 2021). This finding was then reflected in a Qatari study that found that the Pfizer-BioNTech vaccine was not only effective at preventing disease in people infected by those variants, but was observed as 100% effective in preventing fatalities from COVID–19 (Abu-Raddad et al., May 5, 2021). The Janssen vaccine clinical trial was conducted during a time in which SARS–CoV–2 variants were circulating in South Africa (B.1.351 variant) and Brazil (P.2 variant). At 28 or more days past vaccination, efficacy against moderate to severe/critical disease was 72% in the United States; 68% in Brazil; 64% in South Africa (FDA, February 26, 2021). Although some studies have reported antibodies to be less effective against the B.1.351 variant, antibody activity in serum from vaccinated persons was generally higher than activity from serum of persons who recovered from COVID–19 (CDC, April 2, 2021).

A major question not fully addressed in the original clinical trials is whether vaccinated individuals can become infected and shed virus, even if they are asymptomatic. Thompson et al., (April 2, 2021), reported that 11% of the PCR-confirmed breakthrough infections in their essential worker population were asymptomatic, indicating a concern for asymptomatic transmission. However, this concern is based on studies indicating asymptomatic transmission among unvaccinated individuals and it is not known if this phenomena occurs in infected vaccinated individuals. In the Moderna clinical trial, reverse transcription polymerase chain reaction (RT–PCR) testing was performed on participants at their second vaccination visit; asymptomatic positives in the vaccinated group were less than half those in the placebo group (Baden et al., December 30, 2020, supplemental files Table s18). In a Mayo clinic study, an 80% reduction in risk of positive pre-procedural screening tests was observed in patients tested after their second vaccine dose (Tande et al., March 10, 2021). A study of more than 140,000 healthcare workers and their almost 200,000 household members reported a 30% reduction in risk of documented COVID–19 cases in the household members after the healthcare provider was fully vaccinated (Shah et al., March 21, 2021). In the Israeli general population, the estimated vaccine effectiveness for the asymptomatic infection proxy group (infection without documented symptoms, which could have included undocumented mild symptoms) was 90% at 7 or more days after the second dose (Dagan et al., February 24, 2021). Preliminary data from Israel suggest that people vaccinated with the Pfizer-BioNTech COVID–19 vaccine who develop COVID–19 have a four-fold lower viral load than unvaccinated people (Levine-Tiefenbrun, February 8, 2021). As noted by CDC (April 2, 2021), this observation may indicate reduced transmissibility, because viral load is thought to be a major factor in transmission (Marks et al., February 2, 2021).

The CDC has acknowledged that a ''growing body of evidence suggests that fully vaccinated people are less likely to have asymptomatic infection or transmit SARS–CoV–2 to others'' (CDC, April 2, 2021). The decreased risk for infection, especially serious infection, combined with decreased risk of transmission to others has allowed the CDC to relax some recommendations for individuals who are in community or public settings and who are fully vaccinated with one of the three FDA authorized vaccines, as follows.

- Quarantine is no longer required for fully vaccinated individuals who remain asymptomatic following exposure to a COVID–19 infected person (CDC, May 13, 2021).
- Testing following a known exposure is no longer needed for a fully vaccinated person, as long as the individual remains asymptomatic and is not in specific settings such as healthcare (CDC, April 27, 2021a), non-healthcare congregate facilities (*e.g.,* correctional and detention facilities, homeless shelters) or high-density workplaces (*e.g.,* poultry processing plants) (CDC, May 13, 2021).

In non-healthcare settings, fully vaccinated people no longer need to wear a mask or physically distance, except where required by federal, state, local, tribal, or territorial laws, rules, and regulations, including local business and workplace guidance (CDC, May 13, 2021). In healthcare settings, the picture is more mixed. While the

CDC still recommends source controls for vaccinated healthcare workers to protect unvaccinated people, it has relaxed several NPIs for health care providers (HCP) in some circumstances. CDC has stated that ''fully vaccinated HCP could dine and socialize together in break rooms and conduct in-person meetings without source control or physical distancing'' (CDC, April 27, 2021a). The CDC also recommends that fully vaccinated HCP no longer need to be restricted from work after a high-risk exposure, as long as they remain symptom-free (CDC, April 27, 2021a). Perhaps more significantly, while acknowledging the growing body of evidence against SARS–CoV–2 transmission from vaccinated people to unvaccinated people, the CDC has not identified evidence of a substantial risk of such transmission even in healthcare settings. Therefore, pending additional evidence of such transmission, the risk of transmission from vaccinated healthcare workers to unvaccinated co-workers does not appear to be high enough to warrant OSHA's imposition of mandatory controls through an ETS to protect unvaccinated workers from exposure to vaccinated workers.

On the other hand, HCP treating suspected and confirmed COVID–19 patients are expected to have higher exposures to the SARS–CoV–2 virus than others in the workforce, because such work involves repeated instances of close contact with infected patients (Howard, May 22, 2021). Exposure can be even higher in aerosol generating activities. Indeed, one study reported higher infection rates among vaccinated HCWs during a regional COVID–19 surge (Keehner et al., Mar. 23, 2021). Thus, the CDC has not relaxed infection control practices or PPE intended to protect HCP, including respirator use. (CDC, April 27, 2021a). NIOSH has stated that the ''available evidence shows that healthcare workers are continuing to become infected with SARS–CoV–2 . . . including both vaccinated and unvaccinated workers, and the conditions for the transmission of the virus exist at healthcare workplaces'' (Howard, May 22, 2021). The CDC has also indicated that it will continue ''to evaluate the impact of vaccination; the duration of protection, including in older adults; and the emergence of novel SARS–CoV–2 variants on healthcare infection prevention and control recommendations'' (CDC, April 27, 2021a). OSHA, too, will continue to monitor this issue and revise the ETS as appropriate.

Grave Danger Exists in Healthcare Workplaces Where Unvaccinated Workers Are Present

The evidence shows that the advent of vaccines does not eliminate the grave danger from exposure to SARS–CoV–2 in healthcare workplaces where less than 100% of the workforce is fully vaccinated. Unvaccinated workers can transmit the virus to each other and can become infected as a result of exposure to persons with COVID–19 who enter the healthcare facility. An outbreak of COVID–19 due to an unvaccinated, symptomatic HCP was recently reported in a skilled nursing facility in which 90.4% of residents had been vaccinated (Cavanaugh, April 30, 2021). The outbreak, due to the R.1 variant, caused attack rates that were three to four times higher in unvaccinated residents and HCPs as among those who were vaccinated. Additionally, unvaccinated persons were significantly more likely to experience symptoms or require hospitalization. Therefore, unvaccinated employees at these workplaces remain at grave danger of infection, along with the serious health consequences of COVID–19, as discussed in the remainder of this section.

Although the risk appears to be lower, breakthrough infections of vaccinated individuals do occur, but the potential for secondary transmission remains not fully substantiated. For instance, a small yet significant portion of the population does not respond well to vaccinations (Agha et al., April 7, 2021; Boyarsky et al., May 5, 2021; Deepak et al., April 9, 2021; ACI, April 28, 2021) and may be as vulnerable as unvaccinated individuals. These individuals could potentially transmit the SARS–CoV–2 infection to unvaccinated employees. In a California study, seven out of 4,167 fully vaccinated health care workers experienced breakthrough infections (Keehner et al., May 6, 2021). A similar study from the Mayo Clinic, included 44,011 fully vaccinated individuals with 30 breakthrough infections being recorded (Swift et al., April 26, 2021). Of those breakthrough cases, 73% were symptomatic. Secondary transmission was not evaluated in the study. A nursing facility in Chicago found 22 possible breakthrough cases of SARS–COV–2 infection among fully vaccinated staff and residents (Teran et al., April 30, 2021). Of those cases, 36% were symptomatic. However, no secondary transmission was observed in the facility. The lack of secondary transmission was likely due to the facility's implementation of non-pharmaceutical interventions and high vaccination rates. The authors concluded that to ensure outbreaks do not occur from breakthrough infections in workplaces with vaccinated and unvaccinated workers that the facilities need to maintain high vaccine coverage and non-pharmaceutical interventions. While these breakthrough events appear to be uncommon, it is important to remember how quickly a few cases can result in an outbreak in unvaccinated populations.

Moreover, even though the U.S. is approaching the time where there is sufficient vaccine supply for the entire U.S. population, administering the vaccine throughout the country will still take more time. As of May 24, 2021, CDC statistics show that 43% of the population between 18 and 65 has been fully vaccinated (CDC, May 24, 2021a). To this end, there is still a need to strengthen confidence in the safety and effectiveness of the vaccines for significant portions of the population, including workers, to reduce vaccine hesitancy. Even in the healthcare industry, where distribution has enabled entire worker populations to be completely vaccinated by now, some workers exhibited reluctance to getting vaccinated. On January 4, 2021, a study of 1,398 U.S. emergency department health care personnel found that 95% were offered the vaccine, with 14% declining (Schrading et al., February 19, 2021). In February of 2021, the CDC released a study of initial vaccine efforts at skilled nursing facilities offering long-term care (Gharpure et al., February 5, 2021). The study found that only 37.5% of eligible staff were vaccinated, leaving a potentially significant population vulnerable to SARS–CoV–2 infections and capable of transmission.

An anonymous survey of employees across the Yale Medicine and Yale New Haven Health system was used to estimate the prevalence of and underlying reasons for COVID–19 vaccine hesitancy. The survey was sent to about 33,000 employees and medical staff across the Yale healthcare system and included clinical staff and those who support the critical infrastructure without direct patient contact (*e.g.,* food service staff). Out of 3,523 responses (an 11% response rate), 85% of respondents stated they were ''extremely likely'' or ''somewhat likely'' to receive the COVID–19 vaccine. Of that 85%, 12% expressed mild hesitancy by stating they would get it within the next 6 months. But 14.7% of overall respondents expressed reluctance by responding ''neither likely nor unlikely,'' ''somewhat unlikely,'' or ''extremely unlikely'' to receive the COVID–19 vaccine. Overall, 1 in 6 personnel in this health system survey expressed at least

some reluctance to get vaccinated (Roy et al., December 29, 2020).

Findings in more recent surveys of the general working population from 18 to 65 years old show similar rates of people who stated they would not, probably would not, or would only if required get vaccinated (18.2%) (Census Bureau, May 5, 2021); 17–26% (KFF, April 22, 2021). In March 2021, a survey found that healthcare employees reported some of the highest vaccination percentages of any sector (78.3% and 67.7%, respectively; King et al., April 24, 2021). However, future growth of vaccination may be a concern with vaccine hesitation in those sectors reported as 14.1% and 15.9%, respectively.

That unvaccinated healthcare workers remain in grave danger is emphasized by the fact that thousands of new hospital admissions still occur each day (CDC, May 24, 2021b) in the midst of significant distribution of over three hundred million effective vaccine doses. These factors indicate that transmission remains robust and significant portions of the population remain vulnerable to COVID–19. Spread of the disease within the healthcare workforce may start with a worker becoming ill through community transmission or an ill patient seeking treatment. The rate of new cases, hospitalizations, and deaths peaked in January 2021, just before vaccines became more widely available outside of healthcare settings. The January to February decline, however, is likely not attributable in large part to the new vaccines alone, because only a small portion of the population had received them. During this time, variants of concern, such as B.1.1.7, that are more transmissible and may result in worse health outcomes, have become the majority source of infection (CDC, May 24, 2021c). Hundreds of people each day are still dying of COVID–19 in early May 2021, many of them working-age adults (May 24, 2021d).

OSHA will continue to monitor trends as more of the population becomes vaccinated and the post-vaccine evidence base continues to grow. If and when OSHA finds a grave danger from the virus no longer exists for covered healthcare workplaces (or some portion thereof), or new information necessitates a change in measures necessary to address the grave danger, OSHA will update the rule as appropriate.

In summary, the availability and use of safe and effective vaccines for COVID–19 is a critical milestone that has led to a marked decrease in risk for healthcare employees generally, but grave danger still remains for those whose jobs require them to work in settings where patients with suspected or confirmed COVID–19 receive care. CDC has determined that the remaining risk for fully vaccinated persons outside of healthcare settings is low enough to justify foregoing other layers of controls for settings where all persons are fully vaccinated and asymptomatic (CDC, April 27, 2021), but the CDC continues to recommend respirators and PPE for fully vaccinated healthcare employees in settings where patients with suspected or confirmed COVID–19 receive care. Based on CDC guidance and the best available evidence, OSHA finds a grave danger in healthcare for vaccinated and unvaccinated HCP involved in the treatment of COVID–19 patients.

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III. Impact on Healthcare Employees

Data on SARS–CoV–2 infections, illnesses, and deaths among healthcare employees supports OSHA's finding that COVID–19 poses a grave danger to these employees. Even fairly brief exposure (*i.e.,* 15 minutes during a 24-hour period) can lead to infection, which in turn can cause death or serious impairment of health. Employees in healthcare settings include healthcare employees, who provide direct patient care (*e.g.,* nurses, doctors, and emergency medical technicians (EMTs)), and healthcare support employees, who provide services that support the healthcare industry and may have contact with patients (*e.g.,* janitorial/housekeeping, laundry, and food service employees). Employees who perform autopsies are also considered to work in healthcare. Most employees who work in healthcare perform duties that put them at elevated risk of exposure to SARS–CoV–2.

SARS–CoV–2 is introduced into healthcare settings by infected patients, other members of the public, or employees. Workers in healthcare settings that provide treatment to patients with suspected or confirmed COVID–19 face a particularly elevated risk of contracting SARS–CoV–2 (Howard, May 22, 2021). Once the virus is introduced into the worksite, the virus can be transmitted from person-to-person at close contact through inhalation of respiratory droplets. In limited scenarios, it might also be transmitted through inhalation of aerosols, which consists of small droplets and particles that can linger in the air, especially in enclosed spaces with inadequate ventilation (CDC, May 7, 2021). Less frequently, transmission is also possible when someone touches a contaminated item or surface and then touches their nose, mouth, or eyes (CDC, April 5, 2021).

A 2021 cross-sectional study of 6,510 healthcare employees from the Northwestern HCW SARS–CoV–2 Serology Cohort Study (conducted May 28–June 30, 2020 in Illinois) shows that infections among healthcare workers were not limited to doctors and nurses; healthcare administrators had similar rates of seropositivity compared to physicians, and support services had the highest seroprevalence (this group included healthcare facility workers in

food service, environmental services, security, and patient access/registration) (Wilkins et al., 2021). A meta-analysis published in the American Journal of Epidemiologists compared data from 97 separate studies and found evidence that COVID–19 infections were both common (11% of the tested cohort of healthcare employees) and spread among different healthcare worker occupations. In this study, however, nurses had the highest rate of seroprevalence while most of the COVID–19-positive medical personnel were working in hospital nonemergency wards during screening (Gomez-Ochoa et al., January 2021).

Healthcare employees who provide direct patient care are at high risk of exposure to SARS–CoV–2 because they have close and sometimes prolonged contact with patients who are infected or potentially infected with SARS–CoV–2. This contact occurs when conducting physical examinations and providing treatment and medical support. The risk can be amplified when examining or treating a COVID–19 patient who has symptoms such as coughing and difficulty breathing (leading to more forceful inhalation and exhalation), both of which can result in the release of more droplets that can be propelled further. Healthcare employees who conduct, or provide support during, aerosol-generating procedures on persons with suspected or confirmed COVID–19 also face a greater risk of infection (Heinzerling et al., April 17, 2020). Examples of procedures that can produce aerosols include intubation, suctioning airways, use of high-speed tools during dental work, and use of power saws during autopsies. A complete list of aerosol-generating procedures, as defined by this ETS, is included in 29 CFR 1910.502(b). Employees in healthcare are also at risk of exposure to SARS–CoV–2 if they have close contact with co-workers while providing patient care or performing other duties in enclosed areas such as a nursing station, laundry room, or kitchen. Based on the biological mechanisms of SARS–CoV–2 transmission, there is no doubt that some employees in healthcare are at risk of exposure to SARS–CoV–2. Healthcare employees are performing some job tasks that create an *expectation* of exposure to people or human remains infected with COVID–19. The nature of caring for a patient known to have COVID–19 or performing on autopsy on someone who had COVID–19 increases the risk to employees performing that task.

This section summarizes recent studies about U.S. employees in healthcare that illustrate the impact of COVID–19 in several types of settings. Because the pandemic is recent and the evidence generated is on the frontiers of science, studies are not available for every type of employee in every type of healthcare setting. The peer-reviewed scientific journal articles, government reports, and journal pre-print articles described below establish the widespread prevalence of COVID–19 among healthcare employees. OSHA's findings are based primarily on the evidence from peer-reviewed scientific journal articles and government reports. However, peer review for scientific journal articles and the assembly of information for government reports and other official sources of information take time, and therefore those sources do not always reflect the most up-to-date information (Chan et al, December 14, 2010). This is critical in the context of the COVID–19 pandemic, where new information is emerging daily. Therefore, OSHA has supplemented peer-reviewed data and government reports with additional information on occupational outbreaks contained in other sources of media (*e.g.,* newspapers). The reported information from newspapers can provide further evidence of the impact of an emerging and changing disease, especially for certain workers in healthcare and associated occupations (*e.g.,* laundry workers, janitors) that are not well represented in the peer-reviewed scientific literature, and assist OSHA in protecting these employees from the grave danger posed by transmission of SARS–CoV–2. OSHA did not make findings based solely on non-peer-reviewed sources such as pre-prints and news articles, but the agency found that those sources sometimes provided useful information when considered in context with more robust sources. Together, these sources of information represent the best available evidence of the impact on employees of the pandemic thus far.

The peer-reviewed literature, government reports and, in a limited number of cases, non-peer-reviewed articles illustrate a significant number of infections among healthcare employees, but the types of workplaces or conditions described are not the only ones in which a grave danger exists. However, the studies add to the evidence that any healthcare employee is at risk of exposure if they have close contact with others who are suspected or confirmed to have COVID–19. The studies also provide evidence that once SARS–CoV–2 is introduced into the healthcare workplace (*e.g.,* through an infected patient, other member of the public, or employee), unvaccinated employees in that workplace are at risk of exposure.

a. General Investigations of Workers or Workplaces

The Washington State Department of Health and the Washington State Department of Labor and Industries collaborated on a report evaluating COVID–19 cases and their occupational history (WSDH and WLNI, November 10, 2020). They identified 30,895 confirmed cases of COVID–19 in Washington State with occupational data, including healthcare settings, through September 13, 2020. They reported infection rates for 22 occupational groups, and reported that healthcare and social assistance were among the industry sectors with the highest incidence of infections (WSDH and WLNI, November 10, 2020). The report states that some occupations increase the risk to workers of exposure to SARS–CoV–2, but the data does not demonstrate that all the cases reported resulted from occupational exposure.

These data were also used to determine how work activities were related to COVID–19. Zhang used information from a previous Washington State report with an earlier cutoff date (through June 11, 2020; 10,850 cases) and cross-referenced it with information available from O*NET (a Department of Labor database that contains detailed occupational information for more than 900 occupations across the U.S.) to determine occupation-specific COVID–19 risks (Zhang, November 18, 2020). Zhang created a model using the O*NET descriptors and correlated it to the case reports from Washington State to develop a predictive model for COVID–19 cases. The model found that among O*NET's 57 physical and social factors related to work, the two predictive variables of COVID–19 risk were frequency of exposure to diseases and physical proximity to other people. The author found that healthcare professions in general had the highest predicted risk for COVID–19. This finding provides additional evidence that during an active pandemic, healthcare employees can be exposed to a grave danger during sustained periods in workspaces where they are working in proximity to others, including patients with COVID–19.

The Oregon Health Authority (OHA) publishes a weekly report detailing outbreaks directly related to work settings. OHA epidemiologists consider cases to be part of a workplace outbreak when clusters form with respect to space and time unless their

investigation uncovers an alternative source for the outbreak. In their May 19, 2021, COVID–19 Weekly Report, OHA reported 71 active clusters, including at three separate hospitals (OHA, May 19, 2021).

In a May 21, 2021 report, the Tennessee Department of Health reported 238 active clusters (*i.e.,* 2 or more confirmed cases of COVID–19 linked by the same location of exposure or exposure event that is not considered a household exposure), with 6 occurring in assisted care facilities, 37 in nursing homes, and 3 in other healthcare settings (Tennessee Department of Health, May 21, 2021).

A study on SARS–CoV–2 testing in Los Angeles from mid-September through October 2020 evaluated 149,957 symptomatic and asymptomatic positive cases associated with an occupation (Allan-Blitz et al., December 11, 2020). Infection rates were found to be particularly high for healthcare personnel and first responders.

A Morbidity and Mortality Weekly Report (MMWRs) (a weekly epidemiological digest published by the CDC) reported on the occupational status of COVID–19 cases in Colorado. In the Colorado study, 1,738 COVID–19 cases from nine Colorado counties were evaluated; these cases occurred before the state lockdown that began on March 26, 2020 (Marshall et al., June 30, 2020). Half of the individuals were exposed in a workplace setting, with the greatest number of COVID–19-positive employees coming from healthcare (38%).

Chen et al., (January 22, 2021) analyzed records of deaths occurring on or after January 1, 2016 in California and found that mortality rates in working aged adults (18–65 years) increased 22% during the COVID–19 pandemic (March through October 2020) compared to pre-pandemic periods. Relative to pre-pandemic periods, healthcare or emergency workers were one occupational group that experienced excess and statistically significant mortality compared to pre-pandemic periods (19% increase). The study authors concluded that essential work conducted in person is a likely avenue of infection transmission.

Hawkins et al., (January 10, 2021) examined death certificates of individuals who died in Massachusetts between March 1 and July 31, 2020. An age-adjusted mortality rate of 16.4 per 100,000 employees was determined from 555 death certificates that had useable occupation information. Employees in healthcare support, personal care services, and social services had particularly high mortality rates. The study authors noted that occupation groups expected to have frequent contact with sick people, close contact with the public, and jobs that are not practical to do from home had particularly elevated mortality rates.

The impact of COVID–19 across diverse healthcare sectors is not limited to the United States. The European Centre for Disease Prevention and Control investigated clusters in occupational settings throughout Europe (ECDC, August 11, 2020). The Centre reviewed 1,376 occupational clusters from 16 European countries from March through July of 2020. Indoor settings contributed to 95% of reported clusters. Hospitals and long-term care facilities accounted for many of the clusters.

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b. Studies Focusing on Employees in Healthcare

General Surveillance and Surveys Across the U.S.

Burrer et al., (2020) reported surveillance data on COVID–19 cases and deaths among ''healthcare personnel'' between February 12 and April 9, 2020. ''Healthcare personnel'' were defined as ''paid and unpaid persons serving in healthcare settings who have the potential for direct or indirect exposure to patients or

infectious materials.'' [9] Although only 16% of all surveillance forms indicated whether the case was healthcare personnel, 19% of the reported cases occurred in healthcare personnel. Twelve states indicated whether the case was healthcare personnel for at least 80% of all reported cases. An estimated 11% of COVID–19 cases from those 12 states were healthcare personnel. Based on reported known contact with confirmed COVID–19 cases in the 14 days before illness onset, work exposures likely caused 55% of those infections. Between 8% and 10% of infected employees were hospitalized, 2%–5% of the infected employees were admitted to the ICU, and 0.3%–0.6% of those employees died.

CDC continues to provide general updates for COVID–19 cases and deaths among healthcare personnel. However, information on healthcare personnel status was reported for only 18.21% of total cases and death status reported for only 79.57% of healthcare personnel cases as of May 24, 2021 (CDC, May 24, 2021a). CDC reports 491,816 healthcare personnel cases (10% of the 4,856,885 cases that included information on healthcare personnel status) and 1,611 fatalities (0.4% of healthcare employee cases) as of May 24, 2021 (CDC, May 24, 2021a). Independent reporting by Kaiser Health News and the Guardian in their ongoing investigative reporting database found 3,607 fatalities among healthcare personnel in the United States as of April 2021(Kaiser Health News and the Guardian, April 2021; February 23, 2021). The reporters for this effort consider even their own count—which is higher than the official CDC count—to be an undercount due to various reporting issues, such as a lack of reporting requirements for long-term care employees for a significant portion of the initial COVID–19 surge.

Hartmann et al., (2020) analyzed case interview data from February through May 2020 to assess the burden of COVID–19 on healthcare employees in Los Angeles County, CA, where it is mandated that all positive cases be reported to the County Department of Public Health, and all cases are interviewed. Healthcare employees were defined as any person working or volunteering in healthcare settings including hospitals and skilled nursing facilities, medical offices, mental health facilities, and emergency medical services (EMS). The definition also includes healthcare employees providing care in non-healthcare settings such as schools, senior living facilities, and correctional facilities. Healthcare employees included both staff who interacted directly with patients and staff who do not provide direct clinical care to patients. Through May 31, 2020, 5,458 COVID–19 cases among healthcare employees were reported to the County Health Department, representing 9.6% of all cases during this time period. Of those healthcare employees, 46.6% worked in a long-term care setting, 27.7% worked in a hospital, and 6.9% worked in medical offices. Healthcare employees from all other settings represented less than 4% of total healthcare employee cases. Nurses represented 49.4% of all healthcare employee cases; no other group of healthcare employees represented more than 6% of the total reported healthcare employee cases. Of note is that some healthcare associated employees who are expected to have less close contact with patients represented a greater percentage of cases than some healthcare employee that are expected to have close and direct patient contact. For example, employees in administration (4.3%), environmental services (3.2%), and food services (2.9%) represented a higher percentage of infected healthcare employees than physicians (2.7%). When asked about known exposures, 44% of those who tested positive reported exposure to a COVID–19-positive patient or co-worker in their health facility, 11% reported exposure to a COVID–19-positive friend or family member or recent travel, and 45.1% had unknown exposures. At the time of the interviews, 5.3% of COVID–19-positive healthcare employees in Los Angeles County reported requiring hospitalization because of COVID–19, and as of May 31, 2020 there were 40 (0.7%) deaths.

Fell et al., (October 30, 2020) reviewed exposure and infection data for healthcare personnel in Minnesota between March and July of 2020. After the first confirmed case of COVID–19 in Minnesota (on March 6, 2020), the Minnesota Department of Health (MDH) requested that healthcare facilities provide a list of exposed healthcare personnel. Healthcare personnel included EMS personnel, nurses/nursing assistants, physicians, technicians, therapists, phlebotomists, pharmacists, students and trainees, contractors, and those who do not provide direct patient care but could be exposed to infectious agents in a healthcare setting (*e.g.,* clerical, food services, environmental services, laundry, security, engineering and facilities management, administrative, billing, and volunteer personnel). Cases in laboratory personnel are also reported. The facilities were asked to determine if each exposure was high-risk, defined as when the healthcare personnel has close, prolonged contact with a confirmed COVID–19 case or their secretions/excretions while not wearing PPE, or close, prolonged contact with persons with COVID–19 in their household or community. MDH and the 1,217 participating healthcare facilities assessed 17,200 healthcare personnel for 21,406 exposures to COVID–19 cases, of which 5,374 (25%) were classified as higher-risk. It was reported that 373 of 5,374 personnel (6.9%) with high-risk exposures tested positive for COVID–19 within 14 days of the exposure. The report stated that only symptomatic personnel were encouraged to get tested for COVID–19, and therefore it is possible that asymptomatic cases occurred and were not detected. Of those 373 personnel who tested positive for COVID–19, 242 were exposed to a patient, resident of a congregate setting, in a congregate setting outbreak, or to another healthcare personnel. Twenty-one percent of exposures to a confirmed COVID–19 case took place in acute or ambulatory care settings, 24% of exposures were to residents in congregate living or long-term care settings, and 25% of exposures were in congregate setting outbreaks. An additional 25% of exposures to confirmed COVID–19 cases were exposures to co-workers, and 5% were exposures to household/social contacts.

The Fell study (October 30, 2020) also demonstrated that high risk exposures can occur to healthcare employees in positions throughout the healthcare facility. Available data for 4,669 (87%) of the higher risk exposures in the Fell et al., study indicated that the highest percentages of high-risk exposures were in nursing assistants or patient care aides (1,857; 40%) and nursing staff (1,416; 30%). The proportion of high-risk exposures represented by personnel such as administrators (247; 5%) and environmental services staff (155; 3%) were similar to those reported by medical providers, such as physicians or nurse practitioners (220; 5%). Healthcare personnel working in congregate living or long-term care settings, including skilled nursing, assisted living, and group home facilities, were more likely to receive a positive COVID–19 test result within 14 days of a higher-risk exposure than were healthcare personnel working in acute care settings. The study authors note the

[9] The term ''healthcare personnel'' is consistent with OSHA's use of the terms ''healthcare employees'' and ''healthcare workers'' to include healthcare support workers.

potential for employee transmission by cautioning that, in contrast to the recognized risk associated with patient care, healthcare employees might have failed to recognize the risk associated with interacting with co-workers in areas such as breakrooms and nursing stations. Physical distancing and PPE may therefore not have been used as consistently in those situations.

The authors of a different study concluded that nurses and EMTs were, respectively, 26% and 33% more likely to contract COVID–19 than attending physicians. Nurses and EMTs' job duties require more intense, close contact with patients compared to physicians, as well as higher frequency and duration of patient contact. Firew et al., (October 21, 2020) conducted a cross-sectional survey of healthcare employees in May of 2020 across 48 states, the District of Columbia, and U.S. territories. The 2,040 respondents who completed at least 80% of the survey were included in the study. Among included participants, 31.1% were attending physicians, 26.8% were nurses, 13% were EMTs, 8.82% were resident physicians or fellows, 3.97% were physician assistants, and 16.32% were other healthcare employees. A total of 598 respondents (29.3%) reported SARS–CoV–2 infections.

In a prospective study of over 2 million community members and 99,795 frontline healthcare workers that was performed in the U.S. and UK from March through April 2020, healthcare workers were 3.4 times as likely to self-report a positive COVID–19 test as the general public, after adjusting for the increased likelihood of healthcare personnel receiving a COVID–19 test (Nguyen et al., 2020). In the U.S. alone, healthcare workers were almost two times more likely to report a positive test after adjusting for greater likelihood of testing.

Detection of SARS–CoV–2 in Healthcare Employees

OSHA reviewed a number of studies that included hospital employees. Many hospitals provide short-term and/or long-term care for COVID–19 patients who have symptoms that are severe enough to require hospitalization. Therefore, close contact with COVID–19 patients is expected in hospital settings, putting hospital employees at risk of developing COVID–19. Examples of employees who work in hospitals include healthcare practitioners, who generally have either licensure or credentialing requirements (*e.g.,* doctors, nurses, pharmacists, physical therapists, massage therapists) for the purpose of promoting, maintaining, monitoring, or restoring health. Individuals who provide healthcare support services also work at hospitals. Examples of employees who provide healthcare support services and may have close contact with COVID–19 patients in some circumstances include patient intake/admission, patient food services, chaplain services, equipment and facility maintenance, housekeeping services, healthcare laundry services, and medical waste handling services. As noted above, hospital employees are at risk from close contact with patients.

Some of the studies reviewed below were done in employees of healthcare systems that included both hospitals and ambulatory care centers such as physician offices, medical clinics (including urgent care and retail-based clinics), outpatient surgical centers, and outpatient cancer treatment centers. Although this ETS does not cover non-hospital ambulatory care settings where all non-employees are screened prior to entry and people with suspected or confirmed COVID–19 are not permitted to enter, it was not possible to separate out results for hospital versus ambulatory care employees. Also it is not known to what extent those ambulatory care centers in the studies reviewed by OSHA performed screening to identify suspected or confirmed COVID–19. Risk of exposure and transmission of SARS–CoV–2 is expected to be lower in ambulatory healthcare settings that perform screening to exclude persons with suspected or confirmed COVID–19. However some types of ambulatory medical facilities (*e.g.,* family practice; pediatrics clinic; urgent care) may choose to test patients for COVID–19 or examine and treat COVID–19 patients on site. Therefore, healthcare employees and healthcare support employees in some ambulatory care centers who do not conduct health screening to identify and exclude suspected or confirmed COVID–19 patients are at risk of infection due to close contact with patients who could potentially have COVID–19.

Barrett et al., (2020) conducted a prospective cohort study of healthcare employees and non-healthcare employees with no known previous SARS–CoV–2 infection who were recruited and tested for SARS–CoV–2 from March 24 through April 7, 2020 at Rutgers University and two of its affiliated university hospitals in New Jersey. As of July 2020, New Jersey was one of the hardest hit areas, with less than 3% of the U.S. population but 8.5% of all known U.S. cases. Healthcare employees were defined as individuals who worked at least 20 hours per week in a hospital, had occupations with regular patient contact, and were expected to have contact with at least three patients per shift over the following three months. Occupations included residents, fellows, attending physicians, dentists, nurse practitioners, physician assistants, registered nurses, technicians, respiratory therapists, and physical therapists. Non-healthcare employees included faculty, staff, trainees, or students working at Rutgers for at least 20 hours a week and who had no patient contact. The study reported that 7.3% of healthcare employees (40 of 546) and 0.4% of non-healthcare employees (1 of 283) tested positive for SARS–CoV–2 infection. Even after the authors conducted sensitivity analyses to exclude individuals with symptoms at baseline and those who had exposure to someone with COVID–19 or COVID–19 symptoms outside of work, differences between infection rates in healthcare employees and non-healthcare employees continued to be observed. OSHA finds this suggests that healthcare employees were more likely than non-healthcare employees to have developed COVID–19 from a workplace exposure during the early months of the pandemic in the United States. The study authors concluded that the potential for workplace exposure is further supported by the fact that only 8% of infected study subjects reported contact with someone having COVID–19 symptoms outside of work. In addition, higher rates of infection were observed in healthcare employees who worked in the hospital that had more COVID–19 patients and was located in the community that had higher rates of SARS–CoV–2 infections. The study authors noted that because that hospital was overwhelmed, it was not always possible to separate COVID–19 vs. non-COVID–19 patients, which may have led to additional exposures among staff. Among healthcare employees, nurses had the highest rate of observed infections (11.1% tested positive), and attending physicians had the lowest rate of observed infection (1.8% positive). Resident and fellow physicians had a 3.1% positivity rate and other groups of healthcare employees had a 9% positivity rate. Increased risk of infection was associated with spending greater proportions of work time in patients' rooms and higher reported exposures to patients with suspected or diagnosed COVID–19.

Mani et al., (November 15, 2020) reported results from SARS–CoV–2 testing of 3,477 symptomatic employees in the University of Washington

Medical system and its affiliated organizations in Seattle, WA, between March 12 and April 23, 2020. During that period, 185 (5.3%) employees tested positive. Prevalence (*i.e.,* proportion) of SARS–CoV–2 in frontline healthcare employees (those with face-to-face contact with patients) was 5.2% and prevalence in non-frontline staff was 5.5%. Some staff who were asymptomatic also underwent screening as part of outbreak investigations, and 9 of 151 (6%) tested positive. When findings from symptomatic and asymptomatic staff were combined, SARS–CoV–2 prevalence was 5.3% in frontline healthcare employees and 5.3% among all employees. Of the 174 employees who tested positive and were followed, six (3.2%) reported COVID-related hospitalization, and one employee was admitted to the ICU. No deaths were reported. The study authors suspected that community transmission likely played a major role in infection among healthcare employees early in the local epidemic and that similar percentages of infections in frontline and non-frontline healthcare employees support the PPE protocols implemented for frontline workers at the institution. In addition, positive cases were likely underestimated due to the focus on testing symptomatic employees.

Vahidy et al., (2020) studied asymptomatic infection rates among staff from a medical center consisting of seven hospitals in Texas and members of the surrounding community in March through April of 2020. Healthcare jobs with possible exposure to COVID–19 patients were classified into five categories, with varying levels of patient exposure: (1) Nursing (*e.g.,* nurses/nurses aids, emergency medical technicians), (2) clinicians (*e.g.,* physicians, nurse practitioners), (3) allied healthcare workers (*e.g.,* therapists, social workers), (4) support staff (*e.g.,* security, housekeeping), and (5) administrative or research staff (*e.g.,* managers, research assistants). A total of 2,872 asymptomatic individuals, including 2,787 healthcare personnel and 85 community residents, were tested for SARS–CoV–2 infection. Among the healthcare personnel tested, the prevalence of SARS–CoV–2 infection was 5.4% among the 1,992 patient-facing staff treating COVID–19 patients and 0.6% among the 625 patient-facing staff not treating COVID–19 patients. No cases were seen among the 170 nonclinical healthcare staff that did not interact with patients or in the 85 community residents (Vahidy et al., 2020). The nonclinical healthcare staff worked in buildings with separate heating, ventilation, and air conditioning systems, and with lower population density because of remote work when compared to clinical healthcare staff. In the different healthcare categories that cared for COVID–19 patients, prevalence of infection ranged from 3.6% to 6.5%, with no significant differences in the different categories of healthcare workers. Therefore, the study indicates that healthcare workers providing both direct and indirect care to COVID–19 patients are at risk.

Nagler et al., (June 28, 2020), reported the results of SARS–CoV–2 testing in employees from the New York Langone Health system, an academic medical center encompassing four hospital campuses and over 250 ambulatory sites, with approximately 43,000 employees. Between March 25 and May 18, 2020, the health system tested employees who were symptomatic (4,150), were asymptomatic but exposed to COVID–19 (4,362), and asymptomatic employees who were returning to work after their services had been suspended during the peak of the epidemic (6,234). Among symptomatic employees, the COVID–19 positivity rate across the duration of the study was 33%. Among asymptomatic employees with self-reported exposure, the COVID–19 positivity rate was 8%. In asymptomatic employees returning to work, COVID–19 positivity rate was 3%. In all groups, the positivity rate in the first week of testing was substantially higher than in the last week of testing, which occurred more than a month after the first week. The study authors noted a temporal correlation of COVID–19 case declines in healthcare employees and the community, despite continued workplace exposure, and suggested that infections in healthcare employees may reflect importance of community transmission and efficacy of stringent infection control and PPE standards that remained largely unchanged since the start of the pandemic in March 2020. OSHA finds that the study demonstrates the potential for COVID–19 to be introduced into the workplace from uncontrolled community spread and that the effective use of infection control practices and PPE most likely prevented transmission to healthcare employees.

Misra-Hebert et al., (September 1, 2020) conducted a retrospective cohort study to obtain data on rates of COVID–19 and risk factors for severe disease in healthcare employees and non-healthcare employees (neither category defined) who were tested for SARS–CoV–2, and listed in a registry at the Cleveland Clinic Health System, between March 8 and June 9, 2020. The data was drawn from healthcare employees from different segments of the country. Ninety percent of the healthcare employees and 75% of non-healthcare employees were from Ohio, and the remainder were from Florida. Although more healthcare employees than non-healthcare employees reported exposures to COVID–19 (72% vs. 17%), similar, and not significantly different, proportions of employees tested positive for COVID–19 in each group: 9% (551/6145) of healthcare employees and 6.5% (4353/66,764) of non-healthcare employees. OSHA finds it difficult to draw conclusions regarding this finding because the nature of the exposure (*e.g.,* whether it was at close contact) was not explained. In fact, patient-facing healthcare employees (those having direct contact with patients) were 1.6 times more likely than non-patient-facing healthcare employees to test positive. The study authors suggested that the finding represents an increased risk of infection with work exposure, however they were not able to confirm if the exposure occurred 14 days prior to testing or if PPE was worn during the exposure. Positive cases peaked in early-to-mid April for both healthcare employees and non-healthcare employees (16% and 12%, respectively, as estimated from figure 2 of the study), and then decreased concurrently with the implementation of preventive measures, such as masking and physical distancing, over the course of the study. Of those who tested positive, 6.9% of healthcare employees and 27.7% of non-healthcare employees were hospitalized, and 1.8% and 10.8% respectively, were admitted to the intensive care unit. The study noted that the lower rates of hospitalization for the healthcare employee group could be explained on the basis that the healthcare employee population was younger and had fewer co-morbidities.

Serology Testing in Employees in Hospitals.

Although most of the studies described in this section relied on polymerase chain reaction (PCR) tests to detect cases of COVID–19, a number of studies conducted serology testing to determine how many individuals had been infected by the SARS–CoV–2 virus in the past. Serology tests determine if antibodies that respond to the SARS–CoV–2 virus are present in samples of blood serum. Seroprevalence is the percentage of individuals in a population who have antibodies. Terms such as seropositive or seroconversion are often used to describe persons who have tested positive for the SARS–CoV–2 antibody. Most of the serology tests

conducted looked at a type of antibody known as Immunoglobulin G (IgG). Seroprevalence studies provide a more complete picture of how many individuals in a population may have been infected because many individuals who were infected were not tested for current infections for reasons such as lack of symptoms and lack of available testing. Indeed, many individuals who were asymptomatic may be unaware that they were exposed to SARS–CoV–2 or had COVID–19 (CDC, July 6, 2020). The studies described below were conducted before vaccination began, and it is therefore unlikely that the studies are detecting antibodies produced as a result of vaccination.

Venugopal et al., (2020) conducted a cross-sectional study of healthcare employees across all hospital services (including physicians, nurses, ancillary services, and ''others'') who worked at a level one trauma center in the South Bronx, NY between March 1 and May 1, 2020. The period of analysis included the first few weeks of March, when New York City experienced a surge of infections that resulted in strained resources and supplies such as PPE. This hospital was so highly impacted that it was considered ''the epicenter of the epicenter.'' Participants were tested for IgG antibodies. They were also tested for SARS–CoV–2. Of the 500 out of 659 healthcare employees who completed serology testing, 137 (27%) were positive for SARS–CoV–2 IgG antibodies. Seroprevalence was similar across the different types of healthcare employees (25% to 28%). The study authors indicated that seroprevalence in healthcare employees was higher than in the community, and that seroprevalence likely reflected healthcare and community exposures.

Sims et al., (November 5, 2020) conducted a prospective cohort serology study at Beaumont Health, which includes eight hospitals across the Detroit, MI metropolitan area. In April of 2020, during the peak of the pandemic's first wave, Michigan had the third highest number of cases in the U.S. and most cases were in the Detroit metropolitan area. All 43,000 hospital employees were invited to participate and seroprevalence was analyzed in 20,614 of them between April 13 and May 28, 2020. A total of 1,818 (8.8%) of participants were seropositive. However, when separated according to employees working at home (n=1,868) versus working in their normal manner, employees working at home were significantly less likely to be seropositive (5.6%) than those going into work (9.1%). The authors speculated that the seropositivity level for employees working at home was representative of the population sheltering at home and only leaving home when necessary. Participants involved with direct patient care had a higher seropositive rate (9.5%) than those who were not (7%). Healthcare employees with frequent patient contact (phlebotomy, respiratory therapy, and nursing) had a significantly higher seropositive rate (11%) than those with intermittent patient contact (physicians or clinical roles such as physical therapists, radiology technicians, etc.), who on average had a seropositive rate of 7.4%. The study authors speculated that the differences in these two groups may have been based on differences in both duration and proximity of exposure to patients. Another notable observation is that support personnel such as facilities/security and administrative support employees had seropositivity rates of approximately 7% to 8%, which were similar to rates in physicians (values estimated from Figure 2B). Participants reporting frequent contact with either 1) non-COVID–19 patients, or 2) physicians or nurses but not patients, had higher rates of seropositivity (7.6%) than those reporting no significant contact with patients, physicians, or nurses (but who handled patient samples) (6.5%).

Moscola et al., (September 1, 2020) reported the prevalence of SARS–CoV–2 antibodies in healthcare employees from the Northwell Health System in the greater New York City area. The healthcare employees were offered free, voluntary testing at each of the system's 52 sites between April 20 and June 23, 2020. The analysis included 40,329 of the system's 70,812 employees and found that 5,523 (13.7%) were seropositive. The prevalence of SARS–CoV–2 antibodies was similar to that found in randomly-tested adults in New York State at that time (14%). Analysis of seropositivity by job type reported the highest levels of seropositivity (20.9%) in service maintenance staff (including housekeepers, groundskeepers, medical assistants, and 21 others), followed by 13.1% in nurses, 12.6% in administrative and clerical staff (including non-clinical professionals such as employees in information technology, human resources, medical records, and billing); 11.6% in allied health professionals (including clinical professionals such as physician assistants, physical therapists/occupational therapists, social workers, mental health professionals, pharmacists, and laboratory technicians), and 8.7% in physicians. Seropositivity rates were highest in employees from the emergency department and non-ICU hospital units (approximately 17% each), followed by ''other'' non-specified areas (12.1%), and ICUs (9.9%).

Wilkins et al., (2021) conducted a cross-sectional study to examine seropositivity rates in 6,510 healthcare workers from a Chicago healthcare system consisting of hospitals, immediate care centers, and outpatient practices. Blood samples were collected through July 8, 2020. The study authors then compared the seropositivity rate of different occupational groups of workers, using administrators as the referent group to reflect exposure consistent with non-healthcare workers. Overall seropositivity for all study participants was 4.8%. Before adjusting for demographics and self-reported out-of-hospital exposure to COVID–19, the study found that a number of healthcare occupations had a higher crude prevalence rate than the administrator group, including: 10.4% for support service healthcare workers; 10.1% for medical assistants; 9.3% for respiratory technicians; 7.6% for nurses; and 3.8% for administrators. After adjustment for demographics and self-reported out-of-hospital exposure to COVID–19, the only type of healthcare workers that continued to be significantly more likely to be seropositive than administrators were nurses, who were 1.9 times more likely to be seropositive. The study authors concluded that the higher work-related risk in nurses likely occurred as a result of frequent and close contact with patients. The study also compared seropositivity rates for different occupational tasks and found that adjusted seropositivity rates were higher for workers participating in the care of COVID–19 patients when compared with those who did not report participating in the care of COVID–19 patients. Being exposed to patients receiving high-flow oxygen therapy and hemodialysis was significantly associated with 45% and 57% higher odds for seropositive status, respectively.

Comparison of Healthcare Worker Serology and the Surrounding Community

Although some serology studies suggest that infections are more correlated to community transmission than job designation (Jacob et al., March 10, 2021; Carter et al., May 2021), these studies do not undermine the robust evidence that healthcare employees with potential workplace exposure to patients with suspected or confirmed COVID–19 are exposed to an elevated risk of contracting COVID–19 compared

to the general population. Carter et al., (May 2021) found that healthcare worker infection rates varied from region to region, noting the importance of community transmission as a factor in infection rates. In Jacob et al., (March 10, 2021), health care workers' serology results were compared to residence location, job designation, and other characteristics to identify risk factors. The study authors found that community transmission was a significant factor in acquiring infections, but were not able to tie in any specific job designation resulting in increases in infection risk. The authors note, however, that the study did not show that workplace exposures did not increase risk; rather it showed that the levels of community transmission observed may be a greater driver of transmission. It should also be noted that the non-pharmaceutical interventions for each job classification are different, so a direct comparison of non-clinical and clinical personnel may result in conclusions with limited application.

One might expect that a full shift with fully and properly implemented non-pharmaceutical interventions should result in lower infection rates. This appeared evident in a study comparing infection rates between first and second COVID–19 outbreak surges in Norway (Magnusson et al., January 6, 2021). For instance, during the first wave from February 26, 2020 to July 17, 2020, nurses were almost three times more likely to be infected than those in a similar age range (20 to 70 years old). However, during the second wave from July 18, 2020 to December 18, 2020, infection rates for nurses were largely indistinguishable from the population at large of a similar age. The authors suggested that the decrease in the odds ratio was potentially due to the implementation of appropriate infection control practices that were previously lacking.

Studies Examining Risks After Known Exposures

Heinzerling et al., (April 17, 2020) examined the development of COVID–19 in 120 healthcare employees who were unknowingly exposed to a patient with COVID–19. The patient was later identified as one of the first U.S. community cases of COVID–19, and Heinzerling et al., (April 17, 2020) concluded that the ''investigation presented a unique opportunity to analyze exposures associated with SARS–CoV–2 transmission in a healthcare setting without recognized community exposures.'' Of the 120 healthcare employees who were exposed, 43 developed symptoms within 14 days of exposure and were tested for COVID–19. Three of those employees (7% of those tested) were positive for COVID–19. Although those three employees represent 2.5% of the total exposed, it is possible that more employees might have developed COVID–19 because asymptomatic employees were not tested. The healthcare employees who became infected, when compared to those who were not infected, were more commonly present during two aerosol-generating procedures (nebulizer treatment (67% vs. 9%) and non-invasive ventilation (67% vs. 12%); more commonly performed physical examinations of the patient (100% vs. 24%); and were exposed to the patient for longer durations of time (median 120 minutes vs. 25 minutes). None of the exposed healthcare employees had been wearing the complete set of PPE recommended for contact with COVID–19 patients.

Long-Term Care Facilities

Long-term care facilities include nursing homes, skilled nursing facilities, and assisted living facilities. They provide both medical and personal care services to people unable to live independently. Because long-term care facilities are a congregate living situation, infections such as COVID–19 can spread rapidly between patients or residents and the healthcare staff who care for them. Therefore, employees who work at these facilities have an elevated risk of exposure and infection. Like employees who work at hospitals, employees who work at long-term care facilities include both healthcare practitioners, who may have direct and close contact with patients and residents, as well as healthcare support staff who could also be exposed to patients and residents. See the section on ''*Detection of SARS–CoV–2 in Healthcare Employees*'' above for a description of the types of employees who may work at these facilities.

McMichael et al., (March 27, 2020) investigated a COVID–19 outbreak affecting patients, employees, and visitors at a long-term care facility in King County, Washington in February of 2020. SARS–CoV–2 infections were identified in 129 persons, including 81 residents, 34 of 170 staff (20%), and 14 visitors. None of the employees died, but 2 of the 34 infected employees (5.9%) had symptoms severe enough to require hospitalization. The median age of the employees was 42.5 years (range 22–79 years). Job titles reported for the employees that were infected included physical therapist, occupational therapist assistant, environmental care worker, nurse, certified nursing assistant, health information officer, physician, and case manager. The study authors noted that infection prevention procedures at the facility were insufficient, and they concluded that introduction of SARS–CoV–2 into long-term care facilities will result in high attack rates among residents, staff, and visitors.

Weil et al., (September 1, 2020) reported a cross-sectional study of skilled nursing facilities in the Seattle area between March 29 and May 13, 2020. Testing was performed by Public Health of Seattle and King County (testing of both residents and staff) or the Seattle Flu Study (testing of only employees). The authors described the period of the study to be at the peak of the pandemic, but the skilled nursing facilities were not experiencing outbreaks at the time of the study. Testing of employees for SARS–CoV–2 was voluntary, and 1,583 employees at 16 skilled nursing facilities were tested. Eleven of the 16 skilled nursing facilities had at least one resident or employee who tested positive. Forty-six (2.9%) employees had positive or inconclusive testing for SARS–CoV–2. Of 1208 residents tested, 110 (9.1%) were positive. Study authors noted shortages in PPE.

Yi et al., (September 7, 2020) evaluated surveillance data on COVID–19 for assisted living facilities in 39 states (representing 44% of the total long-term care facilities in the U.S.). The states began reporting data at various periods ranging from February 27 to April 30, 2020. As of October 15, 2020, 6,440 of 28,623 (22%) assisted living facilities had at least one COVID–19 case among residents or staff (ranging from 1.3% of assisted living facilities in Iowa to 92.8% of assisted living facilities in Connecticut). In 22 states, 17,799 cases of COVID–19 were reported in staff (total number of staff not specified). In 9 states, 46 of 7,128 (0.6%) employees with COVID–19 died.

Bagchi et al., (2021) reported on the CDC's National Healthcare Safety Network (NHSN) surveillance of nursing homes, which began on April 26, 2020. As of May 25, 2020, the Centers for Medicare & Medicaid Services (CMS) began requiring nursing homes to report COVID–19 cases in residents and staff. The authors analyzed data in residents, nursing home staff, and facility personnel that was reported from May 25 through November 22, 2020 in all 50 states, the District of Columbia, Guam, and Puerto Rico. Staff members and facility personnel were defined as ''all persons working or volunteering in the facility, including contractors,

temporary staff members, resident caregivers, and staff members who might work at multiple facilities.'' The study authors reported that ''case count data were aggregated weekly, and resident-weeks were calculated as the total number of occupied beds on the day data were reported.'' Data on number of staff members employed were not collected, and therefore ''resident weeks'' was used as ''a closest best estimate of the at-risk denominator for staff members.'' The study authors indicated that ''cases per 1,000 resident-week were calculated for residents and staff members using the number of COVID–19 cases reported in a week over the corresponding 1,000 resident-weeks.'' COVID–19 cases in staff members increased during June and July (10.9 cases per 1,000 resident-weeks reported in the week of July 26); declined during August and September (6.3 per 1,000 resident-weeks in the week of September 13); and increased again by late November (21.3 cases per 1,000 resident-weeks in the week of November 22). The study authors noted that COVID–19 rates among nursing home staff followed similar trends in nursing home residents and the surrounding communities, thereby indicating a possible association between COVID–19 rates in nursing homes and nearby communities.

Terebuh et al., (September 20, 2020) investigated COVID–19 clusters in 45 congregate living facilities in Ohio, from March 7 to May 15, 2020. Most of the facilities investigated were healthcare worksites. More than half of the clusters occurred at medical facilities (51% at nursing homes, 11% at assisted living facilities, 7% at treatment facilities, and 2% at intermediate care facilities). The remaining clusters occurred at corrections facilities (7%), group homes (20%), and shelters (2%). Of the combined 598 residents and healthcare employees who were either confirmed to have COVID–19 or identified as a probable case based on symptoms and close contact with a confirmed case, healthcare employees represented 167 (28%) of the confirmed and 37 (6%) of the probable cases of COVID–19. None of the healthcare employees died. The study authors were able to identify the index case in 25 of the clusters, and 88% of the index cases were determined to be healthcare employees.

Studies Focusing on Healthcare Support Services

Healthcare support services employees, such as personnel that provide food, laundry, or waste-handling services, are at risk of exposure to patients with SARS–CoV–2 and contracting COVID–19. Employees who provide healthcare support services usually have less direct contact with patients, but they can have close contact with COVID–19 patients or contaminated materials when performing tasks such as cleaning patient rooms, removing waste or dirty laundry from patient rooms, delivering food and picking up used food trays and utensils, or repairing equipment in the patient's room. In addition, healthcare support employees can have close and prolonged contact with their co-workers while performing their duties.

One study discussed above (Sims et al., November 5, 2020), shows an infection rate among healthcare support services employees that is similar to healthcare employees, such as physicians, who have some patient contact. As noted, support personnel such as facilities/security and administrative support employees had seropositivity rates of approximately 7% to 8%, which were similar to rates in physicians (values estimated from Figure 2B). Both healthcare support employees and physicians had seropositivity rates that were higher than the rates among employees working from home.

Hale and Dayot (2020) examined an outbreak of COVID–19 among food service employees that occurred in an academic medical center before masking and physical distancing requirements were implemented. After an employee in the food and nutrition department tested positive, 280 asymptomatic staff were tested. The entire food and nutrition department that was actively working was considered exposed because employees shared a common locker room and break area. Therefore, testing was not limited to employees who worked near the index case as part of their duties. Ten staff members in the department (including the index case) tested positive during the investigation. At least seven of the cases were thought to result from transmission from the index case.

Outbreaks for support services have not been well documented and may be encapsulated with incidents for the entire hospital. Local newspaper reports have identified potential incidents in laundry facilities that handle linens contaminated with SARS–CoV–2. In a New Jersey unionized laundry facility, representatives noted that eight employees had been infected with SARS–CoV–2 and demanded improvements in infectious disease control implementation (Davalos, December 21, 2020). In Canada, a Regina hospital laundry plant was connected with an 18-employee outbreak (Martin, August 10, 2020). The cause of the outbreak was not determined.

Emergency Medical Services (EMS)

A limited number of studies have examined the impact of COVID–19 on employees who provide EMS (*e.g.,* EMTs, paramedics), who are considered healthcare personnel under this standard. The studies that address EMS often address personnel such as EMTs along with other types of emergency responders such as firefighters, who are not considered healthcare personnel under this standard. EMTs and similar occupations, such as paramedics, have close contact with patients who are or could be infected with SARS–CoV–2 when they provide medical care or transport those patients. The medical care they provide includes intubation and cardiopulmonary resuscitation, which could generate aerosols and put them at particularly high risk when performing those procedures on someone with confirmed or suspected COVID–19.

Prezant et al., (2020) reviewed paid medical leave data for EMS providers and firefighters using New York City fire department electronic medical records from October 1, 2017 through May 31, 2020. The study authors found that as of May 31, 2020, 1,792 of 4,408 EMS providers (40.7%) had been on leave for suspected or confirmed COVID–19. When compared with the medical leave data from before the pandemic—including months during influenza periods in prior years—the authors found that medical leave for EMS providers was 6.8% above baseline in March 2020 and peaked at 19.3% above baseline in April 2020. The authors determined that COVID–19 was responsible for this increase. The medical leave levels for EMS providers were above those for firefighters. Among firefighters, the data showed that 34.5% had been on leave for suspected or confirmed COVID–19 as of May 31, 2020, and there was a peak in medical leave at 13.0% above baseline in April 2020. A total of 66 (1.2%) firefighters and EMS providers with COVID–19 were hospitalized and 4 died. Despite EMS providers having been given the same PPE (not further specified) as firefighters, EMS providers had higher rates of COVID–19. The study authors concluded that higher rates in EMS providers were attributable to greater exposure to COVID–19 patients while administering medical care.

Weiden et al., (January 25, 2021) investigated risk factors for SARS–CoV–2 infection and severe disease (hospitalization or death) in New York City first responders (EMS and

firefighters) from March 1 through May 31, 2020, based on medical records. The study had a total of 14,290 participants (3,501 EMS personnel and 10,789 firefighters). From March 1 to May 31, 2020, 9,115 (63.8%) responders had no COVID–19 diagnosis, 5,175 (36.2%) were confirmed or suspected COVID–19 cases, and 62 (0.4%) were hospitalized. Three participants died in a hospital, and one died at home. Researchers found that EMS respondents had more cases of severe COVID–19 than firefighters (42/3501 [1.2%] vs. 21/10,789 [0.19%]). The SARS–CoV–2 infection rate among New York City first responders overall was 15 times the New York City rate. EMS personnel had a 4-fold greater risk of severe disease and 26% increased risk of confirmed COVID–19 cases when compared with firefighters. Both firefighters and EMS personnel responded to the pandemic-related emergency medical calls and followed the same PPE protocols. However, EMS personnel had greater COVID–19 exposure than firefighters due to greater COVID–19-related call volume and being solely responsible for patient transport, nebulization of bronchodilators, and intubation.

Tarabichi et al., (October 30, 2020) recruited first responders (from EMS and fire departments) to participate in a study in the Cleveland, Ohio area. The authors conducted a first serologic survey and virus test in the period between April 20 through May 19, 2020 and a second between May 18 and June 2, 2020. A total of 296 respondents completed a first visit and 260 completed the second visit. Seventy-one percent of respondents reported exposure to SARS–CoV–2 and 16 (5.4%) had positive serological testing. No subject had a positive virus test. Fifty percent (8/16) of those who tested positive were either asymptomatic or mildly symptomatic. Based on responses to questions about suspected contacts (it does not appear that the time period of exposure was considered), the study author concluded that likely sources of transmission in participants who tested positive were patients or co-workers.

In a study examining COVID–19 antibodies in employees from public service agencies in the New York City area from May through July of 2020, 22.5% of participants were found to have COVID–19 antibodies (Sami et al., March 2021). The percentages of EMTs and paramedics found to have antibodies (38.3 and 31.1%) were among the highest levels observed in all the occupations. The study authors noted that risk of exposures may be increased for employees who provide emergency medical services because those services are provided in uncontrolled, unpredictable environments, where space is limited (*e.g.,* ambulances) and quick decisions must often be made. Both emergency technicians and paramedics perform procedures such as airway management that involve a high risk of exposure. In fact, the proportions of employees who had antibodies were found to be increased with increasing frequency of aerosol-generating procedures.

In-Home Healthcare Providers

In-home healthcare workers provide medical or personal care services, similar to those provided in long-term care facilities, inside the homes of people unable to live independently. Patients receiving in-home care could receive services from different types of healthcare providers (*e.g.,* a nurse administering medical care, a physical therapist assisting with exercise, a personal care services provider assisting with daily functions such as bathing). In addition, a number of workers may provide services to the same patient, while working in shifts over the course of the day. In-home healthcare providers have a high risk of infection from working close to patients and possibly their family members or other caregivers in enclosed spaces (*e.g.,* performing a physical examination, helping the patient bathe).

The impact of COVID–19 on in-home healthcare workers is not well studied. In-home healthcare workers might be included in reports of COVID–19 cases and deaths in healthcare workers, but those reports do not indicate if any of the affected healthcare workers provided home care. One report from the UK indicated that an occupational category of ''social care'' which included ''care workers and home carers'' experienced significantly increased rates of death involving COVID–19 (50.1 deaths per 100,000 men and 19.1 deaths per 100,000 women) from March through May of 2020 (Windsor-Shellard et al., June 26, 2020). And in a related study from March through December of 2020, it was reported that nearly three in four deaths involving COVID–19 in social care operations were in ''care workers and home carers,'' with 109.9 deaths per 100,000 men and 47.1 deaths per 100,000 women (Windsor-Shellard et al., January 25, 2021).

Conclusion

The representative studies OSHA described in this section on healthcare provide examples of the pervasive impact that SARS–CoV–2 exposures have had on employees in those industries before vaccines were available. Even since vaccines have become widely available, approximately 20 to 30% of healthcare workers remained unvaccinated as of March 2021 (King et al., April 24, 2021), and breakthrough cases among vaccinated healthcare employees are evident. The evidence is consistent with OSHA's determination that SARS–CoV–2 poses a grave danger to healthcare employees. Cases or outbreaks in settings such as hospitals, long-term care facilities, and emergency services departments have had a clear impact on employees in those types of workplaces. The evidence establishes that employees in those settings, whether they provide direct patient care or supporting services, have been infected with SARS–CoV–2 and have developed COVID–19. Some of these employees have died and others have become seriously ill. Employees in healthcare are at elevated risk for transmission in the workplace. Employees in these industry settings are exposed to these forms of transmission through in-person interaction with patients and co-workers in settings where individuals with suspected or confirmed COVID–19 receive care. In many cases, close contact with people who are suspected or confirmed to have COVID–19 is required of personnel in these types of workplaces, and such close contact usually occurs indoors. These employees, who form the backbone of the nation's medical response to the COVID–19 public health emergency, clearly require protection under this ETS.

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IV. Conclusion

OSHA finds that healthcare employees face a grave danger from exposure to SARS–CoV–2 in the United States.[10] OSHA's determination is based on three separate manifestations of incurable, permanent, or non-fleeting health consequences of exposure to the virus, each of which is independently supported by substantial evidence in the record. The danger to healthcare employees is further supported by powerful lines of evidence demonstrating the transmissibility of the virus in the workplace and the prevalence of infections in employee populations where individuals with suspected or confirmed COVID–19 receive care.

First, with respect to the grave health consequences of exposure to SARS–CoV–2, OSHA has found that regardless of where and how exposure occurs, COVID–19 can result in death. The risk of death from COVID–19 is especially high for employees who have underlying health conditions, older employees, and employees who are members of racial and ethnic minority groups, who together make up a significant proportion of the working population. Second, even for those who survive a SARS–CoV–2 infection, the virus often causes serious, long-lasting, and potentially permanent health effects. Serious cases of COVID–19 require hospitalization and dramatic medical interventions, and might leave employees with permanent and disabling health effects. Third, even mild or moderate cases of COVID–19 that do not require hospitalization can be debilitating and require medical care and significant time off from work for recovery and quarantine. People who initially appear to have mild cases can suffer health effects that continue months after the initial infection. Furthermore, racial and ethnic minority groups are at increased risk of SARS–CoV–2 infection, as well as hospitalization and death from COVID–19.

Each of these categories of health consequences independently poses a grave danger to individuals exposed to the virus. That danger is amplified for healthcare employees because of the high potential for transmission of the virus in healthcare settings where individuals with suspected or confirmed COVID–19 receive care. The best available evidence on the science of transmission of the virus makes clear that SARS–CoV–2 is transmissible from person to person in these settings, which can result in large-scale clusters of infections. Transmission is most prevalent in healthcare settings where individuals with suspected or confirmed COVID–19 receive care, and can be exacerbated by, for example, poor ventilation, close contact with potentially infectious individuals, and situations where aerosols containing SARS–CoV–2 particles are likely to be generated. Importantly, while older employees and those with underlying health conditions face a higher risk of dying from COVID–19 once infected, fatalities are certainly not limited to that group. Every healthcare workplace exposure or transmission has the potential to cause severe illness or even death, particularly in unvaccinated healthcare workers in settings where patients with suspected or confirmed COVID–19 receive care. Taken together, the multiple, severe health consequences of COVID–19 and the evidence of its transmission in environments characteristic of the healthcare workplaces where this ETS requires worker protections demonstrate that exposure to SARS–CoV–2 represents a grave danger to employees in these workplaces throughout the country.[11]

The existence of a grave danger to employees from SARS–CoV–2 is further supported by the toll the pandemic has already taken on the nation as a whole. Although OSHA cannot estimate the total number of healthcare workers in our nation who contracted COVID–19 at work and became sick or died, COVID–19 has killed 587,342 people in the United States as of May 24, 2021 (CDC, May 24, 2021a). That death toll includes 91,351 people who were 18 to 64 years old (CDC, May 24, 2021b). Current mortality data shows that unvaccinated people of working age have a 1 in 217 chance of dying when they contract COVID–19. As of May 24, 2021, more than 32 million people in the United States have been reported to have infections, and thousands of new cases were being identified daily (CDC, May 24, 2021c). One in ten reported cases of COVID–19 becomes severe and requires hospitalization. Moreover, public health officials agree that these numbers fail to show the full extent of the deaths and illnesses from this disease, and racial and ethnic minority groups are disproportionately represented among COVID–19 cases, hospitalizations, and deaths (CDC, December 10, 2021; CDC, May 26, 2021; Escobar et al., 2021; Gross et al., 2020; McLaren, 2020). Given this context, OSHA is confident in its finding that exposure to SARS–CoV–2 poses a grave danger to the healthcare employees covered by the protections in this ETS.

The above analysis fully satisfies the OSH Act's requirements for finding a grave danger. Although OSHA usually performs a quantitative risk assessment before promulgating a health standard under section 6(b)(5) of the OSH Act, 29 U.S.C. 655(b)(5), that type of analysis is not necessary in this situation. OSHA has most often invoked section 6(b)(5) authority to regulate exposures to chemical hazards involving much smaller populations, many fewer cases, extrapolations from animal evidence, long-term exposure, and delayed effects. In those situations, mathematical modelling is necessary to evaluate the extent of the risk at different exposure levels. The gravity of the danger presented by a disease with acute effects like COVID–19, on the other hand, is made obvious by a straightforward count of deaths and illnesses caused by the disease, which reach sums not seen in a century. The evidence compiled above amply support OSHA's finding that SARS–CoV–2 presents a grave danger in to the healthcare employees covered by the protections in this ETS. In the context of ordinary 6(b) rulemaking, the Supreme Court has said

[10] The determination that COVID–19 presents a grave danger to healthcare employees is not based on a determination that workplace protections previously adopted by any particular employer to address the risk of infection are necessarily inadequate. As discussed in the Feasibility section, many such workplace protections are consistent with the uniform nationwide requirements set forth in the ETS. The purpose of the ETS is to ensure sufficient protections for workers are consistently implemented across the country.

[11] Note that OSHA has made no determination regarding the significance of the risk to employees from exposure to SARS–CoV–2, as would be required in a permanent rulemaking under section 6(b)(5) of the OSH Act, 29 U.S.C. 655(b)(5). OSHA has only considered whether exposure to SARS–CoV–2 poses a grave danger, as required for promulgation of a permanent standard under section 6(c)(1)(A), 29 U.S.C. 655(c)(1)(A).

that the OSH Act is not a ''mathematical straitjacket,'' nor does it require the agency to support its findings ''with anything approaching scientific certainty,'' particularly when operating on the ''frontiers of scientific knowledge.'' *Indus. Union Dep't, AFL–CIO* v. *Am. Petroleum Inst.,* 448 U.S. 607, 656, 100 S. Ct. 2844, 2871, 65 L. Ed. 2d 1010 (1980). This is true *a fortiori* here in the current national crisis where OSHA must act to ensure employees are adequately protected from the new hazard presented by the COVID–19 pandemic (see 29 U.S.C 655(c)(1)).

Having made the determination of grave danger, as well as the determination that an ETS is necessary to protect these employees from exposure to SARS–CoV–2 (see *Need for the ETS,* in Section IV.B. of this preamble), OSHA is required to issue this standard to protect these employees from getting sick and dying from COVID–19 acquired at work. See 29 U.S.C. 655(c)(1).

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B. Need for the ETS

This ETS is necessary to protect the healthcare workers with the highest risk of contracting COVID–19 at work. Healthcare workers face a particularly elevated risk of contracting COVID–19 in settings where patients with suspected or confirmed COVID–19 receive treatment, especially those healthcare workers providing direct care to patients. The ETS is necessary to protect these workers through requirements including patient screening and management, respirators and other personal protective equipment (PPE), limiting exposure to aerosol-generating procedures, physical distancing, physical barriers, cleaning, disinfection, ventilation, health screening and medical management, access to vaccination, and anti-retaliation provisions and medical removal protection.

I. Events Leading to the ETS

Since January 2020, OSHA has received numerous petitions and supporting letters from members of Congress, unions, advocacy groups, and one group of large employers urging the agency to take immediate action by issuing an ETS to protect healthcare employees from exposure to the virus that causes COVID–19 (Scott and Adams, January 30, 2020; NNU, March 4, 2020; AFL–CIO, March 6, 2020; Wellington, March 12, 2020; DeVito, March 12, 2020; Carome, March 13, 2020; Murray et al., April 29, 2020; Solt, April 28, 2020; Public Citizen, March 13, 2020; Pellerin, March 19, 2020; Yborra, March 19, 2020; Owen, March 19, 2020; ORCHSE, October 9, 2020). These petitions and supporting letters asserted that many employees have been infected because of workplace exposures to the virus that causes COVID–19 and immediate, legally enforceable action is necessary for protection. OSHA quickly began issuing detailed guidance documents and alerts beginning in March 2020 that helped employers determine employee risk levels of COVID–19 exposure and made recommendations for appropriate controls.

On March 18, 2020, then-OSHA Principal Deputy Assistant Secretary Loren Sweatt responded to an inquiry from Congressman Robert C. ''Bobby'' Scott, Chairman of the House Committee on Education and Labor, regarding OSHA's response to the COVID–19 outbreak (OSHA, March 18, 2020). In the letter, she stated that OSHA had ''a number of existing enforcement tools'' it was using to address COVID–19, including existing standards such as Personal Protective Equipment (PPE), Respiratory Protection, and Bloodborne Pathogens, as well as the General Duty Clause, 29 U.S.C. 654(a)(1). She also stated that OSHA was working proactively to assist employers by developing guidance documents. And, given the existing enforcement tools, ''we currently see no additional benefit from an ETS in the current circumstances relating to COVID–19,'' and ''OSHA can best meet the needs of America's workers by being able to rapidly respond in a flexible environment.'' However, she noted that OSHA would continue to monitor ''this quickly evolving situation and will take appropriate steps to protect workers from COVID–19 in coordination with the overall U.S. government response effort.''

Shortly after OSHA's announcement that it did not intend to pursue an ETS at that time, the American Federation of Labor and Congress of Industrial Organizations (AFL–CIO), the country's largest federation of labor unions, filed an emergency petition with the U.S. Court of Appeals for the D.C. Circuit, for a writ of mandamus to compel OSHA to issue an ETS for COVID–19, arguing that OSHA's failure to issue legally enforceable COVID–19-specific rules endangered workers (AFL–CIO, May 18, 2020). On May 29, 2020, OSHA denied the AFL–CIO's pending March 6 petition to OSHA for an ETS [12] and simultaneously filed a response brief with the D.C. Circuit, arguing the AFL–CIO was not entitled to a writ of mandamus (DOL, May 29, 2020). The agency stated that the union had not clearly and indisputably demonstrated that an ETS was necessary and expressed its view that an ETS was not necessary at that time because of the agency's two-pronged strategy for addressing COVID–19 in the workplace:

[12] The AFL–CIO had petitioned OSHA on March 6 to issue an ETS to protect working people from occupational exposure to infectious diseases broadly, including COVID–19 (AFL–CIO, March 6, 2020). In OSHA's May 29, 2020 denial, the agency concluded that it lacked compelling evidence to find that an undefined category of infectious diseases generally posed a grave danger for which an ETS was necessary (OSHA, May 29, 2020). With respect to COVID–19 specifically, the agency made no conclusion as to whether the disease posed a grave danger to workers, but concluded, as it had in the earlier March 18, 2020 response to congressional inquiry, that a COVID–19 ETS was not necessary at that time (id.).

Enforcement of existing standards and section 5(a)(1) of the OSH Act (the General Duty Clause), as well as development of rapid guidance to provide a flexible response to new and evolving information about the virus. On June 11, 2020, the U.S. Court of Appeals for the D.C. Circuit issued a one paragraph *per curiam* order denying the AFL–CIO's petition, finding that OSHA's ''decision not to issue an ETS is entitled to considerable deference,'' and ''[i]n light of the unprecedented nature of the COVID–19 pandemic, as well as the regulatory tools that the OSHA has at its disposal to ensure that employers are maintaining hazard-free work environments, . . . OSHA reasonably determined that an ETS is not necessary at this time.'' *In re Am. Fed'n of Labor & Cong. of Indus. Orgs.,* No. 20–1158, 2020 WL 3125324 (AFL–CIO, June 11, 2020), *rehearing en banc denied* (AFL–CIO, July 28, 2020).[13]

Following OSHA's decision in May 2020 not to issue an ETS, some states and local health departments determined enforceable regulation was necessary, leading to the adoption of a variety of state and local executive orders and emergency regulations with specific worker protection requirements. Virginia, Oregon, California, Michigan, and Washington have issued their own ETSs, (see Section VII, Additional Requirements, for a full discussion of OSHA-approved State Plans), and many additional states and localities have issued other kinds of requirements, guidelines, and protective ordinances for workers. Other states and localities have not. The resulting patchwork of state and local regulations led to inadequate and varying levels of protection for workers across the country, and has caused problems for many employees and businesses. As a result, on October 9, 2020, ORCHSE Strategies, LLC (since acquired by the National Safety Council (NSC))—a group of more than 100 large (mostly Fortune 500) companies in over 28 industries—petitioned OSHA to issue an ETS, recognizing that OSHA had provided ''very well prepared and thoughtful'' guidance, but concluding an ETS is still needed and that the lack of a uniform response has caused confusion and unnecessary burden on already struggling workplaces (ORCHSE, October 9, 2020).

Notwithstanding the patchwork efforts at the state and local level, the country experienced a significant increase in COVID–19 deaths and infections. When OSHA decided not to promulgate an ETS in May 2020, the COVID–19 death toll in the United States was reaching 100,000 (CDC, May 28, 2020). Since then, an additional 500,000 Americans have died from COVID–19 (CDC, May 24, 2021a). Despite a decrease in recent weeks, the death rate remains high (7-day moving average death rate of 500 on May 23, 2021) (CDC, May 24, 2021b), and thousands of Americans are hospitalized with COVID–19 every day (CDC, May 24, 2021c).

As of May 23, 2021, the agency had issued 689 citations for COVID–19-related violations of existing OSHA requirements, primarily of healthcare facilities including nursing homes. Violations have included, among other things, failure to properly develop written respiratory protection programs; failure to provide a medical evaluation, respirator fit test, training on the proper use of a respirator, and personal protective equipment; failure to report an injury, illness, or fatality; failure to record an injury or illness on OSHA recordkeeping forms; and failure to comply with the General Duty Clause of the OSH Act. In addition, OSHA issued over 230 Hazard Alert Letters (HALs), including over 100 HALs to employers in healthcare settings (*e.g.,* hospitals, ambulatory care, and nursing and residential care facilities), where it found COVID–19-related hazards during workplace inspections, but did not believe it had sufficient basis to cite the employer for violating an existing OSHA standard or the General Duty Clause.

On January 21, 2021, President Biden issued Executive Order 13999, entitled ''Protecting Worker Health and Safety'' (86 FR 7211). In it, he declared that:

> Ensuring the health and safety of workers is a national priority and a moral imperative. Healthcare workers and other essential workers, many of whom are people of color and immigrants, have put their lives on the line during the coronavirus disease 2019 (COVID–19) pandemic. It is the policy of my Administration to protect the health and safety of workers from COVID–19. The Federal Government must take swift action to reduce the risk that workers may contract COVID–19 in the workplace.

He further directed OSHA to take a number of steps to better protect workers from the COVID–19 hazard, including issuing revised guidance on workplace safety, launching a national emphasis program to focus OSHA enforcement efforts on COVID–19, conduct a multilingual outreach program, and evaluate its COVID–19 enforcement policies (id.). In addition, the President directed OSHA to ''consider whether any emergency temporary standards on COVID–19, including with respect to masks in the workplace, are necessary, and if such standards are determined to be necessary, issue them by March 15, 2021'' (id.). OSHA began working on the issue at once, and shortly after Secretary Walsh took office on March 23, he ordered OSHA to ensure its analysis addressed the latest information regarding the state of vaccinations and virus variants (Rolfson and Rozen, April 6, 2021). In accordance with the executive order and Secretary Walsh's directive, OSHA has reviewed its May 2020 decision not to issue an ETS. For the reasons explained below, OSHA does not believe its prior approach—enforcement of existing standards and the General Duty Clause coupled with the issuance of nonbinding guidance—has proven over time to be adequate to ''reduce the risk that workers may contract COVID–19'' in healthcare settings. Given the grave danger presented by the hazard, OSHA now finds that this standard is necessary to protect the healthcare employees who face the highest risk of contracting COVID–19 at work. See *Nat'l Cable & Telecomm. Ass'n* v. *Brand X internet Svcs,* 545 U.S. 967, 981 (2005) (noting that an agency must ''consider the wisdom of its policy on a continuing basis . . . for example, in response to changed factual circumstances, or a change in administrations''); *Asbestos Info. Ass'n,* 727 F.2d at 423 (5th Cir. 1984) (''failure to act does not conclusively establish that a situation is not an emergency . . . [when there is a grave danger to workers,] to hold that because OSHA did not act previously it cannot do so now only compounds the consequences of the Agency's failure to act.'').

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[13] On October 29, 2020, a group of petitioners including the American Federation of Teachers (AFT), the American Federation of State, County and Municipal Employees, the Washington State Nurses Association, and the United Nurses Association of California/Union of Health Care Professionals filed a separate petition for a writ of mandamus from the U.S. Court of Appeals for the Ninth Circuit to compel OSHA to issue a permanent standard to protect healthcare workers from the risks of infectious diseases (AFT, October 29, 2020). On December 31, 2020, OSHA filed a response brief asserting that the petitioners were not entitled to the requested writ of mandamus (DOL, December 31, 2020). OSHA explained that, while the agency has been considering the need for an infectious disease standard for healthcare workers since at least 2009, it has not yet made a final determination on the necessity of such a standard, and that the agency's limited resources at this time are best directed toward responding to the broader COVID–19 crisis. The Ninth Circuit granted the parties' request to stay the case because OSHA now intends to prioritize the infectious disease rulemaking.

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II. No Other Agency Action Is Adequate To Protect Employees Against Grave Danger

For the first time in its 50-year history, OSHA faces a ''new hazard'' so grave that it has killed almost 600,000 people in the United States in barely over a year, and infected millions more. COVID–19 can be spread to employees whenever an infected person exhales. Those employees, once infected, could end up unable to breathe without ventilators or suffer from failure of multiple body organs, and are at risk of death or long-term debilitation. The COVID–19 pandemic has taken a particularly heavy toll on workers in healthcare providing frontline care to patients with suspected or confirmed COVID–19, creating the precise situation that section 6(c)(1) of the OSH Act was enacted to address. This ETS is necessary to protect these employees from the grave danger posed by COVID–19.

When OSHA decided not to issue an ETS last spring, the agency had preliminarily determined that sufficient employee protection against COVID–19 could be provided through enforcement of existing workplace standards and the General Duty Clause of the OSH Act, coupled with the issuance of industry-specific, non-mandatory guidance. However, in doing so OSHA indicated that its conclusion that an ETS was not necessary was specific to the information available to the agency at that time, and that the agency would continue to monitor the situation and take additional steps as appropriate (see, *e.g.,* OSHA, March 18, 2020, Letter to Congressman Scott (stating ''[W]e *currently* see no additional benefit from an ETS in the *current* circumstances relating to COVID–19. OSHA is *continuing to monitor* this quickly evolving situation and will take the appropriate steps to protect workers from COVID–19 in coordination with the overall U.S. government response effort.'' (emphasis supplied); DOL May 29, 2020 at 20 (stating ''OSHA has determined this steep threshold [of necessity] is not met here, at least not *at this time*.'' (emphasis supplied))). OSHA's subsequent experience has shown that a new approach is needed to protect healthcare workers from the grave danger posed by the COVID–19 pandemic.

At the outset, employers do not have a reliance interest in OSHA's prior decision not to issue an ETS on May 29, 2020, which did not alter the status quo or require employers to change their behavior. See *Dep't of Homeland Security* v. *Regents of the Univ. of*

California, 140 S. Ct. 1891, 1913–14 (2020). As OSHA indicated when it made the decision, the determination was based on the conditions and information available to the agency at that time and was subject to change as additional information indicated the need for an ETS. In light of the agency's express qualifications and the surrounding context, any employer reliance would have been unjustified and cannot outweigh the countervailing urgent need to protect healthcare workers from the grave danger posed by COVID–19.

Multiple developments support a change in approach. First, as noted above, although the rates of death and hospitalization from COVID–19 have decreased in recent weeks as vaccines have become more widely available, COVID–19 continues to pose a grave danger to healthcare employees in settings where the risk of exposure to an infected person is elevated because of the nature of the work performed. In addition, some variability in infection rates in a pandemic is to be expected. While the curves of new infections and deaths can bend down after peaks, they often reverse course only to reach additional peaks in the future (Moore et al., April 30, 2020). Several new mutations—or variants—of the virus, preliminarily understood to be more contagious than the original, are now spreading in this country.

Second, as discussed in more detail in *Grave Danger* (Section IV.A of this preamble), while vaccines have been authorized for use for several months, and the nationwide effort to fully vaccinate all Americans is ongoing, more work is needed to build confidence among Americans in the vaccines so that enough people are protected to bring the virus under control, and to ensure that employees can get vaccinated without the risk of losing their jobs or losing pay. The standard is therefore necessary to facilitate vaccination among healthcare workers by requiring employers to ''provid[e] reasonable time and paid leave . . . to each employee for vaccination and any side effects experienced following vaccination'' (paragraph (m)).

The standard also further encourages vaccination by fully exempting ''well-defined hospital ambulatory care settings where all employees are fully vaccinated'' and all non-employees are screened and denied entry if they are suspected or confirmed to have COVID–19 (paragraph (a)(2)(iv)) and ''home healthcare settings where all employees are fully vaccinated'' and all non-employees at that location are screened prior to employee entry so that people with suspected or confirmed COVID–19 are not present (paragraph (a)(2)(v)). In addition, the standard encourages vaccination by exempting fully vaccinated employees from the requirements for facemasks, physical distancing, and barriers ''in well-defined areas where there is no reasonable expectation that any person with suspected or confirmed COVID–19 will be present'' (paragraph (a)(4)).

Further, OSHA's actual enforcement experience over the past year—which had only just begun when OSHA announced its previous views on the need for an ETS—has demonstrated that existing enforcement options do not adequately protect healthcare employees from the grave danger posed by COVID–19. As of May 23, 2021, OSHA and its State Plan partners have received more than 67,000 COVID-related complaints since March of 2020 (OSHA, May 23, 2021). OSHA has received more complaints about healthcare settings than any other industry.[14] Although the number of employee complaints has gone down in recent months since COVID–19 vaccines have become more widely available, OSHA continues to receive hundreds of employee complaints every month, including many that concern healthcare settings, asking for investigations of workplaces where employees do not believe they are being adequately protected from COVID–19 and indicating that their employers do not follow the guidance issued by the agency and the CDC.

The following narratives are just a few recent examples of the kinds of complaints OSHA continues to receive from healthcare employees on a regular basis:

- 5/21/21 Doctor's office failed to remove employee with COVID–19 symptoms.
- 5/21/21 Assisted living facility for the elderly failed to notify employees that they were exposed to residents with COVID–19.
- 5/19/21 Doctor's office did not maintain distancing for employees, did not notify employees of exposure to COVID–19, and did not remove employees with COVID–19 symptoms from the workplace.
- 5/19/21 Doctor's office did not ensure that technician wore gloves during COVID–19 treatment.
- 5/10/21 Clinic did not follow guidance for patient screening or removal from the workplace of potentially infected employee.
- 5/7/21 Psychiatric facility did not properly clean rooms of COVID–19 positive patients, did not train employees to properly remove infectious disease PPE when exiting COVID–19 positive areas to other areas of the facility, and allows employees who have tested positive for COVID–19 to continue to work at the workplace.
- 5/6/21 Hospital failed to promptly remove employee with COVID–19 from the workplace, notify other employees of their exposure to the COVID–19, and did not require employees to wear facemasks.
- 5/3/21 Doctor's office required employees to reuse isolation gowns to an extent not consistent with CDC guidance.

This ETS addresses numerous issues raised in these complaints, including physical distancing, PPE, cleaning and disinfection, and measures to keep contagious co-workers away from the workplace.

Based on its thorough review of OSHA's existing approach to protecting employees from COVID–19, OSHA finds that existing OSHA standards, the General Duty Clause, and non-mandatory guidance issued by OSHA are not adequate to protect healthcare employees from COVID–19. Similarly, the numerous guidance products published by other entities, such as CDC, are not sufficiently effective at protecting these employees because such guidance is not enforceable and there is no penalty for noncompliance. OSHA has determined that each of these tools, as well any combination of them, is inadequate to address COVID-related hazards in the settings covered by this standard, thereby establishing the need for this ETS.

This inadequacy has also been reflected in the number of states and localities that have issued their own mandatory standards in recognition that existing measures (including non-mandatory guidance, compliance assistance, and enforcement of existing standards) have failed to adequately protect workers from COVID–19. While these state and local requirements may have had positive effects where they have been implemented, they are no replacement for a national standard that would establish definitively that COVID–19 safety measures are no longer

[14] As a result of these complaints, federal OSHA has conducted 2,305 inspections (State Plans have conducted 7,203 inspections) as of May 23, 2021. On March 12, 2021, OSHA issued a National Emphasis program to ensure that OSHA continues to devote a high percentage of its inspection resources to COVID–19, with a target of roughly 1,600 inspections a year. These can be the result of complaints or programmed inspections targeted at high hazard industries. However, as described below, the effectiveness of the NEP will be hampered without the ETS given the inadequacy of OSHA's current enforcement tools.

voluntary for the workers covered by this standard. Without a national standard, the patchwork of inconsistent requirements has proven both ineffective at a national level and burdensome to employers operating across jurisdictions, increasing compliance costs and potentially limiting the ability to implement protective measures at scale (See ORCHSE, October 9, 2020). Congress has charged OSHA with protecting America's workforce, and an ETS is the only measure capable of providing adequate protection to the workers covered by this standard from the grave danger posed by COVID–19.

a. The Current Standards and Regulations Are Inadequate

In updated enforcement guidance issued in March 2021 (OSHA, March 12, 2021), OSHA identified a number of current standards and regulations that might apply when workers have occupational exposure to SARS–CoV–2 (Interim Enforcement Response Plan) (OSHA, March 12, 2021).[15] In addition to the standards listed there, OSHA has also cited the Hazard communication standard (29 CFR 1910.1200) during COVID–19 investigations. Accordingly, the complete list of potentially applicable standards and regulations follows:

- 29 CFR part 1904, Recording and Reporting Occupational Injuries and Illnesses. This regulation requires certain employers to keep records of work-related fatalities, injuries, and illnesses and report them to the government in specific circumstances.
- 29 CFR 1910.132, General requirements—Personal Protective Equipment (PPE). This standard requires that appropriate PPE, including PPE for eyes, face, head, and extremities, protective clothing, respiratory devices, and protective shields and barriers, be provided, used, and maintained in a sanitary and reliable condition.
- 29 CFR 1910.134, Respiratory protection. This standard requires that employers provide, and ensure the use of, appropriate respiratory protection when necessary to protect employee health.
- 29 CFR 1910.141, Sanitation. This standard applies to permanent places of employment and contains, among other requirements, general housekeeping and waste disposal requirements.
- 29 CFR 1910.145, Specification for accident prevention signs and tags. This standard requires the use of biological hazard signs and tags, in addition to other types of accident prevention signs and tags.
- 29 CFR 1910.1020, Access to employee exposure and medical records. This standard requires that employers provide employees and their designated representatives access to relevant exposure and medical records.
- 29 CFR 1910.1200, Hazard communication. This standard requires employers to keep Safety Data Sheets (SDS) for chemical hazards, provide SDSs to employees and their representatives when requested, and train employees about those hazards. The standard does not apply to biological hazards, but hazard communication becomes an issue for the SARS–CoV–2 virus when chemicals are used to disinfect surfaces. OSHA notes that, when such chemicals are used in the workplace, the employer is required to comply with the hazard communication standard. The agency has not incorporated hazard communication requirements in the ETS, but has included related training and notification requirements. Section 1910.1200 compliance is only peripherally related to protection against SARS–CoV–2 hazards, employers are generally aware of those requirements, and the requirements of § 1910.1200 are enforceable without being repeated in the ETS.

Through its enforcement efforts to date, OSHA has encountered significant obstacles demonstrating that existing standards and regulations are inadequate to address the COVID–19 hazard for healthcare workers, and has determined that a COVID–19 ETS is necessary to address these inadequacies. As discussed in further detail below, OSHA has determined that some of the above-listed standards—including Sanitation at § 1910.141—are in practice too difficult to apply to the COVID–19 hazard and have never been cited in COVID enforcement; other standards—such as Respiratory Protection at § 1910.134 and general PPE at § 1910.132—are more clearly applicable to the COVID–19 hazard, but for a variety of reasons have offered little protection to the vast majority of employees who are not directly caring for patients with suspected or confirmed COVID–19. Current CDC guidance does not indicate that respirators are generally needed outside of direct patient care, but CDC does support the protective measures the ETS would require for the workers it covers (Howard, May 22, 2021).

Finally, the remaining listed standards and regulations—for recordkeeping and reporting, accident prevention signs and tags, access to employee records, and hazard communication—while applicable to the COVID–19 hazard and important in the overall scheme of workplace safety, do not require employers to implement specific measures to protect workers from COVID–19. Further, as addressed in more detail below, even applicable regulations like the reporting requirements did not contemplate a hazard like COVID–19, and have proven to be difficult to apply to it. Thus, for the reasons elaborated in further detail below, OSHA has determined that its existing standards and regulations are insufficient to adequately address the grave danger posed by COVID–19 to healthcare workers.

First, most of the safety measures known to reduce the hazard of COVID–19 transmission are not explicitly required by existing standards: none expressly requires measures such as facilitating vaccination, facemasks, physical distancing, physical barriers, cleaning and disinfection (when appropriate), improved ventilation to reduce virus transmission, isolation of sick employees, minimizing exposures in the highest hazard settings such as aerosol-generating procedures on patients with suspected or confirmed COVID–19, patient screening and management, notification to employees potentially exposed to people with COVID–19, or training on these requirements. For example, although OSHA's existing Respiratory Protection and PPE standards require respirators and PPE such as gloves and face shields in some settings covered by the ETS, they do not require all of the other layers of protection required by the ETS that are necessary to mitigate the spread of COVID–19 in the workplace. See *Need for Specific Provisions* (Section V of the preamble).

Similarly, while the Sanitation standard at § 1910.141(a)(3) requires places of employment ''to be kept clean to the extent that the nature of the work allows,'' the standard does not require disinfection of potentially contaminated surfaces nor does it speak to the level or frequency with which cleaning is required to protect against an infectious

[15] The Interim Enforcement Response Plan also suggests that while OSHA's Bloodborne Pathogens standard (29 CFR 1910.1030) does not typically apply to respiratory secretions that may contain SARS–CoV–2, the provisions of the standard offer a framework that may help control some sources of the virus, including exposures to body fluids (*e.g.,* respiratory secretions) not covered by the standard. While this is true for some of the controls required by that standard, such as laundering and cleaning, it does not contain requirements to implement necessary controls to protect employees against airborne transmission of SARS–CoV–2, such as distancing, barriers, and ventilation. And in any event, it imposes no obligations unless blood or other potentially infectious materials (as defined in the standard) are present.

disease hazard like COVID–19. Accordingly, OSHA has not yet identified any instance in which the Sanitation standard could be applied in the agency's COVID–19 enforcement efforts. Thus, OSHA's efforts to enforce existing standards to address the COVID–19 hazard have been significantly hindered by the absence of any specific requirements in these standards related to some of the most important COVID–19-mitigation measures. The COVID–19 ETS addresses this issue by clearly mandating each of these necessary protections.

Second, because existing standards do not contain provisions specifically targeted at the COVID–19 hazard, it may be difficult for employers and employees to determine what particular COVID–19 safety measures are required by existing standards, or how the separate standards are expected to work together as applied to COVID–19. As explained in more detail in the *Need for Specific Provisions* (Section V of the preamble), the infection control practices required to address COVID–19 are most effective when used together, layering their protective impact. Because no such layered framework is currently enforced nationally, the existing standards leave large gaps in employee protection from COVID–19. An ETS with a national scope that contains provisions specifically addressing the COVID–19 hazards facing healthcare workers will provide clearer instructions to the average employer than the piecemeal application of existing standards. The ETS bundles all of the relevant requirements, providing a roadmap for employers and employees to use when developing a plan and implementing protections, so that employers and employees in the settings covered by this standard know what is required to protect employees from COVID–19. More certainty will lead to more compliance, and more compliance will lead to improved protection of employees.

Third, requirements in some existing standards may be appropriate for other situations but simply do not contemplate COVID–19 hazards. For example, as noted above, the Sanitation standard at § 1910.141 requires employers to provide warm water, soap, and towels that can be used for hand washing, an important protective action against COVID–19, and generally requires that places of employment be kept ''clean,'' but it does not specify *disinfection* as a cleaning procedure, even though disinfection is an important precaution against COVID–19 transmission. Nor does it require the provision of hand sanitizer where hand washing facilities cannot be made readily available. Similarly, existing standards do not address facemasks for a hazard such as COVID–19, which protect other workers (source control) as well as provide some degree of protection to the wearer. The ETS, developed in direct response to the COVID–19 hazard and associated pandemic, provides this needed specificity so the employers covered by the ETS understand exactly what is required during this unprecedented public health emergency.

Fourth, the existing recordkeeping and reporting regulations are not adequate to help the employer or the agency assess the full scope of COVID–19 workplace exposures. The recordkeeping regulations were not written with the nature of COVID–19 transmission or illness in mind. In order to adequately understand and thereby control the spread of COVID–19 in the workplace, it is critical that the employer has a record of all cases of COVID–19 occurring among employees; however, such information is outside of the scope of OSHA's existing recordkeeping requirements, which are limited to injuries or illnesses that the employer knows to be work-related. The existing regulations are premised on the assumption that employers can easily identify injuries or illnesses that are work-related, but COVID–19 transmission can occur in the workplace, the community, or the household, and it can be difficult to identify the point of transmission. In numerous investigations, OSHA has identified employee illnesses or deaths from COVID–19 that were not reflected in the employer's required recordkeeping logs because the employer was not able to determine whether the illness or death was work-related. The COVID–19 log required by the ETS will provide a fuller picture of the prevalence of SARS–CoV–2 in the workplace by requiring employers to record employee cases without a work-relatedness determination.

Furthermore, even where work-relatedness can be determined, the existing reporting regulations are also inadequate in ensuring OSHA has the full picture of the impact of COVID–19 in the settings covered by this standard because the regulations only require employers to report in-patient hospitalizations that occur within 24 hours of the work-related incident and to report fatalities that occur within thirty days of the work-related incident. But many COVID–19 infections will not result in hospitalization or death until well after these limited reporting periods; consequently they are not required to be reported to OSHA, which limits the agency's ability to fully understand the impact of COVID–19 on the workforce. In order to adequately understand and thereby control the spread of COVID–19 in the workforce, it is critical that the employer has a record of all cases of COVID–19 occurring among employees and that OSHA is timely informed of all work-related COVID–19 in-patient hospitalizations and fatalities.

OSHA's existing recordkeeping and reporting requirements are also inadequate for addressing the COVID–19 hazard in the workplaces covered by the ETS because the current reporting structure does not require employers to notify employees of possible exposures in the workplace. While the recordkeeping requirements require employers to make illness and injury records available to employees, 29 CFR 1910.35(b)(2), they do not create an affirmative duty requiring employers to notify employees when they may have been exposed to another employee with the disease. Given the transmissibility of COVID–19, timely notification of an exposure is critical to curbing further spread of COVID–19 and protecting employees from the COVID–19 hazard.

Thus, OSHA's existing recordkeeping and reporting requirements are not tailored to address hazards associated with COVID–19 in the workplaces covered by the ETS. As a result, they do not enable OSHA, employers, or employees to accurately identify and address such hazards. The ETS addresses that issue by requiring employers to record each instance identified by the employer in which an employee is COVID–19 positive, regardless of whether the instance is connected to exposure to COVID–19 at work; requiring employers to report work-related, COVID–19 in-patient hospitalizations and fatalities, regardless of when the exposure in the work environment occurred; and imposing an affirmative duty requiring employers to notify employees of COVID–19 exposure.

In conclusion, OSHA's experience has demonstrated that existing standards alone are inadequate to address the COVID–19 hazard. The limitations and inadequacies explained above prevent OSHA from requiring all of the layers of controls necessary to protect employees from COVID–19 under these existing standards, even in situations that are clearly hazardous to employees. Thus, OSHA finds that its existing standards are not sufficient to protect employees from the grave danger posed by COVID–19.

b. The General Duty Clause Is Inadequate To Meet the Current Crisis

Section 5(a)(1) of the OSH Act, or the General Duty Clause, provides the general mandate that each employer ''furnish to each of [its] employees employment and a place of employment which are free from recognized hazards that are causing or are likely to cause death or serious physical harm to his employees.'' 29 U.S.C. 654(a)(1). While OSHA has attempted to use the General Duty Clause to protect employees from COVID–19-related hazards, OSHA has found that there are significant challenges associated with this approach and therefore this ETS is necessary to protect the workers covered by this standard from the grave danger posed by COVID–19. While the General Duty Clause can be used in many contexts, in OSHA's experience over the past year, the clause falls short of the agency's mandate to protect employees from the hazards of COVID–19 in the settings covered by the standard. As explained more fully below, OSHA finds the ETS will more efficiently and effectively address those hazards. Cf. Bloodborne Pathogens, 56 FR 64004, 64007, 64038 (Dec. 6, 1991) (bloodborne pathogens standard will more efficiently reduce the risk of the hazard than can enforcement under the general duty clause).

As an initial matter, the General Duty Clause does not provide employers with specific requirements to follow or a roadmap for implementing appropriate abatement measures. The ETS, however, provides a clear statement of what OSHA expects employers to do to protect workers, thus facilitating better compliance. The General Duty Clause is so named because it imposes a *general* duty to keep the workplace free of recognized serious hazards; the ETS, in contrast, lays out clear requirements for COVID–19 plans, facemasks, distancing, barriers, cleaning, personal protective equipment, and training, among other things, and identifies the settings in which they are required. Conveying obligations as clearly and specifically as possible provides employers with enhanced notice of how to comply with their OSH Act obligations to protect workers from COVID–19 hazards. See, *e.g., Integra Health Mgmt., Inc.,* 2019 WL 1142920, at *7 n.10 (OSHRC No. 13–1124, 2019) (noting that standards ''give clear notice of what is required of the regulated community''); 56 FR 64007 (''because the standard is much more specific than the current requirements [general standards and the general duty clause], employers and employees are given more guidance in carrying out the goal of reducing the risks of occupational exposure to bloodborne pathogens'').

Moreover, several characteristics of General Duty Clause enforcement actions limit how effectively OSHA can use the clause to address hazards associated with COVID–19. Most important, the General Duty Clause is not a good tool for requiring employers to adopt specific, overlapping, and complementary abatement measures, like those required by the ETS, and some important worker-protective elements of the ETS (such as payment for medical removal) would be virtually impossible for OSHA to require and enforce under the General Duty Clause. Second, OSHA's burden of proof for establishing a General Duty Clause violation is heavier than for standards violations.

Third, the ETS will enable OSHA to issue more meaningful penalties for willful or egregious violations, thus facilitating better enforcement and more effective deterrence against employers who intentionally disregard their obligations under the Act or demonstrate plain indifference to employee safety. Fourth, the General Duty Clause does not provide complete protection to employees at multi-employer worksites, which are common situations in hospitals, where more than one employer controls hazards at the workplace. The ETS will permit more thorough enforcement in these situations. Each of these is discussed in more detail below.

General Duty Clause Citations Impose a Heavy Litigation Burden on OSHA

For contested General Duty Clause citations to be upheld, OSHA must demonstrate elements of proof that are supplementary to, and can be more difficult to show than, the elements of proof required for violations of specific standards, where a hazard is presumed. Specifically, to prove a violation of the General Duty Clause, OSHA needs to establish—in each individual case—that: (1) An activity or condition in the employer's workplace presented a hazard to an employee; (2) the hazard was recognized; (3) the hazard was causing or was likely to cause death or serious physical harm; and (4) feasible means to eliminate or materially reduce the hazard existed. *BHC Nw. Psychiatric Hosp., LLC* v. *Sec'y of Labor,* 951 F.3d 558, 563 (D.C. Cir. 2020).

For the first element of a General Duty Clause case, OSHA must prove that there is a hazard, *i.e.,* a workplace condition or practice to which employees are exposed, creating the potential for death or serious physical harm to employees. See *SeaWorld of Florida LLC* v. *Perez,* 748 F.3d 1202, 1207 (D.C. Cir. 2014); *Integra Health Management,* 2019 WL 1142920, at *5. In the case of COVID–19, this means showing not just that the virus is a hazard as a general matter—a fairly indisputable point—but also that the specific conditions in the cited workplace, such as performing administrative tasks in a waiting room setting where patients are seeking treatment for suspected or confirmed COVID–19, create a hazard. In contrast, an OSHA standard that requires or prohibits specific conditions or practices *establishes* the existence of a hazard. See *Harry C. Crooker & Sons, Inc.* v. *Occupational Safety & Health Rev. Comm'n,* 537 F.3d 79, 85 (1st Cir. 2008); *Bunge Corp.* v. *Sec'y of Labor,* 638 F.2d 831, 834 (5th Cir. 1981). Thus, in enforcement proceedings under OSHA standards, as opposed to the General Duty Clause, ''the Secretary need not prove that the violative conditions are actually hazardous.'' *Modern Drop Forge Co.* v. *Sec'y of Labor,* 683 F.2d 1105, 1114 (7th Cir. 1982). With OSHA's finding that the hazard of exposure to COVID–19 can exist in the workplaces covered by this standard (see *Grave Danger,* above), the ETS will eliminate the burden to repeatedly prove the existence of a COVID–19 hazard in each individual case under the General Duty Clause.

One of the most significant advantages to standards like the ETS that establish the existence of the hazard at the rulemaking stage is that the Secretary can require specific abatement measures without having to prove that the cited workplace is hazardous.[16] In contrast, under the General Duty Clause, the Secretary cannot require abatement before proving in the enforcement proceeding that an existing condition at the workplace is hazardous. For example, in a facial challenge to OSHA's Grain Handling Standard, which was promulgated in part to protect employees from the risk of fire and explosion from accumulations of grain dust, the Fifth Circuit acknowledged OSHA's inability to effectively protect employees from these hazards under the General Duty Clause in upholding, in large part, the standard.

[16] ''The Act does not wait for an employee to die or become injured. It authorizes the promulgation of health and safety standards and the issuance of citations in the hope that these will act to prevent deaths and injuries from ever occurring.'' *Whirlpool Corp,* v. *Marshall,* 445 U.S. 1, 12 (1980); see also *Arkansas-Best Freight Sys., Inc.* v. *Occupational Safety & Health Rev. Comm'n,* 529 F.2d 649, 653 (8th Cir. 1976) (noting that the ''[OSH] Act is intended to prevent the first injury'').

See *Nat'l Grain & Feed Ass'n* v. *Occupational Safety & Health Admin.,* 866 F.2d 717, 721 (5th Cir. 1988) (noting Secretary's difficulty in proving explosion hazards of grain handling under General Duty Clause). Although OSHA had attempted to address fire and explosion hazards in the grain handling industry under the General Duty Clause, ''employers generally were successful in arguing that OSHA had not proved that the specific condition cited could cause a fire or explosion.'' Id. at 721 & n.6 (citing cases holding that OSHA failed to establish a fire or explosion hazard under the General Duty Clause). In other words, the General Duty Clause was not an effective tool because OSHA could not prove that existing conditions at the cited workplace were hazardous. The Grain Handling Standard, in contrast, established specific limits on accumulations of grain dust based on its combustible and explosive nature, and the standard allowed OSHA to cite employers for exceeding those limits without the need to prove at the enforcement stage that each cited accumulation was likely to cause a fire or explosion. See id. at 725–26. The same logic applies to COVID–19 hazards. Given OSHA's burden under the General Duty Clause to prove that conditions at the cited workplace are hazardous, it is difficult for OSHA to ensure necessary abatement before employee lives and health are unnecessarily endangered by exposure to COVID–19. The ETS, on the other hand, allows OSHA to cite employers for each protective requirement they fail to implement without the need to prove in an enforcement proceeding that the particular cited workplace was hazardous at the time of citation without that particular measure in place.

An additional limitation of the General Duty Clause is that it requires OSHA to show that there was a feasible and effective means of abating the hazard. To satisfy this element, OSHA is required to prove that there are abatement measures that will be effective in *materially* reducing the hazard. See *Integra Health Management,* 2019 WL 1142920, at *12. Proving the existence of feasible abatement measures that will be effective in materially reducing the hazard usually requires testimony from an expert witness, which limits OSHA's ability to prosecute these cases as broadly as needed to protect more workers. See, *e.g.,* id. at *13 (requiring expert witness to prove proposed abatement measures would materially reduce hazard). In contrast, where an OSHA standard specifies the means of compliance, the agency has already made the necessary technical determinations in the rulemaking and therefore does not need to establish feasibility of compliance as part of its *prima facie* case in an enforcement proceeding; instead, the employer bears the burden of proving infeasibility as an affirmative defense. See, *e.g., A.J. McNulty & Co.* v. *Sec'y of Labor,* 283 F.3d 328, 334 (D.C. Cir. 2002); *S. Colorado Prestress Co.* v. *Occupational Safety & Health Rev. Comm'n,* 586 F.2d 1342, 1351 (10th Cir. 1978). Protecting as many workers as quickly as possible is especially critical in the context of COVID–19 because, as explained in Section IV.A, *Grave Danger,* it can spread so easily in the workplaces covered by this ETS.

The General Duty Clause Is Ill-Suited to Requiring Employers To Adopt a Comprehensive Set of Complementary Abatement Measures, Like Those Required by the ETS

As explained in Section V. *Need for the Specific Provisions of the ETS,* effective infection control programs use a suite of overlapping controls in a layered approach to ensure that no inherent weakness in any one approach results in an infection incident. Each of the practices required by the ETS provides some protection from COVID–19 on its own, but the practices must be used together to ensure adequate worker protection. However, General Duty Clause enforcement poses key obstacles that prevent OSHA from requiring the types of overlapping controls necessary to address COVID–19 hazards. Because the General Duty Clause requires OSHA to establish the existence and feasibility of abatement measures that can *materially reduce* a hazard, it can be difficult for OSHA to use 5(a)(1) to require a full suite of overlapping or complementary control measures, or, in other words, to require additional abatement measures in situations where an employer is doing *something,* but not everything the ETS will require, to address COVID–19 hazards.

In many cases over the past year where OSHA investigated COVID–19-related complaints, the agency discovered that employers were following some minimal mitigation strategy while ignoring other crucial components of employee protection. In such instances, because the employer had taken *some* steps to protect workers, successfully proving a General Duty Clause citation would have required OSHA to show that additional missing measures would have further *materially* reduced the COVID–19 hazard. Although OSHA believes each measure required by this ETS materially reduces the COVID–19 hazard, there are key challenges inherent in trying to make such a showing in an individual case, such as the difficulty of pinpointing exactly when and how employees could become infected with COVID–19 and establishing the magnitude of the effect particular abatement measures would have on reducing infection in the specific conditions present in the employer's workplace. See, *e.g., Pepperidge Farm, Inc.,* 17 OSH Cas. (BNA) 1993, 1997 WL 212599, at *51 (OSHRC No. 89–265, Apr. 26, 1997) (finding that additional feasible abatement measure established by the Secretary to address ergonomic hazard did not materially reduce the hazard in light of the other steps the employer had taken). The ETS cures this problem by imposing separate requirements for, and establishing the general effectiveness of, each necessary mitigation measure, thereby ensuring employers have an enforceable obligation to provide the full suite of workplace protections recommended by the CDC and other expert bodies.

Consider a hospital setting where patients with suspected or confirmed COVID–19 receive treatment. The employer requires respirators for employees providing direct care to those patients but little else to protect those employees or other workers in those settings who are not directly involved in patient care. Under the ETS, OSHA can cite the employer for violating the specific requirements necessary to protect all workers in those settings, such as facemasks for workers who are not directly caring for patients, physical distancing or barriers between administrative employees and patients who have not yet been screened for suspected or confirmed COVID–19, work practice controls for employees performing aerosol-generating procedures on people with suspected or confirmed COVID–19, patient screening and management, paid leave for vaccination, and medical removal protection.

Without the ETS, however, OSHA would have to cite the employer under the General Duty Clause for the much broader violation of failing to eliminate the recognized workplace hazard of COVID–19 infection. This would require OSHA to prove: (1) That the hazard of COVID–19 infection was present and recognized for employees at this particular healthcare workplace, and (2) that additional abatement methods would materially reduce the hazard, over and above the reduction achieved by the use of respirators as already required under 29 CFR 1910.134 for

exposure to people with suspected or confirmed COVID–19. Both of these elements would likely require expert witness testimony specific to conditions in this particular workplace, and it may be difficult to establish that *each* layer of protection necessary to comprehensively protect employees would have *materially* reduced the hazard depending on the facts of the specific instance.

Further, even where OSHA establishes a violation of the General Duty Clause, the employer is under no obligation to implement the precise feasible means of abatement proven by OSHA as part of its prima facie case. *Cyrus Mines Corp.,* 11 OSH Cas. (BNA) 1063, 1982 WL 22717, at *4 (OSHRC No. 76–616, Dec. 17, 1983). Thus, even in cases where OSHA prevails, the employer need not necessarily implement the specific abatement measure(s) OSHA established would materially reduce the hazard. The employer could select alternative controls and then it would be up to OSHA, if it wished to cite the employer again, to establish that the recognized hazard continued to exist and that adding physical distancing or barriers, for example, could materially reduce the hazard even further.

Finally, there are some crucial requirements in the ETS that OSHA would have difficulty enforcing under the General Duty Clause. Of particular note, OSHA is adopting provisions in the ETS that require paid time for vaccination and recovery from vaccine side effects, and removal of COVID–19-positive employees and other workers exposed to them from the workplace and payment of salary for employees who are removed (medical removal protection, or ''MRP''). These provisions are critical to protecting workers because they facilitate vaccination, which is the preferred means of protecting workers exposed to COVID–19 hazards, and removal of infected employees and their close contacts as soon as the employer knows they have COVID–19. Additional discussion of the importance of these provisions can be found in Section V. *Need for the Specific Provisions of the ETS.* While it might be possible for OSHA to establish the value of vaccination as a protective measure and the need to remove known infected employees in a General Duty Clause case, it is highly unlikely that OSHA could require payment to those employees, or other measures to encourage employees to get vaccinated or to let their employers know when they test positive for COVID–19. Rather, paid leave for vaccination and MRP are measures better implemented through OSHA's statutory authority to promulgate standards. Standards are forward-looking and can be used to create a comprehensive network of required, and in this case of layered, worker safety protections. The ETS creates just such a network, and vaccination and MRP are important layers of that approach.

The ETS Will Permit OSHA To Achieve Meaningful Deterrence When Necessary To Address Willful or Egregious Failures To Protect Employees Against the COVID–19 Hazard

As described above, in contrast to the broad language of the General Duty Clause, the ETS will clarify what exactly employers are required to do to protect employees from COVID–19-related hazards, making it easier for OSHA to determine whether an employer has intentionally disregarded its obligations or exhibited a plain indifference to employee safety or health. In such instances, OSHA can classify the citations as ''willful,'' allowing it to propose higher penalties, with increased deterrent effects. Early in the pandemic, shifting guidance on the safety measures employers should take to protect their employees from COVID–19 created ambiguity regarding employers' specific obligations. Thus, OSHA could not readily determine whether a particular employer had ''intentionally'' disregarded obligations that were not yet clear. And, even as the guidance began to stabilize, OSHA's ability to determine ''intentional disregard'' or ''plain indifference'' was difficult, for example, when an employer took some, but not all, of the necessary steps to sufficiently address the COVID–19 hazard. Given the current understanding that multiple layers of protection are necessary to adequately protect workers from COVID–19, an ETS will ensure that employers have clearer notice of their obligations. This will allow the agency to take appropriate steps to redress the situation where an employer has intentionally disregarded the requirements necessary to protect employees from the COVID–19 hazard, or has acted with plain indifference to employee safety.

Further, OSHA has adopted its ''egregious'' policy to impose sufficiently large penalties to achieve appropriate deterrence against bad actor employers who willfully disregard their obligation to protect their employees when certain aggravating circumstances are present, such as a large number of injuries or illnesses, bad faith, or an extensive history of noncompliance. (OSHA Directive CPL 02–00–080 (October 21, 1990.)) Its purpose is to increase the impact of OSHA's enforcement ability. This policy uses OSHA's authority to issue a separate penalty for each instance of willful noncompliance with an OSHA standard, such as each employee lacking the same required protections, or each workstation lacking the same required controls. It can be more difficult to use this policy under the General Duty Clause because the Fifth Circuit and the Occupational Safety and Health Review Commission have held that OSHA may only cite a hazardous condition once under the General Duty Clause, regardless of its scope. *Reich* v. *Arcadian Corp.,* 110 F.3d 1192, 1199 (5th Cir. 1997). Thus, even where OSHA finds that an employer willfully failed to protect a large number of employees from a COVID–19 hazard, OSHA likely could not cite the employer on a per-instance basis for failing to protect each of its employees. A COVID–19-specific ETS will clarify the permissible units of prosecution and thereby make clear OSHA's authority to separately cite employers for each instance of the employer's failure to protect employees and for each affected employee, where appropriate.

By providing needed clarity, the ETS will facilitate ''willful'' and ''egregious'' determinations that are critical enforcement tools OSHA can use to adequately address violations by employers who have shown a conscious disregard for the health and safety of their workers in response to the pandemic. Without the necessary clarity, OSHA has been limited in its ability to impose penalties high enough to motivate the very large employers who are unlikely to be deterred by penalty assessments of tens of thousands of dollars, but whose noncompliance can endanger thousands of workers. Without a willful classification (or a substantially similar prior violation), the maximum penalty for a serious General Duty Clause violation is $13,653, regardless of the scope of the hazard.

The General Duty Clause Provides Incomplete Protection at Multi-Employer Worksites

Finally, the General Duty Clause has limited application to multi-employer worksites like hospitals, as it cannot be used to cite an employer whose own employees were not exposed to a hazard even if that employer may have created, contributed to, or controlled the hazard. See *Solis* v. *Summit Contractors, Inc.,* 558 F.3d 815, 818 (8th Cir. 2009) (''Subsection (a)(1) [the General Duty Clause] creates a general duty running only to an employer's own employees,

while subsection (a)(2) creates a specific duty to comply with standards for the good of all employees on a multi-employer worksite.''). For example, if a janitorial services contractor were to send one employee who is COVID–19 positive into a healthcare setting and knowingly allow that employee to work around employees of other employers, the janitorial services contractor who created the hazard could not be issued a General Duty Clause citation because none of that employer's own employees would have been exposed to the hazard. This limitation of the General Duty Clause can prevent OSHA from citing the employer on a multi-employer worksite who may be the most responsible for an existing COVID–19 hazard or best positioned to mitigate that hazard.

For all of the reasons described above, OSHA finds that the General Duty Clause is not an adequate enforcement tool to protect the employees covered by this standard from the grave danger posed by COVID–19.

c. OSHA and Other Entity Guidance Is Insufficient

OSHA has issued numerous non-mandatory guidance products to advise employers on how to protect workers from SARS–CoV–2 infection. (See *https://www.osha.gov/coronavirus*) Even the most comprehensive guidance makes clear, as it must, that the guidance itself imposes no new legal obligations, and that its recommendations are ''advisory in nature.'' (See OSHA's online guidance, Protecting Workers: Guidance on Mitigating and Preventing the Spread of COVID–19 in the Workplace (January 29, 2021); and OSHA's earlier 35-page booklet, Guidance on Preparing Workplaces for Covid-19 (March 9, 2020)). This guidance, as well as guidance materials issued by other government agencies and organizations, including the CDC, the Centers for Medicare & Medicaid Services (CMS), the Institute of Medicine (IOM), and the World Health Organization (WHO), help protect employees to the extent that employers voluntarily choose to implement the practices they recommend.[17] Unfortunately, OSHA's experience shows that does not happen consistently or rigorously enough, resulting in inadequate protection for employees.

As documented in numerous peer-reviewed scientific publications, CDC, IOM, and WHO have recognized a lack of compliance with non-mandatory recommended infection-control practices (Siegel et al., 2007; IOM, 2009; WHO, 2009). OSHA was aware of these findings when it previously concluded that an ETS was not necessary, but at the time of that conclusion, the agency erroneously believed that it would be able to effectively use the non-mandatory guidance as a basis for establishing the mandatory requirements of the General Duty Clause, and informing employers of their compliance obligations under existing standards. As explained above, that has not proven to be an effective strategy. Moreover, when OSHA made its initial necessity determination at the beginning of the pandemic, it made an assumption that given the unprecedented nature of the COVID–19 pandemic, there would be an unusual level of widespread voluntary compliance by the regulated community with COVID–19-related safety guidelines (see, *e.g.,* DOL, May 29, 2020 at 20 (observing that ''[n]ever in the last century have the American people been as mindful, wary, and cautious about a health risk as they are now with respect to COVID–19,'' and that many ''protective measures are being implemented voluntarily, as reflected in a plethora of industry guidelines, company-specific plans, and other sources'')).

Since that time, however, developments have led OSHA to conclude that the same uneven compliance documented by CDC, IOM, and WHO is also occurring for the COVID–19 guidance issued by OSHA and other agencies. This was evidenced by a cross-sectional study performed from late summer to early fall of 2020 in New York and New Jersey that found non-compliance and widespread inconsistencies in COVID–19 response programs (Koshy et al., February 4, 2021). Several other factors have also been found to contribute to uneven implementation of controls to prevent the spread of COVID–19. For example, there has been a reported rise of ''COVID fatigue'' or ''pandemic fatigue''—*i.e.,* a decrease in voluntary use of COVID–19 mitigation measures over time (Silva and Martin, November 14, 2020; Meichtry et al., October 26, 2020; Belanger and Leander, December 9, 2020). In addition, the fear of financial loss; skepticism about the danger posed by COVID–19; and even a simple human tendency, called ''psychological reactance,'' to resist curbs on personal freedoms, *i.e.,* an urge to do the opposite of what somebody tells you to do, may also play a role in the uneven implementation of COVID–19 mitigation measures (Belanger and Leander, December 9, 2020; Markman, April 20, 2020).

The high number of COVID–19-related complaints and reports also suggests a lack of widespread compliance with existing voluntary guidance. Although the number of employee complaints is declining, OSHA continues to receive hundreds of complaints every month, including complaints alleging that healthcare employers are not consistently following non-mandatory CDC guidance to protect employees. If guidance were followed more strictly, or if there were enough voluntary compliance with steps to prevent illness, OSHA would expect to see a significant reduction in COVID–19-related complaints from employees.

The dramatic increases in the percentage of the population that contracted the virus toward the end of 2020 and in early 2021 indicated a continued risk of COVID–19 spread in workplace settings (for more information on the prevalence of COVID–19 see *Grave Danger* (Section IV.A of the preamble)) despite OSHA's publication of numerous specific and comprehensive guidance documents. OSHA has found that neither reliance on voluntary action by employers nor OSHA non-mandatory guidance is an adequate substitute for *specific, mandatory* workplace standards at the federal level. *Public Citizen* v. *Auchter,* 702 F.2d 1150 at 1153 (voluntary action by employers ''alerted and responsive'' to new health data is not an adequate substitute for government action). The ETS is one aspect of the national response to the pandemic that is needed to improve compliance with infection control measures by establishing clear, enforceable measures that put covered employers on notice that they must,

[17] Although the Centers for Medicare & Medicaid Services (CMS) has issued regulations requiring healthcare employers that accept payment through Medicare and Medicaid to implement nationally recognized infection control practices (see 42 CFR Pts. 400–699), those regulations do not obviate the need for this ETS. As a preliminary matter, not all healthcare workplaces covered by the ETS accept Medicare and Medicaid, and those that do not are not required to comply with the CMS regulations. Furthermore, OSHA has important enforcement tools that CMS lacks: OSHA can enforce a standard by responding to complaints, conducting random unannounced inspections, and issuing citations with penalties, whereas compliance with CMS regulations is generally validated through periodic accreditation surveys. The joint effect of the CMS regulations and a new ETS would improve the breadth, quality and implementation of infection control programs in a manner that the CMS regulations cannot do, and have not done, alone. Indeed, that has been OSHA's experience in enforcing its existing standards against healthcare employers that overlap with CMS requirements, such as the Respirator, PPE, and Bloodborne Pathogens standards. Thus, the ETS is necessary to provide additional coverage and enforcement tools above and beyond the CMS regulations.

rather than should, take action to protect their employees. For these reasons, OSHA finds that non-mandatory guidance efforts are not sufficient, by themselves or in conjunction with General Duty Clause enforcement, to protect employees covered by this ETS from being infected by, and suffering death or serious health consequences from, COVID–19.

d. A Uniform Nationwide Response to the Pandemic Is Necessary To Protect Workers

OSHA is charged by Congress with protecting the health and safety of American workers. Yet OSHA's previous approach proved ineffective in meeting that charge. While some states and localities stepped in to fill the gaps in employee protection, these approaches do not provide consistent protection to workers and have, in some cases, been relaxed prematurely, leading to additional outbreaks (Hatef et al., April 2021). In some states there are no workplace requirements at all. OSHA has determined that a Federal standard is needed to ensure sufficient protection for employees in all states in the settings covered by this ETS; clarity and consistency about the obligations employers have to protect their employees in these settings; and a level playing field among employers.

As the pandemic has continued in the United States, there has been increasing recognition of the need for a more consistent national approach (GAO, September 2020; Budryk, November 17, 2020; Horsley, May 1, 2020). One of the justifications for OSHA standards has always been to ''level the playing field'' so that employers who proactively protect their workforces are not placed at a competitive disadvantage (*Am. Textile Mfrs. Inst.* v. *Donovan,* 452 U.S. 490, 521 n.38 (1981)). Many employers have advised OSHA that they would welcome a nationwide ETS for that reason. For example, in its October 9, 2020 petition for a COVID–19 ETS, ORCHSE Strategies, LLC explained that it is ''imperative'' that OSHA issue an ETS to provide employers one standardized set of requirements to address safety and health for their workers (ORCHSE, October 9, 2020). This group of prominent business representatives explained that an ETS would eliminate confusion and unnecessary burden on workplaces that are struggling to understand how best to protect their employees in the face of confusing and differing requirements across states and localities. While noting that ''OSHA could not pre-empt a State from keeping its own rule (assuming it is 'at least as effective' as OSHA's standard),'' they also observed that ''historically, the impact of federal rulemaking in similar situations (*e.g.,* HazCom) has been that most, if not all, of the States ultimately adhere to the federal requirements . . . . That can only be accomplished if OSHA takes the lead'' (id.). ''Without an ETS,'' they continue, ''employers are left on their own to determine the preventive measures that need to be undertaken'' (id.).

Given that thousands of healthcare employees each week continue to be infected with COVID–19, many of whom will become hospitalized or die, OSHA recognizes that a patchwork approach to worker safety has not been successful in mitigating this infectious disease outbreak, and that an ETS is necessary to provide clear and consistent protection to covered employees across the country.

e. OSHA's Other Previous Rationales for Not Promulgating an ETS No Longer Apply

In addition to asserting that existing standards, guidance, and the General Duty Clause would provide sufficient tools to address COVID–19 hazards to employees, OSHA had previously cited the need to respond to evolving scientific knowledge about the virus as part of its rationale for not issuing an ETS during the late spring of 2020. Knowledge of the nature of COVID–19 was undoubtedly less certain at the beginning of the pandemic when OSHA made its initial determination that an ETS was not necessary. There have been recent changes in CDC recommendations for vaccinated people outside the healthcare context. However, for unvaccinated workers, since the summer of 2020 there has been considerable stability in the guidance from the CDC and other health organizations regarding the basic precautions that are essential to protect unvaccinated people from exposure to COVID–19 while indoors. And the CDC still recommends these precautions to protect vaccinated workers in healthcare settings. For example, the CDC's COVID–19 guidance on How to Protect Yourself & Others (CDC, March 8, 2021) includes the same guidance it issued in July 2020 regarding the basic protections of face coverings, distancing, barriers, and hand hygiene. Moreover, OSHA's previous concern—that an ETS would unintentionally enshrine requirements that are subsequently proven ineffective in reducing transmission—has proven to be overstated. Moreover, even after issuing an ETS OSHA retains the flexibility to update the ETS to adjust to the subsequent evolution of CDC workplace guidance. The major development in infection control over the last year—the development, authorization, and growing distribution and use of COVID–19 vaccines—is addressed in the ETS. Going forward, further developments can be addressed through OSHA's authority to modify the ETS if needed, or to withdraw it entirely if vaccination and other efforts end the current emergency. Nothing in the D.C. Circuit's decision in *In re Am. Fed'n of Labor & Cong. of Indus. Orgs.,* No. 20–1158, 2020 WL 3125324 (AFL–CIO, June 11, 2020); *rehearing en banc denied* (July 28, 2020) precludes OSHA's decision to promulgate an ETS now. To the contrary, at an early phase of the pandemic, when its most severe effects had not yet been experienced, the court decided not to second-guess OSHA's decision to hold off on regulation in order to see if its non-regulatory enforcement tools could be used to provide adequate protection against the virus. ''OSHA's decision not to issue an ETS is entitled to considerable deference,'' the court explained, noting the ''the unprecedented nature of the COVID–19 pandemic'' and concluding merely that ''OSHA reasonably determined that an ETS is not necessary *at this time.*'' (Id., with emphasis added).

Finally, it is worth noting that OSHA's conclusion as to the ineffectiveness of the current approach—*i.e.,* relying on existing enforcement tools and voluntary guidance—is supported by a report issued by the DOL Office of Inspector General, dated February 25, 2021, which concluded after an investigation that OSHA's prior approach to addressing the hazards of COVID–19 leaves employees across the country at increased risk of COVID–19 infection (DOL OIG, February 25, 2021). The DOL OIG report specifically recommended that OSHA reconsider its prior decision not to issue an ETS to provide the necessary protection to employees from the hazards of COVID–19.

f. Even in Combination, the Guidance and General Duty Clause Are Still Inadequate

Early in the pandemic, OSHA took the position that existing standards, together with the combination of non-mandatory guidance and General Duty Clause citations, would be sufficient to protect employees so that specific mandatory requirements would not be necessary. In theory, where existing standards did not address an issue directly, the remaining regulatory gap could be filled by guidance from OSHA,

which would provide notice of COVID–19 hazards and describe feasible means of abating them, enabling OSHA to later issue a General Duty Clause citation to an employer who had failed to follow that guidance. OSHA's enforcement experience has now disproven that theory. As explained above, existing standards leave an enormous regulatory gap that OSHA's guidance, together with the General Duty Clause, cannot cover for the settings covered by this ETS.

In practice, the combination of guidance and General Duty Clause authority has done little to protect employees in settings covered by the standard where employers were not focused on that goal. The limitations identified above, including the heavy litigation burden for General Duty Clause citations, remain. Instead of being able to rely on clear requirements in a standard, employers were left to wade through guidance not only from OSHA but also from multiple other agencies, states, media, and other sources without any clarity as to how the different guidance materials should work together or what to do when alternative guidance did not square with OSHA's guidance. Perhaps because OSHA's guidance was not mandatory, it was frequently ignored or followed only in part. As explained above, the General Duty Clause's shortcomings as an enforcement tool left OSHA, in most cases, ultimately unable to impose all of the layers of protection necessary to protect employees from COVID–19.

In sum, based on its enforcement experience during the pandemic to date, OSHA concludes that continued reliance on existing standards, together with the combination of guidance and General Duty Clause obligations, in lieu of an ETS, will not protect employees covered by this ETS against the grave danger posed by COVID–19.

g. Recent Vaccine Developments Demonstrate the Importance of the ETS; They Do Not Obviate the Current Need for an ETS

The development and availability of safe and highly effective vaccines is an important development in the nation's response to COVID–19. The very low percentage of breakthrough cases (illness among vaccinated people) have led to recent updates to CDC guidance acknowledging vaccination as an effective control to prevent hospitalization and death from COVID–19 to such an extent that the CDC has concluded that most other controls are not necessary to protect vaccinated people outside healthcare settings. In the United States, all people ages 12 and older are eligible to be vaccinated, and vaccines are readily available in most parts of the country.

However, despite the remarkable success of our nation's vaccine program and the substantial promise that vaccines hold, as explained below, OSHA does not believe they eliminate the need for this standard. OSHA embraces the value of vaccination and views the ETS as essential to facilitating access to this critical control for those workers who wish to receive it while still protecting those who cannot be, or will not be, vaccinated. And by excluding certain workplaces and well-defined work areas where all employees are fully vaccinated from all requirements of the standard (paragraphs (a)(2)(iv) and (v)), and exempting fully vaccinated workers in certain settings where not all employees are vaccinated from several requirements of the standard (paragraph (a)(4)), the ETS encourages vaccination for employers and employees who do not want to follow those requirements.

In addition, for vaccines to be effective, workers need first to actually receive them. While the supply of vaccines and their distribution continues to increase, as of the date of the promulgation of this standard, approximately a quarter of healthcare workers have not yet completed COVID–19 vaccination with many of those expressing vaccine hesitation (King et al., April 24, 2021). Although a majority of Americans over 65 are vaccinated, the percentage among the working-age population is much lower (44%) (CDC, May 24, 2021a). There are several barriers to vaccination for the working-age population. Many employees who want to be vaccinated may be unable to do so unless the employer authorizes time off work, or may be financially unable to absorb a reduced paycheck for taking unpaid leave to be vaccinated or potentially missing a significantly larger period of time from work (and a larger financial hit) because of the potential side effects of the vaccination (SEIU Healthcare, February 8, 2021). A recent Kaiser Foundation survey of people who expressed reluctance to be vaccinated indicates that 70% of those respondents (76% and 77% among Black and Latinx respondents, respectively) were concerned about side effects, and 45% (57% Black and 54% Latinx) cited fears that they might miss work if the side effects made them sick (KFF, May 6, 2021). Another recent study, which surveyed 500 businesses, found that paid time off for vaccination and recovery was the highest overall motivator for employees to get vaccinated (51%), which was even higher than employers offering the vaccine on site (49%) (Azimi et al., April 9, 2021). Yet a different report indicates that before the pandemic, about 70% of the lowest-wage workers had no access to paid sick leave, meaning that any time off for vaccination or recovery would result in lost wages for those who can least afford those losses (Gould, February 28, 2020). Despite the American Rescue Plan (ARP) extending tax credits for some employers to allow this sort of sick leave, such leave is not mandated. Those surveys are consistent with the experience among healthcare workers at Yale University and Yale New Haven Hospital. When workers were surveyed at the time the FDA granted Emergency Use Authorization of the Pfizer-BioNTech vaccine, the lack of incentives or mitigation of risk (*e.g.,* not using sick days or pay loss for side effects) was a key reason stated by people who identified themselves as unlikely to get the vaccine. (Roy et al., December 29, 2020). Following four months of vaccination efforts, researchers found that although 75% had been vaccinated, roughly half of low wage, hourly employees, had not yet been vaccinated, and based on their previous research, identified the provision of additional paid sick leave days as a critical barrier for this population of workers (Roy and Forman, April 7, 2021). Even when employees can arrange for time off for the first dose, some of the same difficulties may prevent workers from returning during the designated time window for the second dose of two-dose vaccines. The ETS addresses these obstacles with a requirement that employers must authorize paid leave to cover the time for vaccination and for recovery from side effects.

Further, there is a need to continue building vaccine confidence in some parts of the population, making the ETS even more important to assure safe working conditions during the period before these workers are vaccinated. Moreover, as discussed in more depth in *Grave Danger* (Section IV.A. of the preamble), even though vaccines are now more readily available, they do not protect all workers. Some workers are unable to be vaccinated for medical or other reasons, even if they are willing to be. And in immunocompromised workers, vaccines can be considerably less effective than in immunocompetent individuals.[18] And while some

[18] There is concern that vaccines may not be effective for immunocompromised individuals. A

Continued

employees may simply elect not to be vaccinated for personal reasons, OSHA has a statutory duty to ensure that employers protect those employees from the grave danger of COVID–19 regardless of their basis for refusing vaccination.

These factors, along with the uneven vaccination rates among some sub-populations, make the need for this ETS especially acute. For example, the Latinx and Black populations who have been disproportionately harmed by the virus also have the lowest vaccination rates (Ndugga et al., February 18, 2021; CDC, May 24, 2021a). This ETS can help facilitate vaccination among those groups, protect those who cannot or will not be vaccinated, and thereby mitigate the disproportionate impacts of the virus for workers in these groups.

Even when the ETS helps currently unvaccinated workers overcome the obstacles to becoming vaccinated, they must still be protected by the other measures of this standard until they are fully protected by the vaccine. With the two-dose vaccines in particular, the time from a first shot to fully effective vaccination is 5 to 6 weeks.

Furthermore, also increasing are new virus variants, the most prevalent of which, the B.1.1.7 variant first identified in the U.K., now appears responsible for almost 66% of the cases in the U.S (CDC, May 24, 2021b). While the currently authorized vaccines appear effective against all of the variants now circulating, promoting vaccination as quickly as possible becomes even more critical because the variant is not only more transmissible, it also appears to cause more severe disease.

Finally, while the science continues to develop, the full extent and duration of the immune response remains unknown. Additional evidence is also needed to determine the extent to which people who are vaccinated could still be infected and transmit the disease to others, even if they themselves are protected from the worst health effects. Although such cases do not appear to be common, the ETS would help protect these employees and their co-workers in mixed groups of vaccinated and unvaccinated people.

These issues, as elaborated further in the discussion of *Grave Danger,* demonstrate that the various protections required in this ETS are still necessary, even for workplaces in which many but not all members of the workforce have been vaccinated.

This pandemic has taken a devastating toll on all of American society, and addressing it requires a whole-of-government response (White House, April 2, 2021). This ETS is part of that response. OSHA shares the nation's hope for the promise of recovery created by the vaccines. But in the meantime, it also recognizes that measures to mitigate the spread of COVID–19, including encouraging and facilitating vaccination, are still necessary in the settings covered by this standard. However, although OSHA finds it necessary to continue these mitigation measures for the immediate future, the agency will adjust as conditions change. As more of the workforce becomes vaccinated and the post-vaccination evidence base continues to grow, and the CDC updates its guidance, OSHA will withdraw or modify the ETS to the extent the workplace hazard is substantially diminished in the settings covered by this ETS. However, at this point in time, the available evidence indicates that the ETS is still necessary to protect employees in the settings covered by this ETS, and the potential for higher immunity rates later on does not obviate the need to implement the ETS now.

study evaluating 67 individuals with blood cancers found that 46% of them did not generate an immune response despite being fully vaccinated (Agha et al., April 7, 2021). Almost three quarters of those with chronic lymphocytic leukemia were non-responsive. A study on 658 transplant recipients found that 46% of recipients did not develop an immune response, including 18% of those not on an immunosuppression regimen and 33% of those who received their transplant more than 12 years prior (Boyarsky et al., May 5, 2021). A study on those with chronic inflammatory disease found a three-fold reduction in immune response generated by vaccination in comparison to immunocompetent adults, including a 36 fold reduction for those receiving B cell depletion therapies (Deepak et al., April 9, 2021). Furthermore, the Australian Agency for Clinical Innovation issued a summary detailing significant concerns about the efficacy for vaccination for immunocompromised persons and need for these individuals to continue using non-pharmaceutical interventions (ACI, April 28, 2021). While vaccines are a highly effective tool to minimize infections, it cannot be overlooked that it is likely not an effective means of control for all individuals.

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V. Need for Specific Provisions of the ETS

Grave Danger (Section IV.A. of the preamble) identifies the danger of exposure to SARS–CoV–2 for healthcare workers and explains how the SARS–CoV–2 virus is transmitted. This section, on *Need for Specific Provisions,* examines the scientific underpinnings for the controls that OSHA has identified to stop that transmission in workplaces. In Section VIII, the *Summary and Explanation* for the various provisions of the ETS, OSHA

explains how those controls must be implemented in the workplace. Not all of the requirements of the ETS are examined in this *Need for Specific Provisions* section. Some are addressed fully in the *Summary and Explanation* sections.

A. Introduction—Effective Infection Prevention Utilizes Overlapping Controls

An effective infection prevention program utilizing a suite of overlapping controls in a layered approach better ensures that no inherent weakness in any one approach results in an infection incident. OSHA emphasizes that each of the infection prevention practices required by the ETS provide some protection from COVID–19 by themselves, but work best when used together, layering their protective impact to boost overall effectiveness. A common depiction of this approach in use is Reason's model of accident causation dynamics, more commonly referred to as the ''Swiss Cheese Model of Accident Causation'' (Reason, April 12, 1990). Reason combined concepts of pathogen transmission and airplane accidents to present a model that illustrated that accidents are the result of the interrelatedness of imperfect defenses and unsafe actions that are largely unobservable until an adverse outcome becomes apparent. Using the Swiss cheese analogy, each control has certain weaknesses or ''holes.'' The ''holes'' differ between different controls. By stacking several controls together with different weaknesses, the ''holes'' are blocked by the strengths of the other controls. In other words, if controls with different weaknesses are layered, then any unexpected failure of a single control is protected against by the strengths of other controls. The model provides a guiding approach to reduce incidents across many sectors (Reason et al., October 30, 2006) and that perspective is reflected in widely accepted approaches to controlling infectious diseases (HICPAC, January 1, 1996; Rusnak et al., July 31, 2004; CDC, 2012; WHO, 2016).

The CDC Healthcare Infection Control Practices Advisory Committee's (HICPAC) Isolation Guidelines, which apply to healthcare settings, are an example of established national guidelines that illustrate layered controls to prevent the transmission of infectious diseases (Siegel et al., 2007). The Isolation Guidelines recommend two tiers of precautions: Standard Precautions and Transmission-Based Precautions (*e.g.,* airborne, droplet, contact). Standard Precautions, under the Isolation Guidelines, are the minimum infection prevention practices that apply to patient care, regardless of the suspected or confirmed infection status of the patient, in any setting where health care is practiced. They are based on the principle that there is a possible risk of disease transmission from any patient, patient sample, or interaction with infectious material. For Standard Precautions, guidance follows that a certain set of controls should be implemented to reduce infectious disease transmission regardless of the diagnosis of the patient, in part because there is always baseline risk that is not necessarily either obvious or detectable. These precautions include controls such as improved hand hygiene, use of personal protective equipment, cleaning of equipment, environmental controls, handling of bed linens, changing work practices, and patient placement. When used in concert, these approaches protect workers from potential exposure to infectious agents.

The Isolation Guidelines' second tier of precautions, Transmission-Based Precautions, takes into consideration the transmission mechanism of specific diseases and complements Standard Precautions to better protect workers from the presence of known or suspected infectious agents. For instance, SARS–CoV–2, the infectious agent that causes COVID–19, is considered to be mainly transmissible through the droplet route in most settings (though there is evidence for airborne transmission as noted throughout this preamble). Droplet transmission occurs by the direct spray of large droplets onto conjunctiva or mucous membranes (*e.g.,* the lining of the nose or mouth) of a susceptible host when an infected person sneezes, talks, or coughs. Droplet precautions are a suite of layered controls that are designed to prevent the direct spray of infectious material and supplement the suite of layered controls used for Standard Precautions. They are designed to protect workers from infectious agents that can be expelled in large respiratory droplets from infected individuals. These added interventions are implemented when infection is known or suspected and include placing patients in single rooms or physically distant within the same room, increased mask usage, and limiting patient movement. COVID–19 is considered capable of spreading through multiple routes of transmission, including airborne. Thus, the CDC recommends respiratory protection, isolation gowns, and gloves in healthcare settings to protect workers in those settings.

While a suite of layered controls is appropriate for controlling infectious diseases, it is important to use the hierarchy of controls when choosing which controls to include and the order in which to implement them. Briefly, the hierarchy of controls refers to the concept that the best way to control for hazards is to preferentially utilize the most effective before complementing with less effective controls.[19] Ideally, the hazard is eliminated, which would likely mean using an option such as conducting a telehealth visit outside of a patient care setting with respect to COVID–19 to ensure that there is no shared workspace and thus no potential for employee exposure to COVID–19. When a telehealth visit is not possible, workers must be protected through the implementation of controls. Outside the realm of infection control, the utilization of an engineering control or a change in on-site work practices could alone effectively minimize a hazard in many cases. However, infection prevention failures often are not apparent until an outbreak occurs, resulting in many infected workers. Therefore, it is important for employers to not only adhere to the hierarchy of controls when identifying controls to implement, but also to augment layers of feasible engineering controls (*e.g.,* adequate ventilation, barriers) with administrative and work practice controls (*e.g.,* physical distancing, cleaning, disinfection, telework, schedule modification, health screening). Personal protective equipment (*e.g.,* gloves, respirators, and facemasks) can provide the final layer of control. This approach is consistent with both OSHA and CDC guidance for protecting workers and the public from COVID–19.

In addition to the broad recognition and implementation of layered controls to protect against infectious diseases, a recent study elucidated the effectiveness of isolated and layered controls, with respect to close contacts amidst several community COVID–19 outbreaks in Thailand (Doung-ngern et al., September 14, 2020). While individual controls, such as wearing a face covering or maintaining at least a minimum distance from others, significantly reduced cases (28% and 40%, respectively), the researchers concluded

[19] The hierarchy of controls is a longstanding occupational safety practice and OSHA policy. Under its hierarchy of controls policy reflected in a number of standards, OSHA typically only allows employers to rely on respirators or other PPE to the extent that engineering controls to eliminate the hazard are not feasible. See, *e.g.,* §§ 1910.134(a) (respiratory protection) and 1926.103 (respiratory protection); 1910.1000(e) (air contaminants); 1910.95(b) (occupational noise exposure) and 1926.101 (hearing protection).

that a layered approach would be expected to reduce infections by 84%.

Several similar studies evaluated the importance of layering controls during the 2002/2003 SARS outbreak caused by SARS–CoV–1, which is a different strain of the same species of virus as the virus that causes COVID–19 (SARS–CoV–2) and has some similar characteristics; importantly, both viruses are strains of the same viral species and exhibit the same modes of transmission. Researchers assessed five Hong Kong hospitals on how the utilization of interventions affected SARS transmission (Seto et al., May 3, 2003). In total, the study evaluated 244 workers on their compliance with wearing masks, gowns, and gloves as well as adhering to hand hygiene protocols. Among the 69 workers who fully complied with the layered controls, there were no infections. However, 13 of 185 workers who used only some of the interventions were infected. The researchers concluded that the combined practice of droplet and contact precautions together significantly reduced the risk of infection from exposures to SARS-infected individuals.

Another study investigated the approaches taken to reduce SARS–CoV–1 transmission in hospitals in Taiwan during the 2003 portion of the outbreak (Yen et al., February 12, 2010). Researchers surveyed forty-eight Taiwanese hospitals that provided care for 664 SARS–CoV–1 patients, including 119 healthcare workers, to determine which controls each hospital implemented. Control measures included isolation of fever patients in the Emergency Department (ED), installation of handwashing stations in the ED, routing patients from the ED to an isolation ward, installation of fever screen stations in the ED, and installation of handwashing stations throughout the hospital. Analysis showed that while early SARS–CoV–1 case identification at fever screening stations outside the hospital could reduce transmission inside the hospital by half, combining that intervention with other interventions could almost double that reduction.

A modeling effort to simulate an epidemic of seasonal influenza at a hypothetical hospital in Ann Arbor, Michigan, found that different interventions used in a layered approach would result in a greater predicted reduction in nosocomial cases (*i.e.,* healthcare-associated infections) (Blanco et al., June 1, 2016). The study evaluated six different intervention techniques thought to be effective against influenza, including hand hygiene, employee vaccination, patient pre-vaccination, patient isolation, therapies (*e.g.,* antibody treatments, steroids), and face coverings. The researchers found, based on the model, that while no individual intervention exceeded a 27% percent reduction in cases, utilizing all controls would prevent half of all cases. While this model employed influenza as the vehicle to examine the effectiveness of layered protections, it gives no reason to believe that this approach would not be equally effective for other viruses such as SARS–CoV–2.

In 2016, the World Health Organization, a specialized agency of the United Nations that is focused on international public health (WHO, 2016), addressed the use of layering interventions to reduce infections in performed systematic reviews in its ''Guidelines on Core Components of Infection Prevention and Control Programmes at the National and Acute Health Care Facility Level.'' OSHA's perspective of layered interventions (*e.g.,* engineering controls, work practice controls, personal protective equipment, training) is consistent with what the WHO Guidelines define as ''multimodality.'' WHO defines multimodality as follows:

> A [layered] strategy comprises several elements or components (three or more; usually five, *http://www.ihi.org/topics/bundles/Pages/default.aspx*) implemented in an integrated way with the aim of improving an outcome and changing behavior. It includes tools, such as bundles and checklists, developed by multidisciplinary teams that take into account local conditions. The five most common components include: (i) System change (availability of the appropriate infrastructure and supplies to enable infection prevention and control good practices); (ii) education and training of health care workers and key players (for example, managers); (iii) monitoring infrastructures, practices, processes, outcomes and providing data feedback; (iv) reminders in the workplace/communications; and (v) culture change within the establishment or the strengthening of a safety climate.

The WHO guidelines strongly recommend practicing multimodality/layered interventions to reduce infections based on WHO's systematic review of implementation efforts at facility-level and national scales. Based on a systematic review of 44 studies on implementing infection control practices at the facility level, and another systematic review of 14 studies on the success of National rollout programs using layered strategies, WHO concluded that using layered strategies was effective in improving infection prevention and control practices and reducing hospital-acquired illnesses (WHO, 2016).

Vaccination does not eliminate the need for layered controls for healthcare workers exposed to COVID–19 patients, which can result in exposures that are more frequent and potentially carrying higher viral loads than those faced in workplaces not engaged in COVID–19 patient care. The Director of the CDC's National Institute for Occupational Health (NIOSH) recently wrote to OSHA that layers of control are still needed for vaccinated healthcare workers who remain at ''particularly elevated risk of being infected'' while treating COVID–19 patients: ''The available evidence shows that healthcare workers are continuing to become infected with SARS–CoV–2, the virus that causes COVID–19, including both vaccinated and unvaccinated workers . . . Regardless of vaccination status, healthcare workers need additional protections such as respirators and other personal protective equipment (PPE) during care of patients with suspected or confirmed COVID–19.'' (Howard, May 22, 2021). Further, a recent CDC study found that despite the positive impact on the roll-out of large-scale vaccination programs on reducing the transmission of COVID–19, a decline in non-pharmaceutical interventions (NPIs; *e.g.,* physical distancing, face covering use) may result in a resurgence of cases (Borchering, May 5, 2021). The authors concluded that vaccination coverage in addition to compliance with mitigation strategies are essential to minimize COVID–19 transmission and prevent surges in hospitalizations and deaths. Thus, to effectively control COVID–19 transmission to those who are not vaccinated or immune, an increase in vaccination coverage in addition to NPIs, such as physical distancing, are crucial.

Based on the above evidence, OSHA is requiring in the ETS that healthcare employers must not only implement the individual infection prevention measures discussed in the following sections, but also layer their controls to protect workers from the COVID–19 hazard due to the additional protection provided to workers when multiple control measures are combined.

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B. COVID–19 Plan

An effective COVID–19 plan is modeled on the core components of safety and health programs, which utilize a systematic approach to reduce injuries and illnesses in the workplace. The occupational safety and health community uses various names to describe this type of systematic approach (*e.g.,* safety and health programs, safety and health management systems, and injury and illness prevention programs) and uses the terms ''plans'' and ''programs'' interchangeably. An effective safety and health program involves proactively and continuously identifying and mitigating hazards, before employees are injured or develop disease. The approach involves trained employees and managers working together to identify and address issues before the issues become a problem. Such an approach helps employers meet their obligation under the OSH Act to provide employees a place of employment free from recognized hazards (OSHA, January 2012; OSHA, October 18, 2016). The COVID–19 plan required by this ETS encompasses the core components of this type of safety and health programs. Developing and implementing a COVID–19 plan is an essential part of an effective response to the COVID–19 hazards present in the workplace because the process involves identifying employees who are at risk of exposure to the virus and determining how they can be effectively protected from developing COVID–19 using a multi-layered approach.

Many companies that have received awards for their safety and health accomplishments have credited safety and health programs for their success. Because of the value, effectiveness, and feasibility of such programs, many countries throughout North America, Asia, and Europe require employers to implement programs to prevent injury and illness. Numerous studies and data sources provide evidence of such programs improving safety and health management practices and performance which leads to reductions in injury, illness, and fatalities. For example, a review of the impact of implementation of safety and health programs in eight states showed a reduction of injury and illness rates ranging from 9% to more than 60% (OSHA, January 2012). In three of these states with mandatory injury and illness prevention programs, workplace fatality rates were up to 31% lower than the national average (OSHA, January 2012).

OSHA has traditionally identified seven core elements of successful safety and health programs including (1) management leadership, (2) worker participation, (3) hazard identification and assessment, (4) hazard prevention and controls, (5) evaluation and improvement, (6) coordination and communication at multi-employer sites, and (7) education and training (OSHA, January 2012; OSHA, October 18, 2016). The COVID–19 plan required by this ETS was developed with these elements in mind. The first core element, management leadership, involves a demonstrated commitment to establishing a safety and health culture and continuously improving safety and health in the workplace. A commitment to health and safety is demonstrated by implementing a clear plan for preventing illness and injury, and communicating the plan to all employees (including contractors and temporary staff). Designating a coordinator to track progress of the plan and ensure that all aspects of the plan are implemented further demonstrates management's commitment to employee safety and health (OSHA, 2005; OSHA, January 2012; OSHA, October 18, 2016).

The second, and one of the most important components of a safety and health program, is the participation of trained and knowledgeable employees, including those employed by other employers (*e.g.,* contractors, temporary staff). Employees provide unique perspective and expertise because they are often the most knowledgeable people about the hazards associated with their jobs and how those hazards can be controlled. Employees who are trained to recognize hazards and appropriate controls to address those hazards and know that they can speak freely to employers, can provide valuable input on hazards that need to be addressed, which can lead to a reduction in hazards or exposure to hazards. They can also provide input on improvements that are needed to protections that have already been implemented. An emphasis on employee participation is consistent with the OSH Act, OSHA standards, and

OSHA enforcement policies and procedures, which recognize the rights and roles of workers and their representatives in matters of workplace safety and health (OSHA, 2005; OSHA, January 2012; OSHA, October 18, 2016).

The third core element of a safety and health program approach is hazard identification and assessment. To be most effective, hazard assessments must be conducted as a team approach with management, coordinators, and employees involved in the hazard assessment process (*e.g.,* identifying potential hazards) and the development and implementation of the COVID–19 plan. An assessment to identify safety and health hazards can include surveying the facility to observe employee work habits and evaluating employee input from surveys or meeting minutes. Specifically, the risk of exposure to biological hazards, such as the COVID–19 virus, can be assessed by determining if workers could be exposed (*e.g.,* through close contact with patients, co-workers, or members of the public; contact with contaminated surfaces, objects, or waste) and if controls are present to mitigate those risks (OSHA, 2005; OSHA, October 18, 2016). While a standard can specify controls applicable to particular hazards, the hazard assessment can help identify where controls are needed in specific areas of a particular worksite.

The fourth core element of an effective workplace safety and health program approach is hazard prevention and control, which involves teams of managers, coordinators, and employees assessing if a hazard can be eliminated (*e.g.,* by working at home to eliminate potential virus exposure in the workplace). When hazards cannot be eliminated, the hazard prevention process considers which hazards can be controlled by implementing work practices (*e.g.,* regular cleaning, disinfecting, physical distancing) or controls (*e.g.,* physical barriers, improvements to the ventilation system). Additionally, the process of hazard prevention and control determines if PPE is required as part of a multi-layered strategy to protect workers from infectious biological agents (OSHA, 2005; OSHA, October 18, 2016). The controls may function more effectively when implemented in the most targeted manner following a hazard assessment and team-based evaluation.

The fifth core element of an effective safety and health program approach is evaluation and improvement. Safety and health programs require periodic evaluation to ensure they are implemented as intended and continue to achieve the goal of preventing injury and illness. This re-evaluation can reduce hazards, or result in improvements in controls to help reduce hazards. Managers have the prime responsibility for ensuring the effectiveness of the program but managers should work as a team with coordinators and employees to continually monitor the worksite to identify what is and is not working and make adjustments to improve worker safety and health measures (OSHA, January 2012; OSHA, October 18, 2016).

The sixth core element of an effective safety and health program approach is communication and coordination between host employers, contractors, and staffing agencies. Because the employees of one employer may expose employees of a different employer to a hazard, this communication is essential to protecting all employees. An effective program ensures that before employees go to a host worksite, both the host employer and staffing agencies communicate about hazards on the worksite, procedures for controlling hazards, and how to resolve any conflicts that could affect employee safety and health (*e.g.,* who will provide PPE). The exchange of information about each employer's plans can help reduce exposures by identifying areas where one employer may need to provide additional protections (barriers, timing of workshifts, etc.) to its employees. Additionally, exchanging contact information between employers can facilitate worker protection in case they need to report hazards or illnesses that may occur (OSHA, October 18, 2016). In order to reduce COVID–19 transmission in the workplace, it will be particularly important for employers to have clear plans about how they can quickly alert other employers if a worker at a multi-employer site subsequently tests positive for COVID–19 and was in close contact with workers of other employers.

The seventh core element of an effective safety and health program is education and training. Education and training ensures that employees, supervisors, and managers are able to recognize and control hazards, allowing them to work more safely and contribute to the development and implementation of the safety and health program (OSHA, 2005; OSHA, January 2012; OSHA, October 18, 2016). Later in this *Need for Specific Provisions* section there is a detailed explanation about the need for training as a separate control to minimize COVID–19 transmission.

The effectiveness of a safety and health program approach in preventing injury and illnesses is recognized by a number of authoritative bodies. In its *Total Worker Health* program, the National Institute for Occupational Safety and Health (NIOSH) lists a number of core elements that are consistent with OSHA's safety and health program approaches, including demonstrating leadership commitment to safety and health, eliminating or reducing safety and health hazards, and promoting and supporting employee involvement (NIOSH, December 2016).

The International Organization for Standardization (ISO) developed ISO 45001, a consensus standard to help organizations implement a safety and health management system (ISO, 2018). ISO notes that key potential benefits of the system include reduced workplace incidents, establishment of a health and safety culture by encouraging active involvement of employees in ensuring their health and safety, reinforcement of leadership commitment to health and safety, and improved ability to comply with regulatory requirements.

The American National Standards Institute (ANSI) and American Society of Safety Professionals (ASSP) also developed a health and safety management systems standard for the purpose of reducing hazards and risk in a systematic manner, based on a team approach that includes management commitment and employee involvement, with an emphasis on continual improvement (ANSI/ASSP, 2019). ANSI/ASSP note the widespread acceptance that safety and health management systems can improve occupational safety and health performance. (Id.) They further highlight OSHA reports of improved safety and health performance by companies who implement programs that rely on management system principles (*e.g.,* the Voluntary Protection Program), and that major professional safety and health organizations support management systems as effective in improving safety and health. As further proof that safety and health management systems are valuable, they note that many large and small organizations within the U.S. and internationally are implementing these systems.

Based on the best available evidence, OSHA concludes that a COVID–19 plan that is modeled on the safety and health program principles discussed above, implemented by a COVID–19 coordinator, influenced by employee input, and continuously evaluated, is an effective tool to ensure comprehensive identification and mitigation of COVID–19 hazards. As a result, OSHA concludes that a COVID–19 plan will reduce the incidence of COVID–19 in

the workplace by helping to ensure that all effective measures are implemented as part of a multi-layered strategy to minimize employee exposure to COVID–19.

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C. Patient Screening and Management

Limited contact with potentially infectious persons is a cornerstone of COVID–19 pandemic management. For example, screening and triage of everyone entering a healthcare setting is an essential means of identifying those individuals who have symptoms that could indicate infection with the SARS–CoV–2 virus (CDC, February 23, 2021). Persons with such symptoms can then be triaged appropriately to minimize exposure risk to employees. CDC guidance provides a number of approaches for screening and triage, including screening at entry, separate triage areas for patients desiring evaluation for COVID–19 concerns, and electronic pre-screening prior to arrival (CDC, February 23, 2021). Once identified, potentially infected individuals can then be isolated for evaluation, testing, and treatment. Triage increases the likelihood of implementation of the appropriate level of personal protective equipment for employees and other protections required for exposure to potentially infectious patients. Patient segregation in healthcare settings also reduces nosocomial (healthcare-acquired) infections for employees. Inpatients continue to require regular re-evaluation for COVID–19 symptoms.[20]

Symptoms-based screening is a standard component of infection control. This approach was recommended during the 2003 SARS epidemic (caused by SARS–CoV–1, a different strain of SARS) and is routinely recommended for airborne infections such as M. tuberculosis and measles, and as a general practice in infection control programs (Siegel et al., 2007). Because SARS–CoV–2 can be transmitted by individuals who are infected but do not have symptoms (asymptomatic and presymptomatic transmission), symptom–based screening will not identify all infectious individuals (Viswanathan et al., September 15, 2020). However, persons with symptoms early in their SARS–CoV–2 infection are among the most infectious (Cevik et al., November 19, 2020). Therefore, symptom–based screening will identify some of the highest–risk individuals for SARS–CoV–2 transmission and thereby reduce the risk to workers.

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D. Standard and Transmission-Based Precautions

Standard and Transmission-Based Precautions are well-accepted as important to controlling disease transmission (HICPAC, December 27, 2018; CDC, January 7, 2016). It should be noted that during times of significant transmission, such as during this pandemic, additional protections are needed to supplement the basic level of recommended precautions and practices in these guidelines. For instance, wearing at least a facemask regardless of interaction with known or suspected infectious patients is needed during the pandemic (CDC, February 23, 2021).

Standard Precautions refers to infection prevention practices, implemented in healthcare settings, where the presence of an infectious agent is assumed (*i.e.,* without the suspicion or confirmation of exposure). The use of Standard Precautions thus relies on the assumption that all patients, patient samples, potentially contaminated materials (*e.g.,* patient laundry, medical waste), and human remains in healthcare settings are potentially infected or colonized with an infectious agent(s). For example, Standard Precautions would include appropriate hand hygiene and use of personal protective equipment as well as practices to ensure respiratory hygiene, sharps safety, safe injection practices, and sterilization and disinfection of equipment and surfaces (CDC, February 23, 2021).

Transmission-Based Precautions add an additional layer of protection to Standard Precautions. Transmission-Based Precautions refers to those good infection prevention practices, used in tandem with Standard Precautions that are based on the way an infectious agent(s) may be transmitted. These precautions are needed, for example, when treating a patient where it is suspected or confirmed that the patient may be infected or colonized with agents that are infectious through specific routes of exposure (Siegel et al., 2007). For example, handwashing and safe handling of sharps (needles, etc.) are routine Standard Precautions. An infectious agent capable of airborne transmission through aerosols would require patient care in an airborne infection isolation room (AIIR), if available, under Transmission-Based Precautions.

Even before a patient is treated, certain Transmission-Based Precautions

[20] Limiting and monitoring points of entry to the setting will also help limit contact with potentially infectious persons. For further discussion, see the Need for Specific Provisions for Physical Distancing.

can be critical to protecting healthcare workers. For example, one typical precaution is that patients and visitors who enter a waiting room before being seen or triaged must wear facemasks, or face coverings, as a source control device to prevent them from spreading airborne droplets near the employees. These source control devices may also be critical to reducing the likelihood that COVID–19 is spread as the patients are transported from the admission area to a treatment area.

The critical need for implementing Standard and Transmission-Based Precautions in healthcare settings is evident in the Healthcare Infection Control Practices Advisory Committee's (HICPAC's) 2017 Core Infection Prevention and Control Practices for Safe Healthcare Delivery in All Settings.[21] The core practices included in that document include Standard and Transmission-Based Precautions, which, HICPAC recommended, need to be implemented in all settings where healthcare is delivered.

That Standard and Transmission-Based Precautions are a long-standing and essential element of infection control in healthcare industries is also evidenced by the CDC's 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings, which incorporate Standard and Transmission-Based Precautions into their recommendations. This 2007 Guideline updated 1996 guidelines, which introduced the concept of Standard Precautions and also noted the existence of infection control recommendations dating back to 1970 (Siegel et al., 2007).

Both Standard and Transmission-Based Precautions are recommended by the CDC for healthcare personnel during the COVID–19 pandemic (CDC, February 23, 2021). The CDC considers healthcare personnel (HCP) to include all paid and unpaid persons serving in healthcare settings who have the potential for direct or indirect exposure to patients or infectious materials, including body substances (*e.g.,* blood, tissue, and specific body fluids); contaminated medical supplies, devices, and equipment; contaminated environmental surfaces; or contaminated air. HCP include, but are not limited to, emergency medical service personnel, nurses, nursing assistants, home healthcare personnel, physicians, technicians, therapists, phlebotomists, pharmacists, students and trainees, contractual staff not employed by the healthcare facility, and persons not directly involved in patient care, but who could be exposed to infectious agents that can be transmitted in the healthcare setting (*e.g.,* clerical, dietary, environmental services, laundry, security, engineering and facilities management, administrative, billing, and volunteer personnel).

The CDC also has recommendations for protection of workers in industries associated with healthcare. According to the CDC's *Interim Infection Prevention and Control Recommendations for Healthcare Personnel During the Coronavirus Disease 2019 (COVID–19) Pandemic* (incorporated by reference, § 1910.509), on-site management of laundry, food service utensils, and medical waste should also be performed in accordance with routine procedures (CDC, February 23, 2021).

The work of the College of American Pathologists (CAP) illustrates the importance of taking core precautionary measures in healthcare industries during the pandemic. CAP has provided recommendations for staff protection during the COVID–19 pandemic. For example, CAP has provided COVID–19-specific autopsy recommendations which include biosafety considerations such as performing autopsies on COVID–19-positive cases in an airborne infection isolation room (College of American Pathologists, February 2, 2021).[22]

The Standard and Transmission-Based Precautions required by the ETS only extend to exposure to SARS–CoV–2 and COVID–19 protection. The agency does not intend the ETS to apply to other workplace hazards.

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E. Personal Protective Equipment (PPE)

As previously discussed in *Grave Danger* (Section IV.A. of the preamble), COVID–19 infections occur mainly through exposure to respiratory droplets (referred to as droplet transmission) when a person is in close contact with someone who has COVID–19. COVID–19 can sometimes also be spread by airborne transmission (CDC, May 13, 2021). As the CDC explains, when people with COVID–19 cough, sneeze, sing, talk, or breathe, they produce respiratory droplets, which can travel a limited distance—thereby potentially infecting people within close physical proximity—before falling out of the air due to gravity. Facemasks, face coverings, and face shields are all devices used for their role in reducing the risk of droplet, and potentially airborne, transmission of COVID–19 primarily at the source. Additional discussion on the efficacy of each device, and the need for facemasks and face shields specifically, is explained below. (Respirator use is also included in the ETS and more information on the

[21] HICPAC is a federal advisory committee that provides guidance to the CDC and the Secretary of the Department of Health and Human Services (HHS) regarding the practice of infection control. In March 2013, CDC charged HICPAC with a review of existing CDC guidelines to identify all recommendations that warrant inclusion as core practices. In response, a HICPAC workgroup was formed that contained representatives from the following stakeholder organizations: America's Essential Hospitals, the Association for Professionals in Infection Control and Epidemiology (APIC), the Council of State and Territorial Epidemiologists (CSTE), the Public Health Agency of Canada (PHAC), the Society for Healthcare Epidemiology of America (SHEA), and the Society of Hospital Medicine (SHM) (HICPAC, March 15, 2017). This process resulted in HICPAC's Core Infection Prevention and Control Practices for Safe Healthcare Delivery in All Settings.

[22] CAP is known for its peer-based Laboratory Accreditation Program. The Centers for Medicare & Medicaid Services (CMS) allows a CAP inspection in lieu of a CMS inspection. CAP inspections have a similar status with a number of other leading healthcare and biomedical laboratory authorities including the Joint Commission, United Network for Organ Sharing, the National Marrow Donor Program, the Foundation for the Accreditation of Cellular Therapies, and many state agencies (College of American Pathologists, February 1, 2021b). CAP has worked with the CMS to implement virtual laboratory inspections allowing labs to remain in compliance with Clinical Laboratory Improvement Amendments regulations (College of American Pathologists, February 1, 2021a).

need for respirators to prevent the spread of COVID–19 is discussed in the Need for Specific Provisions for Respirators, further below.)

Well-fitting facemasks, not face coverings, are the baseline requirement in healthcare settings because of their fluid resistant qualities (discussed in detail below). However, the role of facemasks and face coverings are otherwise similar in source control and personal protection for the wearer. OSHA's position on the importance of face coverings and facemasks is supported by a substantial body of evidence. Consistent and correct use of face coverings and facemasks is widely recognized and scientifically supported as an important evidence-based strategy for COVID–19 control. Accordingly, with specific exceptions relevant to outdoor areas and vaccinated persons, the CDC recommends everyone two years of age and older wear a face covering in public settings and when around people outside of their household (CDC, April 19, 2021). And, on January 21, 2021, President Biden issued Executive Order 13998, which recognizes the use of face coverings or facemasks as a necessary, science-based public health measure to prevent the spread of COVID–19, and therefore directed regulatory action to require that they be worn in compliance with CDC guidance while traveling on public transportation (*e.g.,* buses, trains, subway) and while at airports (Executive Order 13998, 86 FR 7205, 7205 (Jan. 21, 2021); CDC, February 2, 2021). Similarly, the World Health Organization (WHO) has recognized face coverings as a key measure in suppressing COVID–19 transmission, and thus, saving lives. The WHO observes that face coverings (and facemasks) serve two purposes, to both protect healthy people from acquiring COVID–19 and to prevent sick people from further spreading it (WHO, December 1, 2020).

I. Need for Facemasks

Facemasks are simple bi-directional barriers that tend to keep droplets, and to a lesser extent airborne particulates, on the side of the filter from which they originate. The term ''facemask,'' as used in this ETS, is defined as a surgical, medical procedure, dental, or isolation mask that is FDA-cleared, FDA-authorized, or offered or distributed as described in an FDA enforcement policy. These are most commonly referred to as ''surgical masks'' or ''medical procedure masks.'' As previously mentioned, facemasks reduce the risk of droplet transmission through their dual function as both source control and personal protection (OSHA, January 28, 2021; Siegel et al., 2007). In healthcare settings, facemasks have long been recognized as an important method of source control for preventing the spread of infectious agents transmitted via respiratory droplets (*e.g.,* in the operating room to prevent provider saliva and respiratory secretions from contaminating the surgical field and infecting patients). However, facemasks do not filter out very small airborne particles and do not provide complete protection even from larger particles because the mask seal is not tight (FDA, December 7, 2020).

Facemasks are designed and regulated through various FDA processes to protect the person wearing them. Not all devices that resemble facemasks are FDA-cleared or authorized. To receive FDA clearance, manufacturers are required to submit an FDA premarket notification (also known as a 510(k) notification) for new products. Data in the 510(k) submission must show that the facemask is substantially equivalent to a facemask already on the market in terms of safety and effectiveness. Facemasks are tested for fluid resistance, filtration efficiency (particulate filtration efficiency and bacterial filtration efficiency), differential pressure, flammability and biocompatibility (FDA, July 14, 2004).[23]

Research developed during the current SARS–CoV–2 pandemic provides evidence of the protection afforded by facemasks. First, a universal surgical masking requirement for all healthcare workers and patients was implemented in Spring 2020 in the Mass General Brigham healthcare system, which is the largest in Massachusetts (Wang et al., July 14, 2020). Based on daily infection rates among healthcare workers, the authors found that universal masking was associated with a significantly lower rate of SARS–CoV–2 positivity. Although the authors noted that other interventions, such as restricting visitors, were also put in place, they concluded that their results supported universal masking as part of a multi-pronged infection reduction strategy in healthcare settings.

Second, a systematic review and meta-analysis evaluated research on healthcare workers exposed to SARS–CoV–2, as well as the SARS and Middle East respiratory syndrome (MERS) viruses (Chu et al., June 27, 2020). Six studies compared the odds of infection in those who wore surgical or similar facemasks compared to those who did not wear any facemask; four of the six studies were on healthcare workers and all six were from the 2003 SARS epidemic. Participants who wore surgical or similar facemasks had only a third of the infection risk of those who did not wear any facemask.

Third, a review of respiratory protection for healthcare workers during pandemics noted that surgical mask material has been shown to protect against more than 95% of viral aerosols under laboratory conditions (Garcia-Godoy et al., May 5, 2020). The authors also reviewed research showing that surgical masks reduced aerosolized influenza exposure by an average of six-fold, depending on mask design.[24]

Finally, in one epidemiological study, a specialized team of contact tracers at Duke University Health System in North Carolina categorized recorded COVID–19 cases among their healthcare workers (Seidelman et al., June 25, 2020). Of the cases that were categorized as healthcare-acquired (meaning acquired as a result of either an unmasked exposure for greater than 10 minutes at less than 6 feet to another healthcare worker who was symptomatic and tested positive for the virus, or an exposure to a COVID–19-positive patient while not wearing all CDC-recommended PPE or while there was a breach in PPE), 70% were linked to an unmasked exposure to another healthcare worker.

Although cloth face coverings have gained widespread use outside of healthcare settings during this pandemic, OSHA has determined that cloth face coverings do not offer sufficient protection for covered healthcare workers for multiple reasons. First, cloth face coverings, as defined by the CDC, encompass such a wide variety of coverings that there is no assurance

[23] Medical devices are subject to premarket review through risk-based classification under the Federal Food, Drug, and Cosmetic Act. Premarket approval (PMA) applies to the highest-risk, Class III devices, and 510(k) notification applies to most Class II and some Class I devices. Under the 510(k) notification pathway, FDA determines whether the device is substantially equivalent to a lawfully marketed predicate device. Medical device manufacturers are required to submit a 510(k) notification if they intend to introduce a device into commercial distribution for the first time or reintroduce a device that will be significantly changed or modified to the extent that its safety or effectiveness could be affected. Such change or modification could relate to the design, material, chemical composition, energy source, manufacturing process, or intended use. For more information, see *https://www.fda.gov/medical-devices/device-advice-comprehensive-regulatory-assistance/how-study-and-market-your-device* and *https://www.fda.gov/medical-devices/device-approvals-denials-and-clearances/510k-clearances.*

[24] For a discussion of the efficacy of respirators over facemasks for protection against aerosolized particles, please see the respirator discussion in the *Need for Specific Provisions* section, below.

of any consistent protection to the wearer, and even source protection can vary significantly depending on the construction and fit of the face covering. Second, a number of studies suggest that, properly worn over the nose and mouth, facemasks provide better protection than face coverings, which is an important consideration in healthcare settings where there are regular, known exposures to COVID–19-positive persons. For example, one randomized trial of cloth face coverings compared rates of clinical respiratory illness, influenza-like illness, and laboratory-confirmed respiratory virus infections in 1,607 healthcare workers in 14 hospitals in Vietnam (MacIntyre et al., March 26, 2015). Infection risks were statistically higher in the cloth face covering group compared to the facemask group: The risk of influenza-like illness was 6.6 times higher, and the risk of laboratory-confirmed respiratory virus infection was 1.7 times higher, in those who wore cloth face coverings compared to those who wore facemasks. Another study which reviewed respiratory protection for healthcare workers during pandemics showed greater protection from surgical masks compared to face coverings (Garcia-Godoy et al., May 5, 2020). Finally, Ueki et al., (June 25, 2020) evaluated the effectiveness of cotton face coverings, facemasks, and N95s (a commonly used respirator) in preventing transmission of SARS–CoV–2 using a laboratory experimental setting with manikins. The researchers found that all offerings provided some measure of protection as source control, limiting droplets expelled from both infected and uninfected wearers, but that facemasks and N95s provided better protection than cotton face coverings. Specifically, the researchers found that when spaced roughly 20 inches apart, if both an infected and uninfected individual were wearing a cotton face covering, the uninfected person reduced inhalation of infectious virus by 67%. But if both individuals were wearing facemasks, exposure was reduced by 76% and when an infected individual was wearing an N95, exposure was reduced by 96%.

Third, cloth face coverings do not function as a barrier to protect employees from hazards such as splashes or large droplets of blood or bodily fluids, which is a common hazard in healthcare settings. And finally, OSHA has previously established that medical facemasks are essential PPE for many workers in healthcare, as enforced under both the PPE standard (29 CFR 1910.132) and more specifically, the Bloodborne Pathogens standard (29 CFR 1910.1030).

Given the health outcomes related to COVID–19 and the exposure characteristics found in healthcare settings (*e.g.,* splashes or large droplets of blood or bodily fluids), OSHA has determined that cloth face coverings are not appropriate for workers in these settings. Research clearly indicates that facemasks provide essential protection for workers in covered healthcare settings.

II. Need for Face Shields

The term ''face shield,'' as used in this ETS, is a device typically made of clear plastic, that covers the wearer's eyes, nose, and mouth, wraps around the sides of the wearer's face, and extends below the wearer's chin. Face shields have long been recognized as effective in preventing splashes, splatters, and sprays of bodily fluids and have a role in preventing the primary route of droplet transmission, although not aerosolized transmission. As explained above, OSHA has determined based on the best available evidence that facemask usage is a necessary protective measure to prevent the spread of COVID–19 for any covered employee. However, the use of face shields, a less protective barrier, is permitted to either supplement facemasks where there is a particular risk of droplet exposure, or as an alternative option in certain limited circumstances where facemask usage is not feasible.

Face shields are proven to provide some protection to the wearer from exposure to droplets, and OSHA has long considered face shields to be PPE under the general PPE standard (29 CFR 1910.132) and the Eye and Face Protection standard (29 CFR 1910.133) for protection of the face and eyes from splashes and sprays. The potential protective value of face shields against droplet transmission is supported by a 2014 study, in which NIOSH investigated the effectiveness of face shields in preventing the transmission of viral respiratory diseases. The purpose of the study was to quantify exposure of cough aerosol droplets and examine the efficacy of face shields in reducing this exposure. Although face shields were not found to be effective against smaller particles, which can remain airborne for extended periods and can easily flow around a face shield to be inhaled, the face shields were effective in blocking larger aerosol particles (median size of 8.5 μM). Face shields worn over a respirator also reduced surface contamination of the respirator by 97%. The study's final conclusion was that face shields can be a useful complement to respiratory protections; however, they cannot be used as a substitute for respiratory protection, when needed (Lindsley et al., June 27, 2014). A recent update of the Lindsley study (Lindsley et al., January 7, 2021) found that face shields blocked only 2% of aerosol produced by coughing. These findings suggest that face shields might be a relevant form of protection in healthcare settings to protect employees from droplet exposure when they could have close contact with individuals who are potentially infected with COVID–19.

Face shields have proven less effective as a method of source control or a method of personal protection than facemasks. For example, in considering face shields' value as source control, Verma et al., (June 30, 2020) observed the effect of a face shield on respiratory droplets produced by simulating coughs or sneezes with a manikin. The face shield initially blocked the forward motion of the droplet stream, but droplets were then able to flow around the shield and into the surrounding area. The study authors concluded that face shields alone may not be as effective in blocking droplets.

In another study, Stephenson et al., (February 12, 2021) evaluated the effectiveness of face coverings, facemasks, and face shields in reducing droplet transmission. Breathing was simulated in two manikin heads (a transmitter and receiver) that were placed four feet apart. Artificial saliva containing a marker simulating viral genetic material was used to generate droplets from the transmitter head. The researchers found that face coverings, facemasks, and face shields all reduced the amount of surrogate genetic material measured in the environment and the amount that reached the receiver manikin head at four feet. While face shields reduced surrogate genetic material by 98.6% in the environment and 95.2% at the receiver, genetic material was still deposited downward in the immediate area of the transmitter, suggesting that use of face shields without a facemask could result in a contamination of shared surfaces. This limits the effectiveness of face shields alone as a method of source control for shared workspaces. Additionally, face shields used as personal protective devices showed that the face shields protected the wearer from large cough aerosols directed at the face, but were much less effective against smaller aerosols which were able to flow around the edges of the shield and be inhaled (Lindsley et al., June 27, 2014).

Based on this evidence, OSHA has determined that face shields are not

generally appropriate as a substitute for a facemask because they are less effective at reducing the risk of droplet and potential airborne transmission. However, face shields do offer some protection from droplet transmission and are, accordingly, required by the ETS to be used in any circumstance where, for example, an individual may not be able to wear a facemask due to a medical condition or due to other hazards (*e.g.,* heat stress, arc flash fire hazards). In such limited (and often temporary) situations, a face shield may be the most effective measure to add a layer of protection to reduce workers' overall COVID–19 transmission risk, particularly when combined with other protective measures.

Additionally, OSHA recognizes that face shields can provide some additional protection when used in addition to a facemask by protecting the wearer's eyes and preventing their facemask from being contaminated with respiratory droplets from other persons. This additional protection may be particularly useful for employees who cannot avoid close contact with others or are unable to work behind barriers. Accordingly, the ETS allows employers to require face shields in addition to facemasks where employment circumstances might warrant the additional protection.

OSHA has always considered recognized consensus standards, with design and construction specifications, when determining the PPE requirements of the agency's standards, as required by the OSH Act (29 U.S.C. 655(b)(8)) and the National Technology Transfer and Advancement Act (15 U.S.C. 272 note).

The agency has already incorporated by reference the ANSI/ISEA Z87.1, Occupational and Educational Personal Eye and Face Protection Devices consensus standard for face shields in its Eye and Face Protection standard (29 CFR 1910.133). In this ETS the agency will incorporate by reference more recent editions of the ANSI/ISEA standard than are currently provided for in the existing standard. Additionally, for the limited purpose of complying with the ETS, the agency will also allow any face shield that meets the criteria outlined in the definition of ''face shield'' found in the definition sections of the ETS. That is: (1) Certified to the ANSI/ISEA Z87.1–2010, 2015, or 2020 standard; or (2) covers the wearer's eyes, nose, and mouth to protect from splashes, sprays, and spatter of body fluids, wraps around the sides of the wearer's face (*i.e.,* temple-to-temple), and extends below the wearer's chin. Any face shield that is worn for the purpose of complying with any OSHA standard other than Subpart U must still meet the requirements of 29 CFR 1910.133.

III. Need for Other Types of PPE

Gloves and gowns (overgarments) are the two most common types of PPE used in healthcare settings. A major principle of Standard Precautions is that all blood and body fluids, whether from a patient, patient sample, or infectious material, may contain transmissible infectious agents (Siegel et al., 2007). Therefore, gloves and gowns (overgarments) are required for certain examinations and all procedures. These include everything from venipuncture to removing medical waste to intubation. Similarly, gowns or similar protective clothing are necessary for any activities in which splashes or clothing contamination is possible. This applies as part of Standard Precautions as well as for care of patients on Contact Precautions where unintentional contact with contaminated environmental surfaces must be avoided (Siegel et al., 2007).

Eye protection in the form of goggles or face shields (as discussed above) can be used with facemasks to protect mucous membranes (eyes, nose, and mouth) in situations where, for example, sprays of blood or body fluids are possible. CDC recommends that healthcare workers wear eye protection during patient care encounters to ensure eyes are protected from infectious bodily fluids (CDC, February 23, 2021).

IV. Conclusion

In closing, the best available experimental and epidemiological data support consistent use of facemasks in healthcare work settings to reduce the spread of COVID–19 through droplet transmission. Adopting facemask policies is necessary, as part of a multi-layered strategy combined with other non-pharmaceutical interventions such as physical distancing, hand hygiene, and adequate ventilation, to protect employees from COVID–19. Based on the proven effectiveness of facemask use and the effectiveness of face shields in preventing contamination of facemasks and protecting the eyes when there is a particular risk of droplet exposure, OSHA's COVID–19 ETS includes necessary provisions for required use of facemasks and face shields (*e.g.,* either as a complementary device or in such circumstances where it is not appropriate or possible to wear a facemask). The ETS also requires additional PPE, such as gloves, gowns, and eye protection, in certain limited circumstances where there is likely exposure to persons with COVID–19.

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F. Respirators

I. Respirator Use in Healthcare

As noted in *Grave Danger* (Section IV.A. of the preamble), it is well-accepted that COVID–19 might spread through airborne transmission during aerosol-generating procedures (AGPs) such as intubation. Moreover, outside of AGP scenarios, CDC has noted growing evidence that airborne droplets and particles can remain suspended in air, travel distances beyond 6 feet, and be breathed in by others (CDC, May 13, 2021). *Grave Danger* (Section IV.A. of the preamble) notes studies showing that infectious viral particles have been collected at distances as far as 4.8 meters away from a COVID–19 patient (Lednicky et al., September 11, 2020), and airborne COVID–19 infection has been identified in a Massachusetts hospital (Klompas et al., February 9, 2021). Accordingly, the CDC recommends the use of airborne Transmission Precautions, including the use of respirators, for any healthcare workers caring for patients with suspected or confirmed COVID–19 (CDC, March 12, 2020). This airborne transmission risk is in addition to the risks associated with contact and droplet transmission. Respirators have long been recognized as an effective and mandatory means of controlling airborne transmissible diseases and the use of this personal protective equipment is regulated under OSHA's Respiratory Protection standard (29 CFR 1910.134).

The CDC has issued core guidelines for when ''healthcare personnel'' should use respiratory protection against COVID–19 infection (see *Interim Infection Prevention and Control Recommendations for Healthcare Personnel During the Coronavirus Disease 2019 (COVID–19) Pandemic* (CDC, February 23, 2021)). These recommendations have been based on the most currently available information about COVID–19, such as how the virus spreads, and are applicable to all healthcare settings in the U.S. In the guidance, the CDC defines ''healthcare settings'' as places where healthcare is delivered, including but not limited to: acute care facilities, long-term acute care facilities, inpatient rehabilitation facilities, nursing homes, assisted living facilities, home healthcare, vehicles where healthcare is delivered (*e.g.,* mobile clinics), and outpatient facilities (*e.g.,* dialysis centers, physician offices). In addition, the CDC provides examples of ''healthcare personnel,'' which include emergency medical service personnel, nurses, nursing assistants, home healthcare personnel, physicians, technicians, therapists, phlebotomists, pharmacists, students and trainees, contractual staff not employed by the healthcare facility, and persons not directly involved in patient care, but who could be exposed to infectious agents that can be transmitted in the healthcare setting (*e.g.,* clerical, dietary, environmental services, laundry, security, engineering and facilities management, administrative, billing, and volunteer personnel).

The CDC describes who is at greatest risk for COVID–19 infection in a set of FAQs designed for healthcare workers (CDC, March 4, 2021). In the FAQs, the CDC notes that those currently at greatest risk of COVID–19 infection are persons who have had prolonged, unprotected close contact (*i.e.,* within 6 feet for a combined total of 15 minutes or longer in a 24 hour period) with a patient with confirmed COVID–19, regardless of whether the patient has symptoms. Moreover, according to the CDC, persons frequently in congregate healthcare settings (*e.g.,* nursing homes, assisted living facilities) are at increased risk of acquiring infection because of the increased likelihood of close contact. In the FAQs, the CDC also reports that current data suggest that close-range aerosol transmission by droplet and inhalation, and contact followed by self-delivery to the eyes, nose, or mouth are likely routes of transmission for COVID–19, and that long-range aerosol transmission, has not been a feature of the virus. The CDC further explains that potential routes of close-range transmission include splashes and sprays of infectious material onto mucous membranes and inhalation of infectious virions (*i.e.,* the active, infectious form of a virus) exhaled by an infected person, but that the relative contribution of each of these is not known for COVID–19.

As the CDC states in the FAQs (CDC, March 4, 2021), although facemasks are routinely used for the care of patients with common viral respiratory infections, N95 filtering facepiece respirators or equivalent (*e.g.,* elastomeric half-mask respirators) or higher-level (*e.g.,* full facepiece respirators or PAPRs) respirators are routinely recommended to protect healthcare workers from emerging pathogens like the virus that causes COVID–19, which have the potential for transmission via small particles. The CDC further advises that while facemasks will provide barrier protection against droplet sprays contacting mucous membranes of the nose and mouth, they are not designed to protect wearers from inhaling small particles. Because of this, the CDC recommends the use of respirators for close-contact care of patients with suspected or confirmed COVID–19. The CDC recommends that N95 filtering facepiece respirators (FFRs) and higher-level respirators, such as other disposable FFRs, powered air-purifying respirators (PAPRs), and elastomeric respirators, should be used when both barrier and respiratory protection is

needed for healthcare workers because respirators provide better fit and filtration characteristics.

The CDC recommendations in *Interim Infection Prevention and Control Recommendations for Healthcare Personnel During the Coronavirus Disease 2019 (COVID–19) Pandemic* are divided into two separate categories. These include: (1) Recommended infection prevention and control practices when caring for a patient with suspected or confirmed COVID–19; and (2) recommended routine infection prevention and control practices during the COVID–19 pandemic (CDC, February 23, 2021).

A topic of interest related to the selection and use of respirators is their dual role as both personal protective equipment for the wearer and also source control to reduce the potential for transmission of potentially infectious exhaled air to others. While many filtering facepiece respirators do not have an exhalation valve, other filtering facepiece respirators do. The other ''higher-level'' respirators referenced above, and in CDC guidance (*e.g.,* half or full facepiece elastomeric respirators and PAPRs), do have exhalation valves. An exhalation valve is a portal in the respirator to allow unfiltered air to leave the respirator in order to reduce breathing resistance for the wearer and reduce moisture and heat buildup inside the respirator. While the exhalation valve does allow some particles to escape through the valve, it is important to compare the performance of a respirator with an exhalation valve to other acceptable forms of source control in order to determine if there are actually reduced levels of effectiveness. NIOSH studied this issue and released a technical report entitled ''Filtering Facepiece Respirators with an Exhalation Valve: Measurements of Filtration Efficiency to Evaluate Their Potential for Source Control'' (NIOSH, December 2020). In the report, NIOSH concluded that respirators with exhalation valves were equally effective as facemasks:

> this study found that unmitigated FFRs with an exhalation valve that were tested in an outward position (with particles traveling in the direction of exhalation) have a wide range of penetration, emitting between <1% and 55%. Further testing could measure greater particle penetration. Even without mitigation, FFRs with exhalation valves can reduce 0.35-μm MMAD particle emissions more consistently than surgical masks, procedure masks, cloth face coverings, or fabric from cotton t-shirts; . . . FFRs with an exhalation valve provide respiratory protection to the wearer, and this study demonstrates that they can also reduce 0.35-μm MMAD particle emissions to levels similar to or better than those provided by surgical masks and unregulated barrier face coverings.

The results that NIOSH observed can be explained in two ways. First, the majority of the leakage takes place around the seal by the nose and mouth, and respirators are designed to provide tight seals around the face so that there is only minimal leakage. Facemasks, on the other hand, do not typically seal tightly to the face and thus significant quantities of unfiltered air with small particles will also escape through the gaps on the side and at the nose, as well as potentially through the fabric of less protective filter materials. Second, the level of filtration in facemasks is highly variable, so a wide range of filter efficiencies have been acceptable under CDC guidance. The CDC does not recommend that respirators with exhaust valves be used as source controls, but the CDC's last updated recommendation on this subject was published in August of 2020, four months before the NIOSH study, and cited lack of data as the basis for the warning against relying on such respirators (CDC, April 9, 2021b). Therefore, the NIOSH study with its conclusion that respirators with exhaust valves are not less adequate as source controls than other acceptable source controls, appears to represent the best available evidence. OSHA therefore concludes that at this time there is no basis for OSHA to prohibit any NIOSH-approved filtering facepiece respirator from serving as both personal protective equipment and as source control. The NIOSH report also details methods of covering the filtering facepiece respirator's exhalation valve in various manners to further improve the effectiveness as source control, which OSHA considers a recommended practice, but not strictly necessary. There are also other methods that can be used to cover or filter the exhalation valve of elastomeric respirators (*e.g.,* place a medical mask over the respirator).

II. The CDC's Recommended Infection Prevention and Control Practices When Caring for a Patient With Suspected or Confirmed COVID–19

The CDC recommends that healthcare personnel (including workers that perform healthcare services and those that perform healthcare support services) who enter the room or area of a patient with suspected or confirmed COVID–19 adhere to Standard Precautions plus gown, gloves, and eye protection, and also use a NIOSH-approved N95 filtering facepiece or equivalent or higher-level respirator. The CDC notes in a set of FAQs that its recommendation to use NIOSH-approved N95 disposable filtering facepiece or higher-level respirators when providing care for patients with suspected or known COVID–19 is based on the current understanding of the COVID–19 virus and related respiratory viruses (CDC, March 10, 2021).

As noted above, the CDC recommendations listed in *Interim Infection Prevention and Control Recommendations for Healthcare Personnel During the Coronavirus Disease 2019 (COVID–19) Pandemic* are applicable to all U.S. settings where healthcare is delivered. To this end, the recommendations on respirator use are repeated in a variety of additional CDC guidelines for specific categories of healthcare settings (*e.g.,* nursing homes, dental settings, assisted living facilities, home health care settings). For example, in its guidance for nursing homes, the CDC recommends that residents with known or suspected COVID–19 be cared for while using all recommended PPE, including an N95 or higher-level respirator (CDC, March 29, 2021). In addition, in its guidance for dental settings, the CDC recommends that dental healthcare personnel who enter the room of a patient with suspected or confirmed COVID–19 use a NIOSH-approved N95 or equivalent or higher-level respirator, as well as other PPE (CDC, December 4, 2020). Additionally, in its guidance for assisted living facilities, the CDC recommends an N95 or higher-level respirator for personnel for situations where close contact with any (symptomatic or asymptomatic) resident cannot be avoided, if COVID–19 is suspected or confirmed in a resident of the assisted living facility (*i.e.,* resident reports fever or symptoms consistent with COVID–19) (CDC, May 29, 2020). Also, in its guidance for home healthcare settings, the CDC recommends that when home health agency personnel are involved in the care of people with confirmed or suspected COVID–19 at their homes, the personnel adhere to relevant infection prevention and control practices as described in the core healthcare guidance *Interim Infection Prevention and Control Recommendations for Healthcare Personnel During the Coronavirus Disease 2019 (COVID–19) Pandemic* (*i.e.,* that they use N95 or higher-level respirators) (CDC, October 16, 2020).

In addition to its infection prevention and control guidelines for healthcare personnel in healthcare settings, the CDC has issued infection prevention and control guidelines for conducting postmortem procedures on decedents/

human remains during the COVID–19 pandemic in *Collection and Submission of Postmortem Specimens from Deceased Persons with Confirmed or Suspected COVID–19* (CDC, December 2, 2020). In this guidance, the CDC recommends respirators while conducting autopsies on decedents in all cases due to the likelihood of aerosol generation during the performance of autopsies (CDC, December 2, 2020). The WHO has also issued guidelines for COVID–19 infection control for aerosol-generating procedures during autopsies. For example, WHO recommends respirators for procedures such as the use of power saws (WHO, September 4, 2020).

As supported by the above evidence and guidance from authoritative bodies, OSHA has concluded that healthcare employees have a heightened risk of COVID–19 infection when working with patients with known or suspected COVID–19. Accordingly, in any healthcare setting where employees are exposed to patients with known or suspected COVID–19, whether or not AGPs are performed, employers are required to provide N95s or higher-level respirators and follow all requirements under 29 CFR 1910.134, including medical evaluations and fit testing.

III. Applicability of the Respiratory Protection Standard to COVID–19

OSHA's Respiratory Protection standard (29 CFR 1910.134) has general requirements for respiratory protection for workers exposed to respiratory hazards, including the COVID–19 virus. In the context of the pandemic, the agency has applied the Respiratory Protection standard to situations in healthcare settings where workers are exposed to suspected or confirmed sources of COVID–19. OSHA's Respiratory Protection standard has been in effect since 1998 and the purpose of those controls have been established for decades (63 FR 1152, January 8, 1998). The standard contains requirements for the administration of a respiratory protection program, with worksite-specific procedures, respirator selection, employee training, fit testing, medical evaluation, respirator use, respirator cleaning, maintenance, and repair, among other requirements. It is important to note that the standard applies to ''biological hazards'' (63 FR 1180, January 8, 1998). Accordingly, the agency will continue to apply the Respiratory Protection standard to work tasks and situations in healthcare as covered by 29 CFR 1910.502.

IV. Respirator Provisions Tailored to the COVID–19 Pandemic Will Clarify Employer Responsibilities

Notwithstanding the applicability of the Respiratory Protection standard, as OSHA will explain in this discussion, it is imperative that the ETS contain additional provisions related to the employer's discretion to select respirators beyond what is required by 29 CFR 1910.134. These additional requirements are necessary in order to appropriately protect workers in healthcare industries. In the *Need for the ETS* (Section IV.B. of the preamble), OSHA has addressed why existing standards in general are inadequate to address the COVID–19 hazard. In this discussion the agency focuses more specifically on how clarifications regarding respirator need and use will help address COVID–19 hazards.

Many employers are confused as to when respiratory protection is required for protection against COVID–19, leaving many unprotected healthcare workers at high risk of becoming infected with COVID–19. This confusion has been exacerbated by two factors. First, many employers that need to provide respirators to protect their workers from COVID–19 have never needed to provide respirators to their workers in the past (*e.g.,* many employers in the home health care or nursing home sector), or have not had to routinely provide respirators to certain workers in their facilities to protect them against infectious disease hazards (*e.g.,* the housekeeping or facilities maintenance staff in some medical facilities). Second, there have been respirator and fit testing supply shortages and a widespread misinterpretation by employers of OSHA's temporary enforcement memoranda on respiratory protection. One issue of great concern to the agency is a misunderstanding by employers about crisis capacity strategies, which were initially suggested by the CDC as a means to optimize supplies of disposable N95 FFRs in healthcare settings when the alternative would be no respiratory protection at all. Many workers report that their employers have employed crisis capacity strategies as the *de facto* daily practice, even when additional respirators were available for use. To address these issues, the ETS contains clear mandates on when respiratory protection is required for protection against COVID–19 and contains a note encouraging employers to use elastomeric respirators or PAPRs instead of filtering facepiece respirators to prevent shortages and supply chain disruption.

To address initial N95 FFR shortages, the CDC began to create and issue a series of strategies to optimize supplies of disposable N95 FFRs in healthcare settings when there is limited supply (CDC, April 9, 2021a). The strategies are based on the three general strata that have been used to describe surge capacity to prioritize measures to conserve N95 FFR supplies along the continuum of care (Hick et al., June 1, 2009). Contingency measures (temporary measures during expected N95 shortages), and then crisis capacity measures (emergency strategies during known shortages that are not commensurate with U.S. standards of care), augment conventional capacity measures and are meant to be considered and implemented sequentially. However, as the supply of respirators for healthcare personnel has increased, the CDC and FDA have encouraged employers to transition away from the most extreme measures of respirator conservation, crisis and contingency capacity strategies, to conventional use (FDA, April 9, 2021; CDC, April 9, 2021a). The use of crisis capacity strategies is likely to increase the risk of COVID–19 exposure when compared to conventional and contingency capacity strategies.

The CDC's conventional capacity strategies for optimizing the supply of N95 FFRs, which the CDC recommends be incorporated into everyday practices, include a variety of measures, such as training on use and indications for the use of respirators, just-in-time fit testing, limiting respirators during training, qualitative fit testing, and the use of alternatives to FFRs. CDC's conventional capacity strategy recommendation is to use NIOSH-approved alternatives to N95 FFRs where feasible. These include other classes of disposable FFRs, reusable elastomeric half-mask and full facepiece air-purifying respirators, and reusable powered air-purifying respirators (PAPRs). All of these alternatives provide equivalent or higher-level protection than N95 FFRs when properly worn. To assist employers in this effort, NIOSH maintains a searchable, online Certified Equipment List identifying all NIOSH-approved respirators (NIOSH, n.d., retrieved on January 11, 2021). Since they are reusable, elastomeric respirators and PAPRs have the added advantage of being able to be disinfected, cleaned, and reused according to manufacturers' instructions. As such, they can be used by workers after the COVID–19 pandemic and during future pandemics that may again create N95 FFR

shortages. Consistent with this, the ETS provides in a note that, where possible, employers are encouraged to select elastomeric respirators or PAPRs instead of filtering facepiece respirators to prevent shortages and supply chain disruption.

Also consistent with this, the ETS provides in the same note that, when there is a limited supply of filtering facepiece respirators (and only when there is a limited supply of filtering facepiece respirators), employers may follow the CDC's *Strategies for Optimizing the Supply of N95 Respirators* (April 9, 2021a). This may include the use of respirators beyond the manufacturer-designated shelf life for healthcare delivery; use of respirators approved under standards used in other countries that are similar to NIOSH-approved N95 respirators; limited re-use of N95 FFRs; and prioritizing the use of N95 respirators and facemasks by activity type. However, again, the FDA and CDC are recommending healthcare personnel and facilities transition away from crisis capacity conservation strategies, such as decontaminating or bioburden reducing disposable respirators for reuse, due to the increased domestic supply of new respirators. The FDA and CDC believe there is an increased supply of respirators to transition away from these strategies (FDA, April 9, 2021; CDC, April 9, 2021a).

OSHA notes finally that its enforcement of the Respiratory Protection standard has been complicated by the respirator and fit-testing supply shortages incurred during the pandemic. In response to these shortages, the agency issued numerous temporary enforcement guidance memoranda allowing its Compliance Safety and Health Officers (CSHOs) to exercise enforcement discretion when considering issuing citations under the Respiratory Protection standard and/or the equivalent respiratory protection provisions of other health standards during the pandemic (OSHA, n.d., Retrieved December 22, 2020). OSHA's temporary enforcement memoranda are aligned with CDC's *Strategies for Optimizing the Supply of N95 Respirators,* which recommend a variety of conventional, contingency, and crisis capacity control strategies, as mentioned above (CDC, April 9, 2021a). Unfortunately, these memoranda have been widely misinterpreted by employers, resulting in additional confusion about OSHA's respiratory protection requirements during the pandemic. OSHA bases this conclusion on staff expertise and experience, as well as on reporting in news media articles (Safety + Health, April 9, 2020; Bailey and Martin, March 19, 2020). (See also *Need for the ETS* (Section IV.B. of the preamble).) For example, employers have misinterpreted the temporary enforcement guidance memoranda as offering blanket waivers or exemptions for complying with certain provisions of the Respiratory Protection standard (*e.g.,* annual fit-testing requirements). In addition, many employers did not understand that these memoranda allow for enforcement discretion by CSHOs only in circumstances where an employer can demonstrate that it made unsuccessful but objectively reasonable efforts to obtain and conserve supplies of FFRs and fit-testing supplies. While the memoranda were intended as guidelines for CSHOs, employer misinterpretation of these memoranda has resulted in fewer protections for workers, particularly in healthcare industries.

OSHA is therefore clarifying that respirators are required for the protection of workers exposed to suspected or confirmed sources of COVID–19 in healthcare settings, and in all of those cases the respirators must be used in accordance with the Respiratory Protection standard (29 CFR 1910.134). OSHA also encourages employers, where possible, to select elastomeric respirators or PAPRs instead of filtering facepiece respirators to prevent shortages and supply chain disruption. Because the crisis capacity strategy is less protective, the employer should only use crisis capacity strategies for a limited period of time and take immediate steps to purchase and use elastomeric respirators or PAPRs in order to prevent future shortages and further expose their workers to the grave danger of COVID–19.

V. Conclusion

The best available evidence demonstrates that respirator use is an important means of reducing the likelihood of COVID–19 infection of the wearer when used in accordance with § 1910.134. Respirators are necessary controls that provide some protection to healthcare workers and healthcare support service workers when exposed to persons with known or suspected COVID–19.

Based on the above analysis, the agency concludes that it is necessary to add into the ETS respiratory protection requirements tailored specifically to the COVID–19 pandemic. These requirements will assist employers in identifying when respiratory protection is required for healthcare workers and will help address and strengthen worker protection during the pandemic. To this end, the ETS takes a prioritization approach to the conservation of respirators by requiring the use of respirators only where airborne transmission is the most likely (when employees are exposed to persons with suspected or confirmed COVID–19, or in accordance with Standard and Transmission-Based Precautions in healthcare settings).

The increased certainty associated with the respirator requirements in the healthcare section and added flexibility of allowing employers to follow 29 CFR 1910.504 in some limited circumstances will lead to more compliance, and more compliance will lead to improved protection of workers. In addition, a note in the ETS will better inform employers that they can consider selecting from other NIOSH-approved respirator options (*i.e.,* elastomeric respirators and PAPRs) as alternatives to N95 FFRs for protection against COVID–19, as well as other respiratory infections (*e.g.,* tuberculosis, varicella, etc.) both during the pandemic and beyond. Knowledge of alternative respiratory protection options for healthcare employers to consider will help them choose appropriate alternative respirators and help mitigate respirator supply shortages.

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G. Mini Respiratory Protection Program

I. Introduction

OSHA emphasizes that when respirators are required under the ETS to protect employees against exposure to suspected or confirmed sources of COVID–19, they must be used in accordance with the Respiratory Protection standard (29 CFR 1910.134). Moreover, nothing in the ETS changes an employer's obligation to identify hazards or provide a respirator that must be used in accordance with the Respiratory Protection standard for any other workplace hazard that might require respiratory protection (*e.g.,* silica, asbestos, airborne infectious agents such as *Mycobacterium tuberculosis*).

OSHA's Respiratory Protection standard requires employers to develop and implement a comprehensive written respiratory protection program, required worksite-specific procedures and elements that include, but are not limited to, respirator selection and use, medical evaluation, fit testing, respirator maintenance and care, and training. Establishing such a program can take time to establish and require a level of expertise that some employers do not have, particularly if they are a covered healthcare employer that did not typically have respiratory hazards before COVID–19 (*e.g.,* many employers in the home health care or nursing home sector). In such cases, these regulatory requirements may have unintentionally prevented employers from providing their employees with a higher level of respiratory protection than afforded by a facemask in circumstances where it may have been beneficial to do so.

The ''mini respiratory protection program'' section of the ETS (29 CFR 1910.504) is designed to strengthen employee protections with a small set of provisions for the safe use of respirators designed to be easier and faster to implement than the more comprehensive respiratory protection program. The ETS is addressing an emergency health crisis, so it is critical for employers to be able to get more employee protection in place quickly. OSHA expects that this approach will facilitate additional employee choice for the additional protection provided by respirators while reducing disincentives that may have discouraged employers from allowing or voluntarily providing respirators. A mini respirator program is therefore an important control to protect employees from the hazard posed by COVID–19.

The mini respiratory protection program section is primarily intended to be used for addressing circumstances where employees are *not* exposed to suspected or confirmed sources of COVID–19, but where respirator use could offer enhanced protection to employees. Examples include when a respirator could offer enhanced protection in circumstances where a less protective (in terms of filtering and fit) facemask is required under the ETS. (See 29 CFR 1910.502(f)(4).) The decision to use a respirator in place of a facemask could be due to the higher filter efficiency and better sealing characteristics of respirators when compared to facemasks and/or in consideration of an employer's determination during their hazard assessment of constraints on their

ability to implement other ETS provisions (*e.g.,* physical distancing and barriers).

If an employee uses a respirator in place of a facemask, then the employer must ensure that the respirator is used in accordance with the mini respiratory protection program section of the ETS or in accordance with the Respiratory Protection standard. For example, if an employee that is required to wear a facemask instead chooses to wear a respirator when performing an aerosol-generating procedure (AGP) on a patient who is not suspected or confirmed with COVID–19, the ETS only requires the employer to ensure that the respirator is used in accordance with the mini respiratory protection program section, rather than in accordance with the Respiratory Protection standard, because there is no exposure to a suspected or confirmed source of COVID–19 (see 29 CFR 1901.502(f)(4)(ii)). In contrast, employees performing AGPs on patients with suspected or confirmed COVID–19 must be provided with respirators that are used in accordance with the Respiratory Protection standard (see 29 CFR 1901.502(f)(3)(i)). Additionally, employers will still be obligated to provide a respirator that is used in accordance with the Respiratory Protection standard for any AGPs performed on patients suspected or confirmed with an airborne disease, such as tuberculosis or measles.

II. Experience From the Respiratory Protection Standard (29 CFR 1910.134)

In determining the need for a mini respiratory protection program section, the agency considered its experience with the existing Respiratory Protection standard. While the majority of the Respiratory Protection standard pertains to the use of respirators that are required for the protection of employees against airborne hazards, there is one provision allowing, but not requiring, employers to permit employees to wear respirators in situations where respirators are not required for protection against airborne hazards. (See 29 CFR 1910.134(c)(2).) In establishing the requirements of this provision of the Respiratory Protection standard, OSHA also establishes some general concepts to guide respirator use. These concepts include: (1) That the respirator use will not in itself create a hazard; (2) that the employer provides the respirator user with information about the safe use and limitations of respirators; and (3) that the respirator is cleaned, stored, and maintained so that its use does not present a health hazard to the user. (29 CFR 1910.134(c)(2)(i) and (ii)).

OSHA has historically imposed a different set of requirements on employers for when respirators are required to protect employees from airborne hazards as compared to when they are not required for protection against airborne hazards but are instead used voluntarily by employees. More specifically, paragraph (c)(1) of the Respiratory Protection standard requires employers to develop and implement a comprehensive written respiratory protection program with required worksite-specific procedures and elements whenever respirator use is required by the standard. As noted earlier, these elements include, but are not limited to, respirator selection and use, medical evaluation, fit testing, respirator maintenance and care, and training. In contrast, paragraph (c)(2) of the Respiratory Protection standard requires employers to implement only a subset of these elements for the voluntary use of respirators, greatly reducing the obligations of employers who allow their employees to use respirators when such use is not required for employee protection. In the 1998 rulemaking, OSHA determined that paragraph (c)(2) is necessary because the use of respirators may itself present a health hazard to employees who are not medically able to wear them, who do not have adequate information to use and care for respirators properly, and who do not understand the limitations of respirators. Paragraph (c)(2) is intended to allow employers flexibility to permit employees to use respirators in situations where the employees wish to do so, without imposing the burden of implementing an entire respirator program. At the same time, it will help ensure that such use does not create an additional hazard and that employees are provided with enough information to use and care for their respirators properly (63 FR 1190, January 8, 1998).

The vast majority of voluntary respirator use situations under the Respiratory Protection standard have historically involved the use of FFRs, worn merely for an employee's comfort (63 FR 1190, January 8, 1998). Examples include employees who have seasonal allergies requesting a FFR for comfort when working outdoors and employees requesting a FFR for comfort while sweeping a dusty floor (63 FR 1190, January 8, 1998). In contrast, respirator use situations under this section of the ETS will involve employers who provide a respirator or employees who want to wear a respirator, out of an abundance of caution, as enhanced protection against COVID–19. They may also opt to wear respirators other than FFRs (*e.g.,* elastomeric respirators, PAPRs), particularly given the supply shortages of N95 FFRs experienced during the COVID–19 pandemic. Thus, the circumstances of respirator use in the ETS are not merely to accommodate individual conditions or comfort, but rather in recognition of some increased risk due to asymptomatic and pre-symptomatic transmission of COVID–19 that is not expected to rise to the level where respirators are required for exposure to suspected or confirmed sources of COVID–19.

OSHA emphasizes that while the new set of requirements for respirator use under the ETS differ in some aspects from those specified under the Respiratory Protection standard, their intent remains the same; that is, employers who provide respirators at the request of their employees or who allow their employees to bring their own respirators into the workplace must ensure that the respirator used does not present a hazard to the health of the employee.

In the 1998 rulemaking, OSHA concluded in the rare case where an employee is voluntarily using other than a filtering facepiece (dust mask) respirator (paragraph (c)(2)(ii)), the employer must implement some of the elements of a respiratory protection program, *e.g.,* the medical evaluation component of the program and, if the respirator is to be reworn, the cleaning, maintenance, and storage components. An exception to this paragraph makes clear that, where voluntary respirator use involves only filtering facepieces (dust masks), the employer is not required to implement a written program. While medical evaluation is required when employees are voluntarily wearing respirators other than FFRs under the Respiratory Protection standard, there are no requirements under the ETS to provide medical evaluations for employees wearing such respirators. The agency concludes that it would be too onerous and costly for employers to provide medical evaluations to employees wearing elastomeric respirators or PAPRs in place of FFRs used in accordance with crisis capacity strategies during the short period of the ETS. However, OSHA's experience with its Respiratory Protection standard suggests that respiratory protection can still be effective even when subject to particular safety provisions, but not subject to the full range of requirements. In place of medical evaluations, the agency has included a training requirement on how to recognize medical signs and symptoms that may

limit or prevent the effective use of employer-provided respirators and what to do if the employee experiences signs and symptoms (29 CFR 1910.504(d)(1)(v)), as well as a requirement for the discontinuation of employer-provided respirator use (see 29 CFR 1910.504(d)(4)). This requirement mandates that employees who wear employer-provided respirators must discontinue respirator use when the employer or supervisor reports medical signs or symptoms that are related to their ability to use a respirator. In addition, any employee who previously had a medical evaluation and was determined to not be medically fit to wear a respirator should not be provided with an employer-provided respirator under the ETS.

The ETS does not require employers to include any of the use requirements specified under the ETS into a written respiratory protection program. OSHA concludes that it would be too onerous for employers to incorporate these requirements into a written respiratory protection program during the short period of the ETS, particularly for those employers who have no need to have a written respiratory protection program in place for required respirator use. OSHA reemphasizes that the intent of the requirements in the mini respiratory protection program are to ensure that employees are provided with information to safely wear respirators, without imposing the burden of additional requirements for a written respiratory protection program on employers.

OSHA notes that unlike the voluntary use requirements specified under the Respiratory Protection standard, there are different requirements for the use of employee-provided respirators as compared to those for employer-provided respirators under the mini respiratory protection program section. This is because the agency is requiring employers to permit the use of employee-provided respirators. OSHA concludes that it is necessary to permit employees to wear their own respirators in healthcare settings given the risk for asymptomatic and pre-symptomatic transmission and the nature of much of the work that precludes such control measures as physical distancing and barriers. However, the agency concludes that it would be too onerous to mandate as many requirements for such use as are mandated when employers are given the option of whether or not to provide employees with respirators for use.

III. Requirements for Employee-Provided Respirators

In the 1998 rulemaking, OSHA determined that complete training is not required for employees using respirators voluntarily; instead, the final rule required employers to provide the information contained in Appendix D to the Respiratory Protection standard, entitled ''Information for Employees Using Respirators When Not Required Under the Standard,'' to ensure that employees are informed of proper respirator use and the limitations of respirators (63 FR 1190–1192, January 8, 1998). Under the ETS, there is only one requirement for the use of employee-provided respirators. This requirement is for the employer to provide these employees with a specific notice, as specified under paragraph (c) of the mini respiratory protection program section. This notice is almost identical to the notice contained in Appendix D to the Respiratory Protection standard, with some minor changes intended only to tailor the information to the situational needs of the COVID–19 pandemic.

IV. Requirements for Employer-Provided Respirators

As noted above, under the ETS, the requirements for the use of employer-provided respirators are more expansive under the mini respiratory protection program section than the requirements for employee-provided respirators. However, OSHA notes that employers are not obligated by the ETS to provide employees with respirators for use under the mini respiratory protection program section, so these requirements are only mandated when an employer voluntarily provides employees with respirators for use under the mini program. The requirements include provisions pertaining to training, user seal checks, reuse of respirators, and discontinuing use of respirators. When employers choose to provide respirators to employees, the same rationale applies as it did in the 1998 rulemaking requiring employers to undertake these minimal obligations when they allow voluntary respirator use is consistent with the fact that employers control the working conditions of employees and are therefore responsible for developing procedures designed to protect the health and safety of the employees. Employers routinely develop and enforce rules and requirements for employees to follow based on considerations of safety. For example, although an employer allows employees discretion in the types of clothing that may be worn on site, the employer would prohibit the wearing of loose clothing in areas where clothing could get caught in machinery, or prohibit the use of sleeveless shirts where there is a potential for skin contact with hazardous materials. Similarly, if an employer determines that improper or inappropriate respirator use presents a hazard to the wearer, OSHA finds that the employer must exert control over such respirator use and take steps to see that respirators are safely used under an appropriate program (63 FR 1190–1191, January 8, 1998).

The training requirements for the use of employer-provided respirators expand on the basic respirator awareness notice required for the use of employee-provided respirators. They require the employer to provide training on: (a) How to inspect, put on and remove, and use a respirator; (b) the limitations and capabilities of the respirator, particularly when the respirator has not been fit tested; (c) procedures and schedules for storing, maintaining, and inspecting respirators; (d) how to perform a user seal check as described in paragraph (e) of this section; and (e) how to recognize medical signs and symptoms that may limit or prevent the effective use of respirators and what to do if the employee experiences signs and symptoms. These training requirements for respirator use are similar to the training requirements mandated under the Respiratory Protection standard for required respirator use. (See 29 CFR 1910.134(k)). OSHA concludes that more extensive training provisions are required for the use of employer-supplied respirators under the ETS because such use is likely to be based on other factors related to the risk of COVID–19, including the ability to implement other control measure (*e.g.,* physical distancing and barriers).

The user seal check requirements mandate employers to ensure that employees conduct user seal checks and to ensure the employees correct any problems discovered during the user seal check. This is similar to the user seal check provision for required respirator use under the Respiratory Protection standard. (See 1910.134(g)(1)(iii)). OSHA concludes that ensuring that user seal checks are conducted is necessary because employees who wear respirators are not required to be fit tested under the ETS. OSHA notes that, in the 1998 rulemaking, OSHA concluded that user seal checks are important in assuring that respirators are functioning properly, and that although user seal checks are not as objective a measure of facepiece leakage as a fit test, they do

provide a quick and easy means of determining that a respirator is seated properly (63 FR 1239–40, January 8, 1998). Given that employees who choose to wear employer-provided respirators will likely be doing so out of an abundance of caution to protect against potential airborne transmission of SARS–CoV–2 and will not be fit tested, OSHA concludes that it is necessary for employers to train employees how to conduct a user seal check and to ensure that they are performed properly in order to improve the effectiveness of the respirator.

In the 1998 rulemaking, OSHA determined that ''if the respirators being used voluntarily are reused, it is necessary to ensure that they are maintained in proper condition to ensure that the employee is not exposed to any contaminants that may be present in the facepiece, and to prevent skin irritation and dermatitis associated with the use of a respirator that has not been cleaned or disinfected'' (63 FR 1190, January 8, 1998). To this end, and given the potential for supply shortages of FFRs necessitating their reuse under certain circumstances during the COVID–19 pandemic, OSHA concludes that it is necessary to add specific requirements for the reuse of respirators used voluntarily. These requirements incorporate some CDC recommendations for the reuse of FFRs used in accordance with crisis capacity strategies (CDC, April 9, 2021).

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H. Aerosol-Generating Procedures on Persons With Suspected or Confirmed COVID–19

As explained in more detail in *Grave Danger* (Section IV.A. of the preamble), aerosol-generating procedures (AGP) are well-known to be high-risk activities for exposure to respiratory infections. Workers in a wide range of settings, such as emergency responders, healthcare providers, and medical examiners performing autopsies, are at risk during AGPs. For the purposes of the ETS, only the following procedures are considered AGPs: Open suctioning of airways, sputum induction, cardiopulmonary resuscitation, endotracheal intubation and extubation, non-invasive ventilation (*e.g.,* BiPAP, CPAP), bronchoscopy, manual ventilation, medical/surgical/postmortem procedures using oscillating bone saws, and dental procedures involving ultrasonic scalers, high-speed dental handpieces, air/water syringes, air polishing, and air abrasion. For further information on why these procedures are considered AGPs under the ETS, please see the discussion of aerosol-generating procedures in Section VIII, *Summary and Explanation.*

The CDC provides extensive guidance for performance of AGPs (CDC, February 23, 2021). First, exposure should be limited where possible. The CDC recommends that the use of procedures or techniques that might produce infectious aerosols should be minimized when feasible, as should the number of people in the room.

CAP has also recognized the risks involved in conducting AGPs by recommending limiting the use of aerosol-generating tools, such as oscillating bone saws, during autopsies on COVID–19-positive cases (College of American Pathologists, February 2, 2021). Post-mortem procedures using oscillating bone saws have specifically been noted as a COVID–19-related exposure concern (Nolte et al., December 14, 2020). The following controls are therefore recommended for autopsies involving the use of oscillating bone saws: Isolation rooms, limiting the number of people in the room who are exposed, negative pressure ventilation, adequate air exchange, double door access, and use of respirators.

As noted in *Grave Danger* (Section IV.A. of the preamble), it is well-accepted that COVID–19 may spread through infectious aerosols during AGPs. Therefore, where these procedures must be performed, there are two important controls for these situations: Ventilation (for example, in the form of air infection isolation rooms (AIIR), if available) and respiratory protection. Both of these controls are required for AGPs in the ETS. For more information on why there is a need to include in this ETS a requirement for respirators during aerosol-generating procedures, please see *Need for Specific Provisions* (Section V of this preamble) on Respirators.

It is well-established that insufficient ventilation increases the risk of airborne disease transmission; indeed, this is the foundation for the World Health Organization recommendations on ventilation in healthcare settings (Atkinson et al., 2009). When air is stagnant or poorly ventilated, aerosols may increase in concentration and increase exposure. Both a lack of ventilation and inadequate ventilation are associated with increased infection rates of airborne diseases. Increasing ventilation rates has been shown to decrease transmission risk of airborne disease. Ventilation is able to direct airflow away from uninfected individuals, which reduces risk of transmission.

The American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) is the authoritative organization for ventilation standards in the U.S. The U.S. Army Corps of Engineers (USACE) has been tasked by the U.S. Federal Emergency Management Agency with the design and construction of alternative care sites during surges in the COVID–19 pandemic. USACE requested that ASHRAE provide engineering guidance for ventilation within alternative care sites. The resulting joint ASHRAE/USACE document makes recommendations for removal of aerosols generated by patients during AGPs and other patient care activities in alternative care sites (ASHRAE and USACE. November 20, 2020). Additionally, ASHRAE provides specific guidance on source control and AIIRs related to aerosol-generating procedures during the COVID–19 pandemic (ASHRAE, January 30, 2021).

Airborne infection isolation rooms (AIIR) are specifically designed to control the spread of aerosols and prevent airborne transmission of disease (Sehulster and Chinn, June 6, 2003). An AIIR has negative pressure in comparison to accessible areas outside the room, which causes air to flow into (rather than out of) the room from the room's access points when they are open (*e.g.,* an open door). When the access points (*e.g.,* the door) are closed and ventilation is adequate, contaminated air cannot escape at all into the rest of the facility. Air exhaust can be delivered directly outdoors or passed through a special high-efficiency (HEPA) filter. In this way, AIIRs minimize potentially contaminated air flow outward into the rest of the facility.

Because of the risk of airborne transmission, the CDC recommends the use of AIIRs when AGPs are performed on patients with suspected or confirmed COVID–19. However, increased protection for workers performing AGPs is not a new recommendation solely for the COVID–19 pandemic. The CDC and WHO both routinely recommend higher levels of personal protective equipment for workers performing these procedures on patients with other respiratory infections (CDC, October 30, 2018). The CDC recommendations for AGPs performed on influenza patients specify use of AIIRs when feasible. The

recommendations also specify that the use of portable HEPA filtration units to further reduce the concentration of contaminants in the air should be considered. Similarly, the World Health Organization recommends more protective respirators for AGPs (WHO, April, 2008). Finally, the National Institute for Occupational Safety and Health (NIOSH) has developed a ventilated headboard that can be used to reduce employee exposure to patient-generated aerosols containing respiratory pathogens (NIOSH, May 26, 2020).

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I. Physical Distancing

The best available current scientific evidence demonstrates that COVID–19 spreads mainly through transmission between people who are physically near each other. The basic concept is that the majority of respiratory droplets expelled from an infected person through talking, coughing, breathing, or sneezing can travel a limited distance before falling to the surface below due to gravity. Therefore, the farther a person is away from the source of the respiratory droplets, the fewer infectious viral particles are likely to reach that person's eyes, nose, or mouth. The fewer infectious viral particles that reach that person, the lower the risk of transmission. Additional explanation of transmission is discussed in *Grave Danger* (Section IV.A. of the preamble). OSHA recognizes that this is a simplification of the complex issue of how droplets and aerosols moving through space applies to the transmission of SARS–CoV–2. Nonetheless, the broad scientific principles described in this preamble enable OSHA to describe to affected employers and employees why the protective measures required by this ETS are necessary to protect employees from exposure to the virus.

The research described below demonstrates that a significant factor in determining whether a healthy employee will become infected with COVID–19 is how close that employee is to other people (*e.g.,* co-workers, patients, visitors, delivery people). Infected individuals can transmit the virus to others whether or not the infected person is experiencing symptoms, and symptoms may not be immediately noticeable, so it is important to keep all employees distanced from other people whether or not those other people exhibit symptoms. Symptomatic, asymptomatic, and pre-symptomatic transmission is discussed further in *Grave Danger* (Section IV.A. of the preamble). The role that physical distancing plays in this ETS is thus to ensure that employees are separated from other people as much as possible so as to reduce the risk that virus-containing droplets reach employees.

Consistent with CDC guidance, OSHA defines physical distancing as maintaining a sufficient distance between two people—generally considered to be at least six feet of separation—such that the risk of viral transmission through inhalation of virus-containing particles from an infected individual is significantly reduced. OSHA is aware of emerging scientific literature that suggests even greater distances may be beneficial. OSHA is also aware of some literature from other countries that suggests less than six feet may be appropriate in some circumstances; however, based on the evidence summarized below, OSHA believes that anything less than six feet is not sufficient to address the level of risk established in the studies the agency has reviewed. While it is likely that a distance of greater than six feet will result in some lowered risk and OSHA recommends six feet as a minimum distance, OSHA is not aware of sufficient evidence to justify mandating a distance farther than the six feet recommended by the CDC. Physical distancing is a critical component of infectious disease prevention guidelines and is a key protective measure of the current COVID–19-specific prevention recommendations from the CDC, WHO, and other public health entities, as discussed in greater detail below (CDC and OSHA, March 9, 2020; WHO, June 26, 2020; CalOSHA, 2020; ECDC, March 23, 2020; PHAC, May 25, 2020).

The importance of physical distancing is evident from CDC's guidance for determining who qualifies as close contacts of an individual who is COVID–19 positive. People who have been in close contact with a COVID–19-positive individual are most likely to become infected. To become infected with COVID–19, a healthy individual typically needs to inhale a certain amount of viral particles (*i.e.,* an infectious dose). The closer that healthy individual is to an infected person emitting infectious viral particles, the greater their exposure may be. In practice, a person generally needs to be both close enough to an infectious person and near them long enough to inhale an infectious dose. The CDC acknowledges the potential for inhalation at distances greater than six feet from an infectious source, but notes

that this is less likely than at a closer distance (CDC, May 7, 2021). This continues to support OSHA's recommendation for a minimum distance of six feet. It is also important to note that multiple short exposures over the course of a day can add up to a long enough period of time to receive an infectious dose of COVID–19. Therefore, CDC's definition of *close contact* is dependent on both proximity to one or more infected people and the time period over which that proximity occurred. The CDC defines close contact as ''someone who was within 6 feet of an infected person for a cumulative total of 15 minutes or more over a 24-hour period starting from 2 days before illness onset (or, for asymptomatic patients, 2 days prior to test specimen collection) until the time the patient is isolated'' (CDC, March 11, 2021). The CDC uses this close contact designation to help determine contact tracing to minimize transmission spread and to help communicate the risk of transmission to the public.

The CDC close contact definition describes the likely context for transmission events under most circumstances. However, it should be noted that infections can occur from exposures of less than 15 minutes. For example, one infection event was documented that resulted from only roughly five minutes of exposure (Kwon et al., November 23, 2020). Thus, distancing may reduce COVID–19 exposure during even short periods of exposure.

The notion that physical distancing can protect a healthy individual from respiratory droplets is well established for droplet-transmissible diseases and has been a topic of study for well over a hundred years (Flugge, 1897; Jennison, 1942; Duguid, November 1, 1945; Wells, November 1, 1955). Carl Flugge (1897) is credited with originating the concept of droplet transmission. In his study using settling plates to collect large droplets that were emitted from an individual, he found that droplets fell to the plates within two meters (approximately 6.6 feet). Combining this knowledge with the known presence of infectious materials in respiratory droplets, Flugge suggested that remaining two meters from infected individuals would be protective. This understanding of droplet transmission was further expanded a few decades later, when William F. Wells noted that in Flugge's study, Flugge was unable to observe a proportion of small droplets that would evaporate before settling on the plates and that these evaporated droplets traveled differently, suggesting that some measure of transmission may happen beyond the large droplet transmission that Flugge observed (Wells, November 1, 1934). Subsequently, in the 1940s and 1950s, high-speed photography improved to the point where it could capture, upon emission, most of the respiratory droplets—large and small—that formed; this line of study validated much of the groundwork that Flugge and Wells laid (Jennison, 1942; Duguid, November 1, 1945; Hamburger and Robertson, May 1, 1948; Wells, November 1, 1955). These studies illustrated that large droplets can be a major driver of disease transmission, but also that there might be exceptions to the effectiveness of physical distancing when it comes to virus-laden small droplets.

Even though COVID–19 is a recent disease, evidence of the effectiveness of physical distancing in reducing exposures to SARS–CoV–2 has been illustrated through a variety of scientific approaches, including an experimental study by Ueki et al., (October 21, 2020), a modeling study by Li et al., (November 3, 2020), and real world observational studies by Chu et al., (June 27, 2020) and Doung-ngern et al., (September 14, 2020). In a controlled laboratory experiment performed by Ueki et al., (October 21, 2020), researchers developed a scenario where 6 mL of SARS–CoV–2 viral serum was nebulized from a mannequin's mouth to form a mist that simulated a cough. Another mannequin, which was outfitted with an artificial ventilator set to an average adult ventilation rate, collected a proportion of the mist at distances of 0.25 meters (approximately 0.8 feet), 0.5 meters (approximately 1.6 feet), and 1 meter (approximately 3.3 feet). Using the 0.25-meter distance as a baseline, increasing the distance between the mannequins reduced viral particle exposure (measured as the number of viral RNA copies) by 62% at 0.5 meters and 77% at 1 meter. The study clearly illustrates the increased protection from viral exposure that results from increasing distance between individuals.

Modeling studies also provide evidence supporting the effectiveness of physical distancing in preventing exposure to SARS–CoV–2. In Li et al., (November 3, 2020), researchers modeled exposures resulting from respiratory droplets dispersed from a simulated typical cough using simulated saliva with a SARS–CoV–2 viral concentration measured from infected individuals. The simulated cough emitted 30,558 viral copies at distances of one meter (approximately 3.3 feet) and two meters (approximately 6.6 feet) between the infectious person and the person exposed. At one meter, more than 65% of the droplet volume (about 20,000 viral copies) reached the recipient. However, almost all of the exposure was deposited below the head, with only 9 viral copies estimated to land on the area that would normally be covered by a face covering. When the distance was increased to two meters, 63 viral copies landed on the recipient, with only 0.6 copies expected to hit the face covering area. This study illustrates not only the benefit of distance for reducing inhalation exposure, but also for reducing contamination of clothing, which can contribute to overall exposure if a person touches their contaminated clothing and then touches their eyes, nose, or mouth.

Outside of experimental and modeling scenarios, observations in real world situations also substantiate the finding that increasing physical distance protects people from developing infections. A systematic review of 172 studies on SARS–CoV–2 (up to early May 2020), SARS–CoV–1 (a viral strain related to SARS–CoV–2), and Middle Eastern Respiratory Syndrome (MERS) (a disease caused by a virus that is similar to SARS–CoV–2 and spreads through droplet transmission) found 38 studies, containing 18,518 individuals, to use in a meta-analysis that evaluated the effectiveness of physical distancing (Chu et al., June 27, 2020). The researchers compared the infection rates for individuals who were within one meter (approximately 3.3 feet) of infected people versus the infection rates for those who were greater than one meter away. For individuals who were within one meter, the chance of viral infection was 12.8%. When distance was greater than one meter, the chance of viral infection decreased to 2.6%. Furthermore, researchers projected that with each additional meter of distance the risk would be reduced by an additional 2.02 times.

The importance of physical distancing even when people are not exhibiting symptoms was further demonstrated by a COVID–19 study from Thailand. Researchers reviewed physical distancing information collected from 1,006 individuals who had an exposure to infected individuals (Doung-ngern et al., September 14, 2020). At the time of the exposure, many of the infected individuals were not yet experiencing symptoms, and none of the exposed individuals included in the study were experiencing symptoms. The researchers contacted the individuals 21 days after their exposures to determine if any secondary infections had occurred. Out of 1,006 participants, 197 tested positive and 809 either tested

negative or were considered low risk contacts, did not exhibit symptoms and, therefore, were not tested. The researchers then compared the incidence of secondary infections to data on how close the exposed individuals were to the infected individuals. Exposed individuals were placed into three groups: Those who had direct physical contact with the infected individual, those who were within one meter (approximately 3.3 feet) but without physical contact, and those who remained more than one meter away. The study revealed that the group with direct physical contact and the group within one meter but without physical contact were equally likely to become infected with SARS–CoV–2. However, the group that remained more than one meter away had an 85% lower infection risk than the other two groups.

As noted earlier, there is additional nuance to droplet fate beyond just the general effects of gravity on large droplets. Studies evaluating the dispersion of aerosols (*i.e.,* particles that are smaller than typical droplets) and atypical droplets in the air have created a more thorough understanding of disease transmission and the limitations on the effectiveness of physical distancing (Jones et al., August 25, 2020). The distance that droplets may be able to travel depends on their size, expelled velocity, airflow, and other environmental considerations (Xie et al., May 29, 2007; Dbouk and Drikakis, May 1, 2020; Li et al., April 22, 2020). Bahl et al., (April 16, 2020) reviewed ten studies on the horizontal spread of droplets, finding that seven of the studies observed maximum distances traveled by droplets that greatly exceeded two meters (approximately 6.6 feet); one of which suggested the possibility of travel up to eight meters (approximately 26.2 feet). Several case studies have identified incidents where transmission of SARS–CoV–2 occurred over distances of 15.1 feet (Li et al., April 22, 2020), 21.3 feet (Kwon et al., November 23, 2020) and 26.2 feet (Gunther et al., October 27, 2020). These studies suggest that while maintaining a physical distance of two meters reduces transmission significantly, there is still some risk of transmission beyond two meters. Thus, these studies illustrate that physical distancing is an important control, but also why physical distancing alone is insufficient, and a multi-layered strategy that includes additional control measures is necessary to protect employees from contracting COVID–19.

As demonstrated by the studies above, it is widely accepted that physical distancing reduces transmission of infectious diseases generally, and COVID–19 specifically. While the specific distance needed to ensure maximum reduction of COVID–19 transmission can be debated, six feet has long been used in the U.S. as the minimum acceptable distance in most situations to prevent transmission of droplet-transmissible infectious diseases, and the CDC has recommended that distance to combat COVID–19 since the start of the pandemic (CDC and OSHA, March 9, 2020).

Physical distancing strategies can be applied on an individual level (*e.g.,* avoiding coming within six feet of another individual), a group level (*e.g.,* canceling group activities where individuals would be in close contact), and an operational level (*e.g.,* promoting telework, reconfiguring the infrastructure or reducing facility occupancy levels to allow sufficient space for physical distancing). As described in further detail in *Summary and Explanation* (Section VIII of the preamble), CDC and OSHA have identified various approaches to maintaining physical distance between employees, such as: Reducing the number of employees on-site at one time; reducing facility occupancy levels (both for employees and non-employees); staggering arrival, break, and departure times to maintain distancing during specific times at work when adherence is difficult; and holding on-site training or meeting activities in larger spaces to allow for sufficient distance between attendees (CDC and OSHA, March 9, 2020).

Physical distancing practices and recommendations are also well-accepted internationally as an effective measure to reduce the spread of COVID–19. The World Health Organization (WHO) recommends physical distance of at least one meter (approximately 3.3 feet) in all workplace settings, with a preference for two meters (approximately 6.6 feet) (WHO, June 26, 2020). WHO also recommends providing sufficient work space of at least 10 square meters for each employee where it is feasible based on work tasks. Some foreign governments have implemented physical distancing requirements and recommendations varying in distances of: One meter (*e.g.,* Hong Kong, Singapore, United Kingdom, Norway), 1.5 meters (*e.g.,* Germany, Spain), and 2 meters (*e.g.,* Japan, South Korea, Canada) (Han et al., November 7, 2020; PHAC, May 25, 2020). While the required or recommended amount of distance varies between jurisdictions, it is clear that physical distancing is considered to be a critical tool in preventing the spread of COVID–19 around the world and that, even where six feet of distance cannot be maintained, maintaining as much distance as possible can help minimize the possibility of disease transmission (Chu et al., June 27, 2020; Doung-ngern et al., September 14, 2020; Li et al., November 3, 2020; Ueki et al., 2020).

Based on the best available evidence, the agency concludes that physical distancing of at least six feet is an effective and necessary tool to protect employees from COVID–19 by reducing incidence of COVID–19 illness. This conclusion applies to physical distancing on its own and also when complemented by other measures as part of a multi-layered strategy to minimize employee exposure to COVID–19.

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J. Physical Barriers

When people with COVID–19 cough, sneeze, sing, talk, yell, or breathe, they produce respiratory droplets. Epidemiological research has found that most COVID–19 transmission occurs via respiratory droplets that are spread from an infected individual during close (within 6 feet) person-to-person interactions (CDC, May 7, 2021; CDC, May 13, 2021a; WHO, July 9, 2020). The amount of respiratory droplets and particles released when a person breathes is significant, and the amount increases when someone talks or yells (Asadi et al., February 20, 2019; Alsved et al., September 17, 2020; Abkarian et al., October 13, 2020).

Barriers can be used to minimize occupational exposure to SARS–CoV–2. Barriers work by preventing droplets from traveling from the source (*i.e.,* an infected person) to an employee, thus reducing droplet transmission. When barriers are used properly, they will intercept respiratory droplets that may contain SARS–CoV–2. Barriers are particularly critical when physical distancing of six feet is required but not feasible (AIHA, September 9, 2020; Fischman and Baker, June 4, 2020; CDC, April 7, 2021; CDC, March 8, 2021; WHO, May 10, 2020; University of Washington, October 29, 2020).

When engineering controls, such as physical barriers, are appropriately installed and located, they can reduce exposure to infectious agents, such as SARS–CoV–2, without relying on changes in employee behavior (OSHA, 2009). Therefore, engineering controls are often the most effective type of control and can also be a cost-effective layer of protection (AIHA, September 9, 2020). Physical barriers are not a stand-alone measure and are only one part of a multi-layered approach for infection control. To protect employees from exposure to SARS–CoV–2, engineering controls need to be combined with work practice controls, administrative controls, and PPE to ensure adequate protection (CDC, April 7, 2021; CDC, March 8, 2021).

Physical barriers, such as plastic or acrylic partitions, are well-established and accepted as an infection control approach to containing droplet transmissible diseases. Recommendations for the use of physical barriers are commonly made in connection with pandemic events, such as the 2010 pandemic influenza (see, for example, OSHA, 2009) or avian influenza pandemics (see, for example, CDC, January 23, 2014). However, physical barriers are recognized as effective engineering controls for preventing the transmission of infectious agents and, therefore, have been commonly used in other workplace settings even under non-pandemic conditions. For instance, sneeze guards are included in the FDA's 2017 Food Code, which all 50 states use for their food safety regulations (FDA, 2017). These barriers, typically placed in front of and above food items, intercept contaminants, such as respiratory droplets, that may be expelled from a person's mouth or nose (Todd et al., August 1, 2010).

Impermeable barriers intercept respiratory droplets and prevent them from reaching another individual (Fischman and Baker, June 4, 2020; Ibrahim et al., June 1, 2020; Dehghani et al., December 22, 2020; University of Washington, October 29, 2020). Thus, physical barriers can be a practical solution for decreasing the transmission of infectious viral particles for a wide range of work activities and locations. Only barriers that keep respiratory droplets out of an employee's breathing zone will reduce overall exposure to SARS–CoV–2. The breathing zone is the area immediately around an individual's mouth and nose from which a person draws air when they breathe and extends 9 inches beyond a person's nose and mouth (OSHA, February 11, 2014). Additional considerations for the design and implementation of physical barriers to

properly block face-to-face pathways of breathing zones, including acceptable materials and installation, is discussed in the *Summary and Explanation* (Section VIII of the preamble).

While COVID–19-related research on barriers is fairly limited due to the recent emergence and ongoing nature of the pandemic, there is some evidence of the effectiveness of physical barriers in healthcare settings during the COVID–19 pandemic. Using a surrogate for SARS–CoV–2, Mousavi et al., (August 13, 2020) designed an experimental study in which general patient rooms in a healthcare facility were converted into isolation rooms constructed out of plastic barriers with zipper doors. The authors found that the use of the barrier alone could stop the particles that contacted the barrier and prevent 80% of the surrogate SARS–CoV–2 particles from spreading to adjacent spaces. In contrast, without the barrier, particles were easily dispersed to other areas of the facility. The barrier was actually more effective at containing particles than a solid door, as the barrier did not create changes in airflow patterns like a door does when it opens and closes.

A simulation study using a double set of plastic drapes as a barrier around a patient's head and neck during patient intubation found that the drapes were effective at minimizing contamination to the healthcare provider and patient (Ibrahim et al., June 1, 2020). Similarly, a simulation study performed in a dental healthcare setting evaluated the use of clear, flexible barriers that were fitted over the patient chair and covered the patient's head, neck, and chest; the barriers had small openings for the employee's hands. The barriers were found to reduce the number of dyed water droplets landing on the provider and in the surrounding work environment during the dental procedure (Teichert-Filho et al., August 18, 2020). A simulation study of peroral endoscopy procedures performed through the mouth found that the use of an acrylic box around a patient's head during the procedure may reduce the number of droplets transmitted to the providers performing the procedure (Gomi et al., October 21, 2020).

A separate group of researchers developed a simulation study in an open work station environment to evaluate how physical barriers may impact disease transmission. They found that physical barriers were able to reduce the transmission of simulated 1um aerosolized particles from a source individual to others who were over 6 feet away by 92% (Abuhegazy et al., October 20, 2020). OSHA notes that it would be expected that large droplets, as opposed to aerosolized particles, would be reduced to a greater extent because they do not remain airborne for extended periods of time unlike aerosolized particles, as noted in the Physical Distancing section of the *Need for Specific Provisions* analysis.

Researchers found that a COVID–19 outbreak among hospital food service employees was effectively contained with the prompt implementation of physical barriers in the workplace where physical distancing was not implemented (Hale and Dayot, August 13, 2020). This included installing partitions at cashier stations between employees and non-employees, as well as in food preparation areas between workstations (Hale and Dayot, August 13, 2020). While this evidence of the effectiveness of barriers was not drawn from healthcare settings, the same concept would be equally applicable to preventing transmission between people at similarly fixed locations in healthcare facilities, such as barriers separating a receptionist from a patient in intake or barriers separating workers sitting side by side at desks in a hospital's administrative office.

It is not clear, however, that barriers are necessary to separate fully vaccinated employees from employees who are not fully vaccinated and are not suspected or confirmed to have COVID–19. As discussed in the *Grave Danger* section and in the explanation for the scope exception in § 1910.501(a)(4), the CDC has acknowledged a ''growing body'' of evidence that vaccination can reduce the potential that a vaccinated person will transmit the SARS–CoV–2 virus to non-vaccinated co-workers (CDC, April 12, 2021; CDC, May 13, 2021b).

Based on the best available evidence, the agency concludes that physical barriers are an effective and necessary means of, and play a vital role in, reducing transmission of SARS–CoV–2 when complemented by other measures as part of a multi-layered strategy to minimize the risks of employee exposure to SARS–CoV–2 by employees who are not fully vaccinated or from non-employees.

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K. Hygiene and Cleaning

COVID–19 can also be spread through contact transmission, which occurs when a person touches another person who has COVID–19 (*e.g.,* during a handshake) or a surface or item contaminated with the virus (*e.g.,* workstations, shared equipment or products) and then touches their own eyes, nose, or mouth (CDC, May 13, 2021; CDC, April 5, 2021d). Contact transmission via inanimate objects is also known as fomite transmission. While contact transmission is less common than droplet transmission, and the risk of infection from touching a surface is low, contracting COVID–19 via contact transmission remains a concern in the workplace. Contact transmission is discussed in greater detail in *Grave Danger* (Section IV.A. of the preamble).

To protect against COVID–19 transmission, the CDC has recommended cleaning and situational disinfecting of high-touch surfaces, as well as frequent handwashing, as key prevention methods (CDC, April 5, 2021a, and CDC, May 17, 2020, respectively). *Cleaning* means the removal of dirt and impurities, including germs, from surfaces using soap and water or other cleaning agents (*i.e.,* not Environmental Protection Agency (EPA)-registered disinfectants). Cleaning alone reduces germs on surfaces by removing contaminants and may also weaken or damage some of the virus particles, which decreases risk of infection from surfaces. *Disinfection* means using an EPA-registered List N disinfectant in accordance with manufacturers' instructions to kill germs on surfaces or objects. Disinfection further lowers the risk of spreading infection and the CDC recommends disinfection in indoor community settings where there has been a suspected or confirmed COVID–19 case in the previous 24 hours (CDC, April 5, 2021d).

I. Cleaning and Hand Hygiene Are Most Effective in Combination

Based on the best available evidence, OSHA has determined that proper hand hygiene, cleaning, and situational disinfection of high-touch surfaces and surfaces touched by someone with COVID–19 are critical provisions of the ETS, both on their own and also when complemented by other measures as part of a multi-layered strategy to minimize employee exposure to this grave COVID–19 danger. Practicing proper hand hygiene combined with routine cleaning of contact surfaces, minimizes the risk of contracting COVID–19 through contact with contaminated surfaces, followed by touching the mouth, nose, or eyes (Honein et al., December 11, 2020). Cleaning surfaces removes harmful contaminants from surfaces, reducing the risk of COVID–19 transmission following hand contact with those surfaces. Disinfection of surfaces and equipment in indoor community settings should be done if a suspected or confirmed COVID–19 case was utilizing those areas within the past 24 hours (CDC, April 5, 2021d). Cleaning, disinfection, and hand hygiene are foundational components of Standard and Transmission-Based Precautions for infection control and prevention (Siegel et al., 2007).

II. Cleaning and Disinfection

Respiratory secretions or droplets expelled by infected individuals can contaminate surfaces and objects (WHO, July 9, 2020). Evidence suggests that the virus that causes COVID–19 may remain viable on surfaces for hours to days (Riddell et al., October 7, 2020; van Doremalen et al., April 16, 2020; CDC, April 5, 2021b), depending on the ambient environment and the type of surface (WHO, July 9, 2020). Although fomites and contaminated surfaces are not a common transmission mode of COVID–19, demonstration of surface contamination and experiences with surface contamination linked to subsequent infection transmission with other coronaviruses, have informed the development of cleaning and situational

disinfection recommendations to mitigate the potential of fomite transmission of COVID–19 (WHO, May 14, 2020; CDC, April 5, 2021d). Cleaning of visibly dirty surfaces is a best practice measure for prevention of COVID–19 and other viral respiratory illnesses in all settings, including healthcare. Disinfection of these surfaces may be appropriate if it is reasonable to assume that individuals with COVID–19 may have been present. Cleaning and disinfection reduces the risk of spreading infection by removing and killing germs on surfaces people frequently touch, and in areas that were occupied or visited by a person confirmed to have COVID–19 (CDC, April 5, 2021a; WHO, May 14, 2020; CDC, April 5, 2021c; CDC, April 5, 2021d).

Scientific evidence and guidelines from the CDC and WHO support cleaning and situational disinfection of surfaces as an effective practice to prevent the transmission of infectious viruses. Human coronaviruses, including MERS coronavirus or endemic human coronaviruses (HCoV), can be efficiently inactivated by surface disinfection procedures (Kampf et al., February 6, 2020). A study of 124 Beijing households with one or more laboratory-confirmed COVID–19 positive family members demonstrated the efficacy of disinfection in preventing the transmission of COVID–19. The study found that disease transmission to family members was 77% less with use of chlorine- or ethanol-based disinfectants every day compared to use of disinfectants once in two or more days, irrespective of other protective measures taken such as mask wearing and physical distancing (Wang et al., May 11, 2020).

The World Health Organization recommends thoroughly cleaning environmental surfaces with water and detergent and applying commonly used hospital-level disinfectants, such as sodium hypochlorite (*i.e.,* the active ingredient in chlorine bleach), for effective cleaning and disinfection (WHO, May 14, 2020). Surface disinfection with 0.1% sodium hypochlorite or 62–71% ethanol significantly reduces coronavirus infectivity on surfaces within 1 minute of exposure time (Kampf et al., February 6, 2020). The Environmental Protection Agency (EPA) has compiled List N, a list of disinfectant products that can be used against the virus that causes COVID–19, including ready-to-use sprays, concentrates, and wipes (EPA, April 9, 2021). EPA includes products on List N if they have demonstrated efficacy against the COVID–19 virus, or a germ that is harder to kill than SARS–CoV–2 virus, or another human coronavirus that is similar to the SARS–CoV–2 virus (EPA, February 17, 2021).

III. Hand Hygiene

In all settings, including settings where regular cleaning may be difficult, frequent hand washing and avoiding touching of the face should be considered the primary prevention approach to mitigate COVID–19 transmission associated with surface contamination (WHO, May 14, 2020). Hand hygiene is generally recognized as an effective intervention at preventing respiratory illnesses and infectious disease transmission (Rabie and Curtis, March 7, 2006; Haque, July 12, 2020; Rundle et al., July 22, 2020). The CDC and the WHO have determined that frequent handwashing, plus sanitization, are essential control measures for COVID–19 prevention within the workplace, and HICPAC identifies hand hygiene as an essential element of Standard Precautions (CDC, May 17, 2020; WHO, July 9, 2020; WHO, May 14, 2020; Siegel et al., 2007).

To prevent virus transmission, the CDC recommends that healthcare workers engage in frequent handwashing with soap and water for at least 20 seconds, or use an alcohol-based hand sanitizer with at least 60% alcohol (CDC, May 17, 2020). Alcohol-based hand sanitizers are the most effective products for reducing the number of germs on the hands of healthcare providers and are the preferred method for cleaning hands in most clinical situations, while handwashing is necessary whenever hands are visibly soiled (CDC, January 8, 2021). Handwashing with soap and water mechanically removes pathogens (Burton et al., January 6, 2011), and laboratory data demonstrates that hand sanitizers that contain at least 60% alcohol are effective at killing the virus that causes COVID–19 (Kratzel et al., July 2020; Siddharta et al., March 15, 2017).

Experience with work settings shows that flexible hand hygiene approaches are effective to address unique scenarios in various work environments. For example, handwashing is usually emphasized over hand sanitizing, but CDC recommends the use of alcohol-based hand sanitizers as the primary method for hand hygiene in most healthcare situations (CDC, October 14, 2020). In healthcare settings, alcohol-based hand sanitizers with 60–95% alcohol effectively reduce the number of pathogens that may be present on the hands of healthcare providers, particularly after interacting with patients (CDC, May 17, 2020). In most clinical settings, unless hands are visibly soiled, an alcohol-based hand rub is preferred over soap and water due to evidence of better compliance compared to soap and water. However, CDC does recommend healthcare workers wash their hands for at least 20 seconds with soap and water when hands are visibly dirty, before eating, and after using the restroom (CDC, May 17, 2020). Alcohol-based hand sanitizers are also important as an alternative to soap and water for workers who do not have ready access to handwashing facilities (*e.g.,* emergency responders).

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L. Ventilation

Improving existing ventilation and ensuring optimal performance of ventilation is an effective way to reduce viral transmission in occupational populations. Work sites with existing heating, ventilation, and air conditioning (HVAC) systems can utilize improvements to, and maintenance of, high performance ventilation as part of a layered response for infectious disease control. The effectiveness of ventilation in controlling disease transmission is based on scientific research and the recommendations of well-respected occupational safety and health organizations, including government agencies.

As explained in *Grave Danger* (Section IV.A. of the preamble), there is evidence of airborne COVID–19 transmission within enclosed spaces with inadequate ventilation. As a result, there is considerable support for ensuring adequate ventilation through maintenance and improvements. Federal agencies, international organizations, industry associations, and scientific researchers agree that ensuring adequate ventilation is important in reducing potential airborne transmission of COVID–19 (ASHRAE, April 14, 2020; Schoen, May 2020; WHO, May 10, 2020; AIHA, September 9, 2020; CDC, May 7, 2021; CDC, April 7, 2021; CDC, March 23, 2021; Tang et al., August 7, 2020; Morawska et al., May 27, 2020).

In one scientific brief, the CDC provides a basic overview of how ventilation can reduce the transmission of COVID–19 in indoor spaces. Once respiratory droplets are exhaled, the CDC explains, they move outward from the source and their concentration decreases through fallout from the air (largest droplets first, smaller later) combined with dilution of the remaining smaller droplets and particles into the growing volume of air they encounter (CDC, May 7, 2021). Without adequate ventilation, continued exhalation can lead to the amount of infectious smaller droplets and particles produced by people with COVID–19 to become concentrated enough in the air to spread the virus to other people (CDC, May 13, 2021).

Ventilation controls the transmission of COVID–19 in two ways. First, improving indoor ventilation by appropriately maximizing air exchanges and by maintaining and improving heating, ventilation, and air-conditioning (HVAC) systems can disperse and decrease the concentration of COVID–19-containing small droplets and particles suspended in the air. The lower the concentration, the less likely some of those viral particles can be inhaled into an employee's lungs; contact their eyes, nose, or mouth; or fall out of the air to accumulate on surfaces. Protective ventilation practices and interventions can reduce the airborne concentration, which reduces the overall viral dose to occupants (CDC, March 23, 2021). Improved ventilation can also significantly reduce the airborne time of respiratory droplets (Somsen et al., May 27, 2020; CDC, March 23, 2021). As a result, the risk of transmission of COVID–19 indoors is reduced, which makes workplaces safer (Schoen, May 2020; CDC, April 7, 2021; CDC, March 23, 2021; Honein et al., December 11, 2020). Ventilation systems alone cannot completely prevent airborne transmission (EPA, July 16, 2020; CDC, March 23, 2021), but are particularly effective when implemented in conjunction with additional control measures in a layered approach, including other engineering controls and other protections required in this ETS.

Second, air filters in HVAC systems remove particles, including aerosolized particles containing COVID–19, from

recirculated air streams before returning the air to workspaces. Increased filter efficiency is a component of the HVAC system which can be adjusted to reduce the risk of COVID–19 transmission (Schoen, May 2020; ASHRAE, April 14, 2020; CDC, May 7, 2021; CDC, March 8, 2021; CDC, March 23, 2021; Morawska et al., May 27, 2020). Minimum Efficiency Reporting Values (MERV) report a filter's ability to capture larger particles between 0.3 and 10 microns (μm). MERV ratings range from 1 to 16, and a higher rating indicates a more efficient filter. The virus that causes COVID–19 is approximately 0.125 μm in diameter; however, the virus is contained in infectious particles, droplets, and droplet nuclei (dried respiratory droplets) that are predominantly 1 μm in size and larger.

The CDC recommends increasing filtration to the highest extent possible that is compatible with the design of the HVAC system (CDC, March 23, 2021). The American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) recommends using filters with a MERV rating of at least 13, where feasible, or the highest level compatible with the specified HVAC system, to help capture the infectious aerosols containing COVID–19 (Schoen, May 2020; ASHRAE, December 8, 2020). The use of filtration has also been supported by others, including Mousavi et al., August 26, 2020. A MERV rating of 13 is at least 85-percent efficient at capturing particles from 1 μm to 3 μm in size (Schoen, May 2020; CDC, March 8, 2021; CDC, March 23, 2021), which is the size of the particles carrying COVID–19. A MERV–14 filter is at least 90% efficient at capturing particles of this same size, and efficiencies for MERV–15 and MERV–16 filters are even greater. As such, filters with MERV ratings of 13 or greater are much more efficient at capturing particles of this size than a MERV 8 filter (CDC, March 23, 2021).

The ability of HVAC systems to reduce the risk of exposure depends on many factors, including design features, operation and maintenance practices, and the quality and quantity of outdoor air supplied to the space. The CDC has emphasized that building owners and operators should ensure that ventilation systems are functioning properly and providing acceptable levels of indoor air quality for the occupancy level of the given space. Consultation with an HVAC professional will help ensure that improvements to ventilation systems are implemented in accordance with the capacity and design of the HVAC system, according to state and local building codes and guidelines, and to avoid imbalances that could negatively alter other indoor air quality parameters (*e.g.,* temperature, humidity, moisture) (EPA, July 16, 2020; CDC, March 23, 2021).

The CDC has also recommended increasing airflow (CDC, March 23, 2021) to occupied spaces, if possible. One way to achieve this is by opening windows and doors (Howard-Reed et al., February 2002; CDC, March 23, 2021), where feasible and as weather conditions permit. However, decisions to open windows and doors should be done after evaluating other safety and health risks for occupants, such as risk of falling or breathing outdoor environmental contaminants (*e.g.,* carbon monoxide, molds, and pollens) (CDC, April 7, 2021; CDC, March 8, 2021; CDC, March 23, 2021). In order for this type of ventilation to serve as an effective COVID–19 control, the air flow must be directed so that contaminated air is not funneled through workspaces toward another person.

Based on the best available evidence, the agency concludes that implementation of improved ventilation and maintaining HVAC system performance is an effective and necessary approach to reduce incidence of COVID–19 both on its own and also when complemented by other measures as part of a multi-layered strategy to minimize employee exposure to the grave COVID–19 danger.

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M. Health Screening and Medical Management

As discussed in more detail in *Grave Danger* (Section IV.A. of the preamble), COVID–19 is a disease that is primarily transmitted from person to person through respiratory droplets that are produced when someone breaths, talks, sneezes, or coughs, and the droplets contact the eyes, nose, or mouth of another person. It may also infrequently be transmitted by someone touching a contaminated surface and then touching their eyes, nose, or mouth. Consequently, to effectively reduce the transmission of COVID–19 in the workplace, it is necessary to have a medical management program that identifies and removes infected or likely infected employees from the workplace, and notifies employees about possible exposures to COVID–19 so they can take appropriate steps to further reduce transmission.

I. Employee Screening

Regular health screening for possible indications of COVID–19 is a first step in detecting employees who might be COVID–19-positive so those employees can seek medical care or testing, or inform the employer if they have certain symptoms. While pre-symptomatic and asymptomatic infections and the non-specificity of COVID–19 symptoms make it difficult to quantify the accuracy of symptom screening in predicting COVID–19, health screening is a strategy supported by the CDC and the American College of Occupational and Environmental Medicine (ACOEM). ACOEM recommends that employers implement a medical surveillance program that includes educating and training employees on how to recognize when they may have COVID–19, in order to prevent employees with infections from entering the workplace (ACOEM, August 19, 2020).

The CDC recommends that employers conduct screening at the worksite, or train employees to be aware of and recognize the signs and symptoms of COVID–19 and to follow CDC recommendations to self-screen for symptoms before coming to work (CDC, March 8, 2021). Screening for employee symptoms, particularly when combined with their recent activities (*e.g.,* the likelihood they have had a recent exposure to COVID–19), can help determine if the employee is suspected to have COVID–19 or should be tested. Testing can be useful in guiding the treatment that employees receive for their illness as well as triggering isolation to prevent exposure to others (NASEM, November 9, 2020). The FDA (March 11, 2021) has issued a number of emergency use authorizations for COVID–19 tests that detect infections with the SARS–CoV–2 virus. CDC recommends prompt COVID–19 testing of anyone who has had a known exposure to someone with COVID–19, has had a possible exposure to someone with COVID–19, or has symptoms of COVID–19, as a strategy to reduce SARS–CoV–2 transmission (Honein et al., December 11, 2020). Based on medical advice and information provided by testing, employees can learn if they are suspected or confirmed to have COVID–19. The earlier employees learn whether they are infected, the more likely that workplace exposures can be prevented.

As explained below, it is necessary that employees who are suspected or confirmed to have COVID–19 be removed from the workplace to prevent transmission to other employees. However, because COVID–19 symptoms are non-specific and common with other infectious and non-infectious conditions, not all individuals experiencing these symptoms will necessarily have COVID–19. Thus, Struyf et al., (2021) concluded that using a single sign or symptom of COVID–19 will result in low diagnostic accuracy and that combinations of symptoms increase specificity while decreasing sensitivity (explained in further detail below); however the authors also noted that studies are lacking on diagnostic accuracy of combinations of signs and symptoms.

The success of a screening strategy in identifying whether an employee has COVID–19 is based on two factors: Sensitivity and specificity for identifying COVID–19. Sensitivity refers to the ability of the symptom screening strategy to correctly identify persons who have COVID–19. Specificity refers to the ability of the symptom screening strategy to correctly identify persons who do not have COVID–19. As an example, a systematic review and meta-analysis by Pang et al., (2020) determined a sensitivity of 0.48 and specificity of 0.93 for smell disorders in identifying COVID–19. This means that under the scenarios in which the studies were conducted, screening for smell disorders would correctly identify around 48% of individuals who have COVID–19 (sensitivity), and would correctly identify 93% of individuals who do not have COVID–19 (specificity).

A number of studies have been conducted to determine common symptoms associated with COVID–19, along with their sensitivity and specificity. In addition to the Pang et al., (2020) study, there have been several other studies strongly linking smell and taste disorders as a symptom indicative of COVID–19. In a review of 18 studies of COVID–19 patients, Printza and Constantidis (2020) reported that loss of either smell or smell and taste was reported in most studies, and that that symptom is more prevalent in COVID–19 patients than in patients suffering from other respiratory infections. The report also found that the loss of smell was more prevalent among patients with a less severe case of COVID–19 disease. Four systematic reviews, three of which included meta-analyses, reported that for smell or taste disorders, sensitivity ranged from 0.41 to 0.65 and specificity ranged from 0.90 to 0.93 (Pang et al., 2020; Printza and Constantidis, 2020; Kim et al., 2021; Struyf et al., 2021).

A systematic review found that while loss of taste or smell is the most specific symptom of COVID–19, the most commonly reported symptoms of COVID–19 were fever, cough, fatigue, shortness of breath, and sputum production (Alimohamadi et al., 2020). In another review of a convenience sample (*i.e.,* a non-randomly selected sample based on availability, opportunity, or convenience) of COVID–19 patients in the United States, 96% of patients reported having a fever, a cough, or shortness of breath (Burke et al., 2020). The review also found that 68% of hospitalized patients experienced all three of those symptoms, but only 31% of non-hospitalized patients reported all three symptoms. A systematic review by Kim et al., (2021) determined sensitivity and specificity, respectively, for fever (0.6, 0.55), cough (0.59, 0.39), and difficulty breathing (0.18, 0.84).

Although not intended to identify individuals who could potentially have COVID–19, and the diagnostic accuracy of the approach is not known, the surveillance definition used by the Council of State and Territorial Epidemiologists (CSTE) provides insight on an approach to using symptoms to identify possible cases of COVID–19 in the absence of a more likely determination by a healthcare provider. The CSTE surveillance definition for COVID–19 includes: (1) At least two of

the following symptoms: Fever (measured or subjective), chills, rigors (*i.e.,* shivering), myalgia (*i.e.,* muscle aches), headache, sore throat, nausea or vomiting, diarrhea, fatigue, congestion or runny nose; or (2) any one of the following symptoms: Cough, shortness of breath, difficulty breathing, new olfactory (*i.e.,* smell) disorder, new taste disorder; or (3) severe respiratory illness with a least one of the following: Clinical or radiographic evidence of pneumonia, acute respiratory distress syndrome (ARDS) (CSTE, 2020).

Given the non-specificity of COVID–19 symptoms, consultation with a licensed healthcare provider can provide more insight on the likelihood that an employee with certain symptoms has COVID–19. A licensed healthcare provider can elicit key clinical information, such as timing, frequency, intensity, and other factors in diagnosing the patient, after considering different medical explanations. A licensed healthcare provider can also elicit additional clinical information (*e.g.,* pre-existing medical conditions), elicit epidemiologic information (*e.g.,* exposure to COVID–19, travel history, rates of community transmission), and order laboratory testing to assist with the diagnosis of COVID–19 and differentiation from other medical conditions.

In general, the presence of COVID–19 symptoms can alert employees that they may have COVID–19, which will allow them to take appropriate next steps. Thus, by monitoring for COVID–19 symptoms through regular health screening, employees can better address their personal health and avoid potentially infecting other people by seeking medical attention and getting tested for COVID–19 as appropriate; informing their employer if they are suspected or confirmed to have COVID–19, including concerning symptoms; and remaining away from the workplace where appropriate. Therefore, health screening is an effective strategy for preventing the transmission of COVID–19 in the workplace.

II. Employee Notification to Employer of COVID–19 Illness or Symptoms

Employers can reduce workplace exposures by preventing employees who are, or could be, COVID–19 positive from entering the workplace and transmitting the disease to others. But to do so, employers must be aware that an employee is suspected or confirmed to have COVID–19 or is symptomatic. The *Summary and Explanation* (Section VIII of the preamble) includes more discussion of the precise criteria and rationale for when an employee is required to notify an employer that they are suspected or confirmed to have COVID–19 or are experiencing certain types of symptoms. It is critical that employees make their employers aware promptly after the employee is suspected or confirmed to have COVID–19 through test, medical diagnosis, or the specific symptoms of concern discussed in the *Summary and Explanation* (Section VIII of the preamble). With this information the employer can act to help prevent transmission in the workplace.

III. Employer Notification to Employees of COVID–19 Exposure in the Workplace

Notifying employees of a possible exposure to someone confirmed to have COVID–19 is an important and effective intervention to reduce transmission. Under the ETS, this includes any employee who was not wearing a respirator and any other required PPE while in close contact with the individual with COVID–19 or while working in the same physical space around the same time as the individual with COVID–19 and consequently may have had contact with that individual or touched a contaminated surface. As the CDC has recognized, notification is important because it allows for an exchange of information with the person exposed to someone with COVID–19 and helps ensure that person can pursue quarantine, timely testing, medical evaluation, and other necessary support services (CDC, February 26, 2021). Notification also acts as a complement to an employer's regular health screening program by informing employees who may have been exposed to COVID–19 in the workplace, so that they can appropriately assess and monitor their health and report any symptoms that may develop to their employer. It is also important for employers to notify other employers whose employees may have had close contact or been in the same area as those infected individuals while not wearing required PPE so those employers can notify their employees.

The impact that notification of possible COVID–19 exposures can have in reducing COVID–19 transmission was demonstrated in a study by Kucharski et al., (2020), which found that when location-specific contact tracing and notification was used to make decisions on isolation and home quarantine, transmission of COVID–19 was reduced by 64% when contact tracing was performed manually and 47% when performed by an app. However, the authors found that while notification is effective in helping to decrease the spread of COVID–19 by making individuals aware of potential infections, it is not a standalone measure. Notification must be used in a layered approach in order to create an effective infection control plan.

IV. Medical Removal From the Workplace

Employers can substantially reduce disease transmission in the workplace by removing employees who are suspected or confirmed to have COVID–19 based on a COVID–19 test or diagnosis by a healthcare provider, or who have developed certain symptoms or combinations of symptoms associated with COVID–19. Employers can also reduce the risk of COVID–19 in the workplace by removing employees who are at risk of developing COVID–19 because they were recently exposed to someone with COVID–19 in the workplace. According to the CDC, a major mitigation effort for COVID–19 is ''to reduce the rate at which someone infected comes in contact with someone not infected. . . .'' (CDC, February 16, 2021b).

The ETS focuses on removing employees from the workplace, rather than specifying requirements for quarantine or isolation that are typically outside the control of the employer because they would occur away from the workplace, but the concept of separating infected or potentially infected individuals from others is the same. Both the CDC and ACOEM endorse the use of isolation and quarantine as measures needed to reduce this rate of contact and consequently slow the spread of COVID–19. Isolation ensures that persons known or suspected to be infected with the virus stay away from all healthy individuals. Isolating contagious, or potentially contagious, employees from their co-workers can prevent further spread at the workplace and safeguard the health of other employees. Quarantine is used to keep persons at risk of developing COVID–19 away from all other people until it can be determined whether the individual is infected following an exposure to someone with suspected or confirmed COVID–19 (Honein et al., 2020).

The first two categories of employees who should be removed from the workplace are those employees who are suspected to be or are confirmed to have COVID–19 based on a COVID–19 test or diagnosis by a healthcare provider and those employees who develop certain

COVID–19 symptoms.[25] Removal of these two categories of employees is consistent with isolation guidance from the CDC (February 11, 2021). Employers also prevent further transmission of COVID–19 in the workplace by providing employees a place to isolate from other workers until they can go home if they arrive with, or develop, COVID–19 symptoms at work (CDC, February 16, 2021a; CDC, March 8, 2021). ACOEM (August 19, 2020) also recommends that symptomatic employees stay home to protect healthy workers. Several studies have focused on the impact of isolating persons with COVID–19 from others during their likely known infectious period, and those studies show that isolation is a strategy that reduces the transmission of infections. For example, Kucharski et al., (2020) found that transmission of SARS–CoV–2 would decrease by 29% with self-isolation within the household, which would extend to 37% if the entire household quarantined. Similarly, Wells et al., (2021) found that isolation of individuals at symptom onset would decrease the reproductive rate (R0) of COVID–19 from an R0 of 2.5 to an R0 of 1.6. However, the study authors noted that when assuming low levels of asymptomatic transmission the R0 never fell below one, meaning there is a need for isolation to be used in concert with a more robust and layered infection control program, as is required by other provisions in the ETS.

The third category of employees who should be removed from the workplace to further reduce disease transmission are those who are at risk of developing COVID–19 because they have had recent close contact in the workplace with someone who is COVID–19-positive while not wearing a respirator and all required PPE (CDC, March 12, 2021). The need for removal of these employees is based on quarantine guidance from CDC (December 2, 2020) and is consistent with CDC recommendations for quarantine as a means of reducing workplace transmission (CDC, February 16, 2021a). Such removal is important because infected individuals are capable of transmitting the virus before they start experiencing symptoms and are aware that they are ill, and many (estimated to be 17% in one analysis) may never experience symptoms at all (Byambasuren et al., December 11, 2020). Therefore, ensuring that exposed employees are removed from work until it is unlikely that they have developed COVID–19 is critical for preventing the transmission of infections. CDC defines exposure through unprotected close contact as being within 6 feet of an infected person for a cumulative total of at least 15 minutes over a 24-hour period starting at 2 days before illness onset (or 2 days before samples are collected for testing in asymptomatic patients) and until the infected person meets the criteria for ending isolation (CDC, March 1, 2021). The risk level of the exposure depends on factors such as whether the healthcare provider was wearing a facemask or respirator, if an AGP was being performed without all recommended PPE, or if the patient had source control in place.

However, CDC does not recommend quarantine following close contact with someone who is suspected or confirmed to have COVID–19, if the person who had close contact meets all of the following criteria: (1) They have been fully vaccinated for COVID–19; (2) it has been at least 2 weeks since the full vaccination was completed; and (3) they do not develop any symptoms (CDC, May 13, 2021; CDC, March 12, 2021). CDC also has analyzed accumulating evidence indicating that persons who have recovered from laboratory-confirmed COVID–19 and remain symptom-free may not have to quarantine again if exposed within three months of the illness. CDC (March 16, 2021) concluded that although the evidence does not definitively demonstrate the absence of reinfection within a three-month period, the benefits of avoiding unnecessary quarantine likely outweigh the risks of reinfection as long as other precautions such as physical distancing, facemasks, and hygiene continue to be implemented.

CDC's recommendation was based on a review of more than 40 studies examining evidence of re-infection in recovered individuals (complete reference list included in CDC, (March 16, 2021). While many studies demonstrated that reinfection can occur at least 90 days after infection (*e.g.,* Colson et al., 2020; Van Elslande et al., 2021), other studies suggest re-infection is possible as early as 45 days after infection (*e.g.,* Abu-Raddad et al., 2020; Larson et al., 2020; Tillet et. al., 2020). Although antibodies to the virus that causes COVID–19 have not been definitively correlated with protection from reinfection and it is not clear what level of antibodies would be required for protection, increasing numbers of studies are suggesting that the majority of recovered patients develop antibodies specific for the virus that causes COVID–19 (*e.g.,* Deeks et al., 2020; Gudbjartsson et al., 2020). Antibody responses have been reported to last for six months or more in some studies (*e.g.,* Choe et al., 2021; Dan et al., 2021), but other studies suggested lower levels of antibodies or detection of antibodies for shorter periods of time (*e.g.,* Ibarrondo et al., 2020; Seow et al., 2020). In addition to the production of antibodies, immunity can be achieved through virus-specific T- and B-cells (*e.g.,* Kaneko et al., 2020), and some studies show that T- and B-cell immunity can last for 6 months or more (*e.g.,* Dan et al., 2021; Hartley et al., 2020). Some studies suggest that T- and B-cell responses could be higher in symptomatic versus asymptomatic adults (*e.g.,* Zuo et al., 2021). Results from animal challenge studies (*e.g.,* Chandrashekar et al., 2020; Deng et al., 2020), and seropositive adults in outbreak settings (Abu-Raddad et al., 2020; Lumley et al., 2021) provide additional evidence that initial infection might protect against reinfection.

In addition to the uncertainty noted above, CDC notes that risk of reinfection may be increased in the future, with the circulation of variants (*e.g.,* CDC, March 16, 2021; Nonaka et al., 2021; Harrington et al., 2021; Zucman et al., 2021). Because of the uncertainty regarding reinfection and increased possibility of reinfection following exposure to variants, the CDC recommends that employees be removed from the workplace if they develop symptoms after close contact with someone who has COVID–19, even if the employee is fully vaccinated or was confirmed to have COVID–19 in the previous three months (CDC, May 13, 2021; CDC, April 2, 2021).

V. Medical Removal Protection Benefits

Notification and removal will be most effective if the employees responsible for reporting do not face potential financial hardships for accurate reporting of symptoms and illnesses. As noted above, employers must know that an employee is suspected or confirmed to have COVID–19 or has certain symptoms of COVID–19 before they can remove those employees from the workplace. But removing employees from the workplace based on their own reports is likely to prove an effective control for COVID–19 only if the employees are not afraid they will be penalized for making those reports. OSHA's experience demonstrates that employees will self-report at a sufficient level to make removal program effective only when removed employees do not face a significant financial penalty—

[25] Evidence on the sensitivity and specificity of certain symptom triggers is discussed above. The *Summary and Explanation* (Section VIII of the preamble) includes more discussion of the symptoms that trigger removal from the workplace and the rationale for selection of those symptoms.

such as lost income during the removal period—and when employees may return to work after their removal period without any adverse action or deprivation of rights or benefits because of the removal. Because the employer will often have no other way to learn whether an employee is suspected or confirmed to have COVID–19, or has certain symptoms of COVID–19, medical removal protections are necessary to ensure that employees are not disincentivized to report suspected or confirmed COVID–19 or symptoms of COVID–19. Because infectious employees pose a direct hazard to their co-workers, removing barriers to reporting symptoms or confirmed diagnoses protects not only the reporting employee but also every other employee who would otherwise be exposed to infection.

OSHA's experience shows that the threat of lost earnings, benefits, and/or seniority protection provides a significant disincentive for employees to participate in workplace medical screening and reporting programs (see *United Steelworkers of America* v. *Marshall,* 647 F.2d 1189, 1237 (D.C. Cir. 1981) (recognizing the importance of removing financial disincentives for workers exposed to lead)). In the lead rulemaking, OSHA adopted a medical removal protection benefits provision in part due to evidence that employees were using chelating agents to achieve a rapid, short-term reduction in blood lead levels because they were desperate to avoid economic loss, despite the possible hazard to their health from the use of chelating agents (43 FR 54354, 54446 (November 21, 1978)). OSHA's standards for cotton dust and lead contain testimony from numerous employees indicating that workers would be reluctant to report symptoms and participate in medical surveillance if they fear economic consequences (43 FR at 54442–54443; 50 FR at 51154–51155). A major reason that OSHA included medical removal protection benefits in the formaldehyde standard is because the standard does not have a medical examination trigger, such as an action level, but instead relies on annual medical questionnaires and employee reports of signs and symptoms. Thus, the approach is completely dependent on employee cooperation (57 FR at 22293). Literature reviews have similarly reported that lack of compensation is one reason why employees might go into work while sick (Heymann et al., 2020; Kniffen et al., 2021). Based on this evidence, OSHA concludes that protection of benefits for removed employees is necessary to maximize employee reporting of suspected or confirmed COVID–19 and symptoms associated with COVID–19. This in turn maximizes protection for all employees at the workplace.

VI. Return to Work

After employees have been removed from the workplace as required by this standard, the employer must ensure that they do not return to the workplace until there is no longer a risk of disease transmission. Scientific evidence is available to determine the appropriate duration of isolation for COVID–19, which can be used to determine the appropriate duration of removal from the workplace. As general guidance, CDC recommends isolating symptomatic people with COVID–19 for at least 10 to 20 days after symptom onset, dependent on factors such as the severity of infection and health of the immune system. In most cases, the CDC states that a person can end isolation when (i) 10 days have passed since symptom onset; (ii) fever has been resolved (without fever-reducing medications) for at least 24 hours; and (iii) other symptoms (except loss of taste and smell) have improved. In cases of severe illness, the decision to end isolation may require consultation with an infection control expert. For persons who are confirmed positive but never develop symptoms, CDC recommends ending isolation at 10 days after the first positive test (CDC, March 16, 2021). These recommendations are based on scientific evidence reviewed by CDC which suggest that levels of viral RNA in upper respiratory tract samples begin decreasing after the onset of symptoms (CDC, March 16, 2021; CDC, unpublished data, 2020, as cited in CDC, March 16, 2021; Midgley et al., 2020; Young et al., 2020; Zou et al., 2020; Wölfel et al., 2020; van Kampen et al., 2021). Levels of replication-competent viruses (*i.e.,* viruses that are able to infect cells and produce more infectious viral particles) also decrease over time; with only two possible exceptions, no replication-competent virus was detected after 10 days of symptom onset in individuals with mild-to-moderate disease (CDC, unpublished data, 2020, as cited in CDC, March 16, 2021; Wölfel et al., 2020; Arons et al., 2020; Bullard et al., 2020; Liu et al., 2020a; Lu et al., 2020; personal communication with Young et al., 2020, as cited in CDC, March 16, 2021; Korea CDC, May 19, 2020; Quicke et al., 2020). In a study of persons with severe disease (possibly complicated in some individuals by an immunocompromised status), the median duration of shedding infectious virus was 8 days after onset of symptoms, and the probability of shedding virus after 15 days was estimated at 5% or less (van Kampen et al., 2021). In severely immunocompromised patients, ''sub-genomic virus RNA'' or replication competent virus was detected beyond 20 days and as much as 143 days after a positive virus test (*e.g.,* Avanzato et al., 2020; Choi et al., 2020). A large contact-tracing study found no evidence of infections in individuals who had contact with infectious individuals in a household or hospital when exposure occurred at least 6 days after illness onset (Cheng et al., 2020). Accordingly, these studies support the CDC's recommended isolation guidance (CDC, February 16, 2021a; CDC, February 18, 2021a; CDC, February 18, 2021b). However, as noted, CDC's recommendations for isolation are broad guidance; the appropriate duration for any given individual may differ depending on factors such as disease severity or the health of the employee's immune system.

As a general rule, CDC does not recommend a testing strategy as a means for determining when to end isolation, with the possible exception of severely immunocompromised persons (CDC, March 16, 2021). This is because tests to detect viral genetic material may yield positive results after a person is no longer infectious. Except in a very limited number of cases, studies have demonstrated that although some individuals were observed to persistently shed virus (for up to 12 weeks), replication-competent virus has not been recovered at three weeks past illness (Korea CDC, May 19, 2020; CDC, March 16, 2021; Li et al., 2020; Xiao et al, 2020; Liu et al., 2020a; Quicke et al., 2020). In addition, a study of 285 persons with persistent virus shedding, including 126 who experienced recurrent symptoms, found no evidence that any of the 790 contacts were infected from exposures to the people with persistent virus shedding (Korea CDC, May 19, 2020; CDC, March 16, 2021).

On the other hand, testing conducted after onset of sensitive symptoms associated with COVID–19 can identify individuals who are not infected. Peak virus shedding has been reported to occur just before and as symptoms are developing (Beeching et al., 2020; He et al., 2020). Testing for COVID–19 soon after the onset of symptoms has been estimated to result in a low false-negative rate of 10%, based on the reported Polymerase Chain Reaction test sensitivity (Grassley et al., 2020).

Return-to-work criteria for employees who are removed from the workplace because they are at risk of developing COVID–19 after exposure to someone with COVID–19 in the workplace, but have not yet developed symptoms or tested positive themselves, are based on the CDC's quarantine guidance. Based on available scientific evidence, the CDC generally recommends a 14-day quarantine period for individuals who have been exposed to a confirmed case of COVID–19 and are therefore at risk of developing COVID–19 (CDC, December 2, 2020; CDC, March 12, 2021). The 14-day quarantine period is based on the conclusion that the upper bound of the incubation period (the period between the point of infection and symptom onset) for COVID–19 is 14 days, and that there is a possibility that an unknowingly infected person can transmit the disease if quarantine is discontinued before 14 days (CDC, December 2, 2020). The scientific community agrees that a 14-day quarantine period is ideal. Linton et al., (2020) recommended a quarantine period of at least 14 days, based on a mean incubation period of 5 days, with a range of 2–14 days, in patients from and outside of Wuhan, China. Lauer et al., (2020) concluded that the CDC recommendation to monitor for symptoms for 14 days is supported by the evidence, including their study of patients outside the Hubei province that reported a mean incubation period of 5.1 days and symptom development within 11.5 days in 97.5% of those who develop symptoms.

Although a 14-day quarantine is ideal and generally recommended, the CDC has recognized that a shorter quarantine period may be less burdensome and result in increased compliance. Therefore, the CDC reviewed emerging scientific evidence to provide shorter quarantine options that employers can consider if allowed by local public health authorities (Oran and Topol, 2020; Johansson et al., 2020; Kucirka et al., 2020; Clifford et al., 2020; Quilty et al., 2021; Wells et al., 2021; Khader et al., 2020, as cited in CDC, December 2, 2020; Liu et al., 2020b; Ng et al., 2021; Grijalva et al., 2020). One of those options is testing for the virus at five days after exposure and ending quarantine at seven days after exposure if results are negative. Importantly, this option is only appropriate for individuals who do not develop symptoms over the quarantine period (as such individuals should instead be managed according to the CDC's isolation strategies). Based on the evidence reviewed, CDC concluded that ending quarantine after a negative test and seven days with no symptoms would result in a residual transmission risk of about 5%, with an upper limit of about 12% (CDC, December 2, 2020).

VII. Conclusion

As demonstrated above, the best available evidence strongly supports OSHA's conclusion that implementation of a comprehensive medical management program which includes health screening; notifications of potential exposures; removing employees who are COVID–19 positive, suspected to be positive, have certain symptoms, or have been exposed to a person with COVID–19 from the workplace until there is no longer a risk of disease transmission; and protection of removed employees' compensation, rights, and benefits are necessary measures to reduce incidence of COVID–19 exposure in the workplace. Because the virus that causes COVID–19 is spread through exposure to infected individuals or surfaces contaminated by infected individuals, quickly identifying and removing employees from the workplace who have developed, likely developed, or are at heightened risk of developing COVID–19 will allow employers to significantly reduce the spread of COVID–19 in the workplace. The prompt identification and removal of these employees can prevent transmission of the virus to others in the workplace. In addition, medical removal protection provisions that ensure compensation and protection of rights and benefits during removal will encourage employees to report diagnoses of suspected or confirmed-positive COVID–19 and symptoms. However, as noted above, some employees with COVID–19 will not have symptoms, and testing to allow employees to return to work after exposures to COVID–19 or experiencing symptoms associated with COVID–19 will likely result in some false negatives. Therefore, a medical management program should be complemented by other measures as part of a multi-layered strategy to minimize employee exposure to the grave danger of COVID–19.

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N. Vaccination

Vaccines are an important tool to reduce the transmission of COVID–19 in the workplace. A vaccine serves three critical functions: First, it can reduce the likelihood that a vaccinated person will develop COVID–19 after exposure to SARS–CoV–2; second, it can lessen the symptoms and effects in cases where the vaccinated person does contract COVID–19; and third, although the CDC still recommends source controls for vaccinated healthcare workers, it also acknowledges a growing body of evidence that vaccination can reduce the potential that a vaccinated person will transmit the SARS–CoV–2 virus to non-vaccinated co-workers (CDC, April 12, 2021; CDC, April 27, 2021). Vaccination also serves an important role in reducing health disparities in employees of certain demographics, who may be especially vulnerable to severe health effects or death from COVID–19 (Dooling et al., December 22, 2020). Below OSHA provides a general explanation of the need for vaccination measures in the ETS; however, a fuller explanation of the efficacy of existing vaccines and their impact on the risk of COVID–19 infection and transmission is discussed in *Grave Danger* (Section IV.A. of the preamble).

OSHA has long recognized the importance of vaccinating employees against preventable illnesses to which they may be exposed on the job. The Bloodborne Pathogens standard, for example, requires the hepatitis B vaccine be made available to any employees with occupational exposure to blood and other potentially infectious materials, in order to reduce the risk of hepatitis B infection and subsequent illness and death (56 FR 64004, 64152 (Dec. 6, 1991)). A number of professional health organizations have similarly long recognized the importance of vaccinating employees to prevent illness. This is particularly true in healthcare industries, where employees are more regularly at risk of occupational exposure to transmissible diseases. For example, the Advisory Committee on Immunization Practices (ACIP), which reviews evidence of risk and vaccine effectiveness, recommends vaccinating healthcare employees against numerous diseases, including influenza, another viral disease spread through droplet transmission (Shefer et al., November 25, 2011). Similarly, both HICPAC and the American Hospital Association have encouraged and endorsed vaccination programs or policies for healthcare workers. CDC, WHO, and the National Academies of Science, among others, have all acknowledged that broad vaccination of all people for COVID–19, in combination with other public health measures, is a critical tool that can be used to address the pandemic (CDC, April 29, 2021; WHO, January 8, 2021; NASEM, 2020).

Any vaccines offered to employees must be demonstrated to be safe and effective. Fortunately, over the course of the pandemic, there have been extensive efforts to develop COVID–19 vaccines. As discussed in greater detail in *Grave Danger* (Section IV.A. of the preamble), there are presently three COVID–19 vaccines authorized for emergency use by the FDA in the United States: the Pfizer-BioNTech COVID–19 vaccine, the Moderna COVID–19 vaccine, and the Janssen Biotech, Inc. Johnson and Johnson COVID–19 vaccine, each recommended for use by ACIP in persons at least 12 years of age and older for the Pfizer-BioNTech vaccines or 18 years of age and older for the Moderna and Johnson and Johnson (Janssen) vaccines (Oliver et al., December 18, 2020; Oliver et al., January 1, 2021; FDA, April 9, 2021; FDA, April 1, 2021; FDA, February 26, 2021; FDA, May 10, 2021). In determining whether to grant EUA for a new COVID–19 vaccine, the FDA considers several statutory criteria provided in section 564 of the Federal Food, Drug, and Cosmetic Act (21 U.S.C. 360bbb–3). In evaluating an EUA request, FDA considers, among other things, the totality of scientific evidence available to determine if it is reasonable to believe that the vaccine may be effective (*i.e.,* an efficacy of at least 50%) in preventing COVID–19 and that the known and potential benefits of the vaccine, when used to prevent COVID–19, outweigh the known and potential risks of the vaccine (FDA, April 9, 2021; FDA, April 1, 2021; FDA, February 26, 2021). The product manufacturer must also demonstrate quality and consistency in manufacturing. Accordingly, any COVID–19 vaccine that receives an EUA from the FDA—including the Pfizer-BioNTech vaccine, Moderna vaccine, the Johnson and Johnson (Janssen) vaccine, and any future vaccine that receives such an authorization after the issuance of this ETS—has been shown to be sufficiently safe and effective.

All three vaccines that have been authorized to date, including the Pfizer-BioNTech, Moderna, and Johnson & Johnson (Janssen) vaccines, have been found to be highly effective for the appropriate ages (Oliver et al., December 18, 2020; Oliver et al., January 1, 2021; Polack et al., December 31, 2020; FDA, December 17, 2020; FDA, December 10, 2020; FDA, February 26, 2021). The vaccines were also found to be effective in preventing disease that is severe or requires hospitalization. The evidence

available at this time, however, does not yet establish that the vaccines eliminate the potential for asymptomatic COVID–19 development; rather, fully vaccinated people are less likely to have asymptomatic infection or transmit SARS–CoV–2 to others (CDC, May 14, 2021). All three authorized vaccines have met the authorization standard for safety, with the majority of adverse effects observed to be mild or moderate in severity and transient, including: fatigue; headache; chills; muscle pain; joint pain; lymphadenopathy (swelling or enlargement of lymph nodes) on the same side as the injection; and injection site pain, redness, and swelling (CDC, December 13, 2020; CDC, December 20, 2020; CDC, May 14, 2021; Oliver et al., December 18, 2020; Oliver et al., January 1, 2021; Polack et al., December 31, 2020; FDA, December 17, 2020; FDA, December 10, 2020; FDA, February 26, 2021).

Further, as discussed more extensively in the *Summary and Explanation* (Section VIII of the preamble) requirement for paid time off for vaccination, vaccination can only function as an effective control if workers have access to it. Additional explanation of the importance of removing barriers to controls is also discussed in *Summary and Explanation* (see discussion of requirements that employees receive protections of the ETS at no cost, as well as requirements for paid time off for vaccination, both in Section VIII of the preamble).

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O. Training

The CDC has determined that training is a necessary component of a comprehensive control plan for COVID–19. The WHO has also determined that training is an important control strategy for COVID–19 (WHO, May 10, 2020). When providing guidance for employers, the CDC has said that employees need to be educated on steps they can take to protect themselves from potential COVID–19 exposures at work. Employers informing employees of the hazards to which employees may be exposed while working is a cornerstone of occupational health and safety (OSHA, 2017). Employees play a particularly important role in reducing exposures because appropriate application of work practices and controls limit exposure levels. Employees therefore need to be informed of the grave danger of COVID–19, as well as the workplace measures included in their employers' COVID–19 plans because those measures are necessary to reduce risk and provide protection to employees. Employees must know what protective measures are being utilized and be trained in their use so that those measures can be effectively implemented.

Training has been shown to be an effective tool to reduce injury and illness (Burke et al., February 2006), but training is even more critical when the workplace hazard includes the potential transmission of the potentially deadly SARS–CoV–2 virus from one employee to another: One improperly trained employee could increase risk for that employee and for all of that employee's contacts, including coworkers.

Therefore, training is an essential component of a layered approach to minimizing the risk of contracting COVID–19 in the workplace.

Training and education provide employees and managers an increased understanding of existing safety and health programs. A thorough understanding of these programs is necessary so employees can more effectively contribute to their development and implementation. Training provides employers, managers, supervisors, and employees with the knowledge and skills needed to do their work safely and to avoid creating hazards that could place themselves or others at risk, as well as awareness and understanding of workplace hazards and how to identify, report, and control them. Specialized training can address unique hazards.

Because OSHA has long recognized the importance of training in ensuring employee safety and health, many OSHA standards require employers to train employees (*e.g.,* the Bloodborne Pathogen standard at 29 CFR 1910.1030(g)(2)). When required as a part of OSHA standards, such as is required by this ETS, training helps to ensure that employees are able to conduct work in a safe and healthful manner (OSHA, April 28, 2010). Training is essential to ensure that both employers and employees understand the sources of potential exposure to COVID–19 and control measures to reduce exposure to the hazard.

Employee comprehension is critical to ensuring that training is an effective control. If training information is not presented in a way that all employees understand, the training will not be effective. Employers must thus consider language, literacy, and social and cultural appropriateness when designing and implementing training programs for employees (O'Connor et al., 2014). Additionally, if employers do not offer training to employees in a convenient manner, employees may be less likely to participate in the training. Therefore, to be effective, training must be offered during scheduled work times and at no cost to the employee. This will ensure that all employees will have the time and financial resources to receive training. This is also consistent with other OSHA standards. For example, the Bloodborne Pathogen standard requires training be provided at no cost and during working hours (§ 1910.1030(g)(2)(i)) and in a manner employees understand (§ 1910.1030(g)(2)(vi)).

Research dating back to the 1980s has found ''overwhelming evidence'' of the effectiveness of training programs on employee knowledge (NIOSH, 1998), as well as employee behaviors (NIOSH, January 2010). With enhanced knowledge of safety and health hazards and controls, employees can implement safer work practices. This can result in reductions in workplace-related illnesses (Burke et al., February 2006).

The CDC has stated that information on workplace policies should be communicated clearly, frequently, and via multiple messages (CDC, March 8, 2021). Training and education on safe work practices and controls should be used to raise awareness among employees. Emphasizing the effectiveness of these workplace controls helps to counteract misinformation. Additional training, such as on PPE and infection control policies and procedures, should be given to employees in those workplaces where there is a high risk of exposure to COVID–19 (WHO, May 10, 2020).

Scientific research and case studies have further reinforced the importance of training in responding to the COVID–19 pandemic. Researchers found that a COVID–19 outbreak was effectively contained as a result of prompt implementation of infection control measures, including early in-person education of employees on the signs, symptoms, and transmission of COVID–19 (Hale and Dayot, August 13, 2020). Knowledge of PPE was markedly improved following training on PPE for healthcare employees in China during the COVID–19 pandemic (Tan et al., June, 2020).

Training has been widely recognized as a key component of occupational safety and health. Even though the body of scientific evidence on the importance of training during the COVID–19 pandemic is limited given its ongoing nature, the evidence that does exist only further emphasizes the important role of training in protecting the health and safety of employees. As such, OSHA has concluded that training is necessary to ensure proper implementation of the employer's COVID–19 plan and all other control measures, and that such training will reduce incidence of COVID–19 illness both on its own and when complemented by other measures as part of a multi-layered strategy to minimize employee exposure to the grave COVID–19 danger.

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VI. Feasibility

A. Technological Feasibility

This section presents an overview of the technological feasibility assessment for OSHA's Emergency Temporary Standard (ETS) for COVID–19. The ETS has four sections: Healthcare (29 CFR 1910.502); Mini Respiratory Protection Program (29 CFR 1910.504); Severability (29 CFR 1910.505); and Incorporation by

Reference (29 CFR 1910.509). The ETS applies to all settings where any employee provides healthcare services or performs healthcare support services. The settings covered by the ETS are listed in Table VI.A.-1.

Table VI.A.-1: Settings covered by the ETS

Settings Covered	Examples of Facility Types
Hospitals – facilities with workers who provide inpatient healthcare services and healthcare support services.	General hospitals Trauma centers Specialty hospitals (children's, cardiac, etc.) Teaching hospitals Emergency departments attached to a hospital Autopsy Suites
Ambulatory Care – facilities with workers who provide outpatient care to patients.	Physician offices Dentist offices Surgical centers Specialty care clinics Urgent care centers Oncology clinics Medical clinics
Home Health Care – facilities with workers who provide healthcare and healthcare support services in the home.	Hospice agencies Home therapy agencies Home healthcare agencies
Emergency Responders and Prehospital Care – facilities with workers who respond to emergency calls, perform healthcare services and/or transport patients to medical facilities.	Fire Departments Ambulance companies Medical transportation services Air evacuation companies
Long-Term Care – facilities where workers provide care and support services in a residential setting.	Skilled nursing centers /assisted living facilities Residential substance abuse centers Residential psychiatric centers Residential rehabilitation centers

The mini respiratory protection program section supplements the ETS to provide additional protection to workers in appropriate cases. The healthcare and mini respiratory protection program sections of the ETS will be discussed below. It is not necessary to discuss the severability or incorporation by reference sections, as those sections do not by their own terms impose any requirements that raise issues of technological feasibility.

Technological feasibility has been interpreted broadly to mean ''capable of being done'' (*Am. Textile Mfrs. Inst.* v. *Donovan,* 452 U.S. 490, 509–510 (1981)). A standard is technologically feasible if the protective measures it requires already exist, can be brought into existence with available technology, or can be created with technology that can reasonably be expected to be developed, *i.e.,* technology that ''looms on today's horizon'' (*United Steelworkers of Am., AFL–CIO–CLC* v. *Marshall,* 647 F.2d 1189, 1272 (D.C. Cir. 1980) (*Lead I*); *Amer. Iron & Steel Inst.* v. *OSHA,* 939 F.2d 975, 980 (D.C. Cir. 1991) (*Lead II*); *American Iron and Steel Inst.* v. *OSHA,* 577 F.2d 825 (3rd Cir. 1978)). Courts have also interpreted technological feasibility to mean that a typical firm in each affected industry or application group will reasonably be able to implement the requirements of the standard in most operations most of the time (see *Public Citizen* v. *OSHA,* 557 F.3d 165 (3d Cir. 2009); *Lead I,* 647 F.2d at 1272; *Lead II,* 939 F.2d at 990).

OSHA's assessment focuses on the controls required by the ETS that stakeholders may believe raise issues of technological feasibility. These controls include the implementation of a COVID–19 plan and healthcare-specific good infection control practices, as well the following controls: Physical distancing; physical barriers; and ventilation.[26] As discussed below, OSHA's finding of technological feasibility is supported by a large number of COVID–19 transmission prevention plans and best practice documents it reviewed, as well as physical distancing scenarios and a job matrix it developed, across the healthcare sector.

While OSHA focuses on certain types of evidence in specific parts of the analysis, much of the evidence supports other discrete findings made by OSHA. Thus, for example, while OSHA focuses on its review of plans and best practice documents in establishing the feasibility of developing and implementing a COVID–19 plan, that evidence also supports the feasibility of implementing healthcare-specific good infection control practices, physical distancing and physical barriers, and ventilation.

In addition, this analysis discusses only a few examples of the plans and best practice documents it reviewed, does not recount every element of the

[26] As will be discussed later in this assessment, there are no technological feasibility barriers related to compliance with other requirements in the ETS (*e.g.,* facemasks, respirators, cleaning and disinfection, health screening and medical management, employee notification).

plans and best practice documents that it reviewed, and does not recount all details of the scenarios and job matrix it developed. OSHA based its technological feasibility assessment on all the evidence in the docket, and not just the select portions discussed here. The discussion below is merely illustrative of the full complement of evidence reviewed to demonstrate that employers have implemented the controls required by the ETS.

Finally, OSHA's finding of technological feasibility should not be read to indicate that individual plans or best practice documents OSHA reviewed are ETS-compliant, that lack of inclusion of a control in a plan or document indicates the control is infeasible, that the use of a barrier by employers in a given situation indicates that physical distancing was not feasible in that situation, or that a particular control used (*e.g.,* a plastic sheet or curtain used as a physical barrier) is compliant with the ETS's requirements. The plans and best practice documents are intended to show two things: (1) That developing plans to address COVID–19 in various workplaces is both common and feasible, and (2) that the controls required by the ETS have been implemented and are feasible in the healthcare settings. The specifics of the plans may vary, but the ETS COVID–19 plan requirements are written as performance requirements that provide sufficient flexibility to ensure that it is feasible for employers to develop and implement such a plan, including appropriate controls, for any given healthcare workplace.

I. The ETS's Approach to Employee Protection

The ETS generally includes provisions that are based on and in accordance with applicable CDC and other well-established guidelines for good infection control practices relevant to the exposures encountered by employees during their job tasks. For example, the ETS requires the employer to develop and implement policies and procedures to adhere to Standard and Transmission-Based Precautions. As discussed in detail in the *Need for Specific Provisions* (Section V of the preamble, these requirements are consistent with well-established CDC and other guidelines that are routinely followed by employers subject to the ETS. That the ETS is based on CDC and other guidelines or practices that are well established and have been routinely followed by many employers both before and during the pandemic is compelling evidence supporting OSHA's finding of technological feasibility.

Moreover, as described in more detail in the *Need for Specific Provisions* (Section V of the preamble), COVID–19 transmission control practices work best when used together, overlapping their protective impact. To this end, the COVID–19 ETS provides a multilayered approach in which a combination of control measures must be implemented to minimize the risks of exposure to COVID–19. Thus, to effectively reduce the risk, employers must ensure that they follow all requirements of the ETS that are feasible. As discussed in the *Need for Specific Provisions* (Section V of the preamble), the OSHA regulatory text reflects a multilayered strategy by requiring employers to implement multiple mitigation strategies with several layers of controls to lower the risks of exposure and reduce the spread of disease. Utilizing overlapping controls in a layered approach better ensures that no inherent weakness in any one approach results in an infection incident. OSHA emphasizes that the infection control practices required by the ETS work best when used together, layering their protective impact (Garner, 1996; Rusnak et al., September 2004; Miller et al., 2012; WHO, 2016). For example, in addition to requiring employers to ensure that employees engage in physical distancing, wear facemasks and follow healthy hand hygiene practices, employers must ensure the use of physical barriers at fixed work locations outside of direct patient care areas where 6 feet of physical distancing is not feasible and ensure adequate building ventilation. No one measure can prevent transmission by itself, but several layers combined can significantly reduce the overall risk of COVID–19 transmission (*e.g.,* a facemask alone will not be enough to prevent the spread of COVID–19 without physical distancing and other controls (Akhtar et al., December 22, 2020)).

Implementing multiple mitigation strategies is even more necessary to reduce the risk, because it will not be feasible to apply every control in every workplace situation. Thus, the ETS employs strategies to ensure that employees will be protected even when a particular control is not feasible. As discussed below, OSHA concludes that this multilayered approach to employee protection is feasible based on its review of commonly implemented healthcare-specific good infection control practices contained in nationally recognized infection control practices like CDC guidelines, employer plans, best practice documents, scenarios, and a job matrix that show these precautions are already in place or can be readily implemented by typical firms in the healthcare sector.

OSHA emphasizes, finally, that although the ETS takes a multilayered approach to employee protection, it also establishes how and when controls must be used. For example, physical barriers are required only where physical distancing is not feasible because, as OSHA discusses in depth in *Need for Specific Provisions* (Section V of the preamble), physical barriers work by preventing droplets from traveling from the source (*i.e.,* an infected person) to an employee, and are particularly critical when physical distancing of 6 feet is not feasible because most COVID–19 transmission occurs via respiratory droplets that are spread from an infected individual during close (within 6 feet) person-to-person interactions.

a. COVID–19 Plans

Paragraph (c) of the ETS requires the employer to develop and implement a COVID–19 plan that includes policies and procedures to minimize the risk of transmission of COVID–19, as reflected in paragraphs (d) through (n) in the ETS. These provisions are summarized in Table VI.A.-2 below, and are discussed in detail in *Need for Specific Provisions* and *Summary and Explanation* (Sections V and VIII of the preamble, respectively).

Table VI.A.-2; Provisions in the ETS	
COVID-19 Plan	(c)
Patient screening and management	(d)
Standard and Transmission-Based Precautions	(e)
Personal protective equipment (including facemasks and respirators)	(f)
Aerosol-generating healthcare or postmortem procedures on a person with suspected or confirmed COVID-19	(g)
Physical distancing	(h)
Physical barriers	(i)
Cleaning and Disinfection	(j)
Ventilation	(k)
Health screening and medical management	(l)
Vaccination	(m)
Training	(n)

OSHA conducted a search for existing COVID–19 plans and best practices developed by employers, trade associations, and other organizations and posted on their publicly available websites. OSHA's search revealed 77 plans and best practice documents from companies and trade associations in the Health Care and Social Assistance industry sector that address COVID–19 hazards using the multilayered approach and controls required by the ETS. To the extent individual plans are not discussed specifically below, a breakdown with the name of the company or organization, a description of the contents, and a link to the plan can be found in the COVID–19 Plans by NAICS spreadsheet (ERG, February 9, 2021).

Based on its review of these plans, OSHA concludes that it is feasible for employers in typical firms in the healthcare sector to comply with the requirements in the ETS for a COVID–19 plan.[27] Below, OSHA highlights the elements of a few of the plans and best practice documents it reviewed. In each case, OSHA presumes that an organization believes that the particular approaches contained in the organization's own documents are technologically feasible.

ETS Workplace-Specific Hazard Assessments Required by Different Healthcare Organizations

Paragraph (c)(4)(i) of the ETS requires healthcare employers to conduct a workplace-specific hazard assessment to identify potential workplace hazards related to COVID–19. The workplace-specific hazard assessment requirements are discussed in detail in *Need for Specific Provisions* and *Summary and Explanation* (Sections V and VIII of the preamble, respectively).

OSHA conducted a search for existing COVID–19 plans and best practices developed by employers, trade associations, and other organizations and posted on their publicly available websites and found that many required employers to conduct a workplace hazard assessment to determine the COVID–19 exposure risks to employees. While the specifics of the assessments may not mirror the full requirements for OSHA's COVID–19 plans, those hazard assessments indicate and provide additional support for OSHA's determination that it is feasible for healthcare employers to design and implement COVID–19 plans. The best practices also indicate that it is feasible for healthcare employers to have policies and procedures to regularly check on the proper implementation of

[27] As stated, OSHA located 77 plans in the Health Care and Social Assistance industry sector. Some of these plans do not address protections that are covered by the ETS (*i.e.,* they do not cover settings where any employee provides healthcare services or healthcare support services). OSHA relied on these particular plans to draw its conclusion that it is feasible for employers in typical firms in the healthcare sector to comply with the requirements in the ETS for a COVID–19 plan, but only to the extent they address the implementation of controls to protect workers in job categories commonly found in workplaces where healthcare services and healthcare support services are provided (*e.g.,* public facing employees, general office workers).

controls, which corresponds to OSHA's requirement that employers regularly re-assess the COVID–19 plan to ensure that it is updated and useful.

The Santa Clara Valley Medical Center (SCVMC) is a 574-bed acute care, fully accredited public teaching hospital affiliated with Stanford University Medical School and provides a full range of inpatient, emergency rehabilitation, neonatal, intensive care, high-risk maternity care, psychiatry, pediatric intensive care, and burn intensive care services. The ambulatory outpatient services include both primary and specialty clinics located not only at SCVMC, but also at satellite facilities located throughout the area (SCVMC, December 1, 2020).

The SCVMC plans reviewed includes guidelines for COVID–19 exposure and risk assessment, contact tracing, testing, and return to work for their employees (SCVMC, December 1, 2020). Furthermore, the COVID–19 plan includes a policy outlining the worker exposure evaluation process to be conducted by each department and each ambulatory care clinic that is part of the SCVMC network. The assessment of exposure risk is required for all individuals working in the SCVMC hospitals and clinics including employees, volunteer, staff, physicians, contract personnel, or other workers. The assessment required by the COVID–19 plan should evaluate physical distancing, period or duration of exposure, as well as the implementation of controls such as facemasks and respiratory protection, and other PPE necessary to protect employees from COVID–19 exposure.

OSHA also reviewed the COVID–19 plan for Michigan Medicine, one of the largest fully accredited academic medical centers in Michigan made up of the University of Michigan health system and medical school. The Michigan Medicine COVID–19 plan includes specific requirements for each department to conduct employee COVID–19 job hazard assessments to evaluate and mitigate the risk of COVID–19 for University of Michigan workers (Michigan Medicine U–M, May 18, 2021).

The U–M COVID–19 plan also requires each department to create a departmental specific COVID–19 work plan for its area to document their COVID–19 employee job hazard assessment and plan. The plan also provides departments with resources to develop and implement the required COVID–19 employee job hazard assessment as well as a departmental COVID–19 work plan including blank templates for both. The hazard assessment and subsequent plan required by each department must evaluate and address for each employee, the ability to maintain physical distance from all other persons, employee requirements for facemasks, respiratory protection, and other PPE, hand hygiene and respiratory etiquette, workplace cleaning and disinfection within the department or unit. The requirements of the job hazard assessment cover employees, vendors, contractors, and all other workers performing task in the department.

Additionally, OSHA reviewed the COVID–19 plan of Johns Hopkins Medicine, which is made up of the Johns Hopkins University Health System with six academic and community hospitals, four suburban health care and surgery centers, over 40 patient care locations, and a home care group that offers an array of health care services. The Johns Hopkins Medicine COVID–19 plan includes requirements that assess the COVID–19 transmission hazards in the workplace to determine the proper implementation of controls (Johns Hopkins Medicine, 2021). The plan also includes policies and procedures to implement a daily COVID–19 safety audit program. Each day, the COVID–19 safety auditor ensures every hospital, outpatient clinic and care center is practicing proper masking, physical distancing, handwashing and disinfection of frequently touched surfaces. As with the SCVMC example, this supports the feasibility of regular reassessments that employers will need to conduct for their COVID–19 plans.

Based on its review of these plans, OSHA concludes that it is feasible for employers in typical firms in the healthcare sector to comply with the requirements in the ETS for a COVID–19 workplace-specific hazard assessment.

ETS Controls Are Included in Best Practices Recommended by Healthcare Professional Associations

Some of OSHA's evidence that the COVID–19 plan, distancing, barriers, and ventilation modifications are feasible for healthcare employers is that such measures, or substantially similar measures, are already recommended by some of the largest professional associations in the healthcare industry.

The American Society for Health Care Engineering (ASHE) is the largest professional membership group of the American Hospital Association. The ASHE is comprised of over 12,000 professionals who design, build, maintain, and operate healthcare facilities. ASHE members include health care facility managers, control specialists, and others. ASHE has developed best practices for minimizing the risk from COVID–19. These best practices can be, and have been, used by ASHE members' organizations to develop their individual plans. (ASHE, December 23, 2020)

The ASHE best practices are a collection of strategies which can be implemented to reduce the spread of COVID–19. The ASHE best practices recommend a multilayered control strategy. ASHE states that healthcare organizations are working to maintain physical distance of at least six feet and one way that this has been achieved is by scheduling check-in times to limit occupancy as well as other controls such as floor markings. When physical distancing is not feasible, employers have installed physical barriers, such as clear, acrylic plexiglass or vinyl, along with requiring face masks. ASHE also states that healthcare organizations have taken a combination of approaches for cleaning and disinfection, such as cleaning workstations including high-touch surfaces daily. ASHE also discusses health screening and medical management. According to ASHE, some healthcare organizations have implemented self-screening policies and procedures, including, for example, having employees certify that they have not displayed symptoms or been in recent contact with someone that has tested positive for COVID–19. Finally, the ASHE best practices recommend ensuring that ventilation systems are working properly, including ensuring that all negative pressure spaces including AIIRs are properly maintained, and that the circulation of outdoor air is increased as much as possible. The ASHE best practices also provide employers with steps to verify that CDC recommended guidelines for air changes and time required for contaminate removal based on air changes are followed.

The American Health Care Association and the National Center for Assisted Living (AHCA/NCAL), an association representing long term and post-acute care providers, with more than 14,000 member facilities including non-profit and proprietary skilled nursing centers, assisted living communities, sub-acute centers and homes for individuals with intellectual and development disabilities, has also developed best practices for minimizing the risk from COVID–19 (AHCA/NCAL, 2021). Similar to the ASHE best practices and other plans and best practice documents that were reviewed, the AHCA/NCAL best practices contain many of the controls that are required

by the ETS. Also similar to the ASHE and other best practice documents, the AHCA/NCAL membership can use the AHCA/NCAL best practices to develop their individual plans. For example, the AHCE/NCAL best practices recommend implementing controls to maintain physical distance including rearranging offices and workstations as needed, posting signs and floor markers, and limiting the number of individuals permitted in the workplace. In addition, the AHCA/NCAL best practices recommend the use of facemasks and increased cleaning and disinfection. The best practices also contain recommendations on health screening and medical management. Members have implemented recommendations on self-questionnaire policies and procedures for employees and all other individuals before they can enter the site, including, for example, recommendations on having employees certify that they have not displayed symptoms or been in recent contact with someone that has tested positive for COVID–19. The AHCE/NCAL best practices also contain recommendations on conducting contact tracing while protecting the employee's identity, and engaging in facility-wide protocols to protect other employees.

The New Mexico EMT Association (NMEMTA) is a professional organization supporting emergency medical technicians and others serving the public in the emergency services sector (NMEMTA, March 29, 2020). Similar to other best practice documents that were reviewed, the NMEMTA best practices contain many of the controls that are required by the ETS and recommend a multilayered approach to infection control. Furthermore, NMEMTA members can use this guidance to develop their individual plans. The NMEMTA best practices recommend implementing physical distancing controls when responding to an emergency as well as when transporting patients. For example, NMEMTA provides guidance on limiting the number of responders by implementing policies for coordinating with dispatchers prior to initial assessment, and additional work practices such as using radio communications to minimize the number of responders on scene. Additionally, the NMEMTA best practices recommend policies and procedures to limit the number of EMS workers in the ambulance and provide guidance on installing physical barriers to separate the driver from the treatment area of the ambulance. The NMEMTA best practices also recommend policies for requiring the proper PPE and respiratory protection for EMS employees as well as for placing facemasks on patients and family members traveling in the ambulance.

The National Association for Home Care & Hospice (NAHC) is a nonprofit organization that represents the nation's 33,000 home care and hospice organizations. NAHC also advocates for the more than two million nurses, therapists, aides, and other caregivers employed by such organizations to provide in-home services to some 12 million Americans each year who are infirm, chronically ill, or disabled (NAHC, March 3, 2020). NAHC developed best practices for home health and hospice employers. The NAHC best practices recommend a multilayered infection control plan to protect employees from COVID–19. These best practices include strategies for maintaining physical distance, including ways to limit instances where caregivers are within 6 feet of other persons. For example, the NAHC best practices contain policies for requiring household members to stay in separate rooms of the home as much as possible and to maintain at least 6 feet of distance from the caregiver when they must be in the same room. In addition, the best practices recommend procedures to ensure the home space has good air flow via an HVAC system or by opening windows and doors during the visit. The best practices also provide guidance on implementing protocols for performing hand hygiene and cleaning and disinfection of the workspace, tools, equipment and other high touch surfaces. The best practices also recommend requirements for the use of facemasks, respirators, and other PPE for home health and hospice caregivers, patients, and members of the household during the home visit. Additionally, the best practices provide strategies for the implementation of patient telehealth, as well as self-screening before visits to prevent employee exposure to known or suspected COVID–19 patients without taking appropriate precautions (*e.g.,* PPE and respirators).

Examples of Existing Healthcare Employer Plans and Controls

OSHA also reviewed a number of existing plans prepared by hospitals and other healthcare providers that also illustrate that employers in the healthcare sector have implemented a multilayered approach to protect their workers from COVID–19. MedStar Health, a not-for-profit community health system comprised of physician offices, urgent care centers, regional ambulatory care centers, and 10 community hospitals, has developed and implemented a COVID–19 plan (MedStar, May 5, 2021). The plan adopts a multilayered approach to protect workers from COVID–19 across MedStar's facilities and contains many of the provisions also required by the ETS. For example, MedStar requires controls to ensure physical distancing, including, for example, restricting the entry of visitors and non-essential employees to reduce occupancy. Additionally, MedStar requires the use of facemasks by employees, patients, and visitors. MedStar also requires employees to self-screen and monitor for signs and symptoms of COVID–19 and for visitors to utilize the telephone triage system when scheduling visits to isolate known or suspected cases of COVID–19 infection. Finally, MedStar requires cleaning and disinfection of the workplace daily, as well as hand hygiene protocols before, during, and after all appointments and procedures.

Other employer plans reviewed also adopt a multilayered approach to COVID–19 protection (see, *e.g.,* Cambridge Health Alliance, 2021; Johns Hopkins Medicine, 2021; HCA Healthcare, 2021; Dignity Healthcare, 2021). With respect to physical distancing, employer plans include strategies to reduce and restrict occupancy at facilities. For example, employers have implemented staggered shifts for employees, as well as teleworking arrangements, to help reduce occupancy and ensure physical distancing. Employers have also expanded remote telemedicine consultations so fewer patients with non-emergency conditions need to visit hospitals and other facilities where patient care occurs to receive medical care. In this respect, where video conferencing systems cannot be used, employers have used other virtual options, such as online secured patient portals with chat and messaging features, to reduce the occupancy of healthcare facilities. Employers have also implemented telephone triage systems, and, in this way, patients identified as low risk for COVID–19 can be cared for virtually, if appropriate, while patients identified as higher risk for COVID–19 can be routed to the appropriate care. In addition, employers have reduced or completely eliminated patient visiting hours for those patients with suspected or confirmed COVID–19. Finally, employers have installed floor markings as visual cues to stay six feet apart throughout the facility, including common areas such as waiting rooms and cafeterias, spaced public seating six

feet apart, and limited the number of people in a space, whenever possible.

The employer plans cited above also include policies and procedures for the installation of physical barriers to protect workers outside of direct patient care areas when physical distancing may not be possible at all times. For example, some hospitals have installed physical barriers at checkpoints, to protect security guards, as well as at reception desks and patient/visitor information counters, to protect the employees working there, from exposure to visitors, patients, and co-workers.

The employer plans reviewed also include policies and procedures for the use of facemasks. Moreover, the plans include policies on increased cleaning and disinfection. For example, the plans include requirements that surfaces and equipment are thoroughly cleaned and disinfected daily using products that are effective against COVID–19. The plans also include policies on maintaining HVAC systems and using system filters with a MERV rating of 13 or higher, as well as polices for pre-screening patients and employees for COVID–19 (including requirements for self-questionnaires designed to identify anyone who has or is suspected to have COVID–19 before their arrival at the facility).

OSHA has determined that developing a COVID–19 plan, as required by the ETS, is feasible based on the evidence that employers in the health care sector have developed plans that address many of the requirements of the ETS. Additionally, national trade associations and other organizations in the health care sector have developed best practices to aid in the development of these plans (ERG, February 9, 2021). As discussed in the *Summary and Explanation* (section [VIII]), the plan must address the hazards identified per the hazard assessment required by paragraph (c)(4) of the ETS and the employer must do regular inspections to ensure ongoing effectiveness of the plan and update as needed.

b. Implementation of Good Infection Control Practices

The ETS contains four provisions for good infection control practices, each of which is discussed in detail in *Need for Specific Provisions* and *Summary and Explanation* (Sections V and VIII of the preamble, respectively):

§ 1910.502(d)—Patient screening and management. The purpose of this provision is to limit contact with potentially infectious persons by, for example, requiring screening and triage of everyone entering a healthcare setting and limiting and monitoring points of entry to the setting.

§ 1910.502(e)—Standard and transmission-based precautions. The ETS requires that, in settings where healthcare services, healthcare support services, are provided, the employer must develop and implement policies and procedures to adhere to Standard and Transmission-Based Precautions. Standard and Transmission-Based Precautions are established and commonly used practices for reducing the risk of transmission of infectious agents such as COVID–19.

§ 1910.502(f)—Personal protective equipment (PPE). The ETS requires employers to provide and ensure employees use facemasks or respirators in specified situations, and also requires the use of other PPE, such as gloves and eye protection, in appropriate circumstances.

§ 1910.502(g)—Aerosol-generating procedures on a person with suspected or confirmed COVID–19. Because aerosol-generating procedures are known to be high risk activities for exposure to respiratory infections such as COVID–19, the ETS contains special requirements to address this hazard. For example, the employer must limit the number of employees present during the procedure to only those essential for patient care and procedure support.

Some of these controls are obviously feasible simply because of the nature of the control. The process of screening, for example, can typically be accomplished simply through questioning, so there are no technological feasibility barriers to implementing those controls. To support its assessment of the technological feasibility of other controls in the ETS, OSHA reviewed evidence that shows that the healthcare-specific good infection control practices identified in § 1910.502(d) through (g) are commonly implemented by employers who have employees in healthcare settings. This evidence includes: CDC infection control guidance documents, many of which are COVID–19 specific; regulations issued by the Centers for Medicare & Medicaid Services (CMS); and accreditation of these settings by The Joint Commission; and OSHA's Bloodborne Pathogens (BBP) Standard, 29 CFR 1910.1030. For example, § 1910.502(e) requires compliance with the CDC's Standard and Transmission-Based Precautions. As detailed below, OSHA can show that this is technologically feasible by demonstrating that at least some hospitals and other healthcare settings follow these precautions (thereby showing it is capable of being done and can be implemented in other healthcare settings).

To demonstrate that, OSHA points to two reasons why healthcare employers comply with these precautions. First, OSHA's BBP standard already requires hospitals and other healthcare facilities to implement a parallel framework, often with similar systems and controls, to comply with many of the same precautions. Even where the requirements for some controls must be implemented somewhat differently under this ETS than under the BBP standard, OSHA is not aware of technological feasibility challenges that arise from these differences. For example, a hospital's COVID–19 plan will be different from its BBP Exposure Plan, but the planning process will already be familiar to the hospital and there should be enough similarities in the construction of plans identifying and addressing hazards that there will not be any feasibility issues with formulating the COVID–19 plan.

Second, healthcare employers must have an infection control program that includes Standard and Transmission-Based Precautions to be eligible for certain government funds (CMS distribution of Medicare and Medicaid funds) or accreditation (The Joint Commission). CMS regulations only cover providers that accept or collect payments from Medicare or Medicaid. Compliance with the CMS regulations is generally validated through periodic accreditation surveys of facilities by CMS-approved accreditation organizations, including The Joint Commission, state survey agencies, and other accrediting organizations (*e.g.,* Accreditation Association for Ambulatory Health Care (AAAHC)). CMS and The Joint Commission reliance on largely the same criteria as this ETS means that the technological feasibility of the ETS is supported by those hospitals and other healthcare settings who do have to comply by proving that the requirements are capable of being done.[28]

[28] OSHA notes that its assessment in this section addresses only whether the ETS is technologically feasible. The fact that many health care facilities have already implemented some version of the controls required by the ETS does not mean that there is no need for the ETS to apply to healthcare. Again, CMS regulations only cover providers that accept or collect payments from Medicare or Medicaid. In addition, OSHA has in place enforcement mechanisms that CMS does not have and that would work in concert with CMS to achieve a greater level of compliance. For example, OSHA can respond to complaints, conduct random unannounced inspections, and conduct worksite inspections in response to complaints filed by workers. As described elsewhere in this preamble, the ETS is necessary to address the grave danger

Continued

CDC Infection Control Guidance Documents

The CDC has issued infection control guidance, listed in Table VI.A.–3, that apply to the following settings and industry groups: Hospitals and ambulatory care, plasma and blood collection facilities and dialysis facilities, home health care, emergency responders and prehospital care, autopsies, long-term care, and dental and oral care. These guidelines provide infection-control recommendations for use in the settings covered by the ETS (listed in Table VI.A.–3). The guidance provides recommendations for implementing policies and practices to minimize the risk of exposure to respiratory pathogens, and many are recently issued guidelines specific to COVID–19.

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Table VI.A.-3: CDC Guidance Documents for COVID-19 and General Infection Control

Hospitals and Ambulatory Care

1. Interim Infection Prevention and Control Recommendations for Healthcare Personnel During the Coronavirus Disease 2019 (COVID-19) Pandemic (February 23, 2021)
2. Interim U.S. Guidance for Risk Assessment and Work Restrictions for Healthcare Personnel with Potential Exposure to SARS-CoV-2 (March 11, 2021)
3. Interim Clinical Guidance for Management of Patients with Confirmed Coronavirus Disease (COVID-19) (February 16, 2021b)
4. Considerations for Alternate Care Sites: Infection Prevention and Control Considerations for Alternate Care Sites (April 24, 2020)
5. Healthcare Facilities: Managing Operations During the COVID-19 Pandemic (March 17, 2021)
6. Infection Control in Healthcare Personnel: Infrastructure and Routine Practices for Occupational Infection Prevention and Control Services (October 28, 2019)
7. Core Infection Prevention and Control Practices for Safe Healthcare Delivery in All Settings – Recommendations of the Healthcare Infection Control Practices Advisory Committee (HICPAC) (December 27, 2018)

posed by COVID–19. See *Rationale for the ETS, Grave Danger* and *Need for the ETS* (Section IV of the preamble).

8. Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings Siegel JD, Rhinehart E, Jackson M, Chiarello L, and the Healthcare Infection Control Practices Advisory Committee (Siegel et al., 2007) 9. Using Personal Protective Equipment (PPE) (August 19, 2020) 10. Hand Hygiene Recommendations, Guidance for Healthcare Providers about Hand Hygiene and COVID-19 (May 17, 2020) 11. Guidance for Pharmacies, Guidance for Pharmacists and Pharmacy Technicians in Community Pharmacies during the COVID-19 Response (November 13, 2020) 12. Post Vaccine Considerations for Healthcare Personnel, Infection Prevention and Control Considerations for Healthcare Personnel with Systemic Signs and Symptoms Following COVID-19 Vaccination (April 2, 2021) 13. Guide to Infection Prevention for Outpatient Settings: Minimum Expectations for Safe Care (September, 2016) 14. Using Telehealth to Expand Access to Essential Health Services during the COVID-19 Pandemic (June 10, 2020) 15. Environmental Infection Control Guidelines: Guidelines for Environmental Infection Control in Health-Care Facilities (July 23, 2019) 16. Clinical Questions about COVID-19: Questions and Answers (March 4, 2021)
Plasma and Blood Collection Facilities and Dialysis Facilities 17. Interim Additional Guidance for Infection Prevention and Control Recommendations for Patients with Suspected or Confirmed COVID-19 in Outpatient Hemodialysis Facilities (December 17, 2020) 18. Guidance for Blood and Plasma Facilities, Interim Infection Control Guidance on COVID-19 for Personnel at Blood and Plasma Collection Facilities (April 29, 2020)
Home Health Care 19. Guidance for Direct Service Providers (December 16, 2020) 20. Interim Guidance for Implementing Home Care of People Not Requiring Hospitalization for Coronavirus Disease 2019 (COVID-19) (October 16, 2020) 21. Interim Infection Control Guidance for Public Health Personnel Evaluating Persons Under Investigation (PUIs) and Asymptomatic Close Contacts of Confirmed Cases at Their Home or Non-Home Residential Settings (April 10, 2020)
Emergency Responders and Prehospital Care 22. Interim Recommendations for Emergency Medical Services (EMS) Systems and 911 Public Safety Answering Points/Emergency Communication Centers

(PSAP/ECCs) in the United States During the Coronavirus Disease (COVID-19) Pandemic (July 15, 2020) 23. What Firefighters and EMS Providers Need to Know about COVID-19 (November 6, 2020)
Autopsies 24. Collection and Submission of Postmortem Specimens from Deceased Persons with Confirmed or Suspected COVID-19, Postmortem Guidance (December 2, 2020)
Long Term Care 25. Interim Additional Guidance for Infection Prevention and Control for Patients with Suspected or Confirmed COVID-19 in Nursing Homes (March 29, 2021). 26. Infection Prevention and Control Assessment Tool for Nursing Homes Preparing for COVID-19 (March 16, 2021) 27. Nursing Homes and Assisted Living (Long-Term Care Facilities [LTCFs]) Infection Prevention Tools (May 28, 2020) 28. Considerations for Preventing Spread of COVID-19 in Assisted Living Facilities (May 29, 2020) 29. Considerations for Memory Care Units in Long-term Care Facilities (May 12, 2020)
Dental and Oral Care 30. Guidance for Dental Settings: Interim Infection Prevention and Control Guidance for Dental Settings During the Coronavirus Disease 2019 (COVID-19) Pandemic, (December 4, 2020) 31. Summary of Infection Prevention Practices in Dental Settings: Basic Expectations for Safe Care (April 28, 2020)

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The CDC guidelines in Table VI.A.–3 are commonly implemented, longstanding, and essential elements of infection control in healthcare settings (*i.e.,* the settings listed in Table VI.A.–1), evidenced by the CDC's 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings (Item 8 in Table VI.A.–3, above), which incorporates Standard and Transmission-Based Precautions into its recommendations. This 2007 Guideline updated 1996 guidelines, which introduced the concept of Standard Precautions, and also noted the existence of infection control recommendations dating back to 1970.

The implementation of the CDC guidelines is also evidenced by regulations issued by the Centers for Medicare & Medicaid Services (CMS) that apply to settings in Table VI.A.–1 and the accreditation of settings in Table VI.A.–1 by The Joint Commission, as described below.

OSHA notes that guidelines that are grouped with one setting in Table VI.A.–1 may apply to other settings as well. For example, the Interim Infection Prevention and Control Recommendations for Healthcare Personnel During the Coronavirus Disease 2019 (COVID–19) Pandemic (Item 1 in Table VI.A.–3) applies to Emergency Medical Personnel, Home Health Care, and Long-Term Care, in addition to applying to Hospitals and Ambulatory Care.[29]

[29] The guidance is applicable to all U.S. settings where healthcare is delivered, and defines ''healthcare setting'' as places where healthcare is delivered. According to the guidance, this includes acute care facilities, long-term acute care facilities, inpatient rehabilitation facilities, nursing homes and assisted living facilities, home healthcare, vehicles where healthcare is delivered (*e.g.,* mobile clinics), and outpatient facilities, such as dialysis centers, physician offices, and others.'' Moreover, the guidance defines ''healthcare personnel,'' or HCP, as all paid and unpaid persons serving in healthcare settings who have the potential for direct or indirect exposure to patients or infectious materials, including body substances (*e.g.,* blood, tissue, and specific body fluids); contaminated medical supplies, devices, and equipment; contaminated environmental surfaces; or contaminated air. According to the guidance, HCP include emergency medical service personnel, nurses, nursing assistants, home healthcare personnel, physicians, technicians, therapists, phlebotomists, pharmacists, students and trainees,

CMS Regulations That Condition Participation in Medicare and Medicaid on Implementation of Nationally Recognized Infection Control Guidelines

The Centers for Medicare & Medicaid Services (CMS) administers healthcare programs for the elderly (Medicare) and needs-based state programs that help with medical costs (Medicaid). As a condition for participation in Medicare or Medicaid, medical providers must comply with regulations issued by the Department of Health and Human Services (DHHS), 42 CFR Pts. 400–699. A number of these regulations, which apply to a broad spectrum of the settings listed in Table VI.A.–1, condition participation in Medicare and Medicaid on the implementation of nationally recognized infection control practices like the CDC guidelines listed in Table VI.A.–3. The applicable CMS regulations are summarized in Table VI.A.–4.

Table VI.A.-4: CMS Regulations by Healthcare Setting

Healthcare Setting	Summary of Requirements for Implementation of Nationally Recognized Guidelines for Infection Control
Hospitals	CMS Regulation, Hospitals. The hospital must have an active hospital-wide program for the surveillance, prevention, and control of Healthcare-Associated Infections (HAIs) and other infectious diseases. The program must demonstrate adherence to nationally recognized infection prevention and control guidelines, and for reducing the development and transmission of HAIs and antibiotic-resistant organisms. (42 CFR 482.42). CMS Regulation, Critical Access Hospitals (CAHs). The CAH must have active facility-wide programs, for the surveillance, prevention, and control of HAIs and other infectious diseases and for the optimization of antibiotic use through stewardship. The programs must demonstrate adherence to nationally recognized infection prevention and control guidelines, and for reducing the development and transmission of HAIs and antibiotic-resistant organisms. 42 CFR 485.640
Ambulatory Care	CMS Regulation, Ambulatory Surgical Centers (ASCs). The ASC must maintain an ongoing program designed to prevent, control, and investigate infections and communicable diseases. In addition, the infection control and prevention program must include documentation that the ASC has considered, selected, and implemented nationally recognized infection control guidelines. (42 CFR 416.51) CMS Regulation, Comprehensive Outpatient Rehabilitation Facilities. The facility must maintain a sanitary environment and establish a program to identify, investigate, prevent, and control the cause of patient infections. The facility must establish written policies and procedures designed to control and prevent infection in the facility and to investigate and identify possible causes of infection. The facility must monitor the infection control program to ensure that the staff implement the policies and procedures and that the policies and procedures are consistent with current practices in the field. (42 CFR 485.62). CMS Regulation, Clinics, Rehabilitation Agencies, and Public Health Agencies as Providers of Outpatient Physical Therapy and Speech-

contractual staff not employed by the healthcare facility, and persons not directly involved in patient care, but who could be exposed to infectious agents that can be transmitted in the healthcare setting (*e.g.,* clerical, dietary, environmental services, laundry, security, engineering and facilities management, administrative, billing, and volunteer personnel).

	Language Pathology Services. The organization that provides outpatient physical therapy services establishes an infection-control committee of representative professional staff with responsibility for overall infection control. The infection-control committee establishes policies and procedures for investigating, controlling, and preventing infections in the organization and monitors staff performance to ensure that the policies and procedures are executed. (42 CFR 485.725).
Home Health Care	CMS Regulation, Home Health Agencies (HHAs). The HHA must maintain and document an infection control program which has as its goal the prevention and control of infections and communicable diseases. The HHA must follow accepted standards of practice, including the use of standard precautions, to prevent the transmission of infections and communicable diseases. The HHA must maintain a coordinated agency-wide program for the surveillance, identification, prevention, control, and investigation of infectious and communicable diseases. (42 CFR 484.70).
Long-Term Care	CMS Regulations, Long Term Care Facilities. The facility must establish an infection prevention and control program (IPCP) that must include a system for preventing, identifying, reporting, investigating, and controlling infections and communicable diseases for all residents, staff, volunteers, visitors, and other individuals providing services under a contractual arrangement and following accepted national standards. (42 CFR 483.80). CMS Regulations, Hospice Care. The hospice must maintain and document an effective infection control program that protects patients, families, visitors, and hospice personnel by preventing and controlling infections and communicable diseases. The hospice must follow accepted standards of practice to prevent the transmission of infections and communicable diseases, including the use of standard precautions. The hospice must maintain a coordinated agency-wide program for the surveillance, identification, prevention, control, and investigation of infectious and communicable diseases. (42 CFR 418.60). In addition, a hospice that provides inpatient care directly must: maintain an infection control program that protects patients, staff and others by preventing and controlling infections and communicable disease as stipulated in 42 CFR 418.60; provide a sanitary environment by following current standards of practice, including nationally recognized infection control precautions; and avoid sources and transmission of infections and communicable diseases. (42 CFR 418.110).

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Accreditation by The Joint Commission

Founded in 1951, The Joint Commission is an independent, not-for-profit organization that accredits and certifies more than 22,000 healthcare organizations and programs in the United States (The Joint Commission, 2021a). Joint Commission accreditation and certification is recognized nationwide as a symbol of quality that reflects an organization's commitment to meeting certain performance standards. Joint Commission standards are the basis of an objective evaluation process that can help healthcare organizations measure, assess and improve performance. The standards focus on important patient, individual, or resident care and organization functions that are essential to providing safe, high-quality care (The Joint Commission, 2021b). To maintain accreditation, organizations undergo an on-site survey by a Joint Commission survey team at least every three years (laboratories are surveyed every two years). In these surveys, The Joint Commission monitors compliance with its standards for the implementation of good infection control and biosafety practices (including, for example, adherence to Standard and Transmission-Based Precautions, as recommended by the CDC Guidelines in Table VI.A.–3) (The Joint Commission, 2021c). The Joint Commission offers accreditation for the following settings (many of which are contained in Table VI.A.–1) (The Joint Commission, 2021c):

- Ambulatory care facilities;
- Critical access hospitals;
- Behavioral health care;
- Hospitals;
- Home care services;
- Nursing care centers; and
- Office-based surgery centers.

OSHA's Bloodborne Pathogens Standard, 29 CFR 1910.1030

Employers subject to the ETS have also been subject to requirements in the Bloodborne Pathogens (BBP) standard for 30 years, since it was promulgated in 1991. As the BBP standard was promulgated, OSHA found ''with

respect to the technological feasibility of the standard that its provisions permit practical means to reduce the risk now faced by those employees working with blood and other infectious materials and that there do not appear to be any major obstacles to implementing the rule.'' (56 FR 64004, 64039 (Dec. 6, 1991)). OSHA's finding of technological feasibility during the BBP standard rulemaking is additional evidence that there are no technological feasibility barriers to complying with the ETS.

For example, Standard Precautions, which are required by the ETS, are similar to, but more extensive than, ''Universal Precautions'', which are required by the BBP standard to prevent contact with blood or other potentially infectious materials (see definitions in the BBP standard). The BBP standard defines ''Universal Precautions'' as an approach to infection control wherein all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens. Standard Precautions were developed to integrate principles of Universal Precautions into broader principles pertaining to routes of exposure other than the bloodborne route, such as via the contact, droplet, or airborne routes. For example, although the BBP standard might not apply, Standard Precautions would be utilized when workers are exposed to urine, feces, nasal secretions, sputum, vomit, and other body fluids, and also when workers are exposed to mucous membranes and non-intact skin. Using Standard Precautions when there is exposure to these materials, it should be assumed that the materials potentially contain infectious agents that could be transmitted via the contact, droplet, or airborne routes. Standard Precautions not only include the infection control methods specified as Universal Precautions (*e.g.,* hand hygiene, the use of certain types of PPE based on anticipated exposure, safe injection practices, and safe management of contaminated equipment and other items in the patient environment), but also include, for example, respiratory and cough etiquette. The respiratory and cough etiquette and other additional controls for Standard Precautions are minor expansions on the Universal Precautions already applicable to most healthcare facilities, and OSHA is not aware of any technological barriers for employers subject to the ETS.

In addition to the above requirements, the BBP standard contains requirements for an exposure control plan, engineering and work practice controls, hand hygiene, personal protective equipment, housekeeping (*e.g.,* cleaning and decontamination), and vaccination, which all have corollaries in the ETS. While there are differences between the BBP standard and the ETS, there is overlap. For example, although the requirements for a COVID–19 plan in the ETS are different than those for the exposure control plan required by the BBP standard, the process for developing and implementing these plans should be similar. Based on this overlap, there should not be any technological feasibility barriers to complying with the corollary provisions in the ETS.

c. Physical Distancing and Physical Barriers

Physical Distancing: The ETS (paragraph (h)) requires the employer to ensure that each employee is separated from all other people by at least 6 feet unless the employer can demonstrate that such physical distancing is not feasible for a specific activity, and that, when the employer establishes it is not feasible for an employee to maintain a distance of at least 6 feet from all other people, the employer must ensure that the employee is as far apart from all other people as feasible.

Physical Barriers: The ETS (paragraph (i)) requires that at each fixed work location outside of direct patient care areas where an employee is not separated from all other people by at least 6 feet of distance, the employer must install cleanable or disposable solid barriers, except where the employer can demonstrate it is not feasible (or the paragraph (a)(4) exception for vaccinated employees applies).

As discussed above, OSHA reviewed a number of plans and best practice documents developed and employed by the healthcare sector to reduce the risk of COVID–19 exposure. These plans included recommendations and requirements for the implementation of physical distancing and physical barriers in the settings covered by the ETS. These plans and best practice documents provide strong evidence that it is technologically feasible to implement these controls in the healthcare sector. Moreover, OSHA developed physical distancing scenarios and a job matrix spreadsheet, discussed below, which also provide strong evidence that the implementation of physical distancing and physical barriers is technologically feasible in the healthcare sector.

Physical Distancing Scenarios

OSHA developed ''physical distancing'' scenarios for a variety of workplaces covering a wide range of situations to describe the controls that have been put in place to maintain not only physical distancing but also physical barriers at each fixed work location outside of direct patient care areas (*e.g.,* entryway/lobby, check-in desks, triage, hospital pharmacy windows, bill payment), as well as other controls required by the ETS as part of a multilayered strategy to reduce or eliminate the transmission of SARS–CoV–2. As OSHA discusses in more depth below, these scenarios are based primarily on COVID–19 plans developed by employers.

OSHA uses these scenarios (and by extension the plans on which they are based) to support its feasibility determination regarding the physical distancing and physical barrier requirements of the ETS, and also to show that other controls required by the ETS are being, or can be implemented, by typical employers across affected workplaces.

OSHA also uses these scenarios to explore ways to mitigate the remaining risk of exposure when it is infeasible to comply with the requirements for physical distancing. While this portion of the analysis falls outside the pure examination of the technological feasibility of the required controls, it is intended to demonstrate the steps that employers are expected to take to reduce exposure risk. Some of the plans that OSHA consulted in developing these scenarios include examples of controls that would not meet the requirements of the ETS, but OSHA has attempted to incorporate some of these examples into the scenarios while noting that some of the controls may only be used when the other controls are infeasible.

Thus, for example, some scenarios describe the use of both physical distancing and physical barriers by employers. OSHA's description of the scenarios below should not be read to mean that OSHA sanctions the use of physical barriers in lieu of physical distancing, when physical distancing is feasible. For an in-depth discussion on the rationale underlying OSHA's rulemaking decisions, please see *Need for Specific Provisions* (Section V of the preamble).

As another example, some scenarios describe facemasks, ventilation, and other controls required by the ETS as additional controls when physical distancing is not feasible. But these controls are not alternatives to physical distancing under the ETS. Again, physical distancing (or physical barriers at fixed workstations outside of direct patient care areas, when physical distancing is not feasible) must be

implemented alongside these controls under the ETS as part of a multilayered approach to infection control.

Finally, OSHA emphasizes that physical distancing is feasible for the vast majority of situations employers may face in their daily job duties. There are a select number of situations where physical distancing is not feasible, and for these situations, employers must implement physical barriers if feasible at fixed work locations outside of direct patient care areas. And, again, employers must implement the other controls as required by the standard (*e.g.,* facemasks, and respirators, cleaning and disinfection, health screening and medical management, employee notification).

In reviewing the record, OSHA found that, while exposure to COVID–19 can occur from contact with co-workers or the public as part of healthcare workers' job duties in a wide range of workplaces covered by the ETS, many of the processes and controls used to minimize risk are the same or similar.

The physical distancing scenarios OSHA's contractor—a safety and health subject matter expert—developed include examples of policies and procedures implemented to maintain physical distancing, physical barriers, and other controls based on a review of guidance and existing pandemic plans and other sources. This information was supplemented where needed with additional internet searches, for instance, from news articles, industry surveys, or articles in industry publications that demonstrate how companies in different industries have been implementing physical distancing. The contractor also relied on its professional expert judgment (ERG, February 25, 2021). The scenarios identify groups of workers who face similar work situations with regard to physical proximity (within 6 feet) of another person (*e.g.,* visitors, members of the public), and for whom the same or similar precautions to limit physical proximity can be implemented. In this respect, some of the evidence on which OSHA relies in this assessment (with respect to the offices, law enforcement, security guards, and protective services, home healthcare, personal care, and companion service providers, and postmortem services scenarios) rely on plans and best practices from both industries affected by this ETS and other industries not affected by the ETS. In analyzing the evidence of physical distancing and barriers across multiple industry sectors, OSHA observed that the feasible methods of implementing physical distancing and physical barriers for employees with similar exposures was similar regardless of industry (for example, employing physical distancing and barriers to protect administrative and clerical staff, receptionists, those who are exposed to human remains, and those who enter personal residences to provide care). To this end, OSHA's assessment of the feasibility of implementing physical distancing and physical barriers in the healthcare section is based on evidence from other industries to the extent that workers share similar job roles and perform similar job tasks such that the feasibility of distancing and barriers would be the same in either case.

OSHA also developed a job matrix spreadsheet to identify groups of workers facing similar work situations. To develop this spreadsheet, OSHA first found and reviewed 418 plans from employers representing various separate 3-digit North Industry Classification System (NAICS) codes, and 286 best practice documents from trade associations and other organizations covering 46 3-digit NAICS codes (ERG, February 9, 2021). As part of the review, OSHA included plans and best practices from industries outside of healthcare to clearly demonstrate the feasibility of implementing a multilayered approach to COVID–19 infection control (including facemasks and the installation of physical barriers where distancing is not feasible) for similar work situations.

Next, OSHA identified unique job categories across the industry sectors with many categories present across multiple NAICS codes. These job categories were cross-referenced with the scenarios to develop the job matrix spreadsheet (February 25, 2021). This job matrix spreadsheet was used to identify job categories facing similar situations regarding the ability to maintain physical distance with coworkers and/or members of the public. OSHA expects that, for these situations, employers can implement the same or similar precautions, for not only limiting physical proximity, but also for the other multilayered controls required by the ETS. Workers with public-facing job duties, such as receptionists and security guards, share many of the same or similar exposure control challenges, and employers of these job categories over a wide variety of industry sectors have implemented similar multilayered controls such as physical distancing, the installation of barriers, requirements for face masks, and hand hygiene, among others, as discussed below (February 25, 2021). OSHA concludes, based on the job matrix that evidence of feasibility for one scenario also establishes feasibility for other scenarios to the extent job categories cut across scenarios.

The scenarios OSHA developed for the healthcare sector are listed in Table VI.A.–5.

Table VI.A.-5: Physical distancing scenarios and corresponding 3-digit NAICS codes:	
Scenario	Covered 3-digit NAICS Codes
Emergency Medical Services	621
Home healthcare, personal care, and companion service providers	621, 624
Long-term Care	623
Offices	531, 533, 541, 551, 561, and others
Law Enforcement, security guards, and protective services	922, 441 – 448, 451 – 453, 561
Postmortem Care	812, 621

Below, OSHA highlights some of the elements of these scenarios and portions of the job matrix on which it relied. In the discussion below, OSHA will first describe some of the types of jobs workers conduct in most workplaces in the scenarios discussed (or across scenarios to the extent this is supported by the job matrix), and identify some of the unique work processes that are already conducted in a physically distanced manner or that can be easily modified to avoid or reduce physical proximity for each scenario discussed (or, as applicable, across scenarios). OSHA then describes some of the discrete activities where physical contact with others (*i.e.,* the public or other workers) may be necessary or unavoidable, along with the precautions and controls that can still feasibly be implemented for the scenarios (or, as applicable, across scenarios) as part of a multilayered approach to protection, such as facemasks, ventilation, and the use of physical barriers.

In this respect, OSHA's analysis found employers have implemented physical barriers at fixed work locations outside of direct patient care areas (*e.g.,* entryway/lobby, check-in desks, triage, hospital pharmacy windows, bill payment). Physical barriers are required as part of the multi-layered approach to infection control that is at the heart of the ETS. As discussed more fully in the *Need for Specific Provisions* (Section V of the preamble), physical barriers, when properly installed, are effective at intercepting respiratory droplets and minimizing the risk of exposure to COVID–19, especially in areas where employees cannot maintain a minimum of 6 feet of distance from coworkers, customers, and members of the general public.

The ETS does not specify the type of material that must be used for physical barriers, but the material must be impermeable to infectious droplets that are transmitted when an infected individual is sneezing, coughing, breathing, talking, or yelling. In addition, physical barriers must be made from materials that can be easily cleaned and disinfected unless in lieu of cleaning the employer may opt to replace the barrier. Using replaceable materials would allow an employer to dispose of and replace barriers between uses, instead of cleaning and disinfecting more permanent barriers. The effective design and implementation of physical barriers will differ among workplaces based on job tasks, work processes, and even potential users. Physical barriers must be designed, constructed, and installed to prevent droplets from reaching employees when they are in their normal sitting or standing location relative to the workstation. For example, under the provision, plastic sheeting can qualify as a physical barrier only in situations where it is fixed in place and blocks face-to-face pathways of air between the users on either side while those workers are performing all of their assigned tasks.

Examples of physical barriers across a variety of workplaces are discussed in the scenarios below. Further considerations for the design and implementation of physical barriers to properly block face-to-face pathways of breathing zones, including whether plastic sheeting, films, curtains, and other non-rigid materials are acceptable materials, as well as installation, are discussed in the summary and explanation of Physical Barriers.

Employers subject to the ETS share a common challenge: Finding ways to limit physical proximity (of less than 6 feet) between each worker and other workers, as well as visitors and other non-employees in the workplace. In the limited situations where physical distancing is not feasible, employers often face similar challenges and employ similar solutions in designing and installing physical barriers to help protect their employees, even though the types of products or services they offer or the work they do vary. For example, employers often install physical barriers with a pass-through space at the bottom.

A barrier is thus an effective tool in helping to protect a security guard at a check point at a hospital's entrance, a receptionist in the billing department, and any other public-facing employee. Physical barriers have also been installed to shield healthcare workers and others from individuals with suspected or confirmed COVID–19 (for example in triage areas of an emergency department). Employers have also installed barriers between urinals and sinks in restrooms both as separations between persons using the facility and as a splash guard (ERG, February 9, 2021; ERG, February 25, 2021).

As the assessment below makes clear, OSHA has found no feasibility issues with the implementation of physical distancing or physical barriers in typical operations in the healthcare sector.

General Office Settings

General office settings are common across a number of industry sectors, and many healthcare facilities have areas

with administrative offices similar to general office settings. OSHA developed a physical distance scenario for offices by identifying industry sectors where office worksites are common. OSHA found that employers have successfully implemented a variety of physical distancing measures (measures to keep people 6 feet apart) by incorporating administrative and engineering controls for the various job categories that work in offices such as supervisors and managerial staff, administrative and clerical staff, and receptionists.

Administrative and clerical workers are a common job category within office worksites across a wide variety of industries. In addition to the offices scenario, administrative and clerical workers were identified in a number of other physical distancing scenarios including: Law enforcement, security guards, and protective services; postmortem care; and long-term care (although OSHA believes administrative and clerical workers likely work within most scenarios, given that administrative and clerical work is usually necessary regardless of industry sector).

A number of strategies for maintaining physical distancing as part of a multilayered approach have been implemented for administrative and clerical staff, including establishing remote work, altering the work environment to limit the number of chairs and workstations, relocating workers to locations that ensure proper physical distancing, and arranging visitor seating areas to be at least 6 feet away from employees' desks. Employers can also adopt telehealth services to completely isolate clerical and administrative staff from the patients, clients, and other people they might otherwise be interacting with in person. Meetings can be conducted virtually, or conference tables and chairs can be relocated to areas of the office where physical distancing can be ensured. Employers may also establish occupancy limits for certain rooms (*e.g.,* bathrooms, breakrooms, elevators, lunchrooms, and changing areas), stagger breaks to limit the number of workers on break at the same time, and use signs and markings to communicate occupancy limits and to remind workers to keep 6 feet apart. Shared equipment, such as copiers or printers, can also be located more than 6 feet apart so that different employees can use that equipment at the same time without having to be close to each other.

OSHA notes that many supervisors and managers (*e.g.,* hospital administrators) have many of the same types of exposures as administrative and clerical staff. They commonly work in communal office areas, engage in collaborative group work, and hold office meetings in conference rooms. Moreover, as supervisors and managers, they implement the physical distancing strategies described above for the facilities where they work, and not just to apply to administrative and clerical staff.

While receptionists are a common job category within office worksites, they are also employed in a variety of industry sectors. Receptionists are public-facing employees and their jobs include tasks which routinely put them in contact with the public, such as greeting and directing patients and families appropriately, responding to inquiries, coordinating with first responders or law enforcement, working with patients to process medical billing and paperwork, and maintaining security and telecommunications systems.

OSHA identified a number of physical distancing strategies that have been commonly used to increase physical distancing for receptionists. When telework is not possible, employers have eliminated reception seating areas, closed lobbies, and required patients and visitors to phone or text ahead for entry into the workplace. In addition, signs and floor marks indicating 6-foot spaces where lines can form in reception areas have been found to help maintain physical distance between visitors and receptionists. When limiting access to reception areas is difficult, employers have reduced occupancy by only allowing seating at every other chair in waiting areas. Touchless or remote payment and scheduling options have been successfully used to limit face-to-face interactions with customer clients.

As discussed above there are many options of potential controls to provide physical distancing for supervisors and managers, receptionists, administrative and clerical workers, and other office workers who work in office settings. However, there may be limited instances where employees might be unable to physically distance all of the time. As part of a multilayered approach to transmission control, physical barriers have been installed in office settings across all industry sectors. For example, workers in office settings (*e.g.,* medical billing and financial service, transcription, and medical records departments) often spend the majority of the day at their desks or other fixed workstations. For these situations, employers have installed plexiglass barriers or partitions between workstations and between public-facing staff and patients, families, customers, clients, and other non-employees. At public facing workstations, physical barriers with small openings have been installed to enable the passing of paperwork and payment machines, for example. Under the ETS, when it is not feasible for employees to be properly distanced from each other, barriers must also be installed between the employees.

Law Enforcement, Security Guards, and Protective Services

A physical distance scenario developed particularly for law enforcement, security guards, and protective services identified a number of industry sectors where job categories within the scenario are common. OSHA found that employers of security guards have successfully implemented a variety of physical distancing controls to maintain 6 feet of physical distance from other people.

Common physical distancing controls for security guards include staggering work shifts and limiting or ending in-person meetings. The use of walk-through metal detectors instead of hand-held wands and electronic mobile credentials to avoid the need for security officers to physically check individuals have also been implemented (if wands are used, the person being wanded should face away from the security guard). Electronic mobile credentials can also be centrally managed from a remote location, limiting the need for personnel to visit badging offices. Employers have utilized signs, floor markings, and ropes to mark a 6-foot distance around security guard stations to remind people who are standing in line to maintain appropriate distance from the security officer and other people in line.

As part of a multilayered approach to transmission control, employers have also installed physical barriers to protect these workers when they are at fixed workstations. Across healthcare workplaces, employees working in security checkpoints are commonly unable to maintain physical distance from non-employees who need to be checked-in or are waiting in line (for example, during identification screenings at hospital entrances). In such circumstances, the installation of barriers helps protect security personnel interacting with the public.

Emergency Medical Services

OSHA developed a physical distancing scenario for Emergency Medical Service (EMS) organizations. EMS workers cover a number of job categories including emergency medical

technicians (EMTs), paramedics, and cross-trained firefighters serving in the capacity of paramedics or EMTs.

OSHA identified a number of common physical distancing controls implemented by EMS providers, which limit the number of onsite workers within physical proximity of patients and others, and also limit crowd size during emergency response. First, to limit the number of EMS workers that respond to a call to those absolutely necessary, EMS employers have implemented polices to coordinate with the emergency response operator (*e.g.,* the 911 operator/dispatcher) on how many EMS responders are needed. Also, employers have implemented policies to ensure that the emergency response operator coordinates with law enforcement to disburse or move unnecessary people before the ambulance arrives. Additionally, employers have instituted work practices where one EMS worker conducts the initial patient evaluation and performs medical treatment, remaining in radio communication with the other EMS worker, who will enter to assist only if necessary. EMS employers have also instituted policies to limit the number of workers in the ambulance to those who are medically necessary and to encourage family members to follow the ambulance in their own vehicle rather than riding in the ambulance.

EMS workers cannot always avoid proximity to coworkers or patients during some operations including, for example, engaging in emergency medical care, transporting patients in ambulances, and transferring patients to healthcare facilities. When EMS workers respond to an emergency, they are involved in evaluating and treating the patient onsite before transporting the patient as necessary. EMS workers may need to work as a team in order to perform some tasks (*e.g.,* while performing cardiopulmonary resuscitation (CPR) and using a bag valve mask also known as an Ambu bag). In addition, arriving EMS workers could be within 6 feet of people at the site, including family members and the general public who may have gathered.

Employers of emergency medical services (EMS) workers have installed physical barriers to protect their workers in at least some of these situations. For example, physical barriers are often installed between the workstations of emergency response operators, who assist in coordinating the response to emergency situations (*e.g.,* for the EMS system or the public health system, and in 911 call centers or healthcare facilities). Employers have also installed physical barriers between the treatment compartment of ambulances and the driver's compartment to protect drivers and other workers who need not be exposed to patients.

OSHA also identified a number of strategies that have been used by EMS providers as part of a multilayered approach to infection control. Employers have implemented policies for requiring employees to wear appropriate respiratory protection and other PPE, placing a face covering or facemask on the patient when possible, and requiring family members to wear face coverings or leave the area while EMS workers respond to emergencies in patient homes. In addition, employers have instituted protocols for moving a patient with confirmed or suspected COVID–19 outside or in a more ventilated area for treatment where medically possible (note that the ETS requires healthcare workers to wear respirators when treating a patient who is confirmed or suspected to have COVID–19 as well as when they are exposed to aerosol-generating procedures conducted on a patient who is confirmed or suspected to have COVID–19).

In some situations, EMS workers might need to ride in the cab within 6 feet of each other as well as the patient being transported. In these situations, overlapping controls, such as requiring all EMS workers in the patient compartment to wear appropriate PPE and to wash their hands or use an alcohol-based hand sanitizer that contains at least 60% alcohol, have been implemented. Moreover, as stated, where feasible, physical barriers can be constructed to isolate the driver's cab from the rear patient care area. In addition, patients riding in the rear compartment can wear a face covering and face shield, when possible, or at least a face shield when a face covering is not possible. Employers have also established procedures to open outside air vents in the cab and turn on the rear exhaust ventilation fans to the highest setting to create a pressure gradient toward the patient area.

It is also common that EMS operations must quickly return an ambulance to service after responding to an emergency involving, or transporting patients who are, COVID–19 positive. In such circumstances, multiple EMS workers must often concurrently participate in cleaning and disinfection of the patient area in the ambulance. In these situations, employers have used outdoor cleaning areas or indoor exhaust ventilation, in addition to following widely-established polices requiring PPE and face coverings.

Long-Term Care

Long-term care employers operate nursing homes, retirement communities, assisted living facilities, and intermediate and continuing care facilities. There are a wide range of job titles for workers in this industry including healthcare providers (*e.g.,* physicians, nurses, nurses' assistants, orderlies, physical, occupational, and speech therapists, personal care aides, and psychiatric aides), as well as support staff (*e.g.,* facility administration, reception, engineering and maintenance, housekeeping, laundry, food service, transportation, pharmacy, and security).

OSHA identified a number of physical distancing strategies that have been implemented in various areas of long-term care facilities such as reception areas, waiting rooms, dining rooms, and common areas. These strategies include: Restricting the number of visitors; limiting access to the residential area to essential workers (*i.e.,* maintenance workers performing non-critical tasks and staff performing billing services would not be granted access); increasing the number of meal services; limiting the number of residents in the dining area at one time; and providing room service.

Although physical distancing can be feasibly maintained most of the time, there are some situations where workers in long-term care facilities cannot always avoid physical proximity with residents, visitors, or co-workers. Long-term care employers have installed physical barriers to protect employees in many of these situations. For example, resident care and front desk staff may need to be within 6 feet of visitors during visitor check-in or when providing information or assistance, and administrative staff may have a central counter for information and resources for residents. In these situations, employers have installed physical barriers between workstations and visitor or resident areas. Food servers and aides may need to be within 6 feet of a resident when serving food, servicing or clearing buffet food lines, and when providing assistance. In these situations as well, employers have installed physical barriers between employees and residents.

Healthcare providers may also need to provide care or therapy in resident rooms or other care/therapy areas. As part of a multilayered approach to infection control, some employers have required workers caring for residents to wear a gown, safety glasses, gloves, and either a surgical mask or N95 respirator (depending on whether the worker is

providing care to residents with suspected or confirmed COVID–19, for example). Also, in accordance with American Health Care Association/National Center for Assisted Living (AHCA/NCAL) recommendations, employers have, to the extent possible, reduced the frequency of routine procedures, such as taking vital signs and weights, and have also required residents to wear a face covering when staff enter their rooms or when receiving care/therapy from a healthcare provider, unless they are medically unable to do so. Many employers have also implemented cohorting procedures for staff and patients (*i.e.,* assigning staff to specific residents and only those residents) while minimizing staff working across units (AHCA and NCAL, April 21, 2020).

Home Healthcare, Personal Care, and Companion Service Providers

OSHA developed a physical distancing scenario for organizations that visit private residences to provide healthcare services and health care support services. Employers in this industry use a wide range of job titles for their workers including professional home healthcare practitioners (*e.g.,* physicians, nurses, medical technicians); personal care providers (*e.g.* self-care aides); and other workers who offer companion services for disabled persons, the elderly, and persons diagnosed with intellectual and developmental disabilities.

To help ensure physical distancing, employers in this industry have switched to virtual services when possible by determining whether some clients' needs can be met through telehealth or with online technology, such as video conferencing. Many physical distancing strategies have also been implemented by employers of this sector when services must be conducted at a patient's private residence. These include implementing protocols for workers to maintain 6 feet of distance from clients and other household members, and for workers providing service in teams to maintain 6 feet of distance from each other, as much as possible while they perform their work. Employers have also implemented procedures to instruct all people within the household (other than the direct client receiving services) to go to another room, or at a minimum, maintain at least 6 feet of distance from workers.

Workers performing in-home healthcare or personal care services cannot always feasibly maintain 6 feet of physical distance from their clients or co-workers. In these situations, companies have successfully implemented a multi-layered suite of controls such as requiring all workers to wear facemasks, respiratory protection, or other PPE, and requiring patients and members of households to self-screen for COVID–19 before the visit. Also employers have required all workers to wash their hands or use an alcohol-based hand sanitizer that contains at least 60% alcohol before and after each visit, and have implemented administrative controls such as assigning workers to ''bubbles'' or cohorts to reduce the number of other individuals with whom a worker comes in physical proximity. Finally, employers have taken steps to ensure that private residences have adequate airflow by way of either an HVAC system or open windows and doors.

Postmortem Services

OSHA developed a physical distancing scenario to address the conduct of autopsies. Jobs involved in conducting medical autopsies generally fall within the following categories; medical examiners, forensic pathologists, and autopsy technicians who examine bodies postmortem; and administrative and clerical staff who may be essential for support purposes.

The postmortem care industry has implemented a variety of physical distancing controls to prevent physical proximity (within 6 feet) of other people when performing autopsies. Physical distancing controls for these situations are meant to keep professional healthcare practitioners and, in some cases guests (*e.g.,* law enforcement, family members of the deceased), at least 6 feet apart. These strategies include posting reminders of the need to maintain at least 6 feet of physical distance from other persons, where possible, training workers on proper physical distancing relative to other workers and guests, and establishing work schedules (*e.g.,* alternating days, extra shifts) that reduce the total number of workers in a facility at any given time. In addition, many employers require workers to limit the number of staff in the prep/exam room at any given time to the minimum number necessary.

In workplaces where autopsies are performed, physical proximity cannot always be avoided. In these situations, facilities have successfully implemented a multi-layered suite of controls, such as wearing appropriate PPE, to protect workers from other people (*e.g.,* guests or other staff) during postmortem medical examination, for example. Physical barriers have also been installed in other areas where physical distancing may be difficult to maintain including, at reception counters, in restrooms, in consultation rooms, and in offices, for example.

Summary of Feasibility Challenges for Distancing and Physical Barriers

While OSHA strongly emphasizes the use of physical distancing and physical barriers, it recognizes that there are a few situations where employers have found that it is not feasible to implement either or both. Physical distancing and physical barriers may not be feasible during direct patient care, including the conduct of Emergency Medical Services (EMS) while treating a patient in the back of an ambulance, for example. Physical barriers may also be infeasible where they obstruct an emergency egress path or interfere with a facility's fire safety systems (*e.g.,* fire alarm notification devices, fire sprinklers, fire pull stations).

OSHA emphasizes a multilayered approach for employers to protect their workers: Physical distancing and, if necessary, physical barriers at fixed work locations outside of direct patient care areas must be used in conjunction with other controls, such as facemasks, hand hygiene, and ventilation, and not as the sole means of control. When confronting the rare situations where both physical distancing and physical barriers are not feasible, employers can still implement the remaining layers of overlapping controls, including facemasks, hand hygiene, and ventilation, required by the standard to reduce the risk of COVID–19 transmission.

Based on the evidence that physical distancing and physical barriers are already being implemented across a broad range of healthcare settings, OSHA concludes that it is feasible to implement the ETS's requirements for physical distancing and for physical barriers at fixed work locations outside of direct patient care areas (*e.g.,* entryway/lobby, check-in desks, triage, hospital pharmacy windows, bill payment). In the few cases where physical distancing and physical barriers are both not feasible, work can be conducted to maintain as much distance as possible, and the additional controls such as facemasks, ventilation, and hygiene required by the ETS will still provide some measure of protection.

d. Ventilation

Ventilation systems are another necessary part of a multilayered strategy to control transmission of COVID–19 (CDC, March 23, 2021). As will be discussed in more detail below, the

ability of heating, ventilation, and air conditioning (HVAC) systems to reduce the risk of exposure depends on many factors, including design features, operation and maintenance practices, and the quality and quantity of outdoor air supplied to the space. Paragraph (k) of the ETS require employers who own or control buildings or structures with existing heating, ventilation, and air conditioning (HVAC) systems to ensure that: (1) Each HVAC system is used in accordance with the HVAC manufacturer's instructions and its design-specifications; (2) the amount of outside air circulated through its HVAC system and the number of air changes per hour (ACHs) are maximized to the extent appropriate; (3) all air filters are rated Minimum Efficiency Reporting Value (MERV) 13 or higher, if compatible with the HVAC system (or, alternatively, rated at the highest compatible filtering efficiency); (4) all air filters are maintained and replaced as necessary; and (5) all outside air intake ports are clean, maintained, and cleared of any debris that may affect the function and performance of the HVAC system. Moreover, where an employer has an existing airborne infection isolation room (AIIR), the employer must maintain and operate it in accordance with its design and construction criteria.

In the remainder of this section, OSHA discusses how employers can comply with these requirements and then draws its conclusion on technological feasibility.

Using HVAC Systems in Accordance With Manufacturer's Instructions and Design Specifications

To meet the ETS's requirements, employers must verify that the system is functioning as designed. Because each building and its existing HVAC systems will be different, the employer might need to consult a professional engineer or HVAC specialist to determine the best way to maximize the system's ventilation and air filtration capabilities for each specific room in the building and thereby ensure the system is operating according to design specifications.

The American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) Standard 180–2018 Standard Practice for Inspection and Maintenance of Commercial Building HVAC Systems provides guidance on preventive maintenance for HVAC systems, including checklists that employers can use to verify the system is operating as designed (ASHRAE, June 11, 2018). Additional guidance can be found in CDC's Guidance for Businesses and Employers Responding to Coronavirus Disease 2019 (COVID–19) (CDC, March 8, 2021), and the ASHRAE Guidance for Re-Opening Buildings (ASHRAE, October 5, 2020).

Healthcare settings have additional HVAC design parameters for meeting specifications for directional airflow and relative pressure differentials. For example, according to ASHRAE's Standard 170 Ventilation of Health Care Facilities, ventilation systems that provide air movement from clean areas (*e.g.,* nursing stations) to potentially contaminated areas (*e.g.,* patient airborne infection isolation rooms) are recommended for preventing airborne transmission. Thus, the air pressure of the room or space would be maintained at a negative pressure relative to the hallways and surrounding spaces. This means that when the door is opened, potentially contaminated air or other dangerous particles from inside the room will not flow outside into non-contaminated areas. (ASHRAE, 2017). Normally functioning existing isolation rooms should already be able to serve this function because Joint Commission accreditation and Centers for Medicare & Medicaid Services (CMS) regulations have requirements for negative pressure airborne infection isolation rooms design.

Using AIIRS in Accordance With Design and Construction Criteria

AIIRs are designed to prevent the transmission of airborne transmissible agents to areas outside a patient's room. These rooms have a high air exchange rate and are under negative air pressure, meaning that the room air has a slight negative pressure compared to the surrounding rooms. The high air exchange rate (at least 12 air changes per hour (ACH) for new construction or renovation, 6 ACH otherwise) helps change the room air frequently and reduces (but does not eliminate) buildup of airborne disease agents, such as the virus that causes COVID–19. The negative air pressure differential (0.01 inch of water [2.5 Pa]) helps reduce the chance that the remaining airborne virus will exit the room door and contaminate air in adjacent hallways. An anteroom is a beneficial room feature that helps further isolate the AIIR from the adjacent hallway. When the AIIR has an anteroom, the AIIR's air pressure should be negative to the anteroom, while the anteroom air pressure should be negative to the adjacent hallway. This arrangement means air from the hallway will flow into the anteroom each time the door is opened, and air from the anteroom will flow into the AIIR—minimizing the amount of airborne disease agents (virus) that exits the room. ASHRAE Standard 170, Ventilation of Health Care Facilities offers detailed guidance for designing and operating AIIRs (ASHRAE, 2017).

Maximizing Outside Air Circulated Through HVAC System(s) and the Number of Air Changes per Hour (ACHs) to the Extent Appropriate

Building HVAC systems are designed to draw in a certain amount of outdoor air into the building to maintain indoor air quality. By introducing fresh air into the building, HVAC systems can prevent the buildup of airborne contaminants through dilution.

The introduction of outdoor air into the building can also help limit the potential for the virus that causes COVID–19 to accumulate in the building. The more outdoor air the HVAC system is capable of drawing into the building, the greater the impact may be on limiting the potential for the virus to accumulate. Maximizing the amount of outdoor air introduced to the system can be achieved by fully opening the building's outdoor air intake dampers; however, this may introduce other indoor air quality or comfort concerns resulting from humidity, temperature extremes, or outdoor pollution. Employers should work with building managers or HVAC professionals to adjust the HVAC system to bring in as much outdoor air as possible, while taking into consideration outdoor pollution levels and ensuring that the HVAC system is capable of maintaining building temperature and humidity levels within acceptable occupant comfort ranges. OSHA notes that it does not expect employers to reconfigure duct work to comply with this provision. When maximizing the outside air, employers should take into account not to draw in air from potential pollution sources such as smoking areas, loading docks, vehicle traffic areas, or active construction zones, or air being re-entrained from the building exhaust itself.

Balancing refers to the process of measuring the air flow through the supply ducts and adjusting the dampers to provide an even distribution of air through the HVAC system duct work and supply vents. According to ASHRAE Standard 111 Measurement, Testing, Adjusting, and Balancing of Building HVAC Systems, testing and balancing an HVAC system provides the means to determine and monitor system performance. Proper balancing ensures that outdoor air brought into the building will be evenly supplied to all areas of the building and limit the potential for ventilation dead zones or stagnant air to accumulate (ASHRAE, October 31, 2017).

In addition to considering the factors discussed above with respect to maximizing outside air, employers must also consider how to maximize ACHs. ACHs are a measure of the air volume that is added to or removed from a space in one hour divided by the volume of the space. The more frequently the air within that space is replaced per hour, or the more ACHs, the more the overall potential concentration of COVID–19 in the work environment will be reduced. Building owner/operators or employers can seek assistance from HVAC professionals on maximizing ACHs based on the workspace and the design capabilities of the HVAC system(s) (ASHRAE, 2017).

Using Air Filters Rated MERV 13 or Higher, if Compatible With the HVAC System(s), or, Alternatively, to the Highest Compatible Filtering Efficiency

Building HVAC systems are equipped with air filters that remove particles from recirculated air streams before returning the air to occupied spaces. Air filters are available in a variety of materials such as pleated paper, cloth, woven fiberglass, and polyester. A filter's efficiency is measured by the fraction of particles the filter is able to remove from the air stream. The higher the filter's efficiency the better it is at removing particles from the air. There are several systems for rating filter efficiencies. The most common is the MERV rating system, which was developed by ASHRAE.

Many existing HVAC systems are designed and installed to operate with filters ranging from MERV 6 to MERV 8. MERV 8 filters are only about 20 percent efficient in removing particles in the 1 μm to 3 μm size range (the size range of concern for aerosol droplets containing the virus that causes COVID–19). Employers and building managers can improve this efficiency by upgrading to MERV 13 or higher filters, to the extent those filters are currently compatible with system components (*e.g.,* filter housing slot type, size, and shape). MERV 13 filters are at least 85 percent efficient at capturing particles in the 1 μm to 3 μm size range. Increasing filter efficiency, however, can increase pressure drop across the filters leading to increased fan energy use, reduced airflow rates, and or/issues controlling indoor temperature and humidity levels. As a result, employers and building owners may need to consult an HVAC professional to optimize filter efficiency consistent with their HVAC system's capabilities.

Maintaining and Replacing All Air Filters as Necessary

The required frequency for changing filters will vary depending on the characteristics of the HVAC system, and therefore the ETS does not specify a frequency for filter changing.

Ensuring All Outside Air Intake Ports Are Clean, Maintained, and Cleared of Any Debris That May Affect the Function and Performance of the HVAC System(s)

To comply with this provision, a visual inspection of the outside air intakes, which can be accomplished as part of a routine maintenance program, is required.

Additional Ventilation Measures

A note to the ETS's ventilation requirements provides that, in addition to the requirements for existing HVAC systems and AIIRs, all employers should also consider other measures to improve ventilation in accordance with CDC guidance. Below are some additional measures that an employer should consider to increase total airflow supply to occupied spaces:

- Disabling demand-control ventilation (DCV) controls that reduce air-supply based on temperature or occupancy;
- Using natural ventilation (*i.e.,* opening windows if possible and safe to do so) to increase outdoor air dilution of indoor air when environmental conditions and building requirements allow;
- Running the HVAC system at maximum outside airflow for 2 hours before and after occupied times;
- Generating clean-to-less-clean air movements, re-evaluating the positioning of supply and exhaust air diffusers and/or dampers, and adjusting zone supply and exhaust flow rates to establish measurable pressure differentials;
- Requiring that staff work in ''clean'' ventilation zones and not in higher-risk areas (*e.g.,* visitor reception) to the extent feasible;
- Using portable high-efficiency particulate air (HEPA) fan/filtration systems to help enhance air cleaning especially in higher-risk areas; and
- Ensuring exhaust fans in restroom facilities are functional and operating at full capacity when the building is occupied.

The terms of the ETS make clear that there are no technological hurdles to compliance with its ventilation requirements. First, the ventilation requirements apply only to existing systems. A note in the ETS emphasizes that the requirements do not require installation of new HVAC systems or AIIRS, or upgrades of existing systems to replace or augment functioning systems. Therefore, the ventilation requirements do not raise the questions of feasibility typically associated with employers needing to install new engineering controls to come into compliance with a new standard.

Second, the HVAC requirements apply only to employers who own or control buildings or structures. Thus, for example, the requirements do not apply to employers who lease space and do not control the building or structure, and the ETS does not raise questions as to how these employers would comply with the ventilation requirements.

Third, employers covered by the general section are required only to ensure that HVAC systems operate with a sufficient filter (MERV–13 where possible) in accordance with manufacturer's instructions and design specifications, and only in a manner that is appropriate for the system using methods that are compatible with the system, and that AIIRs are maintained and operated in accordance with their design and construction criteria. As such employers are not required by the ETS to modify their HVAC systems or AIIRs in any manner, only to ensure that they are operating as designed, which negates questions as to how the employer would make modifications.

Fourth, a number of the plans, best practice documents, and scenarios discussed above reference HVAC systems and ventilation. The use of HVAC systems to manage building air filtration and circulation of fresh air as part of overlapping controls to address the COVID–19 hazard illustrate that there is no technological feasibility barrier to compliance with the ETS's ventilation requirements in typical firms in all affected industries. The ETS's filter requirements are inherently technologically feasible because they only require the installation of the

maximum filter that is compatible with the applicable HVAC system.

The design and complexity of HVAC systems can vary widely depending on a range of factors including the use, size, and age of the building, and, as discussed, deciding on the maximum appropriate amount of outside air to circulate through the HVAC system(s) and number of ACHs can be a complex task. However, larger buildings have dedicated facilities management staff who are responsible for regular ventilation system maintenance and adjustment and will have the prerequisite experience to evaluate the capabilities of the HVAC system, while in other cases, employers may need to consult with an HVAC professional to ensure that facilities HVAC is functioning in accordance with the HVAC manufacturer's instructions and the design specifications of the HVAC system(s). Based on these factors, OSHA concludes that there are no technological barriers to compliance with the ETS's ventilation requirements.

e. Other Provisions

There are no technological feasibility barriers related to compliance with other requirements in the ETS (*e.g.,* facemasks, and respirators, cleaning and disinfection, health screening and medical management, employee notification). Indeed, as explained above, many of the plans, best practice documents, and scenarios reviewed by OSHA indicate that these controls have been implemented by employers across industry sectors as part of a multilayered approach to protecting workers from the COVID–19 hazard. OSHA highlights a few of the ETS's other requirements below, but only to point out administrative issues that will be explored in more depth in other sections of the preamble.

- Facemasks. The ETS requires employers to provide, and ensure that employees wear, facemasks that are FDA-cleared, authorized by an FDA EUA, or offered or distributed as described in an FDA enforcement policy. Facemasks that meet these requirements are currently widely available.
- There may be situations where wearing a facemask presents a hazard to an employee of serious injury or death (*e.g.,* arc flash, heat stress, interfering with the safe operation of equipment). The relevant section of the *Summary and Explanation* provides further discussion on this topic.
- Respirators. As noted in *Need for Specific Provisions* and *Summary and Explanation* (Sections V and VIII of the preamble, respectively), the increased need for respirators by healthcare workers during the pandemic has resulted in shortages of N95 filtering facepiece respirators (FFRs). The ETS addresses these shortages by encouraging employers to use not only N95 FFRs, but also other respirators such as elastomeric respirators and powered air-purifying respirators (PAPRs), where feasible. For further details, see paragraph (f) of the ETS, as well as relevant sections of *Need for Specific Provisions* and *Summary and Explanation.*
- Notification. Paragraphs (l)(2) and (l)(3) of the ETS contain COVID–19-connected notification requirements for both the employer and the employee. OSHA identifies no technological feasibility issues in connection with the ETS's notification requirements. It is the employer's responsibility to ensure that appropriate instructions and procedures are in place so that designated representatives of the employer (*e.g.,* managers, supervisors) and employees conform to the rule's requirements.

There are also no technological barriers to compliance with the mini respiratory protection program section of the ETS. That section requires employers, many of whom have never developed or implemented a respiratory protection program under the Respiratory Protection standard, 29 CFR 1910.134, to develop and implement one if their employees wear respirators. However, the mini respiratory protection program section will require a program that is far less extensive, and thus easier to comply with, than what is required under 29 CFR 1910.134. For example, the mini respiratory protection program section will not require quantitative fit testing or medical evaluations regarding employees' ability to use respirators, both of which are required under 29 CFR 1910.134. Therefore, OSHA concludes that compliance with the mini respiratory protection program section does not raise issues of technological feasibility. OSHA discusses the administrative cost of complying with the mini respiratory protection program section in its economic feasibility analysis.

II. Conclusions

OSHA has reviewed the requirements imposed by the ETS and has determined that achieving compliance with the rule is technologically feasible for typical operations in the settings that are covered by the ETS. In reaching this determination, OSHA reviewed evidence that shows that healthcare-specific good infection control practices are routinely implemented by employers who have employees in covered settings. This evidence includes: Readily available CDC infection control guidance documents, many of which are COVID–19 specific; regulations issued by the Centers for Medicare & Medicaid Services (CMS), compliance with which is typically required for accreditation of these settings by The Joint Commission; and the application of similar requirements in OSHA's Bloodborne Pathogens Standard, 29 CFR 1910.1030.

OSHA's assessment also analyzed the technological feasibility of complying with the requirements of the ETS for developing a COVID–19 Plan: Maintaining physical distancing; installing physical barriers; and ensuring existing ventilation systems are operating as designed. As noted, the ETS requires employers to develop and implement a COVID–19 plan through a multilayered approach to addressing the spread of COVID–19 by taking feasible measures to reduce or eliminate the transmission of COVID–19. This includes requirements for employers to implement procedures to ensure employees maintain at least 6 feet of physical distancing from others to the extent feasible and, when distancing is not feasible, to install physical barriers, again to the extent feasible. It also allows flexibility in the material of barriers.

OSHA recognizes that sometimes it may not be feasible to implement either physical distancing or physical barriers for particular work activities, but even if this is the case, employers must still protect their employees through the other provisions of the flexible multilayered approach required by the ETS. The regulatory text allows for alternatives in some situations, and OSHA has identified a variety of alternatives that it believes would be technologically feasible in those situations most of the time. As explained, there are no technological feasibility barriers related to compliance with requirements in the ETS for facemasks and respirators, cleaning and disinfection, health screening and medical management, or employee notification. Based on the combination of OSHA's evaluation of technological feasibility of controls in the various scenarios examined, OSHA finds that the ETS is technologically feasible.

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B. Economic Feasibility

I. Introduction

This section presents OSHA's estimates of the costs, benefits, and other impacts anticipated to result from the ETS. The estimated costs are based on employers achieving full compliance with the requirements of the ETS. They do not include prior costs associated with firms whose current practices are already in compliance with the ETS requirements. The purpose of this analysis is to:

- Identify the establishments and industries affected by the ETS;
- Estimate and evaluate the costs and economic impacts that regulated establishments will incur to achieve compliance with the ETS;
- Evaluate the economic feasibility of the rule for affected industries; and
- Estimate the benefits resulting from employers coming into compliance with the rule in terms of the reduction in COVID–19 disease and resulting fatalities.

In this analysis, OSHA is fulfilling the requirement under the OSH Act to show the economic feasibility of this ETS. This analysis is different from a benefit-cost analysis prepared in accordance with E.O. 12866 in that the agency is focused only on costs to employers when evaluating economic feasibility. In a true benefit-cost analysis, the costs to all parties (*e.g.,* employees,

governments) are included. Throughout this analysis, there are places where OSHA estimates there are no costs borne by employers. This does not necessarily mean that there are no costs or burdens imposed on others but, from the standpoint of establishing feasibility, these are not being assessed as part of OSHA's analysis of economic feasibility.[30]

A standard must be economically feasible in order to be ''necessary'' under section 6(c)(1)(B) of the OSH Act. *Cf. Am. Textile Mfrs. Inst., Inc.* v. *Donovan,* 452 U.S. 490, 513 n. 31 (1981) (*Cotton Dust*) (''any standard that was not economically . . . feasible would a fortiori not be 'reasonably necessary or appropriate' under the Act''); *Nat'l Maritime Safety Ass'n* v. *Occupational Safety & Health Admin.,* 649 F.3d 743, 752 (D.C. Cir. 2011). A standard is economically feasible when industries can absorb or pass on the costs of compliance without threatening industry's long-term profitability or competitive structure, *Cotton Dust,* 452 U.S. at 530 n. 55, or ''threaten[ing] massive dislocation to, or imperil[ing] the existence of, the industry.'' *United Steelworkers of Am.* v. *Marshall,* 647 F.2d 1189, 1272 (D.C. Cir. 1981) (*Lead I*). Given that section 6(c) is aimed at enabling OSHA to protect workers in emergency situations, the agency is not required to make the showing with the same rigor as in ordinary section 6(b) rulemaking. *Asbestos Info. Ass'n/N. Am.* v. *OSHA,* 727 F.2d 415, 424 n.18 (5th Cir. 1984). In *Asbestos Information Association,* the Fifth Circuit concluded that the costs of compliance were not unreasonable to address a grave danger where the costs of the ETS did not exceed 7.2% of revenues in any affected industry. Id. at 424.

OSHA's evaluation of the overall costs and benefits of the ETS has been performed for the purposes of complying with requirements outside of the OSH Act (*e.g.,* Executive Orders 12866 and 13563, the Unfunded Mandates Reform Act). ''[T]he Supreme Court has conclusively ruled that economic feasibility [under the OSH Act] does not involve a cost-benefit analysis.'' *Pub. Citizen Health Research Grp.* v. *U.S. Dept. of Labor,* 557 F.3d 165, 177 (3d Cir. 2009); see also *Asbestos Info. Ass'n,* 727 F.2d at 424 n.18 (noting that formal cost benefit is not required for an ETS, and indeed may be impossible in an emergency). The OSH Act ''place[s] the 'benefit' of worker health above all other considerations save those making attainment of this 'benefit' unachievable.'' *Cotton Dust,* 452 U.S. at 509. Therefore, ''[a]ny standard based on a balancing of costs and benefits by the Secretary that strikes a different balance than that struck by Congress would be inconsistent with the command set forth in'' the statute. Id. While this case law arose with respect to health standards issued under section 6(b)(5) of the Act, which specifically require feasibility, OSHA finds the same concerns applicable to emergency temporary standards issued under section 6(c) of the Act. An ETS ''serve[s] as a proposed rule'' for a section 6(b)(5) standard, and therefore the same limits on any requirement for cost-benefit analysis should apply. Indeed, OSHA has also rejected the use of formal cost benefit analysis for safety standards, which are not governed by section 6(b)(5). See 58 FR 16612, 16622–23 (Mar. 30, 1993) (''in OSHA's judgment, its statutory mandate to achieve safe and healthful workplaces for the nation's employees limits the role monetization of benefits and analysis of extra-workplace effects can play in setting safety standards.'').[31]

The scope of judicial review of OSHA's determinations regarding feasibility (both technological and economic) ''is narrowly circumscribed.'' *N. Am.'s Bldg. Trades Unions* v. *OSHA,* 878 F.3d 271, 296 (D.C. Cir. 2017) (*Silica*). ''OSHA is not required to prove economic feasibility with certainty, but is required to use the best available evidence and to support its conclusions with substantial evidence.'' *Amer. Iron & Steel Inst.* v. *OSHA,* 939 F.2d 975, 980–81 (D.C. Cir. 1991) (*Lead II*); 29 U.S.C. 655(b)(5), (f). ''Courts, [moreover], 'cannot expect hard and precise estimates of costs.' '' *Silica,* 878 F.3d at 296 (quoting *Lead II,* 939 F.2d at 1006). Rather, OSHA's estimates must represent ''a reasonable assessment of the likely range of costs of its standard, and the likely effects of those costs on the industry.'' *Lead I,* 647 F.2d at 1266. The ''mere 'possibility of drawing two inconsistent conclusions from the evidence,' or deriving two divergent cost models from the data 'does not prevent [the] agency's finding from being supported by substantial evidence.' '' *Silica,* 878 F.3d at 296 (quoting *Cotton Dust,* 452 U.S. at 523).

Executive Orders 12866 and 13563 direct agencies to assess the costs and benefits of the intended regulation and, if regulation is necessary, to select regulatory approaches that maximize net benefits (including potential economic, environmental, and public health and safety effects; distributive impacts; and equity). Executive Order 13563 emphasized the importance of quantifying both costs and benefits, of reducing costs, of harmonizing rules, and of promoting flexibility. OSHA has prepared this ETS and the accompanying economic analysis on an extremely condensed timeline and has complied with E.O. 12866 and E.O. 13563 only to the extent practicable under the circumstances (see Exec. Order No. 13999, Jan. 21, 2021, 86 FR 7211 (Jan. 26, 2021)). This rule is an economically significant regulatory action under Sec. 3(f) of Executive Order 12866 and has been reviewed by the Office of Information and Regulatory Affairs in the Office of Management and Budget, as required by executive order.

II. Healthcare Industry Profile

a. Introduction

In this section, OSHA provides estimates of the number of affected entities, establishments, and employees for the industries that have settings covered by 29 CFR 1910.502. The term ''entity'' describes a legal for-profit business, a non-profit organization, or a local governmental unit, whereas the term ''establishment'' describes a particular physical site of economic activity. Some entities own and operate more than one establishment.

Throughout this analysis, where estimates were derived from available data those sources have been noted in the text. Estimates without sources noted in the text are based on agency expertise.

b. Scope of the ETS

The ETS applies to all settings where any employee provides healthcare or healthcare support services except:

- The provision of first aid by an employee who is not a licensed healthcare provider;
- the dispensing of prescriptions by pharmacists in retail settings;
- non-hospital ambulatory care settings where all non-employees are screened prior to entry and people with suspected or confirmed COVID–19 are not permitted to enter those settings;

[30] For example, there are places in the analysis where OSHA specifically accounts for costs being shifted away from employers through tax credits and other programs aimed at responding to the pandemic. While the direct costs to employers are reduced for purposes of evaluating feasibility, those costs would be attributable to the ETS in a true benefit-cost analysis.

[31] To support its Asbestos ETS, OSHA conducted an economic feasibility analysis on these terms. 48 FR 51086, 51136–38 (Nov. 4, 1983). In upholding that analysis, the Fifth Circuit said that OSHA was required to show that the balance of costs to benefits was not unreasonable. *Asbestos Info. Ass'n,* 727 F.2d at 423. As explained above, OSHA does not believe that is a correct statement of the economic feasibility test. However, even under that approach this ETS easily passes muster.

- well-defined hospital ambulatory care settings where all employees are fully vaccinated and all non-employees are screened prior to entry and people with suspected or confirmed COVID–19 are not permitted to enter those settings;
- home healthcare settings where all employees are fully vaccinated and all non-employees are screened prior to entry and people with suspected or confirmed COVID–19 are not present;
- healthcare support services not performed in a healthcare setting (*e.g.,* off-site laundry, off-site medical billing); or
- telehealth services performed outside of a setting where direct patient care occurs.

In well-defined areas of covered settings where there is no reasonable expectation that any person with suspected or confirmed COVID–19 will be present, paragraphs (f), (h), and (i) do not apply to employees who are fully vaccinated.

Healthcare services are delivered through various means including, but not limited to: Hospitalization, long-term care, ambulatory care (*e.g.,* treatment in physicians' offices, dentists' offices, and medical clinics), home health and hospice care, and emergency medical response. Healthcare support services include, but are not limited to, patient intake/admission, patient food services, equipment and facility maintenance, housekeeping, healthcare laundry services, medical waste handling services, and medical equipment cleaning/reprocessing services.

In order to determine which employers are covered by the ETS, OSHA identified both the occupations where workers would be providing healthcare and healthcare support services and the setting where those tasks would be done. For example, a social worker in a hospital may be working in conjunction with healthcare providers and therefore providing healthcare or healthcare support services. However, a social worker working for a children and family services or social advocacy organization would not be covered by the ETS since neither they nor anyone else at their organization would be providing healthcare or healthcare support services.

OSHA's methodology for determining which establishments and employees are covered by the ETS focuses on job tasks and settings. OSHA did not assign costs to certain categories of job tasks because they are excluded from the scope of the ETS by paragraph (a). These include: Employees who are teleworking; employees who are providing services via telehealth; employees providing healthcare support services at off-site locations; employees who are in uncovered portions of settings (*e.g.,* retail stores with health clinics, schools with school nurses) that are not fully covered by the ETS; and employees who work in parts of hospitals that would meet the ambulatory care exemption in paragraph (a)(2)(iv). Numerous employees of hospitals, long-term care facilities, and nursing homes are likely to fall into one of these categories. While these workers are included in Table VI.B.3 as employees of covered establishments, OSHA has not assigned employee-based costs to their employers in this analysis.

Furthermore, OSHA has not determined how many non-hospital ambulatory care providers will screen patients for COVID–19 infections and symptoms, and therefore be fully exempt from this rule under paragraph (a)(2)(iii). To the extent that providers meet these exemption criteria, they will incur no costs for compliance with respect to these settings. Therefore, for this subset of establishments, the costs presented in OSHA's analysis will be dramatic overestimates (*i.e.,* OSHA assumes full costs where costs should be zero). Overall, however, OSHA believes that the number of workers estimated to be covered by the ETS is reasonable and leads to reasonable aggregate estimates of the average costs of compliance for employers in covered settings.

Table VI.B.1 summarizes the individual North American Industry Classification System (NAICS) codes, along with OSHA's estimated percentage of entities and employees, covered by the ETS. The percentage of entities covered were generally estimated as the percentage of firms reporting having employees whose occupation would have them providing healthcare and healthcare support services (see Appendix VI.B.A). In some healthcare industries (*e.g.,* many of those in NAICS 62 Health Care and Social Assistance), 100 percent of entities are estimated to be affected, but for industries outside of the healthcare sector, no more than 25 percent of entities were estimated to be covered by the ETS. The percent of employees covered by the ETS in covered, non-healthcare entities is estimated based on the percentage of employees in those industries who are reported to be employed in the occupation categories identified in Appendix VI.B.A.

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Table VI.B.1. Affected NAICS Industries, Healthcare COVID-19 ETS

NAICS	NAICS Description	Percent of Entities Affected	Percent of Covered Employees
446110	Pharmacies and Drug Stores	25%	25%
561210	Facility Support Services	25%	23%
561311	Employment Placement Agencies	25%	9%
611110	Elementary and Secondary Schools	25%	6%
611210	Junior Colleges	25%	3%
611310	Colleges, Universities, and Professional Schools	25%	10%
611710	Educational Support Services	6%	3%
621111	Offices of Physicians (except Mental Health Specialists)	100%	59%
621112	Offices of Physicians, Mental Health Specialists	100%	59%
621210	Offices of Dentists	100%	68%
621310	Offices of Chiropractors	100%	55%
621320	Offices of Optometrists	100%	29%
621330	Offices of Mental Health Practitioners (except Physicians)	100%	8%
621340	Offices of Physical, Occupational and Speech Therapists and Audiologists	100%	70%
621391	Offices of Podiatrists	100%	53%
621399	Offices of All Other Miscellaneous Health Practitioners	100%	53%
621410	Family Planning Centers	100%	51%
621420	Outpatient Mental Health and Substance Abuse Centers	100%	16%
621491	HMO Medical Centers	100%	51%
621492	Kidney Dialysis Centers	100%	51%
621493	Freestanding Ambulatory Surgical and Emergency Centers	100%	51%
621498	All Other Outpatient Care Centers	100%	51%
621610	Home Health Care Services	100%	60%
621910	Ambulance Services	100%	79%
621991	Blood and Organ Banks	100%	65%
621999	All Other Miscellaneous Ambulatory Health Care Services	100%	65%
622110	General Medical and Surgical Hospitals	100%	72%
622210	Psychiatric and Substance Abuse Hospitals	100%	45%
622310	Specialty (except Psychiatric and Substance Abuse) Hospitals	100%	66%
623110	Nursing Care Facilities (Skilled Nursing Facilities)	100%	74%
623210	Residential Intellectual and Developmental Disability Facilities	100%	71%
623220	Residential Mental Health and Substance Abuse Facilities	100%	27%
623311	Continuing Care Retirement Communities	100%	62%
623312	Assisted Living Facilities for the Elderly	100%	62%
623990	Other Residential Care Facilities	100%	24%
711211	Sports Teams and Clubs	9%	3%
922160	Public Firefighter-EMTs	100%	65%

Source: OSHA, based on BLS data (BLS, March 29, 2019).
NAICS 922160 includes government and volunteer firefighters, including those cross-trained as EMTs. OSHA obtains estimates of the number of public firefighter-EMT entities and employees from the U.S. Fire Administration (USFA) National Fire Department Registry, rather than a NAICS-based data source. For firefighter-EMT wages, OSHA assigns the same values estimated for Ambulance Services, as these values are judged to be more representative of wages for this specific service versus wages based on NAICS 922160 data.

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Only some state- and local-government entities are included in this analysis. State- and local-government entities are specifically excluded from coverage under the OSH Act (29 U.S.C. 652(5)). Workers employed by these entities only have OSH Act protections if they work in states that have an OSHA-approved State Plan. (29 U.S.C. 667). Consequently, this analysis excludes public entities in states that do not have OSHA-approved State Plans.

Table VI.B.2 presents the states that have OSHA-approved State Plans and their public entities are included in the analysis.

Table VI.B.2. States that Have OSHA-Approved State Plans

Alaska	Maine	Oregon
Arizona	Maryland	South Carolina
California	Michigan	Tennessee
Connecticut	Minnesota	Utah
Hawaii	Nevada	Vermont
Illinois	New Jersey	Virginia
Indiana	New Mexico	Washington
Iowa	New York	Wyoming
Kentucky	North Carolina	US Virgin Islands & Puerto Rico

c. Affected Entities and Employees

OSHA used data from the U.S. Census' 2017 County Business Patterns (CBP) to identify private sector entities and employees, including for-profit and non-profit entities affected by the ETS (U.S. Census Bureau, November 21, 2019, U.S. Census Bureau, March, 2020); and uses the Bureau of Labor Statistics' (BLS) 2017 Quarterly Census of Employment and Wages (QCEW) to characterize state and local government entities (BLS, May 23, 2018). For covered public fire departments and firefighters cross-trained as EMTs, OSHA relied on data from the U.S. Fire Administration (USFA) National Fire Department Registry (USFA, 2018).

OSHA similarly obtained estimates of the number of employees in entities from CBP and QCEW. OSHA used the BLS 2018 Occupational Employment Statistics (OES), which provides NAICS-specific estimates of employment by occupation, to determine the subset of employees performing the tasks outlined in the scope of the ETS (BLS, March 29, 2019). Within the affected NAICS industries, OES includes approximately 700 unique occupations. Of these, OSHA identified 90 occupations representing jobs where workers would perform healthcare or healthcare support services (see Appendix VI.B.A). OSHA then calculated the proportion of total employees that these occupations represented for the NAICS industries that reported employing these occupations in OES data, and applied those proportions to the CBP and QCEW employee estimates for the covered entities. This results in an estimate of the subset of employees by NAICS industry where workers are covered by the ETS.

For many regulatory economic analyses, the agency uses the most up-to-date economic data as its baseline to describe the current state of the economy. It then applies the anticipated changes due to the new OSHA standard or regulation to that baseline. However, even the most current data OSHA uses in a typical economic analysis—including employment, number of establishments, revenue, etc.—represent economic conditions from at least one calendar year in the past. Even with that lag in the data due to reporting and compilation time, the idea is that the basic structure of the economy changes slowly, so the recent past is a good predictor of the near future.

Given the unique circumstances of the pandemic and its economic disruption, OSHA's usual approach is inappropriate for the present analysis. The agency has therefore also made adjustments to the baseline industry profile to account for the economic conditions that are expected to persist during the time period in which this ETS will be in effect. Specifically, OSHA takes the above data as the baseline for 2019, the last full year before the onset of the pandemic.[32] Then the agency adjusted employment and revenue by industry in order to capture the current adverse conditions and provide better estimates of employment and revenue both currently and over the period in which the ETS will be in effect. The detailed methodology for these adjustments is presented in Appendix VI.B.D.

Table VI.B.3 summarizes the entities and employees covered by the ETS. OSHA estimates a total of approximately 563,000 entities, including approximately 749,000 establishments, and approximately 18.1 million total employees who are employed by establishments covered by the ETS. All affected establishments are assumed to incur the establishment-based costs of compliance. In addition, OSHA estimates that there are approximately 10.3 million employees in those establishments who would not meet any of the exemptions in paragraph (a) and whose employers would therefore incur per-employee costs of compliance as well. However, as shown in Table VI.B.3, the portion of employees for whom OSHA took per-employee costs varies considerably by NAICS industry.

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[32] This includes updating revenue numbers for inflation to 2019 using the GDP deflator.

Table VI.B.3. Summary of Affected Entities and Employees

NAICS	NAICS Description	Entities and Establishments		Employees	
		Affected Entities	Affected Estabs	All Employees	Covered Employees
	TOTAL	**562,510**	**748,816**	**18,134,470**	**10,338,353**
446110	Pharmacies and Drug Stores	4,810	12,007	168,358	42,090
561210	Facility Support Services	536	1,680	64,213	15,007
561311	Employment Placement Agencies	1,415	1,588	44,577	4,032
611110	Elementary and Secondary Schools	14,909	15,596	1,140,102	66,703
611210	Junior Colleges	403	494	104,019	2,709
611310	Colleges, Universities, and Professional Schools	1,734	2,238	608,697	58,662
611710	Educational Support Services	494	541	5,705	176
621111	Offices of Physicians (except Mental Health Specialists)	161,977	212,620	2,409,333	1,425,789
621112	Offices of Physicians, Mental Health Specialists	10,568	10,817	40,200	23,789
621210	Offices of Dentists	125,335	136,468	930,308	635,139
621310	Offices of Chiropractors	38,696	39,340	133,053	72,557
621320	Offices of Optometrists	19,627	22,386	122,525	35,556
621330	Offices of Mental Health Practitioners (except Physicians)	24,251	25,370	122,803	9,288
621340	Offices of Physical, Occupational and Speech Therapists and Audiologists	26,746	40,431	338,609	237,533
621391	Offices of Podiatrists	7,304	8,092	32,565	17,344
621399	Offices of All Other Miscellaneous Health Practitioners	19,487	22,696	85,405	45,487
621410	Family Planning Centers	1,479	2,349	22,562	11,461
621420	Outpatient Mental Health and Substance Abuse Centers	6,664	11,967	277,497	45,022
621491	HMO Medical Centers	27	1,723	138,724	70,472
621492	Kidney Dialysis Centers	432	7,904	125,182	63,592
621493	Freestanding Ambulatory Surgical and Emergency Centers	4,401	7,660	170,220	86,472
621498	All Other Outpatient Care Centers	6,775	14,825	399,728	203,061
621610	Home Health Care Services	23,855	33,581	1,396,004	834,687
621910	Ambulance Services	3,230	5,672	183,455	145,161
621991	Blood and Organ Banks	339	1,587	74,034	48,473
621999	All Other Miscellaneous Ambulatory Health Care Services	3,587	4,387	63,328	41,463
622110	General Medical and Surgical Hospitals	2,867	5,281	4,912,663	3,519,001
622210	Psychiatric and Substance Abuse Hospitals	1,275	1,443	198,868	89,079
622310	Specialty (except Psychiatric and Substance Abuse) Hospitals	424	920	238,111	157,898
623110	Nursing Care Facilities (Skilled Nursing Facilities)	9,333	17,137	1,511,492	1,115,312
623210	Residential Intellectual and Developmental Disability Facilities	7,597	35,213	581,968	411,523
623220	Residential Mental Health and Substance Abuse Facilities	4,305	8,081	220,146	59,442
623311	Continuing Care Retirement Communities	3,899	5,570	444,244	273,792
623312	Assisted Living Facilities for the Elderly	14,597	20,052	446,530	275,201
623990	Other Residential Care Facilities	3,401	5,362	123,057	29,369
711211	Sports Teams and Clubs	79	85	2,779	95
922160 *	Public Firefighter-EMTs	5,648	5,648	253,407	165,915
Source: OSHA analysis based on SUSB (U.S. Census Bureau, March, 2020), QCEW (BLS, May 23, 2018), and BLS OES (BLS, March 29, 2019). Firefighter-EMT estimates based on (USFA, 2018).					

d. Affected Small Entities and Employees

While OSHA has determined that it is impracticable to comply fully with the requirements of the Regulatory Flexibility Act (RFA) (see *Additional Requirements,* Section VII of the preamble), the agency has nevertheless examined the impact of the ETS on small and very small entities as part of OSHA's analysis of feasibility. There are three types of small entities under the

RFA: (1) Small businesses; (2) small non-profit organizations; and (3) small governmental jurisdictions. The Small Business Administration (SBA) uses characteristics of businesses classified using the NAICS as a basis for determining whether businesses are small within a given industry. SBA small entity size criteria vary by industry, but are usually based on either number of employees or revenue (Table of Small Business Size Standards (SBA, August 19, 2019)). A small non-profit organization is any not-for-profit enterprise that is independently owned and operated and not dominant in its field. A small governmental jurisdiction is a government of a city, county, town, township, village, school district, or special district with a population of less than 50,000.

To determine the number of private SBA-defined small entities, OSHA relies on 2017 CBP data, which report total revenues by entity and employment size. For those industries with a revenue criterion, OSHA calculated the average revenue for each employment size class in the Census data and identified the largest size class where average revenue is less than the SBA-defined small entity threshold. For those industries with employment criterion, OSHA calculated the average employees per entity by employment size class and included all entities below the SBA threshold.

To estimate the subset of local government entities that are small, OSHA uses additional QCEW data that are specified geographically by county at the 4-digit NAICS level along with 2017 county-level population data from the U.S. Census Bureau's (December 6, 2018) American Community Survey. Using these data, OSHA estimates the percentage of local government entities, by county, that are small local governments (*i.e.,* in counties with a population less than 50,000), for each affected setting. OSHA then applies these proportions to the prior national estimates of all local government entities, by NAICS industry. The RFA's definition of small nonprofits is those not ''dominant in their field.'' As OSHA customarily does, it assumes all nonprofits are small based on this definition.[33]

[33] While the RFA definition suggests that some nonprofits might not be small entities, there is no set definition for the term ''dominant'' or delineation of what should be considered a nonprofit's ''field.'' A nonprofit that is the main entity of its type in a given city is still unlikely to be the dominant nonprofit of its type in its state or region and even less likely to be dominant if the ''field'' encompasses the whole U.S. Given these ambiguities, OSHA has opted to include all non-profits as small entities.

Table VI.B.4. Summary of Affected SBA-Defined Small Entities

NAICS	NAICS Description	Entities and Establishments		Employees	
		Affected Entities	Affected Estabs	All Employees	Covered Employees
	TOTAL	**540,108**	**616,019**	**11,760,494**	**7,037,434**
446110	Pharmacies and Drug Stores	4,726	5,113	45,060	11,265
561210	Facility Support Services	466	642	15,561	3,637
561311	Employment Placement Agencies	1,328	1,374	20,674	1,870
611110	Elementary and Secondary Schools	6,787	7,351	277,197	16,218
611210	Junior Colleges	154	204	13,172	343
611310	Colleges, Universities, and Professional Schools	546	887	375,428	36,181
611710	Educational Support Services	479	498	3,586	111
621111	Offices of Physicians (except Mental Health Specialists)	158,777	170,727	1,417,226	838,683
621112	Offices of Physicians, Mental Health Specialists	10,562	10,811	40,057	23,705
621210	Offices of Dentists	124,962	129,598	857,031	585,112
621310	Offices of Chiropractors	38,679	39,292	131,909	71,933
621320	Offices of Optometrists	19,524	21,361	113,558	32,954
621330	Offices of Mental Health Practitioners (except Physicians)	24,240	25,359	122,149	9,239
621340	Offices of Physical, Occupational and Speech Therapists and Audiologists	26,045	28,976	169,420	118,847
621391	Offices of Podiatrists	7,283	7,915	31,386	16,716
621399	Offices of All Other Miscellaneous Health Practitioners	19,332	20,285	75,759	40,349
621410	Family Planning Centers	1,452	2,184	18,856	9,579
621420	Outpatient Mental Health and Substance Abuse Centers	6,381	10,511	240,759	39,061
621491	HMO Medical Centers	19	1,054	44,077	22,391
621492	Kidney Dialysis Centers	384	929	17,813	9,049
621493	Freestanding Ambulatory Surgical and Emergency Centers	3,934	4,489	80,972	41,134
621498	All Other Outpatient Care Centers	6,416	12,359	340,686	173,068
621610	Home Health Care Services	23,122	25,758	795,193	475,455
621910	Ambulance Services	3,102	4,318	119,761	94,763
621991	Blood and Organ Banks	289	959	48,153	31,527
621999	All Other Miscellaneous Ambulatory Health Care Services	3,287	3,486	27,481	17,993
622110	General Medical and Surgical Hospitals	2,164	3,933	3,824,136	2,739,276
622210	Psychiatric and Substance Abuse Hospitals	192	242	56,886	25,481
622310	Specialty (except Psychiatric and Substance Abuse) Hospitals	182	324	114,198	75,728
623110	Nursing Care Facilities (Skilled Nursing Facilities)	8,623	10,370	840,210	619,981
623210	Residential Intellectual and Developmental Disability Facilities	6,729	27,482	443,851	313,858
623220	Residential Mental Health and Substance Abuse Facilities	4,064	7,165	179,297	48,412
623311	Continuing Care Retirement Communities	3,661	4,383	358,689	221,064
623312	Assisted Living Facilities for the Elderly	14,000	15,760	250,956	154,667
623990	Other Residential Care Facilities	3,145	4,849	108,741	25,952
711211	Sports Teams and Clubs	66	68	365	13
922160	Public Firefighter-EMTs	5,005	5,005	140,240	91,820

Source: OSHA analysis based on CBP (U.S. Census Bureau, March, 2020), QCEW (BLS, May 23, 2018), and BLS OES (BLS, March 29, 2019). Firefighter-EMT estimates based on (USFA, 2018).

Lastly, Table VI.B.5 presents estimates for very small entities (those with fewer than 20 employees) affected by the ETS. OSHA estimates that the ETS affects approximately 472,000 very small entities, employing approximately 2.2

million workers. Of those, approximately 1.2 million are estimated to be workers who are in scope and covered by the ETS.

Table VI.B.5. Summary of Affected Very Small Entities (<20 Employees) and Employees

NAICS	NAICS Description	Entities and Establishments		Employees	
		Affected Entities	Affected Estabs	All Employees	Covered Employees
	TOTAL	**471,735**	**477,203**	**2,153,465**	**1,238,122**
446110	Pharmacies and Drug Stores	4,255	4,324	28,338	7,084
561210	Facility Support Services	283	285	1,281	299
561311	Employment Placement Agencies	1,135	1,141	3,442	311
611110	Elementary and Secondary Schools	5,546	5,551	39,712	2,323
611210	Junior Colleges	109	109	561	15
611310	Colleges, Universities, and Professional Schools	398	398	1,806	174
611710	Educational Support Services	451	453	1,274	39
621111	Offices of Physicians (except Mental Health Specialists)	145,362	146,650	632,694	374,414
621112	Offices of Physicians, Mental Health Specialists	10,170	10,218	25,272	14,956
621210	Offices of Dentists	119,903	121,553	704,500	480,976
621310	Offices of Chiropractors	38,364	38,610	122,952	67,048
621320	Offices of Optometrists	18,608	19,242	88,744	25,753
621330	Offices of Mental Health Practitioners (except Physicians)	23,029	23,146	54,021	4,086
621340	Offices of Physical, Occupational and Speech Therapists and Audiologists	23,945	24,491	90,709	63,632
621391	Offices of Podiatrists	7,032	7,278	24,759	13,186
621399	Offices of All Other Miscellaneous Health Practitioners	18,345	18,445	41,056	21,867
621410	Family Planning Centers	1,225	1,257	6,093	3,095
621420	Outpatient Mental Health and Substance Abuse Centers	4,147	4,207	19,499	3,164
621491	HMO Medical Centers	6	6	3	1
621492	Kidney Dialysis Centers	254	263	1,602	814
621493	Freestanding Ambulatory Surgical and Emergency Centers	2,652	2,665	19,908	10,113
621498	All Other Outpatient Care Centers	3,977	4,066	22,079	11,216
621610	Home Health Care Services	14,871	14,904	73,849	44,155
621910	Ambulance Services	1,661	1,678	12,772	10,106
621991	Blood and Organ Banks	173	178	993	650
621999	All Other Miscellaneous Ambulatory Health Care Services	2,918	2,945	9,804	6,419
622110	General Medical and Surgical Hospitals	64	68	157	113
622210	Psychiatric and Substance Abuse Hospitals	41	41	169	76
622310	Specialty (except Psychiatric and Substance Abuse) Hospitals	23	23	54	36
623110	Nursing Care Facilities (Skilled Nursing Facilities)	2,200	2,231	8,779	6,478
623210	Residential Intellectual and Developmental Disability Facilities	3,664	3,729	20,269	14,333
623220	Residential Mental Health and Substance Abuse Facilities	2,044	2,076	12,372	3,341
623311	Continuing Care Retirement Communities	1,369	1,374	8,302	5,117
623312	Assisted Living Facilities for the Elderly	10,598	10,667	53,536	32,995
623990	Other Residential Care Facilities	1,945	1,963	11,260	2,687
711211	Sports Teams and Clubs	50	50	82	3
922160	Public Firefighter-EMTs	917	917	10,762	7,046

Source: OSHA analysis based on CBP (U.S. Census Bureau, March, 2020), QCEW (BLS, May 23, 2018), and BLS OES (BLS, March 29, 2019). Firefighter-EMT estimates based on (USFA, 2018).

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e. Summary of Affected Firms, Establishments, and Employees by NAICS Industry and Setting

Table VI.B.6 presents a summary of the number of affected entities, establishments, and employees by NAICS industry and setting. The cost estimates presented in this analysis rely on assumptions that are specific to the type of services provided in various healthcare settings in each affected NAICS industry. Table VI.B.6 provides the mapping between the affected NAICS industries and their typical setting based on the type of services provided.

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Table VI.B.6: Summary of Affected Entities, Establishments, and Employees by NAICS Industry and Setting

Setting	NAICS	NAICS Description	Percentage of Establishments Affected	Covered Employees at Affected Establishments	Affected Entities	Affected Establishments	Total Employees at Affected Establishments	Covered Employees at Affected Establishments
All Settings		**All Affected NAICS**	**87%**	**57%**	**562,510**	**748,816**	**18,134,470**	**10,338,353**
General Hospitals	622110	General Medical and Surgical Hospitals	100%	72%	2,867	5,281	4,912,663	3,519,001
Other Hospitals	622210	Psychiatric and Substance Abuse Hospitals	100%	45%	1,275	1,443	198,868	89,079
	622310	Specialty (except Psychiatric and Substance Abuse) Hospitals	100%	66%	424	920	238,111	157,898
Nursing Homes	623110	Nursing Care Facilities (Skilled Nursing Facilities)	100%	74%	9,333	17,137	1,511,492	1,115,312
	623311	Continuing Care Retirement Communities	100%	62%	3,899	5,570	444,244	273,792
	623312	Assisted Living Facilities for the Elderly	100%	62%	14,597	20,052	446,530	275,201
Long Term Care (excluding nursing homes)	623210	Residential Intellectual and Developmental Disability Facilities	100%	71%	7,597	35,213	581,968	411,523
	623220	Residential Mental Health and Substance Abuse Facilities	100%	27%	4,305	8,081	220,146	59,442
	623990	Other Residential Care Facilities	100%	24%	3,401	5,362	123,057	29,369
Other Patient Care	621111	Offices of Physicians (except Mental Health Specialists)	100%	59%	161,977	212,620	2,409,333	1,425,789
	621112	Offices of Physicians, Mental Health Specialists	100%	59%	10,568	10,817	40,200	23,789
	621210	Offices of Dentists	100%	68%	125,335	136,468	930,308	635,139
	621310	Offices of Chiropractors	100%	55%	38,696	39,340	133,053	72,557
	621320	Offices of Optometrists	100%	29%	19,627	22,386	122,525	35,556
	621330	Offices of Mental Health Practitioners (except Physicians)	100%	8%	24,251	25,370	122,803	9,288
	621340	Offices of Physical, Occupational and Speech Therapists and Audiologists	100%	70%	26,746	40,431	338,609	237,533
	621391	Offices of Podiatrists	100%	53%	7,304	8,092	32,565	17,344
	621399	Offices of All Other Miscellaneous Health Practitioners	100%	53%	19,487	22,696	85,405	45,487
	621410	Family Planning Centers	100%	51%	1,479	2,349	22,562	11,461
	621420	Outpatient Mental Health and Substance Abuse Centers	100%	16%	6,664	11,967	277,497	45,022
	621491	HMO Medical Centers	100%	51%	27	1,723	138,724	70,472

Table VI.B.6: Summary of Affected Entities, Establishments, and Employees by NAICS Industry and Setting

Setting	NAICS	NAICS Description	Percentage of Establishments Affected	Covered Employees at Affected Establishments	Affected Entities	Affected Establishments	Total Employees at Affected Establishments	Covered Employees at Affected Establishments
	621492	Kidney Dialysis Centers	100%	51%	432	7,904	125,182	63,592
	621498	All Other Outpatient Care Centers	100%	51%	6,775	14,825	399,728	203,061
	621991	Blood and Organ Banks	100%	65%	339	1,587	74,034	48,473
Home Health Care and Temp Labor	561311	Employment Placement Agencies	25%	9%	1,415	1,588	44,577	4,032
	621610	Home Health Care Services	100%	60%	23,855	33,581	1,396,004	834,687
First Aid and Emergency Care	446110	Pharmacies and Drug Stores	25%	25%	4,810	12,007	168,358	42,090
	621493	Freestanding Ambulatory Surgical and Emergency Centers	100%	51%	4,401	7,660	170,220	86,472
	621910	Ambulance Services	100%	79%	3,230	5,672	183,455	145,161
	621999	All Other Miscellaneous Ambulatory Health Care Services	100%	65%	3,587	4,387	63,328	41,463
	922160	Public Firefighter-EMTs	100%	65%	5,648	5,648	253,407	165,915
School/Industry Clinics	611110	Elementary and Secondary Schools	25%	6%	14,909	15,596	1,140,102	66,703
	611210	Junior Colleges	25%	3%	403	494	104,019	2,709
	611310	Colleges, Universities, and Professional Schools	25%	10%	1,734	2,238	608,697	58,662
	611710	Educational Support Services	6%	3%	494	541	5,705	176
	711211	Sports Teams and Clubs	9%	3%	79	85	2,779	95
Correctional Facility Clinics	561210	Facility Support Services	25%	23%	536	1,680	64,213	15,007

Source: OSHA analysis based on CBP (U.S. Census Bureau, March, 2020), QCEW (BLS, May 23, 2018), and BLS OES (BLS, March 29, 2019). Firefighter-EMT estimates based on (USFA, 2018).

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III. Cost Analysis for the COVID–19 ETS

In this section, OSHA provides estimates of the per-establishment costs for the requirements of the ETS. Section 6(c)(3) of the OSH Act states that the Secretary will publish a final standard ''no later than six months after publication of the emergency standard.'' Costs are therefore estimated over a six-month time period. However, during that period, to the extent OSHA finds that a grave danger from the virus no longer exists for the covered workforce (or some portion thereof), or new information indicates a change in measures necessary to address the grave danger, OSHA will update the ETS, as appropriate.

In developing the cost estimates, OSHA estimates that some establishments are already following at least some of the ETS's requirements. The extent to which firms are already meeting the requirements of this ETS is estimated based, in part, on data presented in ERG (August 9, 2013), the infectious disease expert panel report prepared for OSHA. Because the expert panel was conducted pre-pandemic, OSHA determined that some compliance rates were likely too low given the heightened awareness of infection control practices, the amount of time since the pandemic started, and, especially, the outbreaks in healthcare settings and recognition of the importance of infection control measures for protecting workers and patients. In those limited circumstances, OSHA constrained compliance to be no less than 75 percent for large and SBA-defined small entities and 50 percent for very small entities. Where establishments are already meeting ETS requirements, those costs are not attributable to the ETS. Throughout this analysis, where OSHA provides no other estimate, the agency assumes baseline compliance rates of 50 percent for very small entities and 75 percent for all other entities.[34] [35] OSHA recognizes that the estimated compliance rates are somewhat imprecise, but they are intended to reflect the relatively widespread adoption by employers of some of the practices required by the ETS in response to state OSHA standards, state and local government ordinances, and CDC, OSHA or other guidance. Exceptions to the 50 percent/75 percent compliance rates have been made for a few requirements that are highly specific to OSHA's ETS (like recordkeeping requirements, rule familiarization, and paid medical removal). While it is likely that levels of current compliance vary among the elements of this ETS, OSHA lacks data to make such specific determinations for each provision in the limited time available under these emergency circumstances. OSHA examined the impact of lower levels of baseline compliance on costs in a sensitivity analysis (see section VI.B.III.q).

Despite this estimated baseline compliance, employer compliance is not so widespread, nor does it incorporate enough of the practices required by this ETS, as to render this ETS unnecessary. As discussed in Section V. Need for Specific Provisions of the ETS, OSHA emphasizes that each of the infection control practices required by the ETS provides some protection from COVID–19 by itself, but the controls work best when used together, layering their protective impact to boost overall effectiveness. The ''Swiss Cheese Model of Accident Causation'' (Reason, April 12, 1990) argues that each control has certain weaknesses or ''holes.'' The ''holes'' differ between different controls. By stacking several controls with different weaknesses on top of one another, the ''holes'' are blocked by the strengths of the other controls. In other words, if the controls are layered, then any unexpected failure of a single control is protected against by the strengths of other controls. This model also demonstrates the necessity for high levels of compliance with all requirements of this ETS, since failure to follow the requirements may leave the ''holes'' exposed and lead to an increased risk of disease transmission in the workplace.

It should be noted that this analysis deals strictly with averages and estimates. For any given establishment, actual costs may be higher or lower than the point estimate shown here, but using an average allows OSHA to evaluate feasibility by industry as required by the OSH Act. In addition, OSHA has limited data on many of the parameters needed in this analysis and has estimated them based on the available data, estimates for similar requirements for other OSHA standards, consultation with experts in other government agencies, and internal agency judgment where necessary. OSHA's estimates are therefore based on the best evidence available to the agency at the time this analysis of costs and feasibility was performed.

Many ETS requirements result in labor burdens that are monetized using the labor rates described in Section VI.B.III.a OSHA differentiates per-establishment burden by establishment size for large, SBA-defined small, and very small entities with fewer than 20 employees (which are a subset of SBA-defined small entities). In doing so, OSHA accounts for the fact that, in most industries, a substantial portion of the SBA-defined small entity population is also very small. In most cases, OSHA assigned different unit cost burdens to entities with fewer than 20 employees and to other SBA-defined small entities (with 20 or more employees). Both of these groups are combined when calculating average costs for all SBA-defined small entities.

OSHA estimates that approximately 563,000 entities have employees who provide healthcare and healthcare support services and would be subject to the requirements of the ETS, including approximately 749,000 establishments, and 10.3 million employees (see Table VI.B.3).

Section VI.B.III.a describes the wage rates used to estimate the labor costs incurred by affected entities. Sections VI.B.III.b through VI.B.III.o present the estimated costs for each of the requirements of the ETS. Finally, section VI.B.III.p summarizes the total per-establishment costs and total costs of the ETS.

a. Wage Rates

OSHA estimated occupation-specific wage rates from BLS 2018 Occupational Employment Statistics data (BLS, March 29, 2019). For each affected NAICS industry, OSHA used the BLS (March 29, 2019) data to estimate the average wages across the workers in the affected

[34] The term ''baseline compliance'' is used to describe protective workplace measures that would be conducted in the absence of this ETS, the issuance of which establishes the meaning of and the parameters for ''compliance.''

[35] Note that the lower assumed compliance rate for very small entities sometimes results in the presentation of higher costs for very small entities than for larger entities. This result seems counter-intuitive given that very small entities have fewer employees than larger ones, and many of the costs in this analysis are based on an average number of employees per entity. The very small entities do, in fact, have lower costs when baseline compliance rates are not taken into account. However, because OSHA estimates that these employers are starting from a lower level of current compliance, the tables, which incorporate baseline compliance rates in their estimates, sometimes show higher (or only negligibly lower) per-establishment costs for very small entities. Another point on the tables which can seem counter-intuitive is that average costs per establishment for the category ''all,'' which includes large and very large entities (along with small and very small entities) can be smaller (or not much larger) than for, say, SBA-defined small entities. This is due, again, to the differing compliance rates which can swamp, in the average, the higher costs incurred by large and very large entities. Furthermore, because there are often fewer large entities relative to the number of SBA-defined small and very small entities in an industry, the average costs for the smaller entities tend to result in lower average per entity costs over ''all'' establishments than one might expect.

occupations listed in Appendix VI.B.A. OSHA estimated loaded wages using a fringe benefit rate of 44.4 percent, the average rate for all civilian workers in the healthcare and social assistance industries in the BLS (December 14, 2018) Employer Costs for Employee Compensation data, as well as OSHA's standard estimate for overhead of 17 percent times the base wage. The loaded wage rate averages by NAICS industry and setting are presented in Appendix VI.B.B.

In addition to the wages of the healthcare providers and employees in other covered occupations in the affected NAICS industries, the cost analysis also uses an estimated wage rate for occupational health specialists, training development specialists, and a blended wage rate that reflects the mix of doctors and nurse practitioners.

Table VI.B.7: Average Loaded Wage Used in Analysis

Occupation Description	Occupation Code	Loaded Wage Rate
Occupational Health Specialists	19-5010	$56.33
Training and Development Specialists	13-1150	$52.73
Physicians Nurse Practitioners	29-1210 29-1170	$154.71
Sources and Notes: OSHA, based on BLS (March 29, 2019) and BLS (December 14, 2018)		

b. Rule Familiarization and COVID–19 Plan

ETS Requirements—Under § 1910.502(c).

The employer must develop, implement, and update a COVID–19 plan that addresses the hazards identified in the hazard assessment required by this paragraph. The COVID–19 plan must include policies and procedures that minimize the risk of transmission of COVID–19 for each employee. This provision also requires employers to coordinate and communicate with other employers at sites with multiple employers in order to ensure that each employee is protected. Employers must have policies and procedures to ensure that employees who enter into private residences or other physical locations controlled by those not covered by the OSH Act are protected. Non-managerial employees must be given the opportunity to provide input into the hazard assessment and the COVID–19 plan. The plan must be written if the employer has more than 10 employees. In order for an employer to be exempt from providing certain controls for fully-vaccinated employees in a well-defined area of a workplace where there is no reasonable expectation that any person with suspected or confirmed COVID–19 will be present, the COVID–19 plan must include policies and procedures to determine employees' vaccination status.

This section of the feasibility analysis presents the estimated costs for developing the plan, while the costs of implementing the plan are presented in the subsequent sections (VI.B.III.c through VI.B.III.o) of this report.[36]

Cost Analysis Assumptions

As part of the Infectious Diseases Small Business Advisory Review (SBAR) Panel, OSHA estimated that the development of a full Worker Infection Control Plan (WICP) that included written standard operating procedures for all infectious disease transmission routes would take between 20 and 40 hours to develop, depending on the setting (OSHA, 2014). For this ETS, which applies specifically to COVID–19, OSHA estimates that the written plan, including the hazard assessment, would take 25 percent of the time needed to develop a full WICP. The exception is hospitals, which are assumed to need 40 hours to develop their plans. OSHA has not included additional time for employee participation and assumes that the time estimated to develop the COVID–19 plan is extensive enough to account for this activity. In addition to the costs for developing the COVID–19 plan, OSHA assumes that establishments with fewer than 20 employees will incur a labor burden of 1 hour for rule familiarization and larger establishments will incur a labor burden of 1.5 hours for rule familiarization.

OSHA also assumes an additional recurring daily labor burden to monitor each workplace to ensure the ongoing effectiveness of the COVID–19 plan. OSHA estimates this will take 10 minutes per day of labor per large establishment on average, with 5 minutes per day for SBA-defined small and very small entities. This burden is incurred daily, seven days a week,[37] for six months. OSHA notes that surveillance on the efficacy of an infection control plan is not a wholly new activity for healthcare settings (CDC, March 15, 2017). The Core Infection Prevention and Control Practices for Safe Healthcare Delivery in All Settings from the Healthcare Infection Control Practices Advisory Committee (the federal advisory committee appointed to provide advice and guidance to the Department of Health and Human Services and CDC regarding the practice of infection control in healthcare settings) includes performance monitoring as one of its core elements. Specifically, healthcare providers should ''monitor adherence to infection control practices'' and ''monitor the incidence of infections . . . to detect transmission of infectious agents in the facility'' (CDC, March 15, 2017). OSHA estimates that there will be some additional burden due to the requirements of this ETS, but that it would be a small amount of additional time added on to what is a regular activity that would be undertaken regardless of the ETS.

As part of the planning and on-going monitoring, some employers will need to communicate with other employers whose employees are at the site (*e.g.,* contractors, vendors) about the specifics of their plan and additional information as necessary on an on-going basis. OSHA estimates that hospitals, nursing homes, and other long-term care facilities will spend 30 minutes one time after the promulgation of this ETS

[36] Estimates were based on the Infectious Diseases Panel Report (ERG, August 9, 2013).

[37] To the extent that businesses are open fewer than seven days a week or do not have employees on the premises seven days a week, there will be some tendency toward overestimating the cost of complying with this provision.

to communicate with contractors and others regarding expectations for their activities under the requirements of this ETS. Additionally, OSHA estimates that hospitals, nursing homes, and other long-term care facilities will spend, on average, 15 minutes every week engaging in on-going communication with contractors under this provision. Other settings are estimated to only rarely use contractors, and so their time burden is set to zero for both initial and on-going communication.

The total cost for this communication for hospitals, long-term care facilities, and nursing homes is a product of:

- One-time labor burden (half an hour for applicable settings) plus the on-going labor burden (0.25 hours weekly for 26 weeks)
- Wage rate (NAICS-specific wages)

Cost per Establishment, Rule Familiarization and COVID–19 Plan

Table VI.B.8 presents a summary of the per-establishment rule familiarization and COVID–19 plan development, daily monitoring, and host employer communication time burdens and costs for all establishments. The baseline compliance estimates in Table VI.B.8 are based on the estimated compliance rates in ERG (August 9, 2013), the infectious disease expert panel report prepared for OSHA, and adjusted so that baseline compliance is no less than 50 percent for establishments with fewer than 20 employees and no less than 75 percent for larger establishments. The expert panel survey was done during non-pandemic conditions, so OSHA assumes compliance may be higher in health care settings today. See the introduction to this section for more discussion. OSHA assumes zero current compliance for rule familiarization. Table VI.B.9 presents the same costs as Table VI.B.8 by establishment size.

Table VI.B.8: Rule Familiarization and COVID-19 Plan, Average Cost per Establishment

Setting	Rule Familiarization (hours)[1]	Plan Development (hours)	Monitor Plan Effectiveness (hours)	Communication (hours)	Wage rate	Baseline Compliance	Average cost per establishment
General Hospitals	1.49	40	55.0	6.5	$154.71	94%	$942
Other Hospitals	1.49	40	54.7	6.5	$154.71	94%	$939
Nursing Homes	1.33	10	38.6	6.5	$154.71	90%	$852
Long Term Care (excluding nursing homes)	1.42	10	42.1	6.5	$154.71	90%	$907
Other Patient Care	1.12	5	21.5		$154.71	59%	$1,686
Home Health Care and Temp Labor	1.27	10	27.5		$154.71	67%	$1,933
First Aid and Emergency Care	1.32	10	29.3		$154.71	69%	$1,902
School/Industry Clinics	1.33	5	29.5		$154.71	69%	$1,639
Correctional Facility Clinics	1.42	5	33.1		$154.71	73%	$1,618

Sources: OSHA based on (BLS, March 29, 2019) and (ERG, August 9, 2013).
[1]No baseline compliance is assumed for rule familiarization.

Table VI.B.9: Rule Familiarization and COVID-19 Plan, Average Total Cost per Establishment by Size

Setting	Cost per Establishment		
	All	*SBA-Defined Small*	*Very Small*
All Industry Average	**$1,601**	**$1,620**	**$1,688**
General Hospitals	$942	$942	$727
Other Hospitals	$939	$921	$727
Nursing Homes	$852	$811	$645
Long Term Care (excluding nursing homes)	$907	$895	$645
Other Patient Care	$1,686	$1,700	$1,715
Home Health Care and Temp Labor	$1,933	$1,975	$2,101
First Aid and Emergency Care	$1,902	$1,965	$2,101
School/Industry Clinics	$1,639	$1,683	$1,715
Correctional Facility Clinics	$1,618	$1,650	$1,715

Sources and notes: OSHA analysis based on BLS OES data (BLS, March 29, 2019), QCEW data (BLS, May 23, 2018), ECEC data (BLS, December 14, 2018), and U.S. Census Statistics of U.S. Businesses (U.S. Census Bureau, March, 2020).

c. Patient Screening and Management

ETS Requirements—Under § 1910.502(d)

In settings where direct patient care is provided, employers must limit and monitor points of entry, screen and triage all non-employees entering the setting, and implement other applicable patient management strategies.

Cost Analysis Assumptions

As noted in *Summary and Explanation* (Section VIII of the preamble), screening is a standard part of infection control practices. OSHA expects that healthcare settings will ask about COVID–19 infections and perform a quick check of existing symptoms or assessment for newly emerged symptoms that might suggest the presence of a COVID–19 infection. This screening does not need to be a highly involved procedure and can be completed through verbal questions and answers. OSHA estimates the six-month incremental time burden per facility for screening and triaging non-employees for COVID–19 illness and symptoms of COVID–19 (for all establishments) as follows:

- *General Hospitals:* An incremental burden of 385.1 hours is estimated based on a burden of 1 minute per patient each day for an average of 1 patient per employee [38] and a baseline compliance rate of 81 percent. [385.1 = (1 − 0.81) * (666.3/60) * (365/2); where 81% is the compliance rate, 666.3 is the number of patients (estimated as being equal to the average number of employees per establishment),[39] 60 is the number of minutes in an hour (which allows OSHA to calculate the burden in hours per day), and 365/2 is the number of days of burden]
- *Other Hospitals:* An incremental burden of 60.4 hours is estimated based on a burden of 1 minute per patient each day for an average of 1 patient per employee [38] and a baseline compliance rate of 81 percent. [60.4 = (1 − 0.81) * (104.5/60) * (365/2); where 81% is the compliance rate, 104.5 is the number of patients (equal to the average number of employees per establishment), 60 is the number of minutes in an hour (which allows OSHA to calculate the burden in hours per day), and 365/2 is the number of days of burden]
- *Nursing Homes:* An incremental burden of 20.4 hours is estimated based on a burden of 1 minute per patient each day for an average of 32 patients per facility [40] and a baseline compliance rate of 79 percent. [20.4 = (1 − 0.79) * (32/60) * (365/2); where 79% is the compliance rate, 32 is the number of patients, 60 is the number of minutes in an hour (which allows OSHA to calculate the burden in hours per day), and 365/2 is the number of days of burden]
- *Long Term Care (excluding nursing homes):* An incremental burden of 14.7 hours is estimated based on a burden of 1 minute per patient each day for an average of 23 patients per facility [40] and a baseline compliance rate of 79 percent. [14.7 = (1 − 0.79) * (23/60) * (365/2); where 79 percent is the compliance rate, 23 is the number of patients, 60 is the number of minutes in an hour (which allows OSHA to calculate the burden in hours per day), and 365/2 is the number of days of burden]
- *Other Patient Care:* An incremental burden of 39.9 hours is estimated as 30 minutes per day [41] and a baseline compliance rate of 56 percent [39.9 = (1 − 0.56) * (30/60) * (365/2); where 56 percent is the compliance rate, 30 is the minutes of burden per day, 60 is the number of minutes in an hour (which allows OSHA to calculate the burden in hours per day), and 365/2 is the number of days of burden]
- *Correctional Facility Clinics:* An incremental burden of 18.25 hours is estimated as 30 minutes per day and a baseline compliance rate of 80 percent [18.25 = (1 − 0.80) * (30/60) * (365/2); where 80 percent is the compliance rate, 30 is the minutes of burden per day, 60 is the number of minutes in an hour (which allows OSHA to calculate the burden in hours per day), and 365/2 is the number of days of burden]

The baseline compliance estimates are based on ERG (August 9, 2013), the infectious disease expert panel report prepared for OSHA. As noted above, the rate of compliance with the patient screening and management requirements was estimated to be relatively high prior to the COVID pandemic. It is possible that these compliance rates are even higher now, given the emphasis on screening for symptoms over the course of the pandemic. However, while OSHA has estimated that those settings that were judged to have very low compliance pre-COVID are likely complying with screening requirements more thoroughly now, the agency has not adjusted those settings with higher rates of patient screening pre-COVID since the agency lacks data to make these adjustments. The estimated time spent to screen patients is based on the agency's evaluation of the time necessary to ask standard COVID screening questions.

Cost per Establishment, Patient Screening and Management

Table VI.B.10 shows the average cost per establishment for patient screening and management by setting and size and incorporates the compliance rates as detailed above.

[38] According to AHA Data Hub 2015–2019 data, there were 785,235,256 outpatient visits, 19,418,138 outpatient surgeries, and 34,078,100 admissions in 2019 (AHA, 2021). These data came from 5,141 community hospitals, which results in an average of 447 visits per day for each hospital. Thus, since OSHA estimates there are 492 healthcare workers per hospital across all types of hospitals, that is approximately 1 patient per employee per day.

[39] The estimated average number of workers per hospital for General Hospitals is greater than the average number across all types of hospitals derived from the AHA data cited above.

[40] The number of patients per facility for Nursing Homes and other Long Term Care is estimated using a 2019 National Center for Health Statistics study on long term care facilities and their patients (Harris-Kojetin et al., February, 2019) and OSHA's estimated number of facilities (estimated using BLS (May 23, 2018), BLS (March 29, 2019), and U.S. Census Bureau (March, 2020)).

[41] The number of patients at hospitals and ambulatory care was estimated using AHA Data Hub 2015–2019 data (AHA, 2021).

Table VI.B.10: Patient Screening and Management, Average Cost per Establishment

Setting	Cost per Establishment								
	All			*SBA-Defined Small*			*Very Small*		
	Labor Burden	*Wage Rate*	*Avg Cost per Estab*	*Labor Burden*	*Wage Rate*	*Avg Cost per Estab*	*Labor Burden*	*Wage Rate*	*Avg Cost per Estab*
All Industry Average			**$1,663**			**$2,784**			**$1,124**
General Hospitals	385.1	$53.76	$20,702	409.6	$53.76	$22,019	1.0	$53.76	$52
Other Hospitals	60.4	$49.56	$2,993	116.2	$49.99	$5,811	1.0	$48.30	$49
Nursing Homes	20.4	$28.58	$584	30.8	$28.41	$874	1.6	$25.09	$41
Long Term Care (excluding nursing homes)	14.7	$22.02	$324	16.6	$22.07	$366	3.7	$22.62	$85
Other Patient Care	28.9	$67.34	$1,947	64.7	$67.19	$4,346	19.6	$65.07	$1,275
Correctional Facility Clinics	18.3	$21.65	$395	19.1	$21.65	$413	2.1	$21.65	$47
Sources and notes: OSHA analysis based on BLS OES data (BLS, March 29, 2019), QCEW data (BLS, May 23, 2018), ECEC data (BLS, December 14, 2018), and U.S. Census Statistics of U.S. Businesses (U.S. Census Bureau, March, 2020).									

d. Standard and Transmission-Based Precautions

ETS Requirements—Under § 1910.502(e)

Employers must develop and implement policies and procedures that adhere to standard and transmission-based precautions.

Cost Analysis Assumptions

OSHA estimates that any time spent on the development of policies and procedures that are in accordance with standard and transmission-based precautions is included in the cost of developing the COVID–19 plan discussed earlier. OSHA does not expect that employers will need to deviate significantly from existing practice to account for these precautions and practices, and any costs associated with following standard and transmission-based precautions are covered under the cost estimates for the other sections of this ETS (PPE, hygiene and cleaning, etc.). Therefore, OSHA did not estimate the costs associated with compliance with this provision separately.

e. Personal Protective Equipment

ETS Requirements—Under § 1910.502(f)

Employers are required to provide facemasks and ensure those facemasks are worn by each employee over the nose and mouth when indoors and when occupying a vehicle with other people for work purposes. Employers must ensure that each employee changes their facemask at least once per day, whenever the facemask is soiled or damaged, and more frequently as necessary (*e.g.,* patient care reasons). Employers must provide respirators and other PPE for workers exposed to people with suspected or confirmed COVID–19, for employees involved in aerosol-generating healthcare procedures on people with suspected or confirmed COVID–19, and as necessary to comply with standard and transmission-based precautions under paragraph (e). Required PPE includes gloves, an isolation gown or protective clothing, and eye protection.

Cost Analysis Assumptions

The total cost to establishments to provide PPE will vary based on the type of care provided in a facility and the number of encounters workers will have with patients during a given period. The cost of implementing this PPE provision will also vary by the number of employees and the number of patients that the facility sees, as well as by whether employees are working with people who are suspected or confirmed to have COVID–19. A small practice with few employees and low patient volume may have very low costs for PPE while a large hospital with hundreds of workers and patients on any given day will likely have much higher costs for PPE.

For the purposes of estimating costs for this provision, OSHA is assuming that 25 percent of covered employees in hospitals and nursing homes (which corresponds roughly with the percent of covered workers estimated to work in areas of a hospital where patients with suspected or confirmed COVID–19 infections would be seen) and three percent of in-scope employees in other covered settings (identified in section VI.B.II.b as being in the scope) will be provided with, and use, disposable N95 respirators. These estimates are based on OSHA's best professional judgment. All other workers in covered settings are estimated to use two disposable facemasks (surgical masks) per shift.

The general approach for estimating the total cost of PPE used by employees who have exposure to persons with suspected or confirmed COVID–19 involves the following steps:

1. Estimate the percentage of healthcare providers and employees providing healthcare or healthcare support services in each setting that will use each given type of PPE;

2. For each given type of PPE, estimate how many pieces of equipment an employee will use over six months (*e.g.,* estimate that hospital workers need 1 N95 respirator per shift, work 3 shifts per week on average, so they will need 78 N95 respirators over 6 months);

3. Estimate the unit cost for each PPE item; and

4. Calculate the product of (a) the number of covered employees, (b) the percent that will use a given type of PPE (step 1), (c) the number of items needed per affected worker over six months (step 2), and (d) the unit cost (step 3).

Table VI.B.11 presents the estimated percentages of employees who will need the required PPE by setting.

Table VI.B.11: Percent of Workers that Use Each Type of PPE

Setting	Percent of Workers that use each type of PPE					
	Gloves	Surgical Masks	N95 Respirators	Disposable Gowns	Disposable Face Shields	Protective Eyewear
General Hospitals and Nursing Homes	50%	75%	25%	50%	25%	25%
Other Settings	10%	97%	3%	10%	3%	7%
Source: OSHA Notes: All workers are assumed to wear an N95 respirator or a surgical mask. Estimated percentages are based on best professional judgment.						

Table VI.B.12 presents estimates for the units of PPE needed per employee shift for the employees using a given type of PPE. OSHA assumes that one N95 respirator and either one disposable face shield [42] or protective eyewear will be used per shift. The estimated number of gowns and gloves needed per shift are based on estimates from Carias et al., (April 10, 2015) and Swaminathan et al., (October, 2007).

Table VI.B.12: PPE Pieces Used Per Employee Shift

Setting	PPE Pieces Used Per Shift					
	Gloves (pair)	Surgical Masks	N95 Respirators	Disposable Gowns	Disposable Face Shields	Protective Eyewear
General Hospital and Nursing Homes	5.2	2	1	4.4	1	1
Other Settings	5.2	2	1	1.1	1	1
Source: OSHA, based on Carias et al. (April 10, 2015) and Swaminathan et al. (October, 2007)						

For general hospital, nursing homes, and long-term care facilities, OSHA estimates that employees work three twelve-hour shifts per week, or 78 shifts over six months. For other settings, OSHA estimates that employees work five eight-hour shifts per week, or 130 shifts over six months. Table VI.B.13 presents the total units of PPE per establishment that would need to be used over a six-month period, by setting and worker type. These estimates combine the numbers of covered workers by setting with the percentages presented in Table VI.B.11, the pieces of equipment needed from Table VI.B.12, and the number of shifts per worker that occur over 6 months, and were adjusted for baseline compliance (80 percent for general hospitals and nursing home respirator costs, 90 percent for all other PPE in general hospitals and nursing homes, and 72 percent for other settings).

Table VI.B.13: Additional Units of PPE Per Establishment Used Over 6 Months

Setting	Units of PPE Used Per Establishment Over Six Months					
	Gloves	Surgical Masks	N95 Respirators	Disposable Gowns	Disposable Face Shields	Protective Eyewear
General Hospitals	13,513	7,796	1,299	11,434	1,299	1,299
Other Hospitals	1,187	4,428	68	251	68	160
Nursing Homes	789	455	76	668	76	76
Long Term Care (excluding nursing homes)	117	436	7	25	7	16
Other Patient Care	100	372	6	21	6	13
Home Health Care and Temp Labor	451	1,684	26	95	26	61
First Aid and Emergency Care	257	960	15	54	15	35
School/Industry Clinics	128	478	7	27	7	17
Correctional Facility Clinics	169	631	10	36	10	23
Sources: OSHA based on BLS (May 23, 2018), BLS (March 29, 2019), and U.S. Census Bureau (March, 2020). See Table VI.B.11 and Table VI.B.12 for additional sources.						

[42] Employers may provide reusable face shields which may be less costly on a per-use basis but require cleaning and storage which are additional costs. As a simplifying assumption, OSHA has assumed employers will provide disposable face shields which may represent a source of overestimation of compliance costs.

Table VI.B.14 presents the estimated PPE unit costs. Note that these unit costs reflect typical costs when there is not a PPE shortage.

Table VI.B.14: PPE Unit Costs

Equipment Type	Unit Cost[1] (2020$)	Source
Disposable gloves (pair)	$0.26	Uline (2020b)
Surgical masks	$0.14	Uline (2020c)
N95 respirators	$1.45	Uline (2020a)
Disposable gowns	$3.12	Grainger (2020b)
Disposable face shield	$2.82	Grainger (2020a)
Protective eyewear (goggles)	$3.90	Safety Supply America (2020)
[1]Unit costs are typical costs when there is not a shortage.		

Cost per Establishment, Personal Protective Equipment

The results from Table VI.B.14 and Table VI.B.13 are combined to estimate the per-establishment compliance costs of additional PPE presented in Table VI.B.15.

Table VI.B.15: Total Cost of Additional PPE Used Over 6 Months, Average per Establishment

Setting	PPE Used Per Establishment Over Six Months						
	Gloves	Surgical Masks	N95 Respirators	Disposable Gowns	Disposable Face Shields	Protective Eyewear	All PPE
General Hospitals	$3,513	$1,091	$1,884	$35,675	$3,664	$5,067	$50,895
Other Hospitals	$309	$620	$99	$783	$193	$623	$2,627
Nursing Homes	$205	$64	$110	$2,084	$214	$296	$2,973
Long Term Care (excluding nursing homes)	$30	$61	$10	$77	$19	$61	$259
Other Patient Care	$26	$52	$8	$66	$16	$52	$221
Home Health Care and Temp Labor	$117	$236	$38	$298	$73	$237	$999
First Aid and Emergency Care	$67	$134	$22	$170	$42	$135	$570
School/Industry Clinics	$33	$67	$11	$85	$21	$67	$284
Correctional Facility Clinics	$44	$88	$14	$112	$28	$89	$374
Sources and Notes: Estimated by combining estimates presented in Table VI.B.14 and Table VI.B.13.							

Cost Analysis Assumptions, Respiratory Protection Program

Under this section of the ETS, where employers are required to provide respirators, they must be provided and used in accordance with OSHA's Respiratory Protection standard (29 CFR 1910.134). Note that costs related to optional respirator use under the mini respiratory protection program (29 CFR 1910.504) are discussed in sections VI.B.IV and VI.B.V below but are included in the total average costs presented below in Table VI.B.20 below.

OSHA estimates that 15 percent of nursing home employers and 50 percent of employers in NAICS 621111 Offices of Physicians who do not currently have a respirator program would either be required by the ETS to implement a respiratory protection program or would voluntarily determine that their employees need additional respiratory protection.[43] Of those establishments, OSHA estimates that, at most, 25 percent would, as a result of the requirements in this ETS, need to establish a full program under § 1910.134 and the remainder would be able to take advantage of the mini respiratory protection program under § 1910.504 (see section VI.B.IV.b Scope of the Mini Respiratory Protection section of the ETS below for additional detail). In establishments that already have a respirator program, OSHA estimates that the ETS will cause more employees to be wearing respirators and their employers will incur the additional costs related to medical evaluation, fit testing, and training for those employees.

In this section, OSHA is evaluating the costs for program development, medical evaluation, fit testing, and training related to respiratory protection. As stated above, OSHA is estimating costs assuming that all affected employees will use disposable N95 respirators only.

[43] While OSHA has no hard data on how many establishments have or will need to develop a respiratory protection program, the agency has been assisting numerous nursing homes to establish programs over the course of the pandemic. OSHA expects that some additional nursing homes and long term care facilities will still need to establish a program after the promulgation of this ETS but that most will have done so already. While most offices of physicians would not have needed a respiratory protection program prior to the pandemic, OSHA's estimate for this element reflects an assumption that healthcare providers may decide to be cautious given the close proximity to others that is required in order to provide healthcare services.

Workers who need respiratory protection (*i.e.,* those assumed to be using N95 respirators) will need to have a medical evaluation, fit testing, and training. These are one-time costs per affected worker. That is, total costs are simply calculated as the number of affected workers multiplied by the one-time per worker cost.

The estimated average numbers of workers per establishment affected by respiratory protection requirements under the ETS are presented below in Table VI.B.16.

Table VI.B.16: Additional Workers Per Average Establishment with Respiratory Protection

Setting	Affected Workers Per Establishment
General Hospitals	167
Other Hospitals	3
Nursing Homes	10
Long Term Care (excluding nursing homes)	0.3
Other Patient Care	0.2
Home Health Care and Temp Labor	1
First Aid and Emergency Care	0.4
School/Industry Clinics	0.2
Correctional Facility Clinics	0.3
Sources: OSHA based on BLS (May 23, 2018), BLS (March 29, 2019), and U.S. Census Bureau (March, 2020)	

Table VI.B.17 presents the estimated percentage of baseline compliance with the respiratory protection requirements by setting. The baseline estimates are based on ERG (August 9, 2013), the infectious disease expert panel report prepared for OSHA, but as explained in the introduction to this section, are assumed to be at least 50 percent for establishments with fewer than 20 employees and at least 75 percent for larger establishments.

Table VI.B.17: Baseline Compliance for Respiratory Protection

Setting	Baseline Compliance
General Hospitals	84%
Other Hospitals	
Nursing Homes	50%-75%
Long Term Care (excluding nursing homes)	
Other Patient Care	50%-75%
Home Health Care and Temp Labor	
First Aid and Emergency Care	
School/Industry Clinics	
Correctional Facility Clinics	
Source: OSHA based on ERG (August 9, 2013) Notes: Baseline compliance is assumed to be at least 50% for establishments with fewer than 20 employees and at least 75% for larger establishments (indicated as 50%-75%).	

The per worker labor burdens and costs include those associated with the medical examination and the fit testing, which are described below.

Respiratory Protection Plan Development

The respiratory protection standard requires employers to develop and maintain a written respiratory protection program. OSHA estimates that a physician or other licensed healthcare professional will spend 4 hours for establishments with fewer than 20 employees and 8 hours for larger establishments (OSHA, 2018) to develop this plan.

Medical Evaluation

The Respiratory Protection standard requires employers to provide a medical evaluation to determine the employee's ability to use a respirator before the employee is fit tested or required to use the respirator in the workplace. 29 CFR 1910.134(e)(1); (OSHA, 2018).

While OSHA's respiratory protection standard requires medical re-evaluation under certain circumstances, OSHA believes that, given the limited time this ETS will be in effect, there will not be sufficient time for conditions to change and trigger the requirement for the re-evaluation and therefore OSHA did not estimate any costs associated with medical re-evaluation in this analysis.

The preliminary medical evaluation (medical questionnaire) is estimated to take 15 minutes of the worker's time and 5 minutes of a physician or other licensed health care professional's (PLHCP) time. OSHA estimates that a follow-up medical evaluation is needed 23 percent of the time (OSHA, 2018). When a follow-up medical evaluation is needed, OSHA estimates that this has a cost of $391 plus the cost burden for the 1 hour of the worker's time (OSHA, 2018). In addition, it is estimated that a travel cost of $5 plus a half hour of the worker's time is incurred for all settings

except for hospitals (since the follow-up is assumed to occur off-site for employees in settings other than hospitals).

Fit Testing and Training

The Respiratory Protection standard requires that, before a worker is required to use a respirator with a negative or positive pressure tight-fitting face piece, the employee must be fit tested with the same make, model, style, and size of respirator that will be used. Fit testing costs and training are estimated as one hour of the workers time, plus one half hour of the fit tester's time for fit testing, one half hour per 10 employees of the fit tester's time for training, and the cost of two N95 respirators (OSHA, 2018).

Summary of per Worker Respiratory Protection Costs

Table VI.B.18 summarizes how the per worker respiratory protection costs are estimated.

Table VI.B.18: Summary of Respiratory Protection Program Costs

Cost Component	Calculation Formula	Notes
Plan Development	= $154.71 * 8 hours for large establishments (>=20 employees) = $154.71 * 4 hours for small establishments (<20 employees)	$154.71 is the PLHCP average blended wage
Medical questionnaire	=0.25 * NAICS_Specific_Wage + 0.083 * $154.71	$154.71 is the PLHCP average blended wage
Follow-up medical exam (23% of workers)	=$391 + NAICS_Specific_Wage * 1 hour	(Hospitals only; $391 is the exam cost.)
	=$391 + NAICS_Specific_Wage * 1.5 hours + $5	(All settings except hospitals; $391 is the exam cost; $5 is travel costs.)
Fit Testing and training	=$56.33* 0.55 hour +NAICS_Specific_Wage* 1 hour + $1.45*2	$56.33 is the fit tester wage; $1.45 is the cost of an N95 respirator
Notes: See Appendix VI.B.B for estimated NAICS-specific wage rates (BLS, March 29, 2019).		

Cost per Establishment, Respiratory Protection

Table VI.B.19 presents a summary of the respiratory protection costs per establishment, including plan development, fit testing, training, and medical evaluation costs.

Table VI.B.19: Respiratory Protection, Average Cost Per Establishment

Setting	Plan Development	Plan Development Baseline Compliance	Affected Workers Per Estab.	Average Cost Per Worker	Medical Evaluation and Fit Testing Baseline Compliance	Total Costs Per Estab
General Hospitals	-	100%	167	$216.27	84%	$5,764
Other Hospitals	-	100%	3	$210.05	84%	$105
Nursing Homes	$129	70%	10	$183.44	75%	$485
Long Term Care (excluding nursing homes)	$142	73%	0.3	$172.98	75%	$52
Other Patient Care	$29	50%	0.2	$236.37	72%	$25
Home Health Care and Temp Labor	$0	50%	1	$208.22	75%	$37
First Aid and Emergency Care	$0	50%	0.4	$191.04	75%	$20
School/Industry Clinics	-	100%	0.2	$198.57	75%	$10
Correctional Facility Clinics	-	100%	0.3	$172.38	75%	$12
Source: OSHA based on BLS (May 23, 2018), BLS (March 29, 2019), U.S. Census Bureau (March, 2020), ERG (August 9, 2013)						

Table VI.B.20 presents a summary of the average per establishment combined cost for PPE and respiratory protection. The costs included in Table VI.B.20 also include the costs associated with the

Mini Respiratory Protection Program described in section VI.B.V.0

Table VI.B.20: PPE and Respiratory Protection, Average Cost per Establishment

Setting	Cost per Establishment		
	All	*SBA-Defined Small*	*Very Small*
All Industry Average	**$978**	**$817**	**$151**
General Hospitals	$56,659	$59,226	$141
Other Hospitals	$2,733	$4,673	$46
Nursing Homes	$3,791	$3,181	$337
Long Term Care (excluding nursing homes)	$382	$367	$127
Other Patient Care	$300	$235	$147
Home Health Care and Temp Labor	$1,464	$1,080	$170
First Aid and Emergency Care	$589	$497	$142
School/Industry Clinics	$294	$255	$17
Correctional Facility Clinics	$386	$245	$45
Sources and notes: OSHA analysis based on BLS OES data (BLS, March 29, 2019), QCEW data (BLS, May 23, 2018), ECEC data (BLS, December 14, 2018), and U.S. Census Statistics of U.S. Businesses (U.S. Census Bureau, March, 2020).			

f. Aerosol-Generating Healthcare Procedures on a Person With Suspected or Confirmed COVID–19

ETS Requirements—Under § 1910.502(g)

When an aerosol-generating procedure is performed on a person with suspected or confirmed COVID–19, the employer must limit the number of employees present during the procedure to only those essential for patient care and procedure support and ensure that the procedure is performed in an existing airborne infection isolation room (AIIR), if available. After the procedure is completed, the employer must clean and disinfect the surfaces and equipment in the room or area where the procedure was performed.

Cost Analysis Assumptions

Any costs associated with PPE or enhanced cleaning required under this provision are included in the sections addressing PPE and cleaning and disinfection. Costs associated with assuring properly functioning AIIRs are considered in section VI.B.III.j on ventilation, below.

g. Physical Distancing

ETS Requirements—Under § 1910.502(h)

The employer must ensure that each employee is separated from all other people by at least six feet when indoors unless the employer can demonstrate that such physical distancing is not feasible for a specific activity. When six feet of distancing is not feasible, the employer must ensure that the employees are as far apart as is feasible. This provision does not apply to momentary exposure while people are in movement (*e.g.,* passing in hallways or aisles).

Cost Analysis Assumptions

To implement physical distancing requirements, OSHA assumes employers post signage encouraging physical distancing: 25 Signs on average per large establishment, with 15 and 10 signs for SBA-defined small and very small establishments, respectively. OSHA estimated a unit cost per sign of $0.10, with the assumption that employers will use free downloadable signs from the CDC and self-print those signs. OSHA also includes costs for floor markings, based on the unit cost for a roll of masking tape ($4.39 (Office Depot, 2020)), and assuming 3 rolls per large establishments, 2 rolls per SBA-defined small establishment, and 1 roll per very small establishments. OSHA also assumes 2 minutes of labor per sign, including printing and installation by an employee.

Cost per Establishment, Physical Distancing

Table VI.B.21 presents a summary of the physical distancing costs per healthcare establishment, incorporating the baseline compliance rates of 50 percent for very small entities and 75 percent for all other entities. These include costs of the signs, the floor markings, and the labor of installing them (calculated using the average loaded wage shown in Appendix VI.B.B).

Table VI.B.21: Physical Distancing, Average Cost per Establishment

Setting	Cost per Establishment		
	All	*SBA-Defined Small*	*Very Small*
All Industry Average	**$15**	**$11**	**$11**
General Hospitals	$22	$16	$12
Other Hospitals	$33	$16	$12
Nursing Homes	$13	$9	$8
Long Term Care (excluding nursing homes)	$12	$9	$8
Other Patient Care	$15	$12	$11
Home Health Care and Temp Labor	$18	$12	$11
First Aid and Emergency Care	$18	$12	$10
School/Industry Clinics	$23	$11	$10
Correctional Facility Clinics	$18	$9	$8
Sources and notes: OSHA analysis based on BLS OES data (BLS, March 29, 2019), QCEW data (BLS, May 23, 2018), ECEC data (BLS, December 14, 2018), and U.S. Census Statistics of U.S. Businesses (U.S. Census Bureau, March, 2020).			

h. Physical Barriers

ETS Requirements—Under § 1910.502(i)

The employer must install cleanable or disposable, solid barriers at each fixed work location outside of direct patient care areas where each employee is not separated from all other people by at least 6 feet. An exception is made for where the employer can demonstrate that it is not feasible.

Cost Analysis Assumptions

OSHA estimates that the ETS will result in additional clear plastic barriers installed in 10 percent of general hospital, other hospital, first aid and emergency care, and other patient care settings. Other facilities in these settings are assumed to have installed these barriers or an equivalent barrier prior to the ETS. OSHA estimates that each setting will install 3 clear plastic barriers with a cost of $300 per barrier.[44] This is an average. OSHA also assumes 15 minutes of labor for 2 maintenance workers for the installation of each barrier.

While OSHA has no data on the number of barriers that have been purchased and installed or how many additional barriers will need to be made, the agency has included what it has determined, based on agency judgment, to be a reasonable estimate for this requirement. It is likely that some workplaces will need more barriers than others; it is also likely that many establishments will reevaluate their current barrier set up as a result of this ETS and determine that they need additional barriers. This is an average, so it also accounts for the likelihood that some establishments will not need any barriers because the nature of the work makes spacing feasible, or because barriers are infeasible.

Cost per Establishment, Physical Barriers

Table VI.B.22 presents the average total physical barrier costs for establishments covered by the ETS by setting and incorporates the baseline compliance rate of 90 percent as discussed above for hospitals, first aid and emergency care, and other patient care.

Table VI.B.22: Physical Barriers, Average Cost per Establishment

Setting	Cost per Establishment		
	All	*SBA-Defined Small*	*Very Small*
All Industry Average	**$77**	**$79**	**$86**
General Hospitals	$96	$96	$96
Other Hospitals	$96	$96	$96
Nursing Homes	-	-	-
Long Term Care (excluding nursing homes)	-	-	-
Other Patient Care	$95	$95	$95
Home Health Care and Temp Labor	-	-	-
First Aid and Emergency Care	$95	$95	$95
School/Industry Clinics	-	-	-
Correctional Facility Clinics	-	-	-
Sources and notes: OSHA analysis based on BLS OES data (BLS, March 29, 2019), QCEW data (BLS, May 23, 2018), ECEC data (BLS, December 14, 2018), and U.S. Census Statistics of U.S. Businesses (U.S. Census Bureau, March, 2020).			

[44] The cost of installing clear plastic barriers in response to COVID–19 has been reported in the following news articles: (1) *Altoona company starts installing plexiglass cashier shields* (Lim, April 2, 2020)—$300 per barrier, and (2) *Franklin County to get prices on spit/sneeze shields, doors* (Perry, April 21, 2020)—$140 per barrier. The higher cost estimate is utilized in the analysis.

i. Cleaning and Disinfection

ETS Requirements—Under § 1910.502(j)

In patient care areas and resident rooms, and for medical devices and equipment, the employer must follow standard practices for cleaning and disinfection of surfaces and equipment in accordance with applicable CDC guidelines. In other areas, the employer must clean high-touch surfaces and equipment at least once per day. When an employer is aware that a person who is COVID–19 positive has been in the workplace within the last 24 hours, the employer must clean and disinfect any areas, materials, and equipment under the employer's control that have likely been contaminated by that person. The employer must also provide alcohol-based hand rub or readily accessible hand washing facilities.

Cost Analysis Assumptions

In settings other than hospitals, nursing homes, and long-term care facilities, OSHA assumes establishments will, in addition to their current cleaning product purchases, need to purchase a six-month supply of multipurpose cleaners and disinfectants, at a cost of $4.54 for each (*i.e.,* a supply of multipurpose cleaner and a supply of disinfectants/virucides), for a total of about $9 per establishment (W.B. Mason, 2020).

Hospitals are estimated to spend a total of $56 million annually on soaps and cleaning products, and nursing homes and long-term care settings are estimated to spend $60 million annually on these supplies (BEA, November, 2018). OSHA estimates that spending on cleaning products will increase by 5 percent as a result of the ETS, and accounts for these increased cleaning product costs on a per employee basis, which is equivalent to an additional $0.37 per hospital employee and an additional $0.69 per nursing home and long-term care setting employee. This increased spending also covers the costs of cleaning associated with aerosol-generating procedures under paragraph (g) of the ETS.

OSHA expects that the majority of cleaning that would need to be done to comply with this provision is already being done in response to CDC guidelines or could be completed in nonproductive downtime without affecting worker productivity. Given the emphasis on cleaning and disinfection in healthcare settings (those in NAICS 622), the agency believes that all necessary cleaning is being done at healthcare establishments. However, outside of NAICS 622, OSHA has included a time burden of 2 additional minutes per shift for 25 percent of covered workers, for cleaning, in order to err on the side of being overly inclusive of costs.

This provision of the ETS also requires that the employer provide alcohol-based hand rub (ABHR) or readily accessible hand washing facilities. OSHA estimates that this ETS will result in a 10 percent increase in the use of ABHR or an average incremental increase of 0.0067 ounces [45] of hand sanitizer per use of ABHR (assumed to be 10 percent of the ABHR needed per use, which translates into a 10 percent increase in use overall), with an estimated incremental cost of 0.335 cents per use.[46] The estimated number of uses of ABHR is based on the estimate for the number of gloves used (see Table VI.B.13), assuming that there are two ABHR uses per pair of gloves used (*i.e.,* using ABHR before putting on and after taking off each pair of gloves).

Cost per Establishment, Cleaning and Disinfection

Table VI.B.23 presents the average cleaning and disinfection costs for healthcare establishments by setting and establishment size and incorporates the baseline compliance rates of 50 percent for very small entities and 75 percent for all other entities.

Table VI.B.23: Cleaning and Disinfection, Average Cost per Establishment

Setting	Cost per Establishment		
	All	*SBA-Defined Small*	*Very Small*
All Industry Average	**$16**	**$14**	**$6**
General Hospitals	$677	$708	$7
Other Hospitals	$108	$184	$7
Nursing Homes	$68	$58	$11
Long Term Care (excluding nursing homes)	$20	$19	$10
Other Patient Care	$6	$6	$6
Home Health Care and Temp Labor	$10	$9	$6
First Aid and Emergency Care	$7	$7	$6
School/Industry Clinics	$5	$6	$5
Correctional Facility Clinics	$5	$5	$5
Sources and notes: OSHA analysis based on BLS OES data (BLS, March 29, 2019), QCEW data (BLS, May 23, 2018), ECEC data (BLS, December 14, 2018), and U.S. Census Statistics of U.S. Businesses (U.S. Census Bureau, March, 2020).			

[45] According to the makers of Purell, ''If used as directed, which is to apply enough PURELL® Hand Sanitizer to thoroughly cover hands, a consumer can get 29–30 uses out of a 2 fl. oz. bottle''. Thus, OSHA assumes that each use of hand sanitizer would be 2/30 = 0.067066667 fl oz. (GOJO US, 2020). Ten percent of 0.067066667 fl oz, is 0.0067 fl oz, which is the incremental increase in ABHR use per use assumed to be attributable to the rule.

[46] The cost of bulk hand sanitizer is estimated as $0.50 per ounce (W.B. Mason, 2020).

j. Ventilation

ETS Requirements—Under § 1910.502(k)

Employers who own or control buildings or structures with an existing heating, ventilation, and air conditioning (HVAC) system, must ensure that: The system is used in accordance with the manufacturer's instructions and the design specifications; the amount of outside air circulated through the system and the number of air changes per hour are maximized to the extent appropriate; air filters are rated Minimum Efficiency Reporting Value (MERV) 13 or higher, if compatible, or the highest compatible filtering efficiency for the HVAC system(s); air filters are maintained and replaced as needed; and intake ports are cleaned, maintained, and cleared of debris. This provision does not require installation of new HVAC systems or AIIRs to replace or augment functioning systems. However, where an employer has an existing AIIR, the AIIR must be maintained and operated in accordance with its design and construction criteria. The regulatory text does include a note encouraging additional ventilation measures; however, as they are not a mandatory component of the ETS, costs have not been taken for those additional measures.

Cost Analysis Assumptions

For all settings, OSHA assumes each establishment will need an average of 3 MERV 13 air filters for large establishments, with 2 for SBA-defined small businesses, and 1 for very small establishments. The unit cost is $21.50 per filter (Home Depot, 2020).[47] OSHA assumes filters are replaced every three months, and this replacement requires 10 minutes of labor per filter for an Installation, Maintenance, and Repair (SOC 49–0000) employee every three months. For hospitals with 20 or more employees OSHA assumed that a larger filter would be used, with a unit cost of $79 (HD Supply, 2021) and a replacement labor burden of 20 minutes of labor per filter.

While it is a good business practice to maintain the HVAC system in good working order and OSHA believes that most establishments have HVAC systems that meet the requirements of the ETS, OSHA estimates that some small amount will need to have their HVAC systems serviced. In addition to the cost of purchasing and installing new air filters, OSHA estimates that large hospitals, nursing homes, and long-term care settings will require four hours of a general maintenance and repair worker's time to evaluate the condition of the HVAC system and to complete any necessary maintenance. In all other settings, 30 percent of large employers who need this maintenance will need 2 hours of maintenance work and SBA-defined small employers who need this maintenance will need 1 hour of maintenance work. OSHA assumes that very small entities will be less likely to control the HVAC system in their facility and therefore assigns no additional maintenance costs to those establishments. Any necessary HVAC work could be done by an outside source like an HVAC maintenance contractor or could be done by in-house maintenance workers if they are available.

The draft infectious disease cost analysis prepared for SBREFA included engineering control costs for hospitals to maintain AIIRs to manufacturer's specifications (OSHA, 2014). These costs were updated to current dollars for the analysis of this ETS. And while the infectious disease cost analysis included both initial costs and annual maintenance costs, since the ETS is only effective for six months, OSHA included in this analysis only maintenance costs to bring existing AIIRs up to the manufacturer's specifications where they are not already being maintained properly. OSHA estimates that most hospitals (83 percent) that have AIIRs properly maintain them (ERG, August 9, 2013).

Based on analyses performed in conjunction with OSHA's (1997) proposed rule addressing occupational exposure to tuberculosis, 64 FR 54160 (Oct. 17, 1997), the agency estimates that there would be a one-time cost of $8,143 to perform maintenance on an AIIR so that it functions properly (*e.g.,* maintains negative air pressure relative to the surrounding areas, completes the recommended number of hourly air exchanges) (WCG, November 14, 1994; updated to 2020 dollars). This is based on an estimated cost per square foot to purchase and install material, including ducting, fans, and HEPA filters, in an average isolation room measuring 150 square feet (WCG, November 14, 1994; updated to 2020 dollars). Note that since the analysis timeframe is 6 months, there are no on-going maintenance costs attributable to the ETS.

Cost per Establishment, Ventilation

Table VI.B.24 presents the average ventilation costs for healthcare establishments by setting and size. These estimates incorporate the baseline compliance rates of 50 percent for very small entities and 75 percent for all other entities, and a baseline compliance rate of 83 percent for maintenance of AIIRs in hospitals.

[47] Employers will need to upgrade to the highest efficiency filter compatible with their existing system. To the extent employers are upgrading to something less efficient than a MERV 13 filter, there will be some tendency toward overestimating costs.

Table VI.B.24: Ventilation, Average Cost per Establishment

Setting	Cost per Establishment		
	All	*SBA-Defined Small*	*Very Small*
All Industry Average	**$41**	**$36**	**$29**
General Hospitals	$1,528	$1,527	$1,415
Other Hospitals	$142	$132	$31
Nursing Homes	$28	$22	$28
Long Term Care (excluding nursing homes)	$24	$19	$28
Other Patient Care	$30	$28	$29
Home Health Care and Temp Labor	$29	$25	$29
First Aid and Emergency Care	$32	$24	$29
School/Industry Clinics	$37	$27	$30
Correctional Facility Clinics	$37	$23	$29
Sources and notes: OSHA analysis based on BLS OES data (BLS, March 29, 2019), QCEW data (BLS, May 23, 2018), ECEC data (BLS, December 14, 2018), and U.S. Census Statistics of U.S. Businesses (U.S. Census Bureau, March, 2020).			

k. Health Screening and Medical Management

ETS Requirements—Under § 1910.502(l)

The employer must screen each employee before each work day or shift for COVID–19 symptoms and require employees to promptly notify the employer when they are COVID–19 positive, have been told by a healthcare provider that they are suspected to be COVID–19 positive, or are experiencing certain specified symptoms of COVID–19. When an employer is notified that a person who has been in the workplace is COVID–19 positive, the employer must notify each employee who had, and other employers whose employees had, close contact with that person in the workplace. The employer must also notify any employee who worked in, and any other employers whose employees worked in, a well-defined portion of a workplace in which the COVID-positive person was present during the potential transmission period.

This paragraph also contains a requirement that the employer immediately remove any employee who is positive for COVID–19. Removal, which in the ETS refers to temporary removal from the workplace, must continue until that employee meets the criteria for return to work. In addition, the employer must remove any employee who has been told by their healthcare provider that they are suspected to have COVID–19 and any employee who is experiencing certain COVID–19 symptoms. The employer must ensure that any such employee is kept out of the workplace until they either meet the return to work criteria or they test negative for COVID–19 based on a polymerase chain reaction (PCR) test, which the employer must provide at no cost to the employee. In addition, the employer must remove any employee who has had close contact with someone in the workplace who is COVID–19 positive (unless the employee has either been fully vaccinated or has recently recovered from COVID–19). Employees who had close contact must be removed for 14 days or until they test negative for COVID–19 via a test provided at least 5 days after the exposure and paid for by the employer. Employees who had symptoms or were informed by a licensed healthcare provider they are suspected to have COVID–19, but did not have close contact, can return to work immediately if they test negative. Employees removed because of close contact must stay away from work for at least 7 calendar days from the date of exposure, even if they test negative.

When an employee is removed under the above criteria the employer must continue to pay the employee's normal earnings, as though the employee were still at their regular job, up to $1,400 a week for the first two weeks. If employees remain sick after that first two-week period and must stay out longer, employers with fewer than 500 employees are only required to pay two thirds of regular pay, up to $200 per day, after the initial 10 working days. Pay during removal can be offset with any employer or public benefits, such as paid leave or workers' compensation, until the employee meets the return to work criteria.[48] The requirement to pay the employee terminates if the employer offers a COVID–19 test at least five days after the exposure and the employee refuses to take it. Employers may also require employees who are removed from the workplace under this paragraph to work remotely or in isolation when suitable work is available. These employees would be paid as usual for their work. Employers with 10 or fewer employees are required to remove employees from the workplace under this paragraph but are not required to pay them during the time they are removed.

The ETS does not require notification or removal of employees who were wearing respirators, along with other required PPE, at the time they had close contact with a person with COVID–19. In addition, an employee's close contact with a patient with COVID–19 does not trigger the notification requirements (and therefore does not trigger removal requirements) if the patient with COVID–19 was in an area where such patients are normally expected, such as an emergency room or COVID–19 clinic (as opposed to a maternity unit of a hospital, a physician's office that screens out COVID–19 patients, a physical therapist's office, etc.).

Cost Analysis Assumptions

The health screening activities could include instructing employees to perform a self-assessment for symptoms before they arrive to work. The training on the elements of this self-assessment are included under the cost of training and there is no cost to the employer for this activity because it can be completed by the employee concurrent with other

[48] Recent legislation, the American Rescue Plan Act, Public Law 117–2, section 9641, extends tax credits to many employers for paid leave provided to employees through September 30, 2021 for COVID–19 related reasons. These tax credits will cover leave provided to employees removed from work under this ETS. This reduces costs to employers by shifting those costs to taxpayers.

daily activities without taking time from those activities. Although employers are not required to use temperature screening for employee screening, OSHA assumes for purposes of this analysis that this may be done as part of screening and estimates that it will take an average of 15 seconds per employee per day. OSHA also estimates that establishments will purchase no-touch thermometers at a rate of 1 per 100 employees, on average, with a minimum of 1 per establishment and unit cost of $29.50 per thermometer (Rice et al., December 18, 2020).

OSHA also includes 5 minutes of General and Operations Manager (OES 11–1020) labor per case (*i.e.,* each employee required to notify their employer) to make arrangements for the employee per above, and an additional 40 minutes per case to notify other potentially exposed employees. This includes the time to identify which of the exposed employees would be excluded from the notification and removal requirements because they were wearing respirators and required PPE at the time of the exposure.

Cost per Establishment, Health Screening and Notification

In order to estimate the feasibility of the ETS and due to the highly uncertain path of the pandemic over the period this ETS will be in effect, OSHA examined feasibility based on historic numbers of cases and fatalities from two periods: March 19, 2021 through April 19, 2021, inclusive of the cases on the start and end dates (designated as the ''primary'' scenario) and a monthly average over April 1, 2020 through April 1, 2021, inclusive of the start and end dates (called the ''alternative'' scenario). Using these scenarios, OSHA estimated cost per establishment for the screening and notification requirements of this provision under both scenarios. Costs per establishment are shown below in Table VI.B.25 by setting and size. They incorporate the baseline compliance rates of 50 percent for very small entities and 75 percent for all other entities.

Table VI.B.25: Health Screening and Notification, Average Cost per Establishment

Setting	Cost per Establishment					
	Primary Scenario			Alternative Scenario		
	All	*SBA-Defined Small*	*Very Small*	*All*	*SBA-Defined Small*	*Very Small*
All Industry Average	**$111**	**$100**	**$49**	**$113**	**$107**	**$59**
General Hospitals	$5,115	$5,347	$40	$5,019	$5,246	$44
Other Hospitals	$805	$1,375	$41	$790	$1,351	$57
Nursing Homes	$171	$148	$40	$169	$150	$49
Long Term Care (excluding nursing homes)	$52	$50	$36	$52	$52	$46
Other Patient Care	$62	$57	$50	$64	$64	$58
Home Health Care and Temp Labor	$180	$141	$52	$181	$150	$70
First Aid and Emergency Care	$74	$70	$49	$77	$81	$70
School/Industry Clinics	$54	$52	$20	$64	$100	$87
Correctional Facility Clinics	$49	$38	$24	$51	$50	$53

Sources and notes: OSHA analysis based on BLS OES data (BLS, March 29, 2019), QCEW data (BLS, May 23, 2018), ECEC data (BLS, December 14, 2018), and U.S. Census Statistics of U.S. Businesses (U.S. Census Bureau, March, 2020).

Medical Removal Protection and Medical Removal Protection Benefits

There are two types of costs that employers can incur to comply with the ETS requirements for medical removal: Payments to employees who are removed from work and payment for testing to determine whether those employees can return to work. OSHA developed cost estimates for medical removal protection (MRP) benefits for the two scenarios described above in section VI.B.III.k, Health Screening and Notification. The estimates for each scenario (primary and alternative) follow the same procedure.[49] In order to estimate the cost to employers of providing MRP benefits to their workers, OSHA needed to make the following estimates:

- The number of workers who would need to be removed [50] from the workplace;
- The number of removed workers who would be COVID–19 positive;
- The number of workers who would receive a COVID–19 test, the number of workers who would test negative for COVID–19, and the cost to the employer of those tests;
- The number of days COVID–19 positive employees and employees who receive a negative COVID–19 test would be paid MRP benefits;
- The daily wage paid to removed workers;
- The number of days that can be offset by other paid leave benefits; and
- The impact of the tax credit for paid sick leave included in the American Rescue Plan Act (ARP), Public Law 117–2, assuming 100 percent take-up for all

[49] The provisions for MRP have an exemption for all establishments with 10 or fewer employees, so these establishments are not included in calculating the cost of MRP benefits.

[50] Includes workers who have or are suspected to have COVID–19 illness, those diagnosed to have COVID–19 by a licensed healthcare provider, those who have specified symptoms, and those who have had close contact at work with someone who is COVID–19 positive (unless they have no symptoms and have either been fully vaccinated or recently recovered from COVID–19).

qualifying firms (*i.e.,* those with fewer than 500 employees).[51] [52]

Number of Workers Removed

The base number of COVID–19 cases among workers is determined based on historic infection data. OSHA's calculations of the number of COVID–19 cases among workers affected by this ETS, based on the two scenarios, are shown in the benefits section of this analysis (see section VI.B.VIII.d for details of those estimates).

As shown in Row A of of the Benefits section, OSHA identified 2,041,229 COVID–19 cases during the period of March 19, 2021 through April 19, 2021, which serves as the basis for the ''primary'' scenario, and 2,507,290 cases as the monthly average over the year beginning April 1, 2020 and ending April 1, 2021, which serves as the ''alternative'' scenario.

As explained in the Benefits analysis, OSHA then adjusted that number of cases by removing cases that were outside of the range of working age adults (18–64 years) and then including a further reduction to account for a percentage of that population that is not employed (See Benefits, Rows B and C). Using the primary scenario as an example, there were 1,047,145 remaining cases (See Benefits, Row C). OSHA then removed an additional 228,797 cases to account for teleworkers, who in this analysis do not receive any benefit from the ETS nor incur any costs for the employer. The remaining number of cases (818,348, as shown on Row E of Benefits) is one month of cases among workers expected to be in the physical workplace. While OSHA begins its analysis with the same data as presented in Benefits, the Benefits and Cost analysis diverge at this point because the Benefits remove additional cases to account for community spread (see, Row F), while those cases are not removed for costs because employers will incur removal costs for those workers regardless of whether they were infected at work or elsewhere.

Because this analysis is examining the effect of six months of the ETS, OSHA multiplied that 818,348 by six months to produce a product of 4,910,088 total cases of workers in the workplace over 6 months. Based on OSHA's industry analysis, 13 percent of all employees in the workforce are covered by 29 CFR 1910.502 (see the Benefits analysis). OSHA assumes that the number of cases would be allocated according to those percentages, so during the entire period of the ETS the number of workers under the ETS who have COVID–19 are, respectively, 625,933 (primary), and 768,848 (alternative).[53] [54] In Table VI.B.26, for convenience, OSHA presents the cases discussed in the following text.

Table VI.B.26: MRP Positive Cases and Employees under MRP

Scenario	Primary	Alternative
Total Baseline Positive Cases	**625,933**	**768,848**
After adjusting for vaccinations	**393,662**	**310,637**
Total number of cases accounting for ETS effectiveness (75%)	**98,415**	**77,659**
Positive, (previously tested)	*49,208*	*38,830*
Signs and symptoms (test positive)	*49,208*	*38,830*
Signs and Symptoms (test negative)	**49,208**	**38,830**
Close contact with COVID positive case	**147,263**	**116,4891**
Total number of employees removed	**295,246**	**208,1665**

Like the benefits analysis, the cost analysis further reduces the number of cases to account for vaccinations. Due to the prioritization of healthcare workers for vaccinations, OSHA assumes a vaccination rate of 75 percent for the healthcare sector.[55] Since the original CDC data reflect cases that occurred during periods with a reduced but positive vaccination rate, the calculation to adjust the data for the increase to a 75 percent vaccination rate is slightly complicated. It is explained later in the Benefits section. The final result is that for the primary scenario OSHA estimates that 62.9 percent of the cases remain after all adjustments are incorporated, and for the alternative scenario, 40.4 percent of cases remain. The reduction in the number of cases prevented through vaccination ultimately means that fewer employees will need to be temporarily removed from the workplace per the requirements of the ETS (with a corresponding reduction in benefits). OSHA thus estimates that under the primary scenario there is an adjusted total of 393,662 COVID–19 cases (those cases remaining after the additional number of cases are reduced to reflect cases prevented by vaccination—75 percent) are removed: (625,933 *

[51] In estimating the costs and feasibility of an OSHA standard, OSHA assumes that employers behave rationally to minimize their costs and thus assumes all eligible employers would take the tax credit. The agency examines the impact of less than 100 percent take-up of the tax credit in the sensitivity analysis in section VI.C.XVII.

[52] Note that certain government employers (mainly state and local governments) are qualified for the tax credit regardless of size.

[53] Primary = 13% (rounded) of 625,933 cases in the workplace over 6 months; Alternative = 13% (rounded) of 768,848 cases in the workplace over 6 months.

[54] The products are accurate—13 percent is a rounded number. These numbers do not include teleworkers since they are not in the workplace and hence do not qualify for MRP, but they do include workers at the physical workplace who actually become infected through community spread rather than at work.

[55] OSHA had no direct estimates of healthcare workers who have been vaccinated but based this estimate on the following sources. *Workforce COVID–19 vaccination rates among 8 top U.S. hospitals* (Masson, February 22, 2021) found vaccination rates of about 60 to 85% among hospital personnel in February 2021. *Early COVID–19 First-Dose Vaccination Coverage Among Residents and Staff Members of Skilled Nursing Facilities Participating in the Pharmacy Partnership for Long-Term Care Program—United States, December 2020–January 2021* (Gharpure et al., February 5, 2021) found vaccination rates of about 37.5% among nursing home staff. Given the time that has passed since these studies and the fact that, in the benefits analysis, there is no way to determine job category or industry, OSHA believes an overall rate of 75 percent for healthcare workers is a reasonable average for the job categories and industries being considered here.

0.629)). The adjusted number of cases under the alternative scenario is 310,637 (768,848 * 0.404).

Finally, the agency adjusts MRP cases to account for a gradual reduction in the need for MRP as the comprehensive protections of the standard lower the number of transmissions at the workplace (*e.g.,* working with distance or barriers, etc.). Most other costs of the ETS do not include this type of adjustment because they are not dependent on reductions in workplace transmission (*e.g.,* barriers would still be required regardless of whether some workplace transmissions are prevented). As in the Benefits analysis, OSHA assumes that the effectiveness rate in the workplace will be an overall 75 percent, meaning that 75 percent of the infections would be prevented over the 6-month course of the ETS. The final number of cases for the primary scenario is therefore reduced to 98,445 (393,662 * (1–0.75)), and for the alternative scenario it is reduced to 77,659 (310,637 * (1–0.75)). Note that the effectiveness would be higher except that OSHA assumes, as it does in Benefits, that 20 percent of the cases will be worker infections resulting from community transmission outside the workplace and therefore not reduced by the provisions of the ETS. However, unlike Benefits, those community spread cases are not subtracted from the total number of remaining cases because the employers will still bear the same cost for addressing them as if the worker had been infected at the workplace. For example, whether the employee was infected in the workplace or outside the workplace, once the employer learns that the employee has tested positive for COVID–19 the employer must still remove that employee from the workplace in order to protect its other employees and must provide MRP benefits to the removed employee.

OSHA estimates that in half of these cases (49,208 for the primary scenario) workers will know they are COVID–19 positive through a COVID–19 test or via diagnosis by a licensed healthcare provider of suspected or confirmed COVID–19 (OSHA assumes this group diagnosed by a healthcare provider is then confirmed by a positive test). The other half will have symptoms as described in the ETS (before being tested and confirmed positive).

Beyond the positive cases, other workers will need to be removed from the workplace because they are exposed to someone at the workplace who has COVID–19, or develop the symptoms specified in § 1910.501(i)(2)(iii) or (iv), even though they are not actually infected with COVID–19 and ultimately test negative (but must still be temporarily removed from the workplace pending the testing results). To estimate this number of removed workers, OSHA assumes that for every worker who has symptoms and who will eventually test positive for COVID–19 there will be an equal number (49,208 for the primary scenario) of workers who will have symptoms but who will test negative and not be infected (Kim et al., Jan 25, 2021, Tostmann et al., April 23, 2020). OSHA further assumes that for every potential COVID–19 case reported to an employer (based on a test, diagnosis, or symptoms) there will be 1.5 workers who will have close contact at work with a person with COVID–19.[56] The ETS exempts workers who are wearing respirators and other required PPE from being removed due to close contact with a person with COVID–19. OSHA assumes 25 percent of the workers are wearing N95 respirators and the other required PPE (section VI.B.III.e of this analysis) and therefore would not need to be notified of such contact nor removed from work as a result of it. This is support for the assumption that on average 1.5 people covered by the ETS will need to be removed because they have close contact with an infected person at work. Thus, focusing just on the primary scenario from above for the purposes of illustration, with 98,415 COVID–19 cases there will be an additional 147,263 workers (98,415*1.5) who would need to be removed from work because they had close contact at work with someone who has COVID–19.

Number of Workers Who Would Receive a COVID–19 Test

When testing is an option, OSHA expects employers to have employees tested so that the employees can return to their work as quickly as possible. For workers with suspected COVID–19 illness with symptoms, which includes cases diagnosed by a licensed healthcare provider that are then tested and found to be negative, the employer can offer the test immediately. If the test is negative, the worker can immediately return to work upon receipt of the test results. If the test is positive, the employee would continue removal according to either guidance from a licensed healthcare provider or CDC's isolation guidance.

For workers who are removed due to close contact, OSHA has made several assumptions. Workers removed due to close contact with a primary worker who is COVID–19 positive will either be removed for 14 calendar days or the employer can provide a COVID–19 test 5 days after the workplace exposure. If the results of the test are negative, the worker removed due to close contact can return to work 7 calendar days after exposure. If the results of the test are positive, the worker will continue for the full removal of 14 days. The cost of the test is estimated to be a $10 administrative fee plus $5 in travel costs (this is an average—some employees will not require any travel reimbursement, while others may have higher travel costs); all other costs of testing are assumed to be borne by insurance or other third-party payers. Note that for testing after an employee is removed there is no need to factor in lost work time because the employee is not working and is already compensated for that time.

Number of Days of MRP Benefits

If a worker is COVID–19 positive, OSHA assumes they will be removed from the workplace on average for 10 working days,[57] based on following CDC guidelines on isolation days and accounting for the severity of the cases.[58] The CDC guidelines recommend 10 calendar days minimum for isolation absent a continued fever.

Workers who are removed from work before they know if they have COVID–19 fall into two groups: Workers who are removed because they have specific symptoms, and workers removed because they have been in close contact with someone at work who is COVID positive. For workers in this first group (with symptoms) who are provided tests by their employers but test negative, OSHA estimates they will be tested on the first day they are removed and will be removed from work for an average of two days. For workers in the second group, who are removed due to close contact with a COVID–19 case in the workplace, the employer may provide the employee with a test at least five days after the exposure to the COVID positive employee. The regulatory text (paragraph (i)(4)(iii)(2)(i) also states that an employee removed due to close contact who tests negative can return to work after 7 calendar days from exposure. OSHA therefore estimates that employees in the second group (removed due to having close contact) will be tested five days after exposure and, if their test comes back negative, they will return to work after 7 calendar

[56] OSHA examines the effects of varying this assumption in a sensitivity analysis (see section VI.B.III.q).

[57] OSHA acknowledges that some workers do not work a standard 5-day work week but, for the purposes of this analysis, the agency assumes all employees who will be removed under MRP do so.

[58] See CDC (February 18, 2021).

days (which translates to 5 working days of paid removal).

If their test comes back positive, OSHA assumes employees in both groups (symptoms and close contact) will on average complete the remainder of a 10-working day (14 calendar days) period of removal before returning to work.[59]

Daily MRP Benefits Paid to Removed Workers

The ETS includes a $1,400 weekly cap on MRP payments, except that employers with fewer than 500 workers need not pay more than $200 per day (⅔ of the worker's regular pay, up to $200 per day) after the first two weeks. Since OSHA uses average wage rates in this analysis, this analysis necessitated the calculation of a truncated average wage with a weekly limit of $1,400 as prescribed in paragraph (i)(5)(iii)(A). The wage data used for this analysis do not have the kind of detail needed to calculate an exact truncated average wage, so the agency employed a relatively rough estimate using the median, rather than the average, wage (since with right-tailed data like wage distributions the median is below the mean) and then truncating the median wage at $1,400 for a full-time, 40-hour work week, if needed. This maximum wage is therefore $35 an hour ($1400/40). Note that this may overestimate the costs given that wages are capped at ⅔ of regular pay (up to $200/day) after the first two weeks for employers with fewer than 500 workers.

Other Paid Leave Offsetting MRP Benefits

OSHA also considered how much of the MRP payments can be offset by other payment sources. For this analysis, OSHA only considered the availability and cost offset due to sick leave and payroll tax credits for qualifying leave payments made for removal that are part of the recently enacted ARP (see Pub. L. 117–2, section 9641).

For this analysis, OSHA assumed a 100 percent take-up of the tax credit for sick leave paid under provisions in the ARP for all eligible employers (*i.e.,* establishments with fewer than 500 employees) while these provisions are in effect. Hence, for firms with fewer than 500 employees, all the wage costs associated with providing MRP benefits are assumed to be zero while the credits are available. These tax credits will generally be claimed on employers' tax returns, which in most cases are filed quarterly, although employers may be able to access funds early in anticipation of claiming the credits. The agency estimates that approximately three months of the ETS will be in place while the ARP tax credit will not be unless the tax credit is extended (these ARP provisions are currently slated to cover leave provided through September 30, 2021) and so OSHA includes ⅜ of MRP costs to account for the three months of costs that would not be reimbursed through the tax credit.

For cases where the employer applies an employee's sick leave to days where the employee is both removed from work and is unable to work at home, OSHA calculated the average number of sick days the employee will have at the time of the removal and deducted those days in calculating the wage payments the employer makes. BLS data show that, overall, 78 percent of workers have access to paid sick leave with an average length of available leave of 8 days.[60] [61] Assuming workers have used, on average, 50 percent of their available paid sick leave for other reasons by the time the leave is needed during the ETS, the average employee would have 3.12 days of paid sick leave available (0.78 * 0.5 * 8). Because there is the possibility of multiple removal periods for a single individual (in which case the worker would likely have no sick leave available the second time), OSHA adjusted the available paid sick leave days per worker down from 3.12 to 3 days. Hence, for workers who are removed for symptoms or close contact and tested but ultimately found to not be infected, employers will not have to pay any quarantine wage costs if the employees are out 3 work days or fewer. If they are out longer, the employer would have to pay for each of the days the employee is out after the first 3 work days. For example, if an employee who was removed for a total of 7 days and tested negative, the cost to the employer would be for 4 days of removal following the 3 days of sick leave. For employees who are COVID–19 positive and must be removed from the workplace for 10 work days (14 calendar days), the employer will incur costs to pay wages to those employees for 7 work days, on average, after adjusting for the 3 days of sick leave. The analysis assumes that employers will either take the tax credit or apply employee sick days to offset medical removal costs. Because it does not calculate the additional savings available to the employer if it both applies employee sick days and takes the tax credit, the estimate of the offsets available may be an underestimation.

While workers' compensation insurance might offset some costs under this provision, OSHA did not consider any reduction in costs to employers due to this insurance. The workers' compensation system differs by state so it is hard to generalize the overall offset of this insurance. Some states have moved towards mandating payment for COVID–19 quarantines for certain types of workers (first responders, health care) but, at this point, there are few such mandates in place and generally workers' compensations systems have been reluctant to pay claims for COVID–19 illnesses.[62] To the extent that workers' compensation payments are available to workers removed due to COVID–19, the costs to employers estimated in this analysis will be overstated.

Due to a lack of sufficient data, OSHA has assumed no baseline compliance

[59] As support for an average of 14 calendar days for isolation OSHA drew on several studies to estimate this average based on a breakdown of cases to asymptomatic, mild/moderate, severe without hospitalization, and severe with hospitalization. First is the equation, showing shares of various cases multiplied by their expected days out, and then an explanation of each term:

(17% * 10) + (66.4% * 12) + (7% * 20) + (9.6% * 35.5) ≈ 14 calendar days.

Where broken down term by term: The first term is asymptomatic cases where CDC guidelines have a minimum of 10 calendar days for isolation (CDC, March 12, 2021). The seventeen percent is from Byambasuren et al., (December 11, 2020). The second term is for mild to moderate cases which may need a couple of extra days above the minimum of 10 days (CDC, March 12, 2021). The 66.4 percent comes from a study finding that approximately 80 percent of symptomatic COVID–19 cases are mild to moderate (Wu and McGoogan, April 7, 2020). That 80 percent was multiplied by the remaining cases after removing the asymptomatic cases: (0.8 * (1–0.17) = 0.664). The last term is for hospitalizations, where the total of 35.5 days is from both a study by Emory University that found second surge hospitalization cases had an average length of stay as 8.2 days (Meena et al., March 1, 2021) and another study that found that the median number of days to return to work after hospitalization was 27 days (Chopra et al., November 11, 2020). The 9.6 percent is from *Grave Danger* (Section IV.A. of this preamble). Finally, the third term is for severe, but without hospitalization, cases, where the maximum number of days CDC expects is 20 days (CDC, March 12, 2021). The 7 percent is the percentage left for severe without hospitalization after subtracting out the percentages for other types of cases.

[60] See Scalia and Beach (September, 2020), Tables 31 and 34. These data include a breakdown by employment size class: For employment 1–49, 7 days leave and 66% access to leave rate; employment 50–99, 7 and 76%; employment 100–499, 8 and 83%; employment 500+, 9 and 90%. (Days of leave is for 5 years of service. Both 1 year and 10 years are also shown, where days of leave are usually the same, at most differing by one day.)

[61] While smaller employers may offer less sick leave than average, the exact amount of sick leave workers have available does not impact the estimated costs of this provision because the tax credit will entirely offset the cost of MRP benefits.

[62] For one overview from the National Conference on State Legislatures see Cunningham (December 9, 2020).

with MRP benefits. To the extent that employers are currently paying for workers with suspected or confirmed COVID–19 infections to take leave, this analysis would have some tendency to overstate the cost of this provision.

An important caveat is that this analysis deals strictly with averages and estimates: OSHA has made no attempt to model clustering of infections. Over the year prior to this ETS, there have been multiple incidents where multiple employees in a single workplace were infected, but the methodology in this analysis assumes independence across infections. This means that the cost and feasibility determinations do not consider situations where a single employer has multiple infections among their employees. Conversely, in a situation where infections are clustered, that would mean that, since some employers would be seeing more cases among their employees than the average, other employers would have a below-average number of, or even zero, infections. The effects of modeling clusters of infections on industry-wide feasibility are unclear, but OSHA believes a methodology that assumes the average number of infections for all employers is reasonable as part of the analysis supporting the feasibility of this ETS.

OSHA also notes that, from the standpoint of an analysis that estimates the costs and benefits to society, much of MRP benefits would be considered a transfer payment from one party to another, which is not actually a cost to society as a whole. Since this analysis is focused on determining economic feasibility, which involves a determination of costs borne by employers, the nature of these payments is not taken into account.

This analysis also does not attempt to forecast the course of the pandemic or the effect this ETS will have on the pandemic. To the extent that the historical data do not represent the course of the pandemic over the period the ETS is in effect, and that various interventions alter the course of the pandemic beyond the adjustments made for vaccination status, these costs may be overstated or understated.

Cost per Establishment, Medical Removal Protection and Medical Removal Protection Benefits

Costs per establishment for medical removal and medical removal protection benefits are shown below in Table VI.B.27.

Table VI.B.27: Medical Removal Protection and Medical Removal Protection Benefits, Average Cost per Establishment

Setting	Cost per Establishment					
	Primary Scenario			Alternative Scenario		
	All	*SBA-Defined Small*	*Very Small*	*All*	*SBA-Defined Small*	*Very Small*
All Industry Average	**$253**	**$148**	**$13**	**$200**	**$117**	**$11**
General Hospitals	$15,121	$12,520	$5	$11,932	$9,879	$4
Other Hospitals	$3,192	$3,211	$24	$2,519	$2,534	$19
Nursing Homes	$555	$293	$16	$438	$231	$12
Long Term Care (excluding nursing homes)	$122	$88	$14	$97	$69	$11
Other Patient Care	$77	$37	$13	$60	$30	$10
Home Health Care and Temp Labor	$492	$219	$21	$389	$173	$17
First Aid and Emergency Care	$268	$139	$26	$212	$109	$20
School/Industry Clinics	$148	$90	$4	$116	$71	$3
Correctional Facility Clinics	$175	$52	$6	$138	$41	$4

Sources and notes: OSHA analysis based on BLS OES data (BLS, March 29, 2019), QCEW data (BLS, May 23, 2018), ECEC data (BLS, December 14, 2018), and U.S. Census Statistics of U.S. Businesses (U.S. Census Bureau, March, 2020).

l. Vaccination

ETS Requirements—Under § 1910.502(m)

The employer must support COVID–19 vaccination for each employee by providing reasonable time and paid leave (*e.g.,* paid sick leave, administrative leave) to each employee for vaccination and any side effects experienced following vaccination.

Cost Analysis Assumptions

The ETS does not require any employer to make a vaccine available to employees.

Based on the discussion in section VI.B.III.k, OSHA estimates that, on average, employees will have three days of paid sick leave available before the employer has to pay any additional cost for sick leave. This leave will be more than enough to cover the time needed to receive a vaccine and any needed time off to recover from the side effects of the vaccine.[63] Therefore, OSHA estimates that employers will incur no costs under this provision.[64]

[63] See CDC (2021b), Possible Side Effects After Getting a COVID–19 Vaccine (explaining that vaccine side effects should go away in a few days and some people have no side effects at all).

[64] In addition, OSHA notes that, to the extent individual employees do not have sufficient available paid sick leave to cover this time, ARP allows employers with fewer than 500 employees to recover the costs for the paid time they must provide, via tax credits. Although this funding applies only to leave provided through September 2021, OSHA anticipates that most workers who decide to get vaccinated will have done so before then, particularly in healthcare where most employees became eligible for vaccination earlier and current vaccination rates are higher than in the rest of the workforce. Although non-governmental employers with 500 or more employees are not eligible for the tax credits under ARP, employees of large employers are also more likely to have paid sick time available to them. See Scalia and Beach (September, 2020), ''National Compensation Survey: Employee Benefits in the United States, March 2020,'' BLS, Bulletin 2723, September 2020, Tables 31 and 34. As noted above, this source indicates that for employers with 500 or more employees, 90% of employees have access to sick leave, with an average of 9 days available. These

Continued

m. Training

ETS Requirements—Under § 1910.502(n)

Employers must ensure that each employee receives training, in a language and at a literacy level the employee understands, on topics such as: COVID–19 transmission, symptoms, and ways to reduce risk; patient screening and management; and workplace tasks and situations that could result in COVID–19 infection. The training must also cover employer policies and procedures related to preventing the spread of COVID–19; PPE; cleaning and disinfection; health screening and medical management, including medical removal; and sick leave. Employees must be provided with information on multi-employer agreements related to infection control and on the employer's COVID–19 plan, as well as the identity of the safety coordinator for the COVID–19 plan. Additional training is required whenever changes occur that affect the employee's risk, policies or procedures are changed, or there is an indication the necessary skill or understanding was not retained. The employer must also inform employees about the anti-retaliation requirements under paragraph (o).[65] Finally, the employer must ensure that the training is conducted by a person knowledgeable about the covered subject matter, and that employees being trained have an opportunity to ask questions and get answers from a person knowledgeable about the covered subject matter.

Cost Analysis Assumptions

Based on the infectious disease expert panel report (ERG, August 9, 2013), OSHA estimates that training is already being provided 84 percent of the time for workers in hospitals, 68 percent of the time for workers in home healthcare, and 74 percent of the time for workers in long-term care and nursing homes. Estimates of current compliance were constrained to be no lower than 75 percent for large or SBA-defined small entities or 50 percent for very small entities in other settings, as explained in the introduction to this section.

The costs include those associated with the training development and providing the training to employees, as discussed in the sections below.

OSHA estimated for the infectious diseases SBAR Panel that it would take a total of 30 hours for the individual who would be training workers exposed to infectious agents to develop training materials. And the initial training was estimated to take either two or three hours, depending on the job tasks of the workers.

OSHA estimates that developing training materials and providing training under this ETS will take less time than the training required under the infectious diseases draft regulatory framework since that training was more extensive. This ETS also allows training completed prior to the effective date of the ETS to count towards compliance, provided it meets the relevant training requirements under this section. OSHA estimates that, for large establishments, hospitals, nursing homes, and long-term care settings of all sizes, it will take ⅔ of that 30-hour estimate to develop training materials under this ETS; it will take ½ or slightly less than ½ of 30 hours for SBA-defined small entities (15 hours for hospitals, nursing homes, and long-term care settings and 12 hours for other settings); and very small entities will need 7 hours to develop their training materials. OSHA also estimates that it will take ½ the time for employees to receive the training. Delivering the training to workers is estimated to take between 1 and 1.5 hours depending on the job tasks of the workers.

As described above, development of the training materials is assumed to be a one-time cost burden between 7 and 20 hours per establishment, depending on size and type of facility. The cost per establishment to develop this training is estimated as the product of the one-time labor burden and wage rate ($52.73 for a training development specialist). The baseline adjustments discussed are then applied to these costs.

OSHA estimates the training cost burden assuming 1.25 hours (*i.e.,* the average of 1 hour and 1.5 hours) for each covered employee's time and an average of 12 employees in each instructor-led training session (*i.e.,* about 0.1 hours of the instructor's time per covered employee, estimated at the cost of a training development specialist's loaded wage or $52.73 per hour).

The total training development costs are estimated as the product of:

- The number of establishments affected; and
- The average cost per establishment.

The total costs to deliver training are estimated as the product of:

- The number of workers covered; and
- The average cost per worker who receives the training.

Baseline compliance rates for the various settings were described previously in this section.

Cost per Establishment, Training

The average per-establishment costs of training are summarized in Table VI.B.28.

figures are higher than for smaller employers; for example, 66% of employees in firms with 1–49 employees have paid sick leave, with an average of 7 days of leave.

[65] Although the requirement to provide employees with information about the anti-retaliation provision is in a separate paragraph from the other training requirements (see paragraph (o)), OSHA assumes that employers will include it as an element of their training program to comply with the ETS and is including it with the other requirements of paragraph (n) for cost purposes.

Table VI.B.28: Training, Average Cost per Establishment

Setting	Cost per Establishment		
	All	*SBA-Defined Small*	*Very Small*
All Industry Average	**$529**	**$432**	**$228**
General Hospitals	$9,477	$9,879	$166
Other Hospitals	$2,375	$3,848	$225
Nursing Homes	$1,069	$911	$280
Long Term Care (excluding nursing homes)	$395	$376	$244
Other Patient Care	$375	$306	$227
Home Health Care and Temp Labor	$1,033	$784	$240
First Aid and Emergency Care	$589	$472	$233
School/Industry Clinics	$424	$330	$152
Correctional Facility Clinics	$374	$249	$140
Sources and notes: OSHA analysis based on BLS OES data (BLS, March 29, 2019), QCEW data (BLS, May 23, 2018), ECEC data (BLS, December 14, 2018), and U.S. Census Statistics of U.S. Businesses (U.S. Census Bureau, March, 2020).			

n. Recordkeeping

ETS Requirements—Under § 1910.502(q)

Employers with more than 10 employees must establish and maintain records, including all versions of the COVID–19 plan, and a COVID–19 log to record each instance identified by the employer in which an employee has COVID–19. Employers must also make those records available to specified individuals, and OSHA, upon request. Employers with 10 or fewer employees on the effective date of this standard are not required to comply with this paragraph.

Cost Analysis Assumptions

OSHA assumes 0.5 hours of labor from a General and Operations Manager (SOC 11–1020) to establish a COVID–19 log. For each COVID–19 case, OSHA assumes 10 minutes of labor from an Information and Records Clerk (SOC 43–4000) to record the case in the employer's COVID–19 log.[66] As noted above in section VI.B.III.k, OSHA estimated the costs for provisions that are dependent on the number of COVID–19 infections based on numbers of cases under both a primary and an alternative scenario. Using these data, OSHA calculated the number of cases per establishment that will need to be recorded under both scenarios, along with the associated cost.[67]

Table VI.B.29: Recordkeeping, Average Cost per Establishment

Setting	Cost per Establishment					
	Primary Scenario			Alternative Scenario		
	All	*SBA-Defined Small*	*Very Small*	*All*	*SBA-Defined Small*	*Very Small*
All Industry Average	**$18**	**$11**	**$7**	**$17**	**$11**	**$7**
General Hospitals	$110	$111	$2	$100	$101	$2
Other Hospitals	$68	$63	$14	$66	$60	$14
Nursing Homes	$26	$19	$8	$25	$19	$8
Long Term Care (excluding nursing homes)	$30	$28	$10	$30	$28	$10
Other Patient Care	$13	$8	$7	$13	$8	$7
Home Health Care and Temp Labor	$24	$17	$10	$24	$17	$10
First Aid and Emergency Care	$23	$14	$11	$23	$14	$11
School/Industry Clinics	$34	$18	$17	$34	$18	$17
Correctional Facility Clinics	$37	$21	$9	$37	$21	$9
Sources and notes: OSHA analysis based on BLS OES data (BLS, March 29, 2019), QCEW data (BLS, May 23, 2018), ECEC data (BLS, December 14, 2018), and U.S. Census Statistics of U.S. Businesses (U.S. Census Bureau, March, 2020).						

[66] This is comparable to the requirements in the Infectious Diseases Small Business Regulatory Enforcement Fairness Act Panel Report (OSHA, January 12, 2015), which estimates that employers would spend 15 minutes generating and filing exposure incident records. Note that the draft Infectious Diseases rule presented to the Panel included more extensive reporting requirements than what is being required under this ETS.

[67] See section VI.B.III.k. for additional details.

Cost per Establishment, Recordkeeping

Table VI.B.29 presents the average recordkeeping costs for covered establishments by setting and incorporates the baseline compliance rates of 50 percent for very small entities and 75 percent for all others.

o. Reporting COVID–19 Fatalities and Hospitalizations to OSHA

ETS Requirements—Under § 1910.502(r)

The employer must report each work-related COVID–19 fatality within 8 hours of learning about the fatality and each work-related COVID–19 in-patient hospitalization within 24 hours of learning about it. When reporting work-related COVID–19 fatalities and in-patient hospitalizations to OSHA, the employer must follow the requirements in 29 CFR 1904.39, except for 29 CFR 1904.39(a)(1) and (2) and § 1904.39(b)(6).

Cost Analysis Assumptions

OSHA assumes 45 minutes of labor from a General and Operations Manager (SOC 11–1020) to report each hospitalization or fatality. While this is higher than the 30 minutes estimated to be necessary to report other fatalities or hospitalizations to OSHA,[68] OSHA's estimate of 45 minutes is intended to account for any potential complexities in determining the work-relatedness of COVID–19 fatalities and hospitalizations. In existing OSHA enforcement guidance, issued in May of 2020,[69] OSHA offers several ''considerations'' for determining whether an employer has made a reasonable determination of work-relatedness:

- The reasonableness of the employer's investigation into work-relatedness,
- The evidence available to the employer, and
- The evidence that a COVID–19 illness was contracted at work.

Under that first consideration, OSHA says:

Employers, especially small employers, should not be expected to undertake extensive medical inquiries, given employee privacy concerns and most employers' lack of expertise in this area. It is sufficient in most circumstances for the employer, when it learns of an employee's COVID–19 illness, (1) to ask the employee how he believes he contracted the COVID–19 illness; (2) while respecting employee privacy, discuss with the employee his work and out-of-work activities that may have led to the COVID–19 illness; and (3) review the employee's work environment for potential SARS–CoV–2 exposure. The review in (3) should be informed by any other instances of workers in that environment contracting COVID–19 illness.

Based on this guidance, and the fact the healthcare employers covered by the ETS are typically used to making work-relatedness determinations for OSHA reporting purposes, OSHA believes 45 minutes likely overstates the average time necessary to comply with the reporting provisions.

OSHA calculated costs for this provision based on the numbers of fatalities among healthcare workers under the primary and alternative scenarios. Hospitalizations were estimated based on the ratio of hospitalizations to fatalities reported by CDC of about 8.4 hospitalizations for each fatality.[70] Based on these parameters, OSHA estimates the cost of reporting per establishment under both scenarios.[71]

Cost per Establishment, Reporting COVID–19 Fatalities and Hospitalizations to OSHA

Table VI.B.30 presents the average reporting costs for covered establishments by setting, incorporating the baseline compliance rates for reporting fatalities of 50 percent for very small entities and 75 percent for all others. No baseline compliance is assumed for reporting of hospitalizations.[72]

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[68] See OSHA (January 24, 2019), Supporting Statement for the Information Requirement on Recordkeeping and Reporting Occupational Injuries and Illnesses (29 CFR part 1904).

[69] See OSHA (2020), Enforcement Memo: Updated Interim Enforcement Response Plan for Coronavirus Disease 2019 (COVID–19)

[70] See CDC (April 29, 2021). Feb. 2020–Dec. 2020 4.1 million hospitalizations. Feb. 2020–Dec. 2020 344,836 Fatalities.

[71] See section VI.C.XI.e. for additional details.

[72] OSHA assumes zero compliance for reporting COVID–19-related in-patient hospitalizations because OSHA's standard reporting requirements, see 29 CFR part 1904.39, only require reporting of in-patient hospitalizations when they occur within 24 hours of the work-related incident. 29 CFR part 1904.39(b)(6). Because hospitalization for reasons related to COVID–19 is unlikely to occur within 24 hours of a workplace exposure to COVID–19, reporting of these cases by employers was probably sporadic. OSHA assumes its standard levels of compliance with the reporting requirement for fatalities in this ETS because COVID–19-related fatalities were more likely to occur within the timeframe specified in 29 CFR part 1904.39(b)(6), which is 30 days from the date of the work-related incident (exposure). To the extent employers were already reporting COVID–19-related hospitalizations, OSHA's estimate of zero baseline compliance would overestimate costs.

Table VI.B.30: Reporting, Average Cost per Establishment

Setting	Cost per Establishment					
	Primary Scenario			Alternative Scenario		
	All	*SBA-Defined Small*	*Very Small*	*All*	*SBA-Defined Small*	*Very Small*
All Industry Average	**$0.17**	**$0.04**	**<$0.01**	**<$0.01**	**$0.03**	**<$0.01**
General Hospitals	$5.52	$5.75	$0.01	$4.36	$4.54	$0.01
Other Hospitals	$0.05	$0.06	$0.06	$0.04	$0.05	$0.07
Nursing Homes	$0.19	<$0.01	<$0.01	$0.14	<$0.01	<$0.01
Long Term Care (excluding nursing homes)	$0.03	<$0.01	<$0.01	$0.02	<$0.01	<$0.01
Other Patient Care	$0.12	<$0.01	<$0.01	<$0.01	<$0.01	<$0.01
Home Health Care and Temp Labor	$0.36	<$0.01	<$0.01	$0.27	<$0.01	<$0.01
First Aid and Emergency Care	$0.27	<$0.01	<$0.01	$0.20	<$0.01	<$0.01
School/Industry Clinics	$0.01	<$0.01	<$0.01	<$0.01	<$0.01	<$0.01
Correctional Facility Clinics	$0.01	<$0.01	<$0.01	$0.01	<$0.01	$0.01
Sources and notes: OSHA analysis based on BLS OES data (BLS, March 29, 2019), QCEW data (BLS, May 23, 2018), ECEC data (BLS, December 14, 2018), and U.S. Census Statistics of U.S. Businesses (U.S. Census Bureau, March, 2020).						

p. Total Costs

Table VI.B.31 summarizes the total costs per establishment across covered establishments. Table VI.B.32 presents the total costs across all establishments for the primary scenario.

Table VI.B.31: Average Cost per Establishment

Setting	Cost per Establishment					
	Primary Scenario			Alternative Scenario		
	All	*SBA-Defined Small*	*Very Small*	*All*	*SBA-Defined Small*	*Very Small*
All Industry Average	**$5,301**	**$4,768**	**$3,393**	**$5,252**	**$4,752**	**$3,411**
General Hospitals	$110,455	$112,017	$2,664	$107,159	$109,265	$2,671
Other Hospitals	$13,485	$19,680	$1,271	$12,796	$18,978	$1,300
Nursing Homes	$7,156	$5,937	$1,413	$7,039	$5,881	$1,430
Long Term Care (excluding nursing homes)	$2,266	$2,162	$1,205	$2,241	$2,147	$1,225
Other Patient Care	$4,607	$4,158	$3,574	$4,596	$4,165	$3,589
Home Health Care and Temp Labor	$5,184	$4,262	$2,641	$5,086	$4,237	$2,675
First Aid and Emergency Care	$3,597	$3,295	$2,701	$3,548	$3,292	$2,744
School/Industry Clinics	$2,656	$2,471	$1,969	$2,648	$2,554	$2,109
Correctional Facility Clinics	$3,094	$2,543	$2,028	$3,062	$2,558	$2,089
Sources and notes: OSHA analysis based on BLS OES data (BLS, March 29, 2019), QCEW data (BLS, May 23, 2018), ECEC data (BLS, December 14, 2018), and U.S. Census Statistics of U.S. Businesses (U.S. Census Bureau, March, 2020).						

Table VI.B.32: Total Cost

Setting	Total Costs		
	All	*SBA-Defined Small*	*Very Small*
Total	**$3,969,645,432**	**$2,937,031,248**	**$1,619,187,522**
General Hospitals	$583,335,163	$440,547,676	$180,533
Other Hospitals	$31,866,811	$11,146,435	$81,084
Nursing Homes	$306,004,890	$181,139,745	$20,160,638
Long Term Care (excluding nursing homes)	$110,248,288	$85,406,603	$9,361,222
Other Patient Care	$2,573,086,767	$2,005,415,783	$1,499,682,755
Home Health Care and Temp Labor	$182,305,198	$115,633,840	$42,374,580
First Aid and Emergency Care	$127,251,773	$73,845,171	$33,848,065
School/Industry Clinics	$50,348,057	$22,264,906	$12,921,541
Correctional Facility Clinics	$5,198,485	$1,631,088	$577,103
Sources and notes: OSHA analysis based on BLS OES data (BLS, March 29, 2019), QCEW data (BLS, May 23, 2018), ECEC data (BLS, December 14, 2018), and U.S. Census Statistics of U.S. Businesses (U.S. Census Bureau, March, 2020).			

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q. Sensitivity Analyses

OSHA considered two sensitivity analyses in order to consider alternative values for selected parameters used in the cost analysis for which there was greater uncertainty. The following sensitivity analyses are presented below in Table VI.B.33 (all establishments), Table VI.B.34 (SBA-Defined small establishments), and Table VI.B.35 (very small establishments with fewer than 20 employees):

- *Sensitivity Analysis 1:* Costs estimated assuming a lower take-up rate for the tax credit available for paid leave that would apply to paid removal (75 percent and 50 percent take-up rates for establishments with 100–499 and <100 employees, respectively, instead of the 100 percent take-up rate for these establishments under the primary estimate).
- *Sensitivity Analysis 2:* Costs estimated with double the number of assumed close contacts with COVID–19 positive workers (3 close contacts per infection instead of 1.5).

Table VI.B.33: Estimated Per Establishment Costs for Primary Scenario and Sensitivity Analyses: All Establishments

Setting	Cost per Establishment		
	Primary Estimate	*Alt. 1: Lower Tax Credit Take-Up Rate*	*Alt. 2: Doubled Close Contacts*
All Industry Average	**$5,301**	**$5,284**	**$5,374**
General Hospitals	$110,455	$108,218	$114,861
Other Hospitals	$13,485	$13,318	$14,483
Nursing Homes	$7,156	$7,128	$7,313
Long Term Care (excluding nursing homes)	$2,266	$2,256	$2,300
Other Patient Care	$4,607	$4,609	$4,628
Home Health Care and Temp Labor	$5,184	$5,174	$5,321
First Aid and Emergency Care	$3,597	$3,597	$3,671
School/Industry Clinics	$2,656	$2,642	$2,696
Correctional Facility Clinics	$3,094	$3,092	$3,145
Sources and notes: OSHA analysis based on BLS OES data (BLS, March 29, 2019), QCEW data (BLS, May 23, 2018), ECEC data (BLS, December 14, 2018), and U.S. Census Statistics of U.S. Businesses (U.S. Census Bureau, March, 2020).			

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Table VI.B.34: Estimated Per Establishment Costs for the Primary Scenario and Sensitivity Analyses: SBA-Defined Small Establishments

Setting	Cost per SBA-Defined Small Establishment		
	Primary Estimate	*Alt. 1: Lower Tax Credit Take-Up Rate*	*Alt. 2: Doubled Close Contacts*
All Industry Average	**$4,768**	**$4,749**	**$4,808**
General Hospitals	$112,017	$109,013	$115,393
Other Hospitals	$19,680	$18,983	$20,546
Nursing Homes	$5,937	$5,897	$6,017
Long Term Care (excluding nursing homes)	$2,162	$2,150	$2,187
Other Patient Care	$4,158	$4,163	$4,169
Home Health Care and Temp Labor	$4,262	$4,249	$4,321
First Aid and Emergency Care	$3,295	$3,299	$3,332
School/Industry Clinics	$2,471	$2,463	$2,495
Correctional Facility Clinics	$2,543	$2,536	$2,557
Sources and notes: OSHA analysis based on BLS OES data (BLS, March 29, 2019), QCEW data (BLS, May 23, 2018), ECEC data (BLS, December 14, 2018), and U.S. Census Statistics of U.S. Businesses (U.S. Census Bureau, March, 2020).			

Table VI.B.35: Estimated Per Establishment Costs for the Primary Scenario and Sensitivity Analyses: Very Small Establishments

Setting	Cost per Very Small Establishment		
	Primary Estimate	*Alt. 1: Lower Tax Credit Take-Up Rate*	*Alt. 2: Doubled Close Contacts*
All Industry Average	**$3,393**	**$3,396**	**$3,398**
General Hospitals	$2,664	$2,664	$2,666
Other Hospitals	$1,271	$1,276	$1,278
Nursing Homes	$1,413	$1,416	$1,418
Long Term Care (excluding nursing homes)	$1,205	$1,208	$1,210
Other Patient Care	$3,574	$3,577	$3,578
Home Health Care and Temp Labor	$2,641	$2,645	$2,648
First Aid and Emergency Care	$2,701	$2,707	$2,709
School/Industry Clinics	$1,969	$1,970	$1,971
Correctional Facility Clinics	$2,028	$2,030	$2,030
Sources and notes: OSHA analysis based on BLS OES data (BLS, March 29, 2019), QCEW data (BLS, May 23, 2018), ECEC data (BLS, December 14, 2018), and U.S. Census Statistics of U.S. Businesses (U.S. Census Bureau, March, 2020).			

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IV. Mini Respiratory Protection Program

a. Introduction

In this section, OSHA provides estimates of the number of affected entities, establishments, and employees for the industries that will establish a respirator program in accordance with § 1910.504, the mini respiratory protection program section of the ETS.[73]

Throughout this analysis, where estimates were derived from available data those sources have been noted in the text. Estimates without sources noted in the text are based on agency expertise.

b. Scope of the Mini Respiratory Protection Program Section

This section of the ETS is applicable when employers provide respirators, or allow employees to provide their own respirators, instead of a facemask. The mini respiratory protection program section applies to respirator use not covered by OSHA's respiratory protection standard at § 1910.134. While no employer is required to establish a respiratory protection program under this section of the ETS, OSHA assumes that some employers will take advantage of the mini respiratory protection program and opt to provide a higher level of respiratory protection to their workers. OSHA estimates that 50 percent of NAICS 6216 Home Health Care Services, 37.5 percent of NAICS 621111 Offices of Physicians, and 37.5 percent of NAICS 623 Nursing and Residential Care Facilities will establish a program under this section of the ETS.

c. Affected Entities and Employees

below shows the entities and employees affected by this section of the ETS.

[73] Although there are two additional sections of this ETS—§ 1910.505 Severability and § 1910.509 Incorporation by Reference—neither imposes duties on employers independent of § 1910.502. Therefore, OSHA estimates no separate costs for compliance with these sections.

Table VI.B.36: Mini Respiratory Protection Program, Affected Establishments and Employees

NAICS	NAICS Description	All		SBA-Defined Small		Very Small	
		Estab.	Employees	Estab.	Employees	Estab.	Employees
0	**Total**	**261,608**	**3,527,509**	**64,888**	**1,768,739**	**141,422**	**373,679**
621111	Offices of Physicians (except Mental Health Specialists)	159,465	1,069,342	18,057	348,201	109,988	280,811
621610	Home Health Care Services	33,581	834,687	10,854	431,300	14,904	44,155
623110	Nursing Care Facilities (Skilled Nursing Facilities)	12,853	836,484	6,104	460,127	1,673	4,858
623311	Continuing Care Retirement Communities	4,177	205,344	2,257	161,961	1,031	3,837
623312	Assisted Living Facilities for the Elderly	15,039	206,401	3,820	91,254	8,000	24,746
623210	Residential Intellectual and Developmental Disability Facilities	26,410	308,642	17,815	224,644	2,797	10,749
623220	Residential Mental Health and Substance Abuse Facilities	6,061	44,582	3,817	33,804	1,557	2,505
623990	Other Residential Care Facilities	4,022	22,026	2,165	17,448	1,472	2,016

Sources and notes: OSHA analysis based on BLS OES data (BLS, March 29, 2019), QCEW data (BLS, May 23, 2018), ECEC data (BLS, December 14, 2018), and U.S. Census Statistics of U.S. Businesses (U.S. Census Bureau, March, 2020).

V. Cost of the Mini Respirator Program

a. Wage Rates

OSHA used occupation-specific wage rates from BLS 2018 Occupational Employment Statistics data (BLS, March 29, 2019) to calculate hourly wage costs. Within each affected 6-digit NAICS industry, OSHA calculated the employee-weighted average wage to be used in the analysis. OSHA estimated loaded wages using industry-specific fringe benefit rates for all civilian workers as reported in the BLS 2018 Employer Costs for Employee Compensation data, as well as OSHA's standard estimate for overhead of 17 percent times the base wage (BLS, December 14, 2018).

b. Respirators Provided by Employees

ETS Requirements—Under § 1910.504(c)

Where employees provide and use their own respirators, the employer must provide each employee with a specified notice (provided in the regulatory text) detailing proper protocols and warnings.

Cost Analysis Assumptions

OSHA estimates that time spent by employers to comply with this provision will be negligible and the notice required can be provided as part of the training required under 1910.502(n). Because this provision is applicable when employees provide their own respirators, OSHA is not including any cost for respirators.

c. Respirators Provided by Employers

ETS Requirements—Under § 1910.504(d)

Where employers provide respirators to their employees, the employer must ensure that employees receive specified training. The employer must also ensure that employees who use tight-fitting respirators perform a user seal check each time a respirator is put on to achieve a proper seal, and ensure that problems discovered during the seal check are corrected. The employer must also ensure that a single filtering facepiece respirator used by a particular employee is reused only by that employee and only under the conditions specified. Reuse of single use respirators is discouraged. When there are medical signs and symptoms related to an employee's ability to wear a respirator, the employer must require that employee to discontinue use of the respirator.

Cost Analysis Assumptions

OSHA estimates that, in order to comply with this provision, employers will provide training to employees using respirators under this provision. OSHA estimates that it will take 30 minutes to deliver the training to employees with 10 employees per training session. The labor burden for providing the training is estimated using the same fit tester's wage rate used in section VI.B.III.e. OSHA also includes a one-time cost of 10 minutes per employee for the initial user seal check demonstration. The cost for N95 respirators is accounted for in section VI.B.III.e—PPE.

OSHA has included no baseline compliance in estimating the cost of this provision (*i.e.,* a zero percent current compliance rate) since this is a new option for respiratory protection that employers would not currently be implementing absent this ETS.

Cost per Establishment

Table VI.B.37 below shows the estimated cost per establishment for establishments affected by this requirement.

Table VI.B.37: Mini Respiratory Protection Program, Average Cost per Establishment

Setting	Cost per Establishment		
	All	*SBA-Defined Small*	*Very Small*
All Industry Average	**$84**	**$61**	**$19**
General Hospitals	-	-	-
Other Hospitals	-	-	-
Nursing Homes	$333	$277	$24
Long Term Care (excluding nursing homes)	$71	$68	$19
Other Patient Care	$54	$37	$19
Home Health Care and Temp Labor	$427	$316	$50
First Aid and Emergency Care	-	-	-
School/Industry Clinics	-	-	-
Correctional Facility Clinics	-	-	-

Sources and notes: OSHA analysis based on BLS OES data (BLS, March 29, 2019), QCEW data (BLS, May 23, 2018), ECEC data (BLS, December 14, 2018), and U.S. Census Statistics of U.S. Businesses (U.S. Census Bureau, March, 2020).

VI. Economic Feasibility Determination

a. OSHA's Screening Tests for Economic Feasibility

To determine whether a rule is economically feasible, OSHA typically begins by using two screening tests to determine whether the costs of the rule are beneath the threshold level at which the economic feasibility of an affected industry might be threatened. The first screening test is a revenue test. While there is no hard and fast rule on which to base the threshold, OSHA generally considers a standard to be economically feasible for an affected industry when the annualized costs of compliance are less than one percent of annual revenues. The one-percent revenue threshold is intentionally set at a low level so that OSHA can confidently assert that the rule is economically feasible for industries that are below the threshold (*i.e.,* industries for which the costs of compliance are less than one percent of annual revenues). To put the one percent threshold into perspective, in healthcare and healthcare support industries, prices (and therefore revenues) are generally observed to change by well more than one percent per year, indicating that firms are able to withstand such changes.[74] In other words, in many industries, prices (and therefore revenues) are generally observed to change by well more than one percent per year, indicating that firms are able to withstand such changes.

The second screening test that OSHA traditionally uses to consider whether a standard is economically feasible for an affected industry is if the costs of compliance are less than ten percent of annual profits (see, *e.g.,* OSHA's economic analysis of its Silica standard, 81 FR 16286, 16533 (March 25, 2016); upheld in *N. Am.'s Bldg. Trades Unions* v. *OSHA,* 878 F.3d 271, 300 (D.C. Cir. 2017)). The ten-percent profit test is also intended to be at a sufficiently low level so as to allow OSHA to identify industries that might require further examination. Specifically, the profit screening is primarily used to alert OSHA to potential impacts on industries where the price elasticity of demand does not allow for ready absorption of new costs (*e.g.,* industries with foreign competition where the American firms would incur costs that their foreign competitors would not because they are not subject to OSHA requirements). In addition, setting the threshold for the profit test low permits OSHA to reasonably conclude that the rule would be economically feasible for industries below the threshold. To put the ten-percent profit threshold test into perspective, evidence used by OSHA in its 2016 OSHA silica rule indicates that, for the combined affected manufacturing industries in general industry and maritime from 2000 through 2012, the average year-to-year fluctuation in profit rates (both up and down) was 138.5 percent (81 FR 16545).[75]

When an industry ''passes'' both the ''cost-to-revenue'' and ''cost-to-profit'' screening tests, OSHA is assured that the costs of compliance with the rule are economically feasible for that industry. Most of the healthcare and healthcare support industries covered by the ETS fall into this category.

A rule is not necessarily economically infeasible, however, for the industries that do not pass the initial revenue screening test (*i.e.,* those for which the costs of compliance with the rule are one percent or more of annual revenues), the initial profit screening test (i.e, those for which the costs of compliance are ten percent or more of annual profits), or both. Instead, OSHA normally views those industries as requiring additional examination as to whether the rule would be economically feasible (see *N. Am.'s Bldg. Trades Unions* v. *OSHA,* 878 F.3d at 291). OSHA therefore conducts further analysis of the industries that ''fail'' one or both of the screening tests in order to evaluate whether the rule would threaten the existence or competitive structure of those industries (see *United Steelworkers of Am., AFL–CIO–CLC* v. *Marshall,* 647 F.2d 1189, 1272 (D.C. Cir. 1980)).

b. Time Parameters for Analysis

OSHA's economic analyses almost always measure the costs of a standard on an annual basis, conducting the screening tests by measuring the cost of the standard against the annual profits and annual revenues for a given industry. One year is typically the

[74] See BLS (June 3, 2021) BLS's CPI medical care index.

[75] Profits are subject to the dynamics of the overall economy. Many factors, including a national or global recession, a downturn in a particular industry, foreign competition, or the increased competitiveness of producers of close domestic substitutes are all easily capable of causing a decline in profit rates in an industry of well in excess of ten percent in one year or for several years in succession (OSHA, March 25, 2016). Final Economic and Regulatory Flexibility Analysis for OSHA's Rule on Occupational Exposure to Respirable Crystalline Silica, Chapter VI, p. VI–20.

minimum period for evaluating the status of a business; for example, most business filings for tax or financial purposes are annual in nature.

Some compliance costs are up-front costs and others are spread over the duration of the ETS; regardless, the costs of the rule overall will not typically be incurred or absorbed by businesses all at once. For example, the initial capital costs for equipment that will be used over many years are typically addressed through installments over a year or a longer period to leverage loans or payment options to allow more time to marshal revenue and minimize impacts on reserves.

The compliance costs for this ETS are for a temporary rule of a limited duration. While the costs of an ETS are only incurred during that duration, making the examination of costs over a six-month period expected for the ETS the logical analysis, OSHA believes most healthcare providers are likely to pay for those costs in installments when possible in order to minimize cash-flow effects and allow more time to replenish initial outlays for compliance with the rule.

Using one year of revenues and profits as the denominators in the cost-to-revenue and cost-to-profit ratios would have resulted in ratios that are half of the estimated ratios presented in this analysis. Under that approach, none of the industries would have exceeded the revenue screen, and only 10 industries would have triggered the profit or revenue screen.

Nevertheless, faced with some uncertainty about how a given court might view an analysis involving separate time periods of cost and revenue/profits, and with only a limited amount of time to complete the economic analysis for this emergency rule, OSHA determined that there was not time to conduct a full screening analysis based on both annual profits and revenues as well as a full screening analysis on a shorter 6-month time period. While OSHA believes the most appropriate screens would be based on annual profits and revenue, it has followed the more cautious route of basing the screens on 6 months of profits and revenue to avoid any potential uncertainty about whether the ETS is economically feasible for the affected sectors. It is therefore unsurprising that businesses in a greater number of NAICS industries exceed the thresholds under this measurement, and OSHA believes that edging above the screening thresholds is less of an indicator of economic peril in this context than in the context of a typical rulemaking analysis. Nevertheless, OSHA has examined each of the NAICS that did not clear either of these conservative screening tests and has concluded that the ETS is economically feasible for each one.

c. Data Used for the Screening Tests

The estimated costs of complying with the ETS, which OSHA relied upon to examine feasibility based on the two tests described above, are presented, for each provision of the ETS, in section VI.B.III. (see summary of total costs by establishment in Table VI.B.38). The revenue numbers used to determine cost-to-revenue ratios were obtained from the 2017 Economic Census. This is the most current information available from this source, which OSHA considers to be the best available source of revenue data for U.S. businesses.[76] OSHA adjusted these figures to 2019 dollars using the Bureau of Economic Analysis's GDP deflator, which is OSHA's standard source for inflation and deflation analysis. To account for the economic effects of the pandemic beginning in 2020, and provide a more reasonable estimate of revenues for the period in 2021 during which the ETS will be in effect, the agency used other national datasets to derive percentage changes to the baseline data. Those sources and the method used for adjusting revenues are described in more detail in Appendix VI.B.D.

The profit screening test for feasibility (*i.e.,* the cost-to-profit ratio) was calculated as ETS costs divided by profits. Profits were calculated as profit rates multiplied by revenues. The before-tax profit rates that OSHA used were estimated using corporate balance sheet data from the 2013 *Corporation Source Book* (Internal Revenue Service, 2013). The IRS discontinued the publication of these data after 2013, and therefore the most current years available are 2000–2013.[77] The most recent version of the Source Book represents the best available evidence for these data on profit rates.[78]

For each of the years 2000 through 2013, OSHA calculated profit rates by dividing the ''net income'' from all firms (both profitable and unprofitable) by total receipts from all firms (both profitable and unprofitable) for each NAICS. OSHA then averaged these rates across the 14-year (2000 through 2013) period. Since some data provided by the IRS were not available at disaggregated levels for all industries and profit rates, data at more highly aggregated levels were used for such industries; that is, where data were not available for each six-digit NAICS code, data for the corresponding four- and five-digit NAICS codes were used. Finally, although profit rates were determined using data from the two previous decades, the profit calculations have been adjusted, as described in Appendix VI.B.D of this economic analysis, to reflect declining revenues—and therefore declining profits (profits = profit rate * revenues) during the pandemic. Profit rates are expressed as a percentage and are reported in Table VI.B.38, below. Profits themselves were used to calculate the cost-to-profit estimates, which are also reported in Table VI.B.38, below.

OSHA has estimated costs over a 6-month timeframe for this ETS. As discussed above, OSHA has therefore used six months of revenue to conduct the cost-to-revenue tests and six months of profit to conduct the cost-to-profit tests.

d. Expected Healthcare Industry Responses to New Temporary Costs

In general, ''[w]hen an industry is subjected to a higher cost, it does not simply swallow it; it raises its price and reduces its output, and in this way shifts a part of the cost to its consumers and a part to its suppliers.'' *Am. Dental Ass'n* v. *Sec'y of Labor,* 984 F.2d 823, 829 (7th Cir. 1993). This summary by the Seventh Circuit is in accord with microeconomic theory. In the face of new compliance costs (or other external costs), firms that otherwise have a profitable line of business may have to increase prices to stay viable. Increases in prices typically result in reduced quantity demanded, but rarely eliminate all demand for the product. Depending on the cost and profit structure of individual firms within the industry, a decrease in the total production of goods or services may result from smaller output for each establishment within the industry; the closure of some plants within the industry; a reduced number of new establishments entering the industry; or a combination of the three.

Whenever demand is relatively inelastic, employers facing new costs typically can pass them along to customers and thereby avoid economic harm to their business. To understand the point about the price elasticity of demand, some economic background is needed. The price elasticity of demand

[76] For information regarding the standards and practices used by the Census Bureau to ensure the quality and integrity of its data, see, *e.g.,* U.S. Census Bureau (August 2, 2018).

[77] See IRS (2013).

[78] OSHA also investigated Bizminer and RMA as potential sources of profit information and determined that they do not represent adequate and random samples of the affected industries.

refers to the relationship between the price charged for a product or service and the quantity demanded for that product or service: The more elastic the relationship, the larger the decrease in the quantity demanded for a product when the price goes up. When demand is elastic, establishments have less ability to pass compliance costs on to customers in the form of a price increase and must absorb such costs in the form of reduced profits. In contrast, when demand is relatively inelastic, the quantity demanded for the product or service will be less affected by a change in price. In such cases, establishments can recover most of the variable costs of compliance (*i.e.,* costs that are highly correlated with the quantity of output or service) by raising the prices they charge; under this scenario, if costs are variable rather than fixed, business activity and profit rates are largely unchanged by small changes in costs. Ultimately, any impacts are primarily borne by those customers who purchase the relevant product or service for a slightly higher price. A large percentage of the costs of this ETS are variable costs because they depend primarily on the number of employees at an establishment.[79]

Increases in fixed costs can also be passed along, but with a likely reduction in output. A reduction in output could happen as a result of delayed entry of new firms into the industry or the reduction in the level of service or production by individual incumbent establishments, which in healthcare could take the form of a reduction of worker hours and/or fewer appointments. Some marginal establishments could close, but healthcare providers as a group are more likely to be insulated from that level of economic jeopardy.

It is important to note at the outset that the infection control measures necessary for patient safety and worker safety are substantially the same measures and thus included in the reimbursable costs for patient care activities. The agency also notes that the healthcare industry was able to absorb similar types of costs without significant issues when OSHA implemented its Bloodborne Pathogens rule (56 FR 64004 (Dec. 6, 1991)), which also required hazard assessment and similar PPE. OSHA expects healthcare providers will have a number of options for passing along or addressing any cost increases associated with the ETS. First, where health care providers are reimbursed by private health insurers for a percentage of a charge, small increases in charges such as those that would result from the ETS can be implemented quickly and the increase will be distributed between the insurer and the patient (Williams and Saine, December 14, 2015). Even larger charge increases could be implemented after negotiation with insurers. In either case, the distribution of the price increase makes it less likely that any price increases from this rule would significantly impact demand.

Second, the federal government has already taken steps to provide economic assistance to any healthcare providers that have difficulty passing along costs increases to patients and insurers because of COVID–19. Pursuant to the CARES Act, Public Law 116–136 (March, 2021), and the COVID Provider Relief Fund, HHS is distributing $178 billion to hospitals and healthcare providers ''on the front lines of the coronavirus response,'' which are the providers the ETS focuses on (HHS, January 21, 2021). Providers who participate in Medicare have been eligible for loans through the Medicare Accelerated and Advance Payment Programs, which helps providers facing cash flow disruptions during an emergency (Kaiser Family Foundation, April 20, 2021). Medicare has also authorized increased payments to address COVID care needs, which are often the same as the worker protections required by the ETS (more facemasks, respirators, gloves, etc.) (Id.)

Third, some health care providers, including some long-term care facilities, have simply added ''COVID fees'' to directly cover the increased cost of facemasks and other COVID–19 related worker protections. (Paavola, November 5, 2020).

Further, the temporary nature of the ETS and its associated costs suggests that firms may have more flexibility to respond than when facing a permanent increase in costs. For example, firms may be able to temporarily increase prices or temporarily defer planned capital expenditures or other maintenance to cover compliance costs.

When all establishments in an affected industry are covered by a rule and have to comply with the rule, none of the competitors gain any economic advantage from the rule and the ability of a competitor to offer a substitute product or service at a lower price is greatly diminished. In this case, all the firms in the industry will try to, and generally be able to, pass on most of the costs of the rule in increased prices and revenues rather than in reduced profits. The scope of the ETS is so broad that nearly all firms in nearly all industries that provide healthcare or healthcare support services (at least those OSHA examined due to exceeding the threshold for either the revenue or profit test) would be covered, with the result that even substitution of a service by a different industry is very unlikely.

Turning now to the specifics of the ETS and giving an advance summary of the results of the industry investigations that follow all of the industries that exceed the initial profit or revenue screening test to determine economic feasibility provide a domestic service that is not subject to international competition. Thus, in those industries, competition from establishments that are not also subject to this ETS and its related costs is unlikely. Because this indicates that entities in these industries will likely be able to pass most of the costs of the rule on to customers (patients) in the form of increased prices, their profits will not be much affected by the ETS.

e. Limitations of Economic Screens

As with other OSHA rulemaking efforts, the agency relies on the two screening tests (costs less than one percent of revenue and costs less than ten percent of profit) as an initial indicator of economic feasibility. Both have their limits in use, and the profit screen in particularly is subject to several limitations.

First, as previously noted, OSHA has been using corporate balance sheet data from the IRS as the best available evidence for estimating corporate profits for years.[80] Nevertheless, because firms typically have an incentive to minimize their tax burden, it is reasonable to expect that some of the reported accounting data may have been strategically adjusted to reduce reported profits and their associated tax implications. Business profits are particularly amenable to such accounting manipulations (relative to business revenues), which can reduce the accuracy of reliance on profits alone

[79] While fixed cost can be more limiting in terms of options for businesses, most of the costs of this rule are not fixed. Instead, most of the compliance costs vary with the level of output or employment at a facility.

[80] OSHA funded and accepted a final report by Contractor Henry Beale (Beale Report, 2003) that reviewed alternative financial data sources and concluded that the IRS data were the best. Since then OSHA has been relying on IRS data to provide the financial data to support its rulemaking analyses. See, for example, Occupational Safety and Health Administration (OSHA) (March 25, 2016), Final Economic and Regulatory Flexibility Analysis for OSHA's Rule on Occupational Exposure to Respirable Crystalline Silica, Chapter VI, pp. VI–2 to VI–3, Docket No. OSHA–2010–0034–4247, which includes a more recent review of data sources for corporate financial profit data and further support for OSHA's choice of IRS data.

as a measure for evaluating economic feasibility.[81]

Second, and most importantly, the profit test has a fairly limited function in the economic analysis for this particular rule because it functions primarily as a screen for a limited purpose: Alerting OSHA to potential impacts where a high price elasticity of demand will prevent firms from passing costs along to customers. In particular, the profit screen test is primarily used to alert OSHA to potential issues with foreign competition or substitution of goods that could threaten to disrupt an industry, but neither of those are serious considerations for the provision of healthcare services in the U.S. subject to the ETS. The fact that some healthcare provider groups exceed the profit screen does not mean that there is necessarily an issue of foreign competition or substitution; it just alerts OSHA of the need to look more closely.

These issues are discussed further in the sections below as part of OSHA's examination of the feasibility for particular industries.

VII. Economic Feasibility Analysis: All Establishments

The preceding discussion has been abstract and technical. This section summarizes OSHA's feasibility findings for specific industries covered by section 1910.502. As stated previously, the agency uses the two screening tests (costs less than one percent of revenue and costs less than ten percent of profit) as an initial indicator of economic feasibility. However, for this ETS the cost-to-revenue test appears to be the more reliable indicator of feasibility for the industries covered by the ETS. In this section, OSHA discusses the industries that fall above the threshold level for either screening test.

OSHA is aware that the economic climate in which this ETS has been promulgated is unique, and that many employers and their workers have been under considerable economic strain for the past year or more. While some healthcare providers were undoubtedly in that group to the extent that patients avoided elective services in accordance with CDC recommendations, the decrease in profits and revenues they experienced resulted to a large extent from their businesses' inability to service their customers' and patients' needs because of COVID–19-related safety issues, rather than a decrease in the demand for their products. On the other hand, some larger healthcare providers, such as hospitals, experienced significant increases in demand because of the pandemic. OSHA has designed the ETS with a flexible approach that provides options for full and partial scope exemptions to control their costs while protecting workers as demand increases for their services as the economy continues to reopen and vaccination becomes increasingly prevalent.

Table VI.B.38, ''Screening Analysis for all Establishments'' shows that for the majority of covered NAICS industries, the cost-to-revenue and cost-to-profit ratios are below both of OSHA's screening thresholds. Only four six-digit NAICS are estimated to have costs in excess of one percent of revenues, ranging from a high of 1.46 percent for NAICS 621310 (Offices of Chiropractors) to 1.05 percent for NAICS 621399 (Offices of All Other Miscellaneous Health Practitioners): The four industries that exceed the revenue screen are:

1. NAICS 621310—Offices of Chiropractors, 1.46 percent;
2. NAICS 621112—Offices of Physicians, Mental Health Specialists, 1.14 percent;
3. NAICS 621330—Offices of Mental Health Practitioners (except Physicians), 1.09 percent;
4. NAICS 621399—Offices of All Other Miscellaneous Health Practitioners, 1.05 percent.

There are several reasons why the ETS will still be economically feasible for these industries. First, and most critically, the four NAICS industries for which costs are above the revenue screen all provide ambulatory care, typically in non-hospital settings. Healthcare providers in non-hospital ambulatory care settings can avoid the costs of complying with the ETS simply by performing screening for COVID–19 and preventing people with suspected or confirmed COVID–19 from entering their facility (see paragraph (a)(2)(iii)). Many providers in the four NAICS industries that are above the revenue threshold are likely already taking these actions. If an employer determines that complying with the rule would cause financial hardship for its business, that employer could choose to institute these simple policies and procedures for screening and preventing patients with suspected or confirmed COVID–19 from entering the facility. OSHA anticipates that most establishments in the four NAICS industries that are above the revenue screen will be exempt from the ETS, as there is no regular need for providers like chiropractors and mental health care specialists to care for patients who have COVID–19. Those providers who are not already screening out patients with COVID–19 infections or symptoms may choose to begin doing so if they have concerns about covering the costs of complying with the ETS. Therefore, because it is so simple to for employers in these industries to avoid the costs of the ETS, OSHA finds that on that basis alone the ETS is inherently feasible for these industries.

Second, even to the extent that some of these establishments choose to care for patients with COVID–19, they will likely be a small segment of these industries. Providers that choose not to screen out patients with suspected or confirmed COVID–19, and incur the costs to comply with the ETS, will likely do so because they would be providing a niche service with sufficient economic incentives to enable them to pass the costs of compliance on to their COVID–19 patients or to those patients' insurers. These industries provide domestic services and are not subject to international competition; in addition, all similarly situated ambulatory care health care providers would be subject to the ETS to the extent that they treat COVID–19 patients, so there would be no opportunity to substitute that service for COVID–19 patients for a cheaper one by switching providers.

Finally, for mental health practitioners in NAICS 621112 and NAICS 621330, there is the additional option of providing telehealth services in many cases. This telehealth option would also permit employers to avoid the costs of complying with the ETS (see § 1910.502(a)(2)(vii). Although the Dingel & Neiman study (Dingel and Neiman, July 9, 2020) indicated a lack of telework/telemed options, likely because of medical licensing and legal restrictions on providing distanced care, that study was performed before the pandemic began.[82] Since the study was conducted, there has been a significant loosening of restrictions on the provision of mental health services through non-geographic settings. On March 6, 2020, the Coronavirus Preparedness and Response Supplemental Appropriations Act was signed into law. That statute gave the Secretary of Health and Human Services (HHS) the authority to waive geographic and originating site Medicare telehealth

[81] In fact, all other Department of Labor agencies rely solely on revenues to assess economic impacts, such as for Regulatory Flexibility Act certifications, in their rulemakings (see, *e.g.,* Employment and Training Administration, Final Rule on Strengthening Wage Protections for the Temporary and Permanent Employment of Certain Aliens in the United States; Wage and Hour Division, Tip Regulations Under the Fair Labor Standards Act (FLSA)).

[82] OSHA used the findings of the Dingel & Neiman study as the basis for its estimates of the percentages of employees who are able to work remotely, as discussed in section VI.B.VIII.e of this analysis.

reimbursement restrictions for mental health services during certain emergency periods. On March 17, 2020, a division of HHS released guidance allowing patients to be seen via live videoconferencing in their homes, without having to travel to a qualifying ''originating site'' for Medicare telehealth encounters. As a result, OSHA expects that many mental health physicians and other practitioners who might face economic feasibility issues as a result of the ETS would elect to provide virtual mental health services that fall outside the scope of the rule. Furthermore, psychiatrists and other mental health practitioners practice in a highly regulated industry that is typically based on state licensure that even restricts practice across state lines, never mind national borders. As a result, there is little foreign competition in these industries, indicating that these practitioners would have the ability to pass the costs of compliance onto patients (or insurers).

For the above reasons, OSHA finds that the ETS is economically feasible for establishments in NAICS 621310, NAICS 621112, NAICS 621330 and NAICS 621399.

As shown in Table VI.B.38, establishments in 10 six-digit NAICS covered by the ETS are estimated to have costs in excess of ten percent of profits, ranging from a high of 23.82 percent for NAICS 621112 (Offices of Physicians, Mental Health Specialists) to 11.51 percent for NAICS 621320 (Office of Optometrists): The industries with costs that exceed ten percent of profits are:

1. NAICS 621112—Offices of Physicians, Mental Health Specialists, 23.82 percent;
2. NAICS 621310—Offices of Chiropractors, 23.21 percent;
3. NAICS 621330—Offices of Mental Health Practitioners (except Physicians), 17.31 percent;
4. NAICS 621399—Offices of All Other Miscellaneous Health Practitioners, 16.65 percent;
5. NAICS 621340—Offices of Physical, Occupational and Speech Therapists and Audiologists, 15.69 percent;
6. NAICS 621391—Office of Podiatrists, 14.81 percent;
7. NAICS 621410—Family Planning Centers, 12.41 percent;
8. NAICS 623210—Residential Intellectual and Developmental Disability Facilities, 12.07 percent;
9. NAICS 621210—Office of Dentists, 11.71 percent; and
10. NAICS 621320—Office of Optometrists, 11.51 percent.

Several of these NAICS industries are the same as those that failed the revenue-screening test. As discussed above, those NAICS industries, and nearly all of the rest of the NAICS industries with cost-to-profit ratios above 10 percent, are expected to avoid the costs of complying with the ETS by performing screening for COVID–19 and preventing people with suspected or confirmed COVID–19 infections from entering their facility (see paragraph (a)(2)(iii)). This exemption is available to ambulatory care facilities, which describes nine out of the ten NAICS industries that were above the profit threshold. As noted earlier, in those NAICS industries, establishments for which full compliance with the ETS might cause economic feasibility concerns could avoid the costs of the standard by adopting procedures to screen non-employees prior to entry and prevent those with suspected or confirmed COVID–19 from entering.

The one exception is NAICS 623210—Residential Intellectual and Developmental Disability Facilities. Because facilities in this NAICS industries provide residential care, they would not fall under any of the full scope exemptions in the ETS. However, OSHA notes that this NAICS industry did not fail the cost-to-revenue screening test, which OSHA believes is the more useful metric for this industry. There is no foreign competition, and because all facilities in this NAICS industry must comply with the ETS and incur similar costs, the availability of cheaper substitute services will be limited. OSHA also notes that the ETS includes a partial scope exemption for vaccinated workers in specific areas that could save the employer compliance costs for facemasks, distancing, and barriers (see § 1910.502(a)(4)), particularly to the extent that employers in this NAICS industry do not normally allow residents with COVID–19 into their facilities.

Finally, OSHA notes that none of the 10 industries that are above the profit screen are subject to foreign competition. The services provided by these industries are often necessities and covered in part or total by insurance, both of which are contributing factors to a very inelastic demand curve, enabling them to pass the cost of the ETS onto the patients, as described earlier in this section. Accordingly, the firms in these 10 industries with ETS costs exceeding 10 percent of profits would not, in fact, have to absorb the costs in the form of lost profits, but would be able to increase revenue to recover most or all of the ETS costs. Thus cost-to-revenues is the proper metric for these industries. And, as explained above, OSHA does not anticipate feasibility problems in the four industries with cost-to-revenues ratios above one percent; the remaining six did not fall above the revenue threshold.

For these reasons, OSHA finds that the ETS is economically feasible for all covered industries in their entirety.

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Table VI.B.38: Screening Analysis for All Establishments

NAICS	NAICS Description	Affected Establishments	Total Cost per Establishment	Average Revenue per Establishment	Profit Rate	Average Profit per Estab.	Cost to Revenue	Cost to Profit
	Total / Average	**748,816**	**$5,301**	**$1,911,613**	**5.5%**	**$92,318**	**0.63%**	**10.88%**
446110	Pharmacies and Drug Stores	12,007	$2,663	$3,369,410	2.9%	$97,717	0.08%	2.73%
561210	Facility Support Services	1,680	$3,094	$2,497,359	2.8%	$69,924	0.12%	4.43%
561311	Employment Placement Agencies	1,588	$2,484	$1,221,797	2.1%	$25,601	0.20%	9.70%
611110	Elementary and Secondary Schools	15,596	$2,387	$1,959,824	6.1%	$118,914	0.12%	2.01%
611210	Junior Colleges	494	$2,565	$3,942,008	6.1%	$239,186	0.07%	1.07%
611310	Colleges, Universities, and Professional Schools	2,238	$4,743	$31,920,760	6.1%	$1,936,826	0.01%	0.24%
611710	Educational Support Services	541	$1,960	$992,979	6.1%	$60,250	0.20%	3.25%
621111	Offices of Physicians (except Mental Health Specialists)	212,620	$5,739	$1,259,015	4.8%	$60,106	0.46%	9.55%
621112	Offices of Physicians, Mental Health Specialists	10,817	$3,343	$294,032	4.8%	$14,037	1.14%	23.82%
621210	Offices of Dentists	136,468	$4,358	$513,967	7.2%	$37,201	0.85%	11.71%
621310	Offices of Chiropractors	39,340	$2,778	$190,102	6.3%	$11,971	1.46%	23.21%
621320	Offices of Optometrists	22,386	$2,824	$389,589	6.3%	$24,534	0.72%	11.51%
621330	Offices of Mental Health Practitioners (except Physicians)	25,370	$2,152	$197,437	6.3%	$12,433	1.09%	17.31%
621340	Offices of Physical, Occupational and Speech Therapists and Audiologists	40,431	$4,251	$430,106	6.3%	$27,086	0.99%	15.69%
621391	Offices of Podiatrists	8,092	$2,960	$317,432	6.3%	$19,990	0.93%	14.81%
621399	Offices of All Other Miscellaneous Health Practitioners	22,696	$2,812	$268,181	6.3%	$16,888	1.05%	16.65%
621410	Family Planning Centers	2,349	$3,931	$723,456	4.4%	$31,667	0.54%	12.41%
621420	Outpatient Mental Health and Substance Abuse Centers	11,967	$3,279	$1,023,130	4.4%	$44,785	0.32%	7.32%
621491	HMO Medical Centers	1,723	$17,091	$10,818,809	4.4%	$473,565	0.16%	3.61%

Table VI.B.38: Screening Analysis for All Establishments

NAICS	NAICS Description	Affected Establishments	Total Cost per Establishment	Average Revenue per Establishment	Profit Rate	Average Profit per Estab.	Cost to Revenue	Cost to Profit
621492	Kidney Dialysis Centers	7,904	$5,038	$1,771,112	4.4%	$77,526	0.28%	6.50%
621493	Freestanding Ambulatory Surgical and Emergency Centers	7,660	$3,597	$2,220,462	4.4%	$97,195	0.16%	3.70%
621498	All Other Outpatient Care Centers	14,825	$6,961	$2,074,479	4.4%	$90,805	0.34%	7.67%
621610	Home Health Care Services	33,581	$5,311	$1,393,479	5.7%	$79,004	0.38%	6.72%
621910	Ambulance Services	5,672	$4,624	$1,613,166	5.7%	$91,459	0.29%	5.06%
621991	Blood and Organ Banks	1,587	$9,048	$4,271,421	5.7%	$242,170	0.21%	3.74%
621999	All Other Miscellaneous Ambulatory Health Care Services	4,387	$3,248	$1,596,078	5.7%	$90,490	0.20%	3.59%
622110	General Medical and Surgical Hospitals	5,281	$110,455	$99,866,871	4.4%	$4,426,601	0.11%	2.50%
622210	Psychiatric and Substance Abuse Hospitals	1,443	$8,616	$20,802,558	4.4%	$922,074	0.04%	0.93%
622310	Specialty (except Psychiatric and Substance Abuse) Hospitals	920	$21,121	$28,136,246	4.4%	$1,247,140	0.08%	1.69%
623110	Nursing Care Facilities (Skilled Nursing Facilities)	17,137	$11,482	$3,997,433	4.4%	$177,186	0.29%	6.48%
623210	Residential Intellectual and Developmental Disability Facilities	35,213	$2,398	$448,418	4.4%	$19,876	0.53%	12.07%
623220	Residential Mental Health and Substance Abuse Facilities	8,081	$2,047	$1,171,465	4.4%	$51,925	0.17%	3.94%
623311	Continuing Care Retirement Communities	5,570	$8,277	$3,461,301	4.4%	$153,422	0.24%	5.39%
623312	Assisted Living Facilities for the Elderly	20,052	$3,148	$837,247	4.4%	$37,111	0.38%	8.48%
623990	Other Residential Care Facilities	5,362	$1,726	$881,494	4.4%	$39,072	0.20%	4.42%
711211	Sports Teams and Clubs	85	$2,015	$12,052,931	5.2%	$631,274	0.02%	0.32%
922160	Public Firefighter-EMTs	5,648	$4,824	$1,613,166	5.7%	$91,459	0.30%	5.27%

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a. Economic Feasibility Screening Analysis: Small and Very Small Businesses

The preceding discussion focused on the economic viability of each affected industry in its entirety, including entities of all sizes. Even though OSHA found that the ETS does not threaten the economic viability of these industries, the agency also examines whether there is still a possibility that the competitive structure of these industries could be significantly altered. For instance, if the increase in costs were such that most or all small firms in that industry would have to close, it could reasonably be concluded that the competitive structure of the industry had been affected by the rule. To address this possibility, OSHA will follow its normal rulemaking procedure for examining the average compliance costs per affected small entity and very small entity for each industry covered under the ETS. As with all establishments, the agency relies on the two screening tests (costs less than one percent of revenue and costs less than ten percent of profit) to evaluate the impacts on small and very small entities.[83] In cases where the small and very small entities in particular industries are above the threshold level for either screening test, OSHA will investigate further.[84]

OSHA notes that cost impacts for affected small or very small entities will generally tend to be somewhat higher, on average, than the cost impacts for the average business in those affected industries. That is to be expected. After all, smaller businesses typically suffer from diseconomies of scale in many aspects of their business, leading to lower revenue per dollar of cost and higher average costs. Small businesses are able to overcome these obstacles by providing specialized products and services, offering local service and better service, or otherwise creating a market niche for themselves. The higher cost impacts for smaller businesses estimated for this rule generally fall within the range observed in other OSHA standards and OSHA is not aware of any record of major industry failures resulting from those standards.[85]

As explained above, OSHA is relying on the threshold of a costs-to-revenue ratio of one percent as the superior indicator of economic feasibility unless the industries that ''fail'' the cost-to-profits screening test are unable to pass the costs onto their customers. For the industries that have a cost-to-profit ratio above ten percent, therefore, the discussion focuses on the ability of these industries to pass along their increased costs, rather than absorbing them in the form of reduced profits. For industries that are below the thresholds for both the cost-to-revenue and cost-to-profit ratios, the agency concludes that the costs of complying with the ETS are unlikely to threaten the survival of small establishments or very small establishments and are, consequently, unlikely to alter the competitive structure of the affected industries.

Table VI.B.39, ''Screening Analysis for SBA-Defined Small Entities,'' shows that the estimated cost of complying with the ETS for the average small establishment covered by the standard is $5,438. Table VI.B.40: Screening Analysis for Very Small Entities (fewer than 20 Employees) shows that the estimated cost of the rule for the average very small entity is $3,432.

Small entities in five six-digit NAICS industries covered by the ETS are estimated to have costs in excess of one percent of annual revenues:

1. NAICS 621310—Offices of Chiropractors, 1.47 percent;
2. NAICS 621399—Offices of All Other Miscellaneous Health Practitioners, 1.24 percent;
3. NAICS 621340—Offices of Physical, Occupational and Speech Therapists and Audiologists, 1.23 percent;
4. NAICS 621112—Offices of Physicians, Mental Health Specialists, 1.14 percent;
5. NAICS 621330—Offices of Mental Health Practitioners (except Physicians), 1.09 percent;

As discussed above in the section on feasibility for all establishments, these NAICS industries that failed the revenue screen are all ambulatory care facilities that can be easily scoped out of compliance with the requirements of the ETS pursuant to paragraph (a)(2)(iii) and therefore most employers will not need to incur the costs of complying with the standard. The other reasons noted above for the same NAICS industries still apply to these categories of small businesses. Because all five NAICS industries that are above the revenue threshold for small entities are comprised of ambulatory care providers, OSHA finds the ETS to be feasible for small entities in those NAICS industries.

Turning to the cost-to-profit test, small entities in 16 six-digit NAICS industries covered by the ETS are estimated to have costs in excess of ten percent of profits, ranging from a high of 23.79 percent for NAICS 621112 (Offices of Physicians, Mental Health Specialists) to 10.90 percent for NAICS 623312 (Assisted Living Facilities for the Elderly).

The 16 industries with cost-to-profit ratios above 10 percent for SBA-defined small entities are:

1. NAICS 621112—Offices of Physicians, Mental Health Specialists, 23.79 percent;
2. NAICS 621310—Office of Chiropractors, 23.39 percent;
3. NAICS 621410—Family Planning Centers, 20.32 percent;
4. NAICS 621399—Offices of All Other Miscellaneous Health Practitioners, 19.70 percent;

[83] Note that OSHA uses the same screening tests (costs less than one percent of revenue and costs less than ten percent of profit) to evaluate the economic feasibility of all of its standards. These economic feasibility screening tests should not be confused with OSHA's *regulatory flexibility* screening tests for small and very small entities, which are whether costs are less than one percent of revenue and less than five percent of profit for these entities. These regulatory flexibility screening tests are used to determine, under the Regulatory Flexibility Act (5 U.S.C. 601 *et seq.*), whether the rule will have a significant economic impact on a substantial number of small entities. See *e.g.* OSHA (March 25, 2016), Final Economic and Regulatory Flexibility Analysis for OSHA's Rule on Occupational Exposure to Respirable Crystalline Silica, Chapter VI, pp. VI–11 to VI–12. The significant economic impact test is entirely distinct from the determination of economic feasibility. Because OSHA has certified that compliance with the requirements of the Regulatory Flexibility Act are not practicable under the circumstances, OSHA has not performed the significant impact screening analysis for the ETS.

[84] One additional factor that is relevant to OSHA's analysis of feasibility for this particular rule is the high level of baseline compliance with the ETS's requirements in comparison to other new OSHA standards. As explained in section VI.C., OSHA estimates that about 50 percent of very small entities and 75 percent of small entities are already broadly in compliance with most provisions of the ETS. This current compliance rate indicates that many businesses will have very low costs to comply with the new requirements and that the costs would be borne primarily by those businesses that have lagged in implementing safety measures. See *Lead I,* 647 F.2d at 1130 (''It would appear to be consistent with the purposes of the [OSH] Act to envisage the economic demise of an employer who has lagged behind the rest of the industry in protecting the health and safety of employees and is consequently financially unable to comply with new standards as quickly as other employers' '') (quoting *Indus. Union Dep't, AFL–CIO* v. *Hodgson,* 499 F.2d 467, 478 (D.C. Cir. 1974)). The businesses that have already incurred many of the costs of compliance, including half of very small entities and the majority of small entities, will presumably be at low risk of going out of business as a result of the ETS. Therefore, even when small or very small entities are above the screening thresholds for particular industries, it would be very unlikely that this ETS would meet the criteria for alteration of the economic structure of affected industries based on the failure of most or all of the small or very small entities in those industries.

[85] For example, OSHA's economic analysis for the agency's 2016 silica rule showed cost-to-profit ratios as high as 39 percent for small entities and 91 percent for very small entities (OSHA (March 25, 2016), Final Economic and Regulatory Flexibility Analysis for OSHA's Rule on Occupational Exposure to Respirable Crystalline Silica, Chapter VI, p. VI–85).

5. NAICS 621340—Offices of Physical, Occupational and Speech Therapists and Audiologists, 19.57 percent;

6. NAICS 622110—General Medical and Surgical Hospitals, 17.76 percent;

7. NAICS 621330—Offices of Mental Health Practitioners (except Physicians), 17.30 percent;

8. NAICS 621391—Office of Podiatrists, 15.15 percent;

9. NAICS 561311—Employment Placement Agencies, 15.13 percent;

10. NAICS 621111—Offices of Physicians (except Mental Health Specialists), 14.49 percent;

11. NAICS 623210—Residential Intellectual and Developmental Disability Facilities, 12.35 percent;

12. NAICS 621210—Office of Dentists, 12.21 percent;

13. NAICS 621320—Office of Optometrists, 12.06 percent;

14. NAICS 621991—Blood and Organ Banks, 12.02 percent;

15. NAICS 621498—All Other Outpatient Care Centers, 11.60 percent;

16. NAICS 623312—Assisted Living Facilities for the Elderly, 10.90 percent.

Of the sixteen industries that fail the profit screening, all but 5 would be eligible for the ambulatory care exemptions in § 1910.502(a)(2)(iii) (for ambulatory care outside hospital settings) or (a)(2)(iv) (for ambulatory facilities located within hospital settings where workers are vaccinated). Some, such as mental health care providers, may also be able to provide care through telehealth, thereby avoiding the costs of the ETS (see § 1910.502(a)(vii)).

As discussed in the previous section, all the firms in the 5 NAICS industries that do not provide ambulatory care must comply with the ETS, substantially diminishing the ability of a competitor to offer a substitute product or service at a lower price, as they all are expected to incur the costs of compliance. These industries also provide domestic services and are not subject to foreign competition. This, along with the fact that services provided by these industries are often necessities and covered in part or total by insurance, are contributing factors to very inelastic demand curves. The inelasticity of demand enables practitioners in these industries to pass costs along to their patients. Accordingly, the small entities in these industries with ETS costs exceeding 10 percent of profits would not, in fact, have to absorb the costs in the form of lost profits, but would be able to increase revenue to recover most or all of the ETS costs. Thus, the cost-to-revenues screen is the more useful metric for these industries, and none of those firms fail the revenue screen.

The five industries that do exceed the profit threshold are not obvious candidates for the ambulatory care exemption or any of the other blanket exemptions to the scope of the standard, although they may be able to reduce costs through the vaccinated-employee partial exemption in § 1910.502(a)(4). Each of these is addressed in turn below with the explanation of why the ETS would be feasible for the majority of small entities in these NAICS industries.

NAICS 622110—General Medical and Surgical Hospitals: These essential services have significant inelastic demand and there are no substitute services that would not also be subject to the ETS. As described earlier in this section, these establishments can pass along costs, or can apply for CARES Act Relief funds to help them weather financial difficulties during the temporary period in which the ETS will be in effect.

NAICS 561311—Employment Placement Agencies: Entities in this NAICS industry are included in the scope of the ETS because they place healthcare personnel into medical facilities or other locations to provide healthcare services. However, it seems unlikely that they would be providing healthcare services inside their placement offices, so the exception for ''healthcare support services not performed in a healthcare setting'' would likely apply such that they could avoid the costs of the rule with respect to their administrative offices (§ 1910.502(a)(2)(vi)). To the extent that they have employees who contract to work in other healthcare settings, they could either pass along the costs through increases in the contract costs or arrange with the host healthcare provider to directly assume the costs for providing PPE, barriers, and other protections needed in the host setting. In the unlikely event that the ETS costs impacted demand in this area, employers in this field could decrease the number of employees.

NAICS 623210—Residential Intellectual and Developmental Disability Facilities: It is feasible for the employers in this NAICS industry to comply with the ETS for the reasons already provided earlier with respect to the same NAICS industry failing the profit screen for the all-sized category, as well as the other general reasons identifies in this section.

NAICS 621991—Blood and Organ Banks: The ETS would be economically feasible for small businesses in this NAICS industry because blood and organs are textbook examples of essential goods and services for which there is such a constant demand that firms in this NAICS industry can easily pass along costs to the hospitals and other clients who need to obtain blood or organs.

NAICS 623312—Assisted Living Facilities for the Elderly: This NAICS industry, which only slightly exceeds the profit-to-cost screen of 10 percent at 10.9 percent, is not subject to substitution because there is typically significant demand for these services and all similar facilities would be covered by the ETS.

For these reasons, the increase in costs are not such that most or all small firms in those NAICS industries would have to close, and OSHA concludes that the competitive structure of these industries will not be affected by the rule. OSHA therefore finds that the ETS is economically feasible for small entities in these industries.

As shown in Table VI.B.40, very small entities in 10 six-digit NAICS industries covered by the ETS are estimated to have costs in excess of one percent of revenues, ranging from a high of 1.63 percent for NAICS 621330 (Offices of Mental Health Practitioners (except Physicians)) to 1.02 percent for NAICS 621910 (Ambulance Services):

1. NAICS 621330—Offices of Mental Health Practitioners (except Physicians), 1.63 percent;

2. NAICS 621399—Offices of All Other Miscellaneous Health Practitioners, 1.56 percent;

3. NAICS 621310—Office of Chiropractors, 1.54 percent;

4. NAICS 621340—Offices of Physical, Occupational and Speech Therapists and Audiologists, 1.49 percent;

5. NAICS 621410—Family Planning Centers, 1.41 percent;

6. NAICS 621112—Offices of Physicians, Mental Health Specialists, 1.37 percent;

7. NAICS 621610—Home Health Care Services, 1.13 percent;

8. NAICS 621391—Office of Podiatrists, 1.08 percent;

9. NAICS 922160—Public Firefighter-EMTs, 1.03 percent;

10. NAICS 621910—Ambulance Services, 1.02 percent;

Most employers in all but three of those NAICS industries are likely eligible for the non-hospital ambulatory care exception in § 1910.502(a)(2)(iii) if they screen out and bar entry to people with suspected or confirmed COVID–19. That basis alone is sufficient to support a finding that the ETS will not disrupt any of those industries. In addition, OSHA notes that all of the very small businesses in this group that failed the

revenue screen provide services that do not face foreign competition and cannot be readily substituted by other domestic healthcare providers because those providers would also be subject to the ETS and incur the same costs.

There are three groups that are not likely to qualify for the ambulatory care scope exception. All three have inelastic demand for their services and no obvious substitutes, so they could easily pass along costs.

NAICS 621610—Home Health Care Services,

NAICS 922160—Public Firefighter-EMTs,

NAICS 621910—Ambulance Services,

The ETS includes provides a scope exception in § 1910.502(a)(2)(v) for home health care when the employees conducting a home visit are fully vaccinated and screen their patients and limit their services to homes where there is no one with suspected or confirmed to have COVID–19. Public Firefighters-EMTs and Ambulance Services are both essential services that typically receive enough support from public funding that it would be very unlikely that any such employer would be driven out of business by an increase in cost, and even more unlikely that the industry would be disrupted by the ETS costs. Both the firefighter/EMTs and ambulance services barely failed the screen at 1.02 and 1.03, respectively, even when costs were compared to just 6 months of revenue.

Very small entities in 26 six digit NAICS industries that are covered by the ETS are estimated to have costs in excess of ten percent of profits, ranging from 34.14 percent for NAICS 561311 (Employment Placement Agencies) to 10.02 percent for NAICS 621991 (Blood and Organ Banks). The 26 very small entities with cost-to-profit ratios above 10 percent are:

1. NAICS 561311—Employment Placement Agencies, 34.14 percent;
2. NAICS 621410—Family Planning Centers, 32.17 percent;
3. NAICS 621112—Offices of Physicians, Mental Health Specialists, 28.69 percent;
4. NAICS 621330—Offices of Mental Health Practitioners (except Physicians), 25.90 percent;
5. NAICS 621399—Offices of All Other Miscellaneous Health Practitioners, 24.77 percent;
6. NAICS 621310—Offices of Chiropractors, 24.45 percent;
7. NAICS 621340—Offices of Physical, Occupational and Speech Therapists and Audiologists, 23.69 percent;
8. NAICS 621420—Outpatient Mental Health and Substance Abuse Centers, 20.46 percent;
9. NAICS 621610—Home Health Care Services, 19.93 percent;
10. NAICS 922160—Public Firefighters-EMTs, 18.23 percent;
11. NAICS 621111—Offices of Physicians (except Mental Health Specialists), 17.97 percent;
12. NAICS 621910—Ambulance Services, 17.93 percent;
13. NAICS 621498—All Other Outpatient Care Centers, 17.49 percent;
14. NAICS 621391—Offices of Podiatrists, 17.10 percent;
15. NAICS 623312—Assisted Living Facilities for the Elderly, 16.59 percent;
16. NAICS 623210—Residential Intellectual and Developmental Disability Facilities, 16.04 percent;
17. NAICS 621320—Offices of Optometrists, 13.74 percent;
18. NAICS 621210—Offices of Dentists, 13.48 percent;
19. NAICS 621492—Kidney Dialysis Centers, 13.31 percent;
20. NAICS 621999—All Other Miscellaneous Ambulatory Health Care Services, 12.65 percent;
21. NAICS 623311—Continuing Care Retirement Communities, 12.62 percent;
22. NAICS 611710—Educational Support Services, 11.95 percent;
23. NAICS 623990—Other Residential Care Facilities, 11.67 percent;
24. NAICS 611110—Elementary and Secondary Schools, 11.63 percent;
25. NAICS 561210—Facility Support Services, 10.48 percent; and
26. NAICS 621991—Blood and Organ Banks, 10.02 percent.

The feasibility of the ETS has been addressed earlier for employers in most of these NAICS industries, while a number of the employers not previously addressed would be eligible for the ambulatory care exception in § 1910.502(a)(2)(iii) (Outpatient Care, Outpatient Mental Health and Substance Abuse Centers, Physicians' Offices, Kidney Dialysis Centers, Miscellaneous Ambulatory Care). As with the small entities, these industries provide domestic services and are not subject to international competition. As a result, these industries would have the ability to pass costs onto the customer. Accordingly, the very small entities in these industries with ETS costs exceeding 10 percent of profits would not, in fact, have to absorb the costs in the form of lost profits, but would be able to increase revenue to recover most or all of the ETS costs.

There do not appear to be any feasibility issues for any of the remaining very small entities that failed the profit screen for the reasons below:

NAICS 623311—Continuing Care Retirement Communities: As with assisted living, these are not subject to substitution because there is typically significant demand for these services and all similar facilities would be covered by the ETS.

NAICS 623990—Other Residential Care Facilities: Same as continuing care retirement communities.

NAICS 611710—Educational Support Services: Employers in this NAICS are likely small firms who provide school nursing services to public and private schools. OSHA believes that the demand for such services is inelastic, and such entities will be able to pass the roughly $2,000 in one-time costs to their clients.

NAICS 611110—Elementary and Secondary Schools: Employers who are very small entities within this NAICS industry and failed the profit screen are likely to be private educational institutions with a school nurse or similar personnel. However, the NAICS industries includes a variety of educational institutions, including for profit, non-profit, and public. Public schools have the ability to pass compliance costs on to their local funding jurisdictions, while some private schools have affiliated religious or other institutions that can provide financial support to these institutions without it counting toward ''profit.'' In addition, the federal government has distributed significant funding to schools for the purposes of assisting the schools in protecting against COVID–19, so many schools will be able to use that money to protect their healthcare workers in accordance with the ETS. Even in the unlikely event that a small number of institutions would not be able to sustain the one-time $2,000 cost of the ETS, the likely result could be the temporary closure of a school nurse's office, if permitted by law, as opposed to closure of an entire school. Even in the unlikely event that a small number of institutions would not be able to sustain the one-time $2,000 cost of the ETS, OSHA finds it very unlikely that the failure of such schools for that reason would disrupt the education sector when many private education institutions are non-profit organizations.

NAICS 561210—Facility Support Services: Employers providing services tied to specific facilities will typically be essential to that facility, especially when any potential source of substitution would also be subject to the same ETS costs.

For the reasons identified above the increase in costs are not such that most or all very small firms in that industry would have to close, the competitive

structure of these industries will not be affected by the rule. OSHA therefore concludes that compliance with the ETS would be economically feasible for very small entities in these covered industries.

Table VI.B.39: Screening Analysis for SBA Small Entities

NAICS	NAICS Description	Covered Entities	Total Cost per Entity	Average Revenue per Entity	Profit Rate	Average Profit per Entity	Cost to Revenue	Cost to Profit
	Total / Average	**540,108**	**$5,438**	**$845,055**	**5.74%**	**$43,580**	**0.81%**	**14.05%**
446110	Pharmacies and Drug Stores	4,726	$2,765	$2,022,822	2.9%	$58,664	0.14%	4.71%
561210	Facility Support Services	466	$3,504	$2,597,165	2.8%	$72,718	0.13%	4.82%
561311	Employment Placement Agencies	1,328	$2,456	$774,616	2.1%	$16,231	0.32%	15.13%
611110	Elementary and Secondary Schools	6,787	$2,293	$1,098,503	6.1%	$66,653	0.21%	3.44%
611210	Junior Colleges	154	$2,719	$3,628,828	6.1%	$220,183	0.07%	1.23%
611310	Colleges, Universities, and Professional Schools	546	$9,500	$7,509,751	6.1%	$455,662	0.13%	2.08%
611710	Educational Support Services	479	$2,015	$452,479	6.1%	$27,455	0.45%	7.34%
621111	Offices of Physicians (except Mental Health Specialists)	158,777	$5,305	$767,061	4.8%	$36,620	0.69%	14.49%
621112	Offices of Physicians, Mental Health Specialists	10,562	$3,419	$300,964	4.8%	$14,368	1.14%	23.79%
621210	Offices of Dentists	124,962	$4,496	$508,653	7.2%	$36,816	0.88%	12.21%
621310	Offices of Chiropractors	38,679	$2,818	$191,362	6.3%	$12,051	1.47%	23.39%
621320	Offices of Optometrists	19,524	$3,077	$405,233	6.3%	$25,519	0.76%	12.06%
621330	Offices of Mental Health Practitioners (except Physicians)	24,240	$2,251	$206,552	6.3%	$13,007	1.09%	17.30%
621340	Offices of Physical, Occupational and Speech Therapists and Audiologists	26,045	$4,125	$334,648	6.3%	$21,074	1.23%	19.57%
621391	Offices of Podiatrists	7,283	$3,210	$336,393	6.3%	$21,184	0.95%	15.15%
621399	Offices of All Other Miscellaneous Health Practitioners	19,332	$2,950	$237,803	6.3%	$14,975	1.24%	19.70%
621410	Family Planning Centers	1,452	$5,661	$636,407	4.4%	$27,857	0.89%	20.32%
621420	Outpatient Mental Health and Substance Abuse Centers	6,381	$5,346	$1,399,106	4.4%	$61,242	0.38%	8.73%
621491	HMO Medical Centers	19	$551,787	-	4.4%	-	-	-
621492	Kidney Dialysis Centers	384	$13,369	$3,635,883	4.4%	$159,151	0.37%	8.40%
621493	Freestanding Ambulatory Surgical and Emergency Centers	3,934	$3,747	$1,863,378	4.4%	$81,564	0.20%	4.59%
621498	All Other Outpatient Care Centers	6,416	$13,557	$2,670,531	4.4%	$116,895	0.51%	11.60%

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Table VI.B.39: Screening Analysis for SBA Small Entities

NAICS	NAICS Description	Covered Entities	Total Cost per Entity	Average Revenue per Entity	Profit Rate	Average Profit per Entity	Cost to Revenue	Cost to Profit
621610	Home Health Care Services	23,122	$4,860	$919,859	5.7%	$52,152	0.53%	9.32%
621910	Ambulance Services	3,102	$5,759	$1,560,934	5.7%	$88,498	0.37%	6.51%
621991	Blood and Organ Banks	289	$31,108	$4,565,418	5.7%	$258,838	0.68%	12.02%
621999	All Other Miscellaneous Ambulatory Health Care Services	3,287	$2,983	$572,697	5.7%	$32,469	0.52%	9.19%
622110	General Medical and Surgical Hospitals	2,164	$203,535	$25,856,848	4.4%	$1,146,105	0.79%	17.76%
622210	Psychiatric and Substance Abuse Hospitals	192	$14,930	$15,101,150	4.4%	$669,359	0.10%	2.23%
622310	Specialty (except Psychiatric and Substance Abuse) Hospitals	182	$45,507	$17,003,097	4.4%	$753,663	0.27%	6.04%
623110	Nursing Care Facilities (Skilled Nursing Facilities)	8,623	$12,315	$4,005,545	4.4%	$177,546	0.31%	6.94%
623210	Residential Intellectual and Developmental Disability Facilities	6,729	$9,414	$1,719,306	4.4%	$76,208	0.55%	12.35%
623220	Residential Mental Health and Substance Abuse Facilities	4,064	$3,419	$1,659,564	4.4%	$73,560	0.21%	4.65%
623311	Continuing Care Retirement Communities	3,661	$9,927	$2,904,780	4.4%	$128,754	0.34%	7.71%
623312	Assisted Living Facilities for the Elderly	14,000	$2,758	$570,891	4.4%	$25,305	0.48%	10.90%
623990	Other Residential Care Facilities	3,145	$2,594	$1,126,003	4.4%	$49,910	0.23%	5.20%
711211	Sports Teams and Clubs	66	$1,952	$849,465	5.2%	$44,491	0.23%	4.39%
922160	Public Firefighter-EMTs	5,005	$3,671	$1,121,142	5.7%	$63,564	0.33%	5.78%

Table VI.B.40: Screening Analysis for Very Small Entities (fewer than 20 Employees)

NAICS	NAICS Description	Affected Entities	Total Cost per Entity	Average Revenue per Entity	Profit Rate	Average Profit per Entity	Cost to Revenue	Cost to Profit
	Total / Average	**471,735**	**$3,432**	**$367,593**	**5.82%**	**$20,902**	**1.04%**	**18.01%**
446110	Pharmacies and Drug Stores	4,255	$2,585	$1,561,067	2.9%	$45,273	0.17%	5.71%
561210	Facility Support Services	283	$2,039	$694,693	2.8%	$19,451	0.29%	10.48%
561311	Employment Placement Agencies	1,135	$2,339	$326,928	2.1%	$6,850	0.72%	34.14%
611110	Elementary and Secondary Schools	5,546	$1,976	$279,998	6.1%	$16,989	0.71%	11.63%
611210	Junior Colleges	109	$1,941	$365,396	6.1%	$22,171	0.53%	8.76%
611310	Colleges, Universities, and Professional Schools	398	$1,969	$573,805	6.1%	$34,816	0.34%	5.66%
611710	Educational Support Services	451	$1,938	$267,163	6.1%	$16,210	0.73%	11.95%
621111	Offices of Physicians (except Mental Health Specialists)	145,362	$3,942	$459,514	4.8%	$21,937	0.86%	17.97%
621112	Offices of Physicians, Mental Health Specialists	10,170	$3,042	$222,079	4.8%	$10,602	1.37%	28.69%
621210	Offices of Dentists	119,903	$4,243	$434,891	7.2%	$31,477	0.98%	13.48%
621310	Offices of Chiropractors	38,364	$2,770	$179,901	6.3%	$11,329	1.54%	24.45%
621320	Offices of Optometrists	18,608	$2,864	$331,136	6.3%	$20,853	0.86%	13.74%
621330	Offices of Mental Health Practitioners (except Physicians)	23,029	$2,100	$128,741	6.3%	$8,107	1.63%	25.90%
621340	Offices of Physical, Occupational and Speech Therapists and Audiologists	23,945	$3,369	$225,863	6.3%	$14,224	1.49%	23.69%
621391	Offices of Podiatrists	7,032	$2,987	$277,483	6.3%	$17,474	1.08%	17.10%
621399	Offices of All Other Miscellaneous Health Practitioners	18,345	$2,588	$165,951	6.3%	$10,451	1.56%	24.77%
621410	Family Planning Centers	1,225	$3,403	$241,732	4.4%	$10,581	1.41%	32.17%
621420	Outpatient Mental Health and Substance Abuse Centers	4,147	$2,410	$269,125	4.4%	$11,780	0.90%	20.46%
621491	HMO Medical Centers	6	$2,123	-	4.4%	-	-	-
621492	Kidney Dialysis Centers	254	$3,797	$651,812	4.4%	$28,531	0.58%	13.31%

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Table VI.B.40: Screening Analysis for Very Small Entities (fewer than 20 Employees)

NAICS	NAICS Description	Affected Entities	Total Cost per Entity	Average Revenue per Entity	Profit Rate	Average Profit per Entity	Cost to Revenue	Cost to Profit
621493	Freestanding Ambulatory Surgical and Emergency Centers	2,652	$2,837	$771,867	4.4%	$33,786	0.37%	8.40%
621498	All Other Outpatient Care Centers	3,977	$3,560	$465,086	4.4%	$20,358	0.77%	17.49%
621610	Home Health Care Services	14,871	$2,671	$236,340	5.7%	$13,399	1.13%	19.93%
621910	Ambulance Services	1,661	$2,979	$293,115	5.7%	$16,618	1.02%	17.93%
621991	Blood and Organ Banks	173	$3,297	$580,221	5.7%	$32,896	0.57%	10.02%
621999	All Other Miscellaneous Ambulatory Health Care Services	2,918	$2,614	$364,453	5.7%	$20,663	0.72%	12.65%
622110	General Medical and Surgical Hospitals	64	$2,805	$5,316,386	4.4%	$235,649	0.05%	1.19%
622210	Psychiatric and Substance Abuse Hospitals	41	$1,283	$1,310,672	4.4%	$58,096	0.10%	2.21%
622310	Specialty (except Psychiatric and Substance Abuse) Hospitals	23	$1,249	$622,250	4.4%	$27,581	0.20%	4.53%
623110	Nursing Care Facilities (Skilled Nursing Facilities)	2,200	$1,427	$523,442	4.4%	$23,202	0.27%	6.15%
623210	Residential Intellectual and Developmental Disability Facilities	3,664	$1,332	$187,430	4.4%	$8,308	0.71%	16.04%
623220	Residential Mental Health and Substance Abuse Facilities	2,044	$1,147	$306,461	4.4%	$13,584	0.37%	8.45%
623311	Continuing Care Retirement Communities	1,369	$1,505	$269,127	4.4%	$11,929	0.56%	12.62%
623312	Assisted Living Facilities for the Elderly	10,598	$1,412	$191,984	4.4%	$8,510	0.74%	16.59%
623990	Other Residential Care Facilities	1,945	$1,097	$212,052	4.4%	$9,399	0.52%	11.67%
711211	Sports Teams and Clubs	50	$1,927	$551,915	5.2%	$28,907	0.35%	6.67%
922160	Public Firefighter-EMTs	917	$2,999	$290,146	5.7%	$16,450	1.03%	18.23%

b. Conclusion

To determine whether compliance with the ETS is economically feasible for all affected industries, OSHA conducted two screening tests to determine whether the costs of the rule are beneath the threshold level at which the economic viability of an affected industry might be threatened. The two screening tests are the one-percent-of-revenue test and the ten-percent-of-profit test. For those industries with costs beneath both of these threshold levels, the rule was presumed to be economically feasible. Industries that have costs beneath both thresholds for all establishments constitute the majority of industries covered by the ETS. For industries with costs above one percent of revenues or ten percent of profits, OSHA performed additional analysis regarding whether firms would

be eligible for scope exemptions to avoid the cost of compliance with the ETS or whether they could generally pass on the compliance costs of the rule in the form of higher prices or if, instead, firms would have to absorb the costs of the rule in the form of lost profits. Given the fact that all competitors in the industries that had costs above the revenue or profit threshold have to comply with the ETS, OSHA does not expect foreign competition or other factors to restrict the ability of affected firms to pass the costs of the ETS on to consumers through price increases.

OSHA has, for that reason and for the additional reasons described in more detail above, concluded that the revenue test is the most appropriate metric to use for determining the economic feasibility of the ETS. Looking at ETS costs to revenues, OSHA has concluded that complying with the ETS is economically feasible for all covered industries in their entirety. Furthermore, none of the economic impacts on small or very small entities are such as to threaten the structure of any of the covered healthcare industries (this is further buttressed by the significant baseline compliance of the small and very small entities in these industries).

In addition, it is important to note that the costs of compliance with the ETS will only affect revenues and profits for the period during which the ETS is in effect, which is expected to be at most 6 months, so it will be easier for employers to withstand the impact of any additional costs for this time period as opposed to absorbing ongoing costs typically required by rulemakings.

Finally, OSHA notes that most of the NAICS that failed one or both of the screens would not have done so if OSHA followed its normal analysis of comparing costs to annual profit and revenue, as opposed to only 6 months of profits and revenue. Under a one-year timeframe of revenues and costs, the economic impacts of the ETS would have been cut in half.

VIII. COVID–19 ETS Health Benefits

a. Introduction

This chapter estimates the health benefits of the COVID–19 Emergency Temporary Standard (ETS), while the following chapter discusses other (non-health) benefits of the ETS. Assessing the health benefits of the ETS accurately is a difficult task because COVID–19 case and fatality counts change rapidly and because the recent deployment of three new vaccines and the advance of rapidly spreading variants have complicated the calculation of baseline infections and deaths for the ETS. As vaccines have become available to an increasing number of people, fatalities from COVID–19 have dropped over the last few months. Meanwhile, case counts and hospitalizations have not uniformly decreased alongside vaccinations, instead at times increasing—including among people of working age—as a particularly transmissible variant accounts for more than a quarter of new cases assessed in the U.S. To be representative of recent experience, OSHA is examining the number of cases and fatalities during the recent month of March 20, 2021 through April 20, 2021, to develop an estimate of how many infections and fatalities will be prevented over the 6-month period of the ETS if those numbers stay constant during that time. OSHA labels this its ''primary'' estimate. But there is a great deal of uncertainty around any estimates of health benefits obtained from the ETS. OSHA also developed a scenario that uses the historic average over the first year of the pandemic, divided by two, as an alternative estimate of impacts for the next six months. There are further discussions of the effects of vaccines below, as a part of a systematic construction of possible cases and fatalities avoided.

The estimation of the monetized health benefits of the ETS, taking into account community transmission (transmission outside the workplace) and the degree of worker vaccination, as well as other uncertainties, is developed step by step in the following sections. The first section describes the scope and limitation of ETS health benefits. The second section describes the data and underlying assumptions used in OSHA's estimation of health benefits for workers in healthcare (HCWs) subject to 29 CFR 1910.502. The third section addresses how OSHA developed several baseline estimates of infections and deaths from the SARS–CoV–2 virus for HCWs that might occur in the absence of the ETS and vaccination. The fourth section describes how OSHA estimated the infections and deaths that would be prevented by the ETS relative to (alternative) baseline conditions. In that section, OSHA takes into account the rapid development and deployment of vaccines for the working population. The health benefits of infections and deaths averted due to the ETS are monetized in the fifth section. The chapter concludes with a summary of estimated health benefits of the ETS under various scenarios.

b. Scope of OSHA's Estimates of ETS Health Benefits and Discussion of Secondary Benefits

For the purpose of estimating the ETS benefits, OSHA has not attempted to quantify or account for a variety of secondary and feedback health benefits arising as a result of the ETS. For example, the agency does not account for the secondary benefits of avoided COVID–19 cases among family and friends (other than co-workers) that would occur due to exposure to an infected worker absent the ETS. The agency also does not count the benefits of avoided cases that would otherwise occur due to workplace transmission from employees to patients and other visitors to a healthcare facility. Nor does the agency include the many downstream benefits to the public of keeping HCWs safe from COVID–19, including maintaining sufficient healthy staff with the necessary skills to treat patients in need of care. Other unquantified benefits include those due to the feedback effects of reduced community spread of the virus that may lead to fewer COVID–19 infections and deaths generally, including reduced spread to workers outside the workplace. As discussed below in the following two paragraphs, the agency believes that taken together these non-quantified benefits are sizable.

Reducing cases of COVID–19 among HCWs will help ensure the effective functioning of the healthcare system, which in turn protects workers who become patients, as well as many others, after COVID–19 infection. Patients hospitalized for COVID–19 require substantial health care resources such as staff, beds, and equipment. Many hospitals over the course of the pandemic have been at or near ICU capacity due to the surges in COVID–19 cases, diminishing the health care system's ability to provide essential healthcare services. Reducing employee infections can remove one of the stressors on the healthcare system. Reducing infections among HCWs in particular will increase the number of staff available to treat patients with both COVID–19 and non-COVID–19 ailments. In turn, the quality of care will improve since medical staff will be less time constrained.

Additionally, the estimated quantified ETS benefits do not include non-health related benefits such as a beneficial impact on the economy at large or the impact of how the disease has disproportionately impacted communities of color both financially and in terms of health effects and lives lost throughout the pandemic. For a

discussion of non-health related benefits please see the section VI.B.VIII.i, Other (Non-Health) Benefits of the ETS.

c. Limitations of OSHA's Estimates of ETS Health Benefits

OSHA's analysis of potential benefits has a number of analytical limitations due to the uncertain trajectory of the pandemic, difficulty forecasting future infection and death rates, difficulty quantifying the impacts of various factors that might influence this analysis, unavailability of data and information suitable for extrapolation, and limits on the time and resources available for this analysis given the emergency circumstances.

Throughout the analysis, OSHA found it necessary to include a variety of simplifying assumptions. Some of the most important are summarized here and discussed further later in the analysis:

- The ETS will be in place for six months.
- HCWs are age 18–64.
- HCWs have the same COVID–19 infection rates as non-health care workers (NHCWs).[86]
- Each of the next 6 months of infections and deaths will duplicate the ''primary'' scenario or the monthly ''alternative'' scenario average.
- The average vaccination rate over the next six months for the HCW population will be 75 percent. Vaccines will have an 85.2 percent efficacy rate at preventing infections and will prevent all fatalities (U.S. Food and Drug Administration (FDA), December 18, 2020, U.S. Food and Drug Administration (FDA), December 11, 2020, U.S. Food and Drug Administration (FDA), February 4, 2021).
- 80 percent of COVID–19 infections and deaths in HCWs are workplace-acquired; the remaining 20 percent are attributable to community spread.
- The standard will have preventiveness coefficients of 94 percent of HCW workplace transmissions and, taking into account a community spread of 20 percent, an overall effectiveness rate of 75 percent for HCWs.

These simplifying assumptions mean that specific analytical inputs and outputs might be over- or underestimated to the extent that real world conditions vary from these assumptions. As discussed further, a sensitivity analysis was conducted exploring some alternative simplifying assumptions, along with examples with much lower monthly case counts. This analysis is presented at the end of this document.

OSHA was also not able to adjust its quantitative estimates to account for several factors that might impact the potential benefits of the ETS. These include:

- Unreported infections or deaths. Infections and deaths may have been underreported early in the pandemic, when knowledge of, and testing for, COVID–19 were more limited.
- Potential reductions in fatalities from improvements in medical treatment for COVID–19 in the coming months.
- Impacts of mutations or variations in the SARS–CoV–2 virus on disease transmissibility or severity, virus susceptibility to one or more class of therapies, and neutralization of antibodies generated during previous infection or vaccination.
- Changes in social and state, local, tribal, and territorial government practices and restrictions beyond those reflected in the baseline infection and death counts. These changes could result in more or fewer vulnerable workers being exposed to COVID–19.
- Decreases in teleworking and more in-person work, which would increase the benefits for this ETS.
- Chronic impacts of COVID–19 disease, including any potential risk of premature death.

While OSHA relied on the best available evidence in forming its estimates, it is possible that given these analytical limitations, aspects of OSHA's quantitative estimate of benefits may be over or underestimated. Additionally, a variety of potential benefits were not quantified.

OSHA requests public comments on relevant data, literature, and methodological suggestions that it might use to improve underlying assumptions or otherwise address these limitations at the final standard rule stage, if a final standard is needed. OSHA also welcomes comments on all aspects of the economic analysis.

d. Data and Estimation Methods

The starting point for estimating the expected number of COVID–19 infections and deaths prevented by the ETS is to estimate the expected number of the respective health outcomes in the absence of the ETS. The data source for the baseline estimates is from the Centers for Disease Control and Prevention (CDC): The CDC's Cases and Deaths, Daily and Total Trends, found on the CDC Daily Tracker website (CDC April 20, 2021). The CDC collects COVID–19 data from state and county health departments and publishes a daily update that includes the number of confirmed infections in the U.S. along with cumulative deaths. The CDC reports both the total number of ''confirmed'' COVID–19 infections (*i.e.,* confirmed by a lab test such as a polymerase chain reaction or serologic test) and ''probable'' cases (*i.e.,* clinical and epidemiologic evidence without confirmed testing).[87] Note that the CDC daily reports likely undercount the number of infections since most people infected with COVID–19 are not tested.[88] The characteristics of the CDC data that OSHA uses to calculate the baseline estimates for the healthcare worker populations are described below.

[86] OSHA emphasizes that this is a simplifying assumption for the analysis. OSHA believes that HCW, on average, face higher risks of COVID–19 illness than most NHCW.

[87] CDC's (2021a) website notes the following:

A confirmed case or death is defined by meeting confirmatory laboratory evidence for COVID–19.

A probable case or death is defined by one of the following:

Meeting clinical criteria AND epidemiologic evidence with no confirmatory laboratory testing performed for COVID–19.

Meeting presumptive laboratory evidence AND either clinical criteria OR epidemiologic evidence.

Meeting vital records criteria with no confirmatory laboratory testing performed for COVID19.

Source: CDC, March 23, 2021.

[88] The Estimated Disease Burden of COVID–19 shows that only one out of every 4.6 COVID–19 cases in the U.S. was reported from February 2020 to December 2020 (CDC, April 29, 2021).

Forecasts of COVID–19 cases and deaths involve a high level of uncertainty, because they depend largely on predicting human behavior, both inside and outside of work; mitigation policies at all levels of government, which are constantly changing; and the emergence of new variants of the virus, all of which are major factors influencing COVID outcomes. Forecasting the course of the pandemic beyond four weeks is so uncertain that many infectious disease modelers refuse to do it. For example, one recent review found that, compared to one-week forecasts, prediction errors doubled when forecasting four weeks out and were five to six times higher when forecasting 20 weeks out (Cramer et al., February 5, 2021). The same review found that, on average, models looking eight weeks or more ahead estimated ranges that included the actual outcome less than half the time. Given that degree of uncertainty, the CDC only forecasts for four weeks and does so as an ensemble model, which brings together insights from numerous different models into a combined forecast (CDC, April 20, 2021).

Short-range predictions from models such as the CDC Ensemble Model have provided useful information. For example, on March 15, 2021 the CDC Ensemble Model for the week ending April 10, 2021 showed a mid-point estimate of 272,367 cases. That week there were 451,328 cases, but this was well within the forecast range of 137,538 to 510,617 cases per week. On April 25, 2021, this group of models predicted 248,663 to 723,900 (mid-point of 476,970) new cases per week likely to be reported in the week ending May 15, 2021; the actual number of reported cases for the week ending May 15 was 218,241. This was below even the models' 97.5 percent lower bound estimate from April.

Rather than using available forecasting models,[89] OSHA will rely on the documented number of cases and deaths during either a recent time period or for the first year of the pandemic as representing a range of possible baseline estimates. A review of forecasting models available to the public over the past year shows they have been universally inaccurate. OSHA has found none are sufficiently reliable to support an estimate of COVID–19 cases and deaths for the next 6 months. OSHA's estimates of health benefits from the ETS are therefore derived from its analysis of the cases in this range, with subsequent adjustments as described below. OSHA believes this approach is appropriate as a starting point for this analysis, and notes that the agency's estimates appear in line with the three-week modeling, although the CDC Ensemble Model produces a range of estimates with a midpoint (476,970 cases per week) that is near OSHA's estimate of 510,307 cases per week, based on the month before April 20, 2021 (CDC, April 20, 2021).

Summary of COVID–19 Cases and Fatalities Prevented by the ETS

Using OSHA's ''primary'' scenario based on actual data from March 19, 2021 through April 19, 2021 (explained below), and taking into account overall effectiveness of 75 percent, the agency estimates there would be 295,284 HCW infections and 776 HCW deaths *prevented by* the ETS.[90] These results are summarized in Table VI.B.41.

Table VI.B.4142: Summary of Six-Month Estimates for Infections and Fatalities Prevented among HCW, with ETS 75 Percent Full Effectiveness (to Account for Community Spread) and Vaccination, under Primary and Alternative Scenarios

	Primary (March 19-April 19, 2021 adjusted data)	Alternative (April 1, 2020-April 1, 2021 adjusted data)
Health Care Worker Cases	295,284	232,961
Health Care Workers Fatalities	776	545

Most of this section explains OSHA's use of data to discover the number of cases and fatalities that would occur over six months *without* the ETS. OSHA's step-by-step derivation of baseline infections and deaths over a six-month period is described in the sections below.

Identification of Total COVID–19 Cases by Age Group To Determine Infected Worker Population

OSHA bases its analysis of the health benefits on the estimated reduction in the number of COVID–19 infections and deaths among covered HCWs as a result of compliance with the ETS. Prevented cases of COVID–19 infections can range widely in severity and include asymptomatic cases, cases involving mild to moderate symptoms, cases involving severe symptoms prompting hospitalization, cases with long-term health effects, including disability, and fatal cases. For other rulemakings, OSHA has calculated benefits for the reduced risk of premature death from chronic disease.[91] For this ETS, given that the COVID–19 pandemic is a little over a year old, the agency believes that estimates of the costs of premature death due to the disease's chronic effects would be too speculative to quantify.

OSHA relies on CDC data reported on April 19, 2021, which was as current as the timeline for this emergency rulemaking allows, to identify the data sample for baseline estimates of HCWs COVID–19 infections and deaths. HCWs, for purposes of this section of the preamble, are those covered by Section 1910.502 of the ETS. As of April 19, 2021, the U.S. had 31,484,148 reported COVID–19 infections and 564,292 deaths. Out of the 31,484,148 COVID–19 infections, 24,726,290 individual ''Human Infection with 2019 Novel Coronavirus Case Report Forms,'' containing more extensive information about each patient, have been collected

[89] Since May, 2020 OSHA staff have monitored the UCLA Model Comparison page (Statistical Machine Learning Lab at UCLA, 2021)) along with models by the University of Texas, Columbia University, MIT, Iowa State University, IHME, Los Alamos National Lab, and the YYG model. Of note, the Model Comparison page stopped ranking forecasts in the summer of 2020.

[90] OSHA's analytical framework is based on raw case data. Although that does not allow a breakdown by type of healthcare setting, for the reasons identified in *Grave Danger* (Section IV.A. of this preamble), the agency expects that a substantial majority of the cases among healthcare workers will occur in healthcare settings where COVID–19 patients are treated or persons who are suspected or confirmed to have COVID–19 will otherwise be located (*e.g.,* healthcare establishments offering COVID–19 testing).

[91] See for example, the FEA in support of the January 9, 2017 final beryllium rule [(OSHA 2016a), Pages VII–14 to VII–17].

by the CDC.[92] Of those forms collected, 24,740,863 indicated the age of the individual who had COVID–19. Based on those forms, 74 percent of the people who identified their age were of working age (assumed to be ages 18 to 64 for purposes of this analysis).

Table VI.B.42, below, presents the total number of cases and deaths reported by the CDC through April 19, 2021, along with the agency's estimate of cases and deaths among employed workers ages 18–64. As its starting point, OSHA used the number of cases reported by the CDC on April 19, 2021 (31,484,148). From there, OSHA used the 74 percent figure described in Table VI.B.42 to exclude all cases among people ages 1–17 years and 65 years and over to obtain the total number of cases among people ages 18 to 64.[93] Once OSHA had estimated the number of cases within the 18–64 age range, the agency applied an average employment-to-population ratio of 69 percent to the number of cases among people ages 18–64 to determine the number of employed people infected.[94] OSHA's estimate of the number of cases among employed adults, ages 18–64, is based on the simplifying assumption that employed and unemployed adults within this broad age range contract COVID–19 at the same rate. Teleworkers are removed from this analysis. Although workers who do not telework may actually have a much higher infection rate than either teleworkers or unemployed individuals because of increased contact with others at work, this assumption is necessary because of the lack of specific data on differences in infection rates between employed and unemployed individuals. OSHA followed the same procedure to obtain the number of fatalities among workers aged 18 to 64. The information in Table VI.B.42 was used to help develop the baseline estimates that follow.

Table VI.B.42: Number of Employed People and Share of Cases and Deaths

Population Age 18-64	196,957,000
Working Population Age 18-64	136,259,000
Percent of Population Age 18-64 Working	69 percent
Total Cases	31,484,148
Total Cases for Ages 18-64	22,310,383
Percent of Total Cases in 18-64 Age Group	74 percent
Total Cases for Workers Ages 18-64	15,434,792
Total Fatalities	564,292
Total Fatalities for Ages 18-64	103,276
Percent of Fatalities in 18-64 Age Group	19 percent
Total Fatalities for Workers Ages 18-64	71,449
Source: Cases and deaths are as of April 19, 2021 from (CDC, April 20, 2021) . Population data were obtained from Table cpsaat03 (BLS, 2020).	

In order to estimate benefits arising from the ETS, OSHA provides ''primary'' and ''alternative'' historic estimates of the number of cases and fatalities based on two different methods of counting cases and fatalities. These primary and alternative estimates provide a bounded range for benefits calculations. The primary historic estimate corresponds to the number of infections and fatalities in the U.S. (not just workers) among people ages 18 to 64 in a one-month period (March 19–April 19, 2021). OSHA relies on this estimate in its primary analysis for several reasons: (1) It has a basis in recent historic fact, (2) the estimate is well within the bounds of short-term CDC forecasts, and (3) at the time this analysis was conducted, this is a reasonable estimate considering the current infection numbers and the uncertainty between the rate of vaccinations and the spread of more transmissible variants. If the entire epidemic had behaved similarly to the primary month levels of infections and fatalities, there would have been a lower number of infections and fatalities over the past year.

The alternative estimate is based on the historic average monthly infections and fatalities between April 1, 2020 and April 1, 2021, which covers most of the pandemic.[95] To obtain this alternative estimate, OSHA took the total infections and fatalities for this period among those who were 18 to 64 years old, and then divided by 12 months.

[92] The CDC PUI (Person under Investigation) Form lists the clinical outcome, which can include death (CDC, May 1, 2020).

[93] Workers over age 64 are excluded from the analysis because including higher age cohorts would introduce the possibility of overestimating the share of COVID infections and deaths among workers. In these older cohorts, the employment to population ratio falls rapidly with age, while fatalities related to COVID–19 increase rapidly with age. For example, within the cohort of those aged 65–74 years, employment is loaded toward the youngest in the age group (*i.e.,* people who are 65–67 years old), while many more fatalities occurred at the higher end of that band (*i.e.,* those 73–74 years old).

[94] The average employment to population ratio rate of 69% among people ages 18–64 is based on the 2020 waves of the Basic Monthly Current Population Survey (CPS). CPS is a monthly U.S. survey conducted by the U.S. Census Bureau that is commonly used to identify the demographic and employment characteristics of individuals in a household (BLS, 2020).

[95] Prior to April 1, 2020 there had been 188,192 cases reported, and 4,584 fatalities, beginning in January, 2020.

OSHA considered using a higher estimate based on the pre-vaccine December 2020 surge in cases and fatalities but will instead report the 12-month monthly-average as the alternative estimate. A December estimate of cases and deaths would be at least twice the magnitude of even the OSHA alternative estimate (the higher of OSHA's two estimates) and could significantly over-estimate the benefits even after vaccinations are considered. Furthermore, at the time this analysis was conducted, a December weekly case count (of over 1 million) seemed unreasonable and was also significantly higher than the highest estimate from the CDC Ensemble model. The primary and alternative historical averages for infections and fatalities for the U.S. population ages 18 to 64 are summarized in Table VI.B.43.

Table VI.B.4344: Single Month Average Cases and Fatalities for All Working-Age Adults, Ages 18-64

	Primary	Alternative
Monthly Infections	1,513,606	1,859,199
Fatalities	4,561	8,606
Source: OSHA calculations based on CDC (April 20, 2021).		

Baseline Estimate Assumptions

For this analysis, OSHA assumes that the ETS will be in effect for six months. Estimating baseline COVID–19 infections and deaths that will occur among HCWs over this six-month period is uncertain due to several factors, including: (1) The novel nature of the virus and resulting pandemic; (2) heterogeneous timing and conditions of exposure control policies enacted by various governmental authorities; (3) new virus variants; and (4) the effect of currently-authorized vaccines. OSHA was unable to adjust infection or fatality rates for any of these factors except vaccination, which is discussed further below. OSHA also includes a simplifying assumption that NHCWs and HCWs have the same COVID–19 infection rates. OSHA believes this method significantly undercounts HCW cases. However, in the benefits calculations, OSHA takes into account the higher vaccination rates for HCWs. This results in the ETS providing a lower percentage of infections avoided per HCW relative to per NHCW.

In developing its main set of baseline estimates, OSHA makes an important simplifying assumption. For the alternative historic estimates, OSHA assumes that the average monthly number of HCW infections and fatalities over the next 6 months will, absent this ETS, equal the average monthly number of HCW infections and fatalities during the first twelve months of the epidemic, with April 1, 2020 as the starting point. In other words, OSHA assumes that the average monthly number of HCW infections and deaths that occurred during the twelve-month period from April 2020 to April 2021 will also occur on a monthly basis during the six-month period beginning when the ETS goes into effect. The same assumption is also true for the primary scenario. For the primary scenario, absent the ETS, OSHA assumes that the same monthly number of cases and fatalities that occurred from March 19, 2021 through April 19, 2021 would be prevented each month, on average, for the next six months. This simplifying assumption of a constant continuing average number of baseline infections and deaths makes sense because, among other reasons, one would not expect employers to institute additional infection control procedures beyond what they already have in place absent the requirements of the ETS. As a starting point for creating the baseline, this assumes other influences—including social and government practices and restrictions; infection and fatality rates; variants of the virus; and the efficacy, production, and use of available vaccines—will stay relatively constant, or, more realistically, will balance each other out.

e. Baseline Estimates of Cases and Deaths

Table VI.B.44 and Table VI.B.45 and the discussion below illustrate OSHA's process for determining the number of baseline cases and deaths that can be affected by the ETS.

Table VI.B.01: Estimating Health Care Worker Cases and Removing Those Caused By Community Spread

	Primary	Alternative
(A) CDC total of COVID-19 Cases	2,041,229*	2,507,290*
(B) Cases within working age range (18-64 years)	1,513,606	1,859,199
(C) Cases who are workers	1,047,145	1,286,233
(D) Subtract # of cases who are teleworkers	228,797	281,037
(E) Remaining non-teleworker cases (1 month)	818,348	1,005,196
(F) Remaining cases after subtracting 20% community spread	654,678	804,157
(G) # of cases of Non-Health Care Workers (87%) – 1 month	571,221	701,644
(H) # of cases of Health Care Workers (13%) – 1 month	83,458	102,513
(I) # of cases of Non-Health Care Workers (87%) – 6 months	3,427,323	4,209,863
(J) # of cases of Health Care Workers (13%) – 6 months	500,746	615,078
(K) Adjusted for 75 Percent Vaccination (HCW	314,969	248,492
(L) Total # of cases of HCW adjusted for 93 Percent Preventiveness	295,284	232,961
* CDC data for past dates are continuously revised. This CDC data snapshot was downloaded Tuesday, April 20, 2021 at 19:35:43 GMT-0400. These data encompass the number of cases reported from March 19 through April 19, including data from both March 19 and April 19.		

Table VI.B.12: Estimating Health Care Worker Fatalities and Removing Those Caused by Community Spread

	Primary	Alternative
(A) CDC total of COVID-19 Fatalities	**23,642**	**44,615**
(B) Fatalities of persons within working age range (18-64 years)	4,561	8,606
(C) Fatalities of workers	3,155	5,954
(D) Subtract # of fatalities who are teleworkers	689	1,301
(E) Remaining non-teleworker fatalities (1 month)	2,466	4,653
(F) Remaining fatalities after subtracting 20% community spread	1,973	3,722
(G) # of fatalities of Non-Health Care Workers (87%) – 1 month	1,721	3,248
(H) # of fatalities of Health Care Workers (13%) – 1 month	251	475
(I) # of fatalities of Non-Health Care Workers (87%) – 6 months (Row G x 6)	10,326	19,448
(J) # of fatalities of Health Care Workers (13%) – 6 months (Row H x 6)	1,506	2,850
(K) With HCW Fatality Adjustment--HCW	1,656	2,034
(L) Adjusted for 75 Percent Vaccination (HCW)	828	581
(M) HCW Fatalities Adjusted for 93 Percent Preventiveness	776	545

OSHA's process for identifying the number of workplace cases of COVID–19, which for this analysis is treated the same as the number of infections,[96] is illustrated in Table VI.B.44.

The primary scenario OSHA is examining extrapolates data from March–April 2021. While OSHA has data from the CDC indicating the total number of COVID–19 cases recorded during March 19–April 19 (2,041,229), those data do not specify which of those cases are infected workers and which are other members of the community. The data do, however, identify most of the cases by age. After OSHA has adjusted the number of these cases for age (to focus on cases of working-age people—see Table VI.B.42 and Row B of Table VI.B.44), OSHA also reduces that number to account for working-age persons who are not employed based on age-specific employment percentages, assuming the employed and non-employed have an equal chance of becoming infected. The remaining total number of worker cases from CDC data for this month is estimated to be 1,047,145 (see Row C of Table VI.B.44).

OSHA's benefits calculations include several additional adjustments, each described in more detail later, to ensure that they are focused on the prevention of just those infection transmissions that would have occurred at the workplace. First, OSHA allocated all infection cases between teleworking employees (by definition they are not at the workplace so cannot be infected at work) and physical workplace employees. Second, OSHA adjusted the number of cases remaining for physical workplace employees by removing some of those cases as potentially attributable to community spread (infection transmission occurring outside the workplace) versus workplace infection. Any infection discovered at work could have been contracted at work, at home, or elsewhere outside of the workplace. The ETS does not protect employees when they are away from the workplace, and they might still become infected in non-work settings. Failure to account for these non-work-acquired infections would lead to an overestimation of the number of cases averted by the ETS. Unfortunately, the data available to the agency for estimating baseline COVID–19 infections and deaths do not distinguish between workplace infections and those acquired elsewhere. To make such a distinction, OSHA ultimately must try to account for the community spread of infections.

Finally, it is important to note that while OSHA is attempting to remove community spread cases from benefits calculations, many such community spread cases include workers in the workplace, so OSHA still takes full ETS costs for them. For example, the employer would still be required to pay for the medical removal of an employee who was infected outside the workplace in order to keep that employee from transmitting the virus to others at the workplace.

As a final step, OSHA removed a number of cases to account for vaccinations (later in the analysis the vaccinations are also factored into reducing monetized benefits).

COVID–19 Cases Among Teleworkers

Table VI.B.46 presents percentages of the labor force by teleworking and non-teleworking sectors. Note that teleworkers are estimated from all those occupations capable of telework as estimated by Dingel and Neiman (July 9, 2020) and will be overestimated to the extent that, as pandemic conditions improve, more workers return to the physical workplace.[97]

[96] OSHA recognizes that not all COVID–19 infections are identified as COVID–19 cases and that there are important distinctions in those terms, but for the purposes of this benefits analysis they are equated for simplicity.

[97] Dingel & Neiman estimate, by detailed occupation, the proportion of employees who are capable of full-time telework based on survey data from the Occupational Information Network (O*Net), a DOL-sponsored program. Dingel & Neiman use the responses to two surveys included in release 24.2 of the database administered by O*NET, the Worker Context Questionnaire and the Generalized Work Activities Questionnaire. The questions are about standard tasks in an occupation (use of computer, work outdoors, etc.) The median occupation had 26 respondents for each work context question and 25 respondents for each generalized work activities question per detailed-

Continued

Table VI.B.2: Employee Percentages—Telework and Non-telework and by Sector

	Number	Percent of All Workers
Total Teleworking	**41,122,180**	**33%**
Non-teleworking Workers		
Non-Teleworking Healthcare Workers	10,601,734	9%
Non-Teleworking Non-Health Care Workers	72,562,850	58%
Total Non-teleworking Workers	**83,164,584**	**67%**
Total	**124,286,764**	**100%**

To use these worker percentages to allocate total cases among the groups we need to know the relative rate of infections for teleworkers versus employed non-teleworkers. Here OSHA relies on a study conducted in mid-2020 that found a relative rate of 66 percent.[98] Applying this relative rate, along with the teleworking percentage of 33 percent, to the total number of worker cases, OSHA calculates that the total number of COVID–19 cases among teleworkers is 228,797 (33% × 66% × 1,047,145) (See Table IV.B.44, Row D).[99]

Adjustment to physical workplace cases to remove cases from community spread.

The remaining 818,348 (1,047,145 − 228,797) cases among people of working age are attributed to workers who work in the physical workplace (See Table IV.B.44, Row E). These cases are likely to be partly due to community spread and partly to workplace transmission. This analysis includes a simplifying assumption that the community spread share is 20 percent.[100] This leaves 654,678 cases attributed to workplace transmission (818,348 × (1–20%)) (See, Row F).

Allocation of workplace transmission to section 502.

Next the remaining 654,678 cases among healthcare workers and non-healthcare workers are allocated by their relative share of non-teleworking employment, where healthcare workers are 13 percent (9%/(9% + 58%)) and non-health care workers represent the remainder, which is 87 percent (100% − 13%). The number of workplace cases for healthcare workers is therefore 83,458 (13% × 654,678) (See Table IV.B.44, Row H).

Next, because these numbers are only for a single month, OSHA multiplies these totals by six to get the total number cases during the next six months: For healthcare workers, 500,746 cases (6 × 83,458). (See Table IV.B.44, Row J).

Finally, OSHA reduces cases by vaccination rates, taking into account vaccine effectiveness. OSHA's adjustment for vaccines has two steps: (1) Removing some cases to account for vaccination preventing them; and (2) adding back in some cases to reflect the fact that the vaccine is not 100 percent effective, so a small number of people who are vaccinated are still included in the number of COVID–19 cases.

For the first step, if OSHA simply assumed no one was vaccinated during the period from which the raw data were drawn, and the vaccination rate stays constant during the period of the ETS with an average of 75 percent, the reduction for vaccination would be the simple subtraction of 75 percent of the cases in the raw data.

But that would result in an over-reduction of cases because the CDC's raw data does in fact already have some vaccination rates built in. Healthcare workers were some of the first workers to be eligible for vaccination. For the primary scenario, which is the data from March/April 2021, OSHA estimates the vaccination rate for healthcare workers at 50 percent during that period.[101]

In the second step, OSHA must account for the fact that vaccination will not prevent all COVID–19 cases, so a small group of vaccinated HCWs will still become COVID–19 cases even after being vaccinated (although OSHA assumes that the vaccine will still prevent all of them from dying). In other words, if the vaccine efficacy rate was 100 percent, then OSHA would just focus on vaccinated cases versus unvaccinated cases, but the vaccines are assumed to have only an 85.2 efficacy rate at preventing COVID–19, which is the average rate derived from the three available vaccines.[102] The formula adjusting for the reduction of vaccinated cases from the 50 percent baseline, as further adjusted to account for vaccine inefficacy, is:

cases = (raw data from Table IV.B.44, Row J) * (((75% vaccinated) * (1-vaccine efficacy) + (1–75%) unvaccinated)/((50% vaccinated) * (1-vaccine efficacy) + (1–50%) unvaccinated))

which translates to

cases = (500,746 adjusted HCW with COVID during month of March/April 2021) * ((0.75 * 0.148) + 0.25)/(0.5 * 0.148) + 0.5)) = 314,929

level SOC occupation code. See the paper for full details.

[98] See (Fisher et al., November 6, 2020). They find that 35% of teleworkers and partial teleworkers were COVID positive versus 53% of employees who worked at a physical workplace, giving a relative rate of 0.35/.53 = 66%.

[99] This estimate of teleworker infections has various uncertainties including the relative rate estimate from this Fisher et al., (November 6, 2020) study. The final number of participants of the study was 248. The definition of ''teleworking'' used is that of ''teleworking or working from home at least part of the time.'' This means that some of the infections in their 35% ''teleworking'' rate may actually have occurred at the physical workplace, which would mean OSHA's estimate of the number of teleworking cases is too high.

[100] This is based on the high incidence of workplace infection documented in the Grave Danger chapter. Some of this research includes a study of the Nashville Metro Health Department (November 20, 2020) which found 200 COVID–19 clusters occurring under 18 settings, 16 of which were workplace settings. Another paper cited is Allan-Blitz et al., (December 11, 2020), which found 149,957 cases in Los Angeles associated with an occupation. Marshall et al., (2020) found half of the exposure by individuals to COVID–19 occurred in a workplace setting. Bui et al., (August 17, 2020) found that 210 out of 277 COVID–19 outbreaks (76%) occurred in workplace settings. Chen et al., (January 22, 2021) found that mortality rates in working aged adults (18–65 years) increased 22% during the COVID–19 pandemic compared to pre-pandemic periods. Other studies also found elevated mortality risk for in-person workers (Hawkins, June 2, 2020).

[101] See a March 2021 survey of healthcare workers done by the Kaiser Family Foundation (KFF) (Kaiser Family Foundation, March 19, 2021).

[102] Vaccine efficacy against infections was calculated by taking a simple average of the efficacy rates of the three vaccines that are currently being employed, found from their clinical trial results: (Pfizer—94.6% Moderna—94.1%, Johnson & Johnson—66.9% for an average efficacy of 85.2%). See FDA (December 11, 2020), FDA (December 18, 2020), FDA (February 4, 2021).

[314,969 when adjusted for rounding]

or

cases = (500,746) * 0.361/0.574 = 314,929 [314,969 when adjusted for rounding]

OSHA multiplies the raw data by the ratio of the ETS period adjustment to that during the data period. For the primary scenario, the result is that 62.9 percent of raw data cases remain.

For the alternative scenario, which is based on a full year of data for which vaccination was not available until December 2020 when vaccines were FDA-authorized for use, the vaccination rates for healthcare workers was lower than 50 percent. For the average rate for the alternative scenario the agency assumes a rate of 50%/4 = 12.5 percent. Based on the same adjustment formula used for the primary scenario, the number of cases in the alternative scenario is reduced by 40.4 percent.[103] Since the base level of vaccinations was lower for the alternative scenario, a smaller number of cases are removed from that total to account for vaccinations.

As a result, vaccinations lower the number of cases for HCWs to 295,284. Table IV.B.44 provides these final totals of cases after the effects of vaccination in Row K.

Another way of explaining this process is that OSHA's method of calculating the number of infections prevented by the ETS involves a seven-step process. Again, OSHA illustrates this process from the ''primary'' baseline, although this method is also applicable to the alternative baseline estimate as well.

First, a count of monthly infections is created by summing daily infections from CDC's daily tracking data. In this example, for the period between March 19 and April 19 there were 2,041,229 new infections (or cases) counted by CDC that month (CDC, April 20, 2021, file: ''case_daily_trends__united_states''). Next, a count of monthly infections for working age adults is created by multiplying the number of recent cases (2,041,229) by the share of those cases (0.74) in which the person infected with COVID–19 was a working-age adult (aged 18–64).[104] The product is 1,513,606 (shown in Table VI.B.43). In the third step, the share of the population ages 18–64 who are employed (0.69) is multiplied by the previous product to produce the number of workers infected in the period March 19–April 19 (1,513,606 × 0.69 = 1,047,145) (see Table IV.B.44, Row C). The fourth step is the removal of community transmission cases, which was explained above. In that step 228,797 cases for teleworkers are removed, along with an additional 20 percent for community spread for in-person workers, leaving a total of 654,678 cases (see Table IV.B.44, Rows D through F). For the fifth step, the number of workers infected from March 19–April 19 is divided between HCWs and NHCWs by using the share of each worker type found in OSHA's industry profile; about 87 percent are NCHWs, and the remaining 13 percent are HCWs.[105] For NHCWs, this product is 571,221 (0.87 × 654,678),[106] and for HCWs, the figure is the remainder, 83,458 (654,678 − 571,221) (See Table IV.B.44, Rows G and H). In the sixth step, the number of NHCW and HCW infections is multiplied by 6 to convert the estimate for one month to a six-month period. For NHCWs, this is 3,427,323 (571,221 × 6) infections. For HCWs, this is 500,746 (83,458 × 6) infections. Table IV.B.44 summarizes these results (See Rows I and J).

In the final step of determining the number of cases, the numbers HCW cases are further reduced to account for vaccination as described above (see Rows K and L).

Fatalities

OSHA's estimation of fatalities uses a slightly modified seven-step procedure to take advantage of the HCW infection and fatality data reported to CDC. It is the same methodology used for determining the number of infections, but beginning with the baseline of CDC data on fatalities instead of infections. Again, using March 19, 2021 to April 19, 2021 as the basis for the primary scenario, for the first step a count of monthly fatalities is created by summing daily fatalities from CDC's tracking data (CDC, April 20, 2021). In this example, for the recent month there were 23,642 new deaths counted by CDC in that period. Next, a count of monthly fatalities for working age adults is created by multiplying the number of deaths from March 19–April 19, 2021 (23,642) by the share of deaths among adults ages 18–64 out of all deaths from COVID–19 for that month (0.19). This product is 4,561 deaths of working-age adults in the March/April 2021 time period. In the third step, the share of the population aged 18–64 who are employed (0.69) is multiplied by the previous product to produce the number of worker deaths in the recent month (4,561 × 0.69 = 3,155). Fatalities attributed to community spread are removed, following the same logic as was used above for infection cases. There were 689 teleworker fatalities (by definition attributable to community spread), and after removing the 20 percent of in-person worker fatalities attributable to community spread, the remainder is 1,973 COVID–19 worker fatalities attributable to the workplace for that month. The six-month total of 11,835 worker fatalities (for both NHCWs (10,180) and HCWs (1,656)) is obtained by multiplying the estimated number of worker deaths for one month by 6.

For the fifth step, the focus shifts to measurement of HCW fatalities. Since June 2020, CDC has been reporting HCW infections and fatalities. While there is significant underreporting of HCW status and possibly HCW infections and fatalities (making this data unsuitable for direct analysis of HCW impacts), OSHA believes that the ratio of fatalities to infections for HCWs is unlikely to be much affected by underreporting of total cases.[107] OSHA therefore uses the ratio of HCW fatalities to HCW infections (0.0033), which could be considered a provisional HCW case fatality rate, to produce the estimate of work-related HCW fatalities.[108] For the primary scenario, multiplying (0.0033 × 500,746 HCW infections) yields 1,656 HCW fatalities projected over the next six months.[109]

In the final step for determining the total number of work-related fatalities that would occur over the next six months without the ETS, the effects of vaccinations on the number of fatalities are shown. For fatalities, OSHA assumes that vaccination will prevent all

[103] ETS adjustment −36.1%, alternative scenario adjustment −9.4%, so 36.1/89.4 = 40.4%.

[104] Because the percentages reported throughout the text are rounded, numbers calculated using these percentages may differ slightly from the exact numbers reported in the text or tables.

[105] The Industrial Profile for the ETS provides employment data for covered employees. This allows the analysis to separate HCWs from NHCWs. In the profile there are 124,286,764 total workers: 105,278,752 NHCWs, and 10,601,734 HCWs. Therefore, NHCWs are 87.26 percent of the total workers, and HCWs are 12.74 percent of the total workers. (Source: Cost analysis.)

[106] Because the percentages reported throughout the text are rounded, numbers calculated using these percentages may differ slightly from the exact numbers reported in the text or tables.

[107] OSHA has examined CDC's data on HCW infections and fatalities, and is only using those data to calculate a preliminary case fatality ratio. Because the healthcare occupation is rarely reported on the CDC's COVID–19 Reporting Form, it is likely that fatalities and, especially, infections are vastly undercounted.

[108] On March 23, 2021, the CDC Daily Tracker website showed a total of 1,557 HCW fatalities and 470,942 HCW infections since March 2020. The fatalities divided by the infections produces a ratio of 0.0033 (CDC, April 20, 2021).

[109] Because the percentages reported throughout the text are rounded, numbers calculated using these percentages may differ slightly from the exact numbers reported in the text or tables.

fatalities for those vaccinated. For HCWs, OSHA assumes that 75 percent will be vaccinated. The vaccine fatality adjustment explained above is ultimately expressed as a 50 percent reduction. Because OSHA assumes that vaccination prevents all fatalities, these adjustments are the following:

Fatalities = (raw data from Table VI.B.4546, Row K) * (((75% vaccinated) * (1 − 100 percent vaccine efficacy) + (1 − 75%) unvaccinated)/((50% vaccinated) * (1 − 100 percent vaccine efficacy) + (1 − 50%) unvaccinated))

which translates to

fatalities = (1,656) * ((0.75*0.0 + 0.25)/(0.5*0.0) + 0.5)) = 828

or

fatalities = 1,656 * 0.25/0.5 = 828

In the case of the primary scenario, this equation collapses because two terms (in bold above) are multiplied by zero, leaving the multiplier as (0.25)/(0.5) = 0.5, so the fatalities are reduced by half by the additional vaccinations that would happen over the next six months. Using the same equation for the alternative scenario, fatalities are reduced by a factor of 0.29:

Fatalities = (2,034) * ((0.75 * 0.0 + 0.25)/(0.125 * 0.0) + 0.875)) = 581

The final number of fatalities, after taking into account community spread, preventiveness, and vaccination is 776 HCW under the primary analysis, and 545 HCW under the alternative analysis (Table VI.B.4546, Row M).

f. Infections and Deaths Prevented by the ETS

A critical factor in the estimation of the benefits of the ETS is the percentage of baseline infections and deaths that would be avoided by full implementation of all ETS requirements. This final adjustment to reach the number of cases prevented is summarized in Row L of in *Need for Specific Provisions* (Section V of the preamble), OSHA reviews numerous studies evaluating the effectiveness of various infection control practices in preventing infectious diseases. Given the consistent, multi-layered approach required by the ETS, the rate of COVID–19 infection prevention in non-healthcare and healthcare settings covered by the ETS should approach 100 percent, assuming full compliance with all requirements.

For the benefits section, OSHA suggests that overall program effectiveness for workers has two underlying components: Workplace preventiveness and community spread. Workplace preventiveness is how well the ETS works to prevent workplace transmission. The community spread is the transmission that happens outside of the workplace that, by definition, the ETS is incapable of preventing.[110] These factors can be explained by the equation: Overall effectiveness = Preventiveness after taking into account Community Spread. OSHA believes the standard will have preventiveness coefficients of about 94 percent of HCW workplace transmissions (see earlier calculations) and, taking into account a community spread of 20 percent, for an overall effectiveness rate of 75 percent for HCWs.[111] A sensitivity analysis explores potentially higher values of community spread, much lower monthly case and fatality counts, and the impact of lower overall effectiveness rates on the estimates of monetized health benefits.

Health Care Worker Population

For its main estimates of benefits, OSHA has selected a 75 percent overall effectiveness rate of the ETS for all HCWs, taking into account both the workplace preventiveness of the ETS and community transmission. This higher rate reflects the expectations that workers covered by the ETS will have enhanced ventilation and that roughly a quarter of those workers are required to wear respirators and other PPE because of exposure to people with suspected or confirmed COVID–19. Additionally, employers in these settings are already accustomed to infection control practices, even if these practices are different under normal circumstances. Then, as a sensitivity analysis, the agency also presents results using a 56 percent overall effectiveness rate, which corresponds to an overall higher rate of community spread of 40 percent.[112] These alternative effectiveness and preventiveness rates are used to derive estimates of the number of COVID–19 infections and deaths prevented by the ETS among HCWs.

Applying the 75 percent ETS effectiveness rate to the baseline estimates, along with a vaccination rate of 75 percent for HCWs, yields benefits of the ETS of 295,284 confirmed COVID–19 HCW infections and 776 deaths prevented over a six-month period as a result of the ETS (see Table VI.B.4142). Applying the 56 percent ETS effectiveness sensitivity rate to the March/April estimates yields benefits of 221,463 confirmed COVID–19 HCW infections and 466 deaths prevented over the six-month period as a result of the ETS.

g. Monetizing ETS Health Benefits

OSHA here provides estimates of the monetized value of the COVID–19 infections and fatalities prevented as a result of the ETS. These estimates are included solely to facilitate the type of analysis required by E.O. 12866 because the OSH Act, as interpreted by the courts, prohibits OSHA from using cost-benefit analysis as a basis for regulatory decisions. See, *e.g., Pub. Citizen Health Research Grp.* v. *U.S. Dept. of Labor,* 557 F.3d 165, 177 (3d Cir. 2009) (''the Supreme Court has conclusively ruled that economic feasibility does not involve a cost-benefit analysis''), *citing Am. Textile Mfrs. Inst., Inc.* v. *Donovan,* 452 U.S. 490, 513 (1981).

OSHA has developed estimates of monetized benefits under important baseline assumptions of partial worker vaccination at the time the ETS takes effect resulting in an average worker vaccination rate of 75 percent for HCWs over the course of the ETS. This is not an endpoint prediction of vaccination rates, but rather an approximate average rate attained over the course of the ETS. This is an assumption of what the estimated total vaccination rates will be for HCWs under age 65 about three or four months into the ETS, given that some vaccines take two to six weeks to be fully effective after the first shot.

Value of Each ETS Fatality Avoided

The agency's methodology for monetizing benefits is based on relevant academic literature and approaches OSHA and other regulatory agencies have taken in the past for similar regulatory actions.[113]

To estimate the monetary value of each COVID–19-related fatality prevented as a result of the ETS, OSHA relies on estimates developed from the willingness of affected individuals to pay to avoid a marginal increase in their risk of dying.[114] While a willingness-to-pay (WTP) approach clearly has theoretical merit, it should be noted that

[110] Community spread would likely be further reduced because of reductions of workplace spread, but OSHA has not attempted to take that into account in order to account for a worst-case scenario in which only small reductions would occur.

[111] The equation for 75 percent overall effectiveness is: 0.75 = 0.9375 (1–0.20) where 0.20 is community spread and 0.9375 is preventiveness.

[112] The 56 percent overall effectiveness rate was selected for the sensitivity analysis because it is the mathematical result of doubling the community spread from 20% to 40%. This equation shows the overall effectiveness rate equals the preventiveness rate (0.925) time the non-community spread, which is 60 percent, or 100 percent minus 40 percent [0.56 = 0.925 * (1–0.4)].

[113] See, for example, the discussion in the FEA in support of the 2016 silica final rule (OSHA–2010–0034–4247; ''Benefits and Net Benefits'') (OSHA, March 25, 2016).

[114] This is the procedure that OMB recommends in Circular A–4. See (OMB, 2003), pp. 18–19.

an *individual's* willingness to pay to reduce the risk of death may tend to underestimate the total societal willingness to pay, which could include the willingness of others—particularly immediate family—to pay to reduce that individual's risk of fatality.[115]

For estimates using the WTP concept, OSHA relied on existing studies of the imputed value of fatalities avoided based on the theory of compensating wage differentials in the labor market. These studies rely on certain critical assumptions for their accuracy, particularly that workers understand the risks to which they are exposed and that workers have legitimate choices between high- and low-risk jobs. Actual labor markets only imperfectly reflect these assumptions.[116] A number of academic studies, as summarized in Viscusi and Aldy (August, 2003), have shown a correlation between higher job risk and higher wages, suggesting that employees demand monetary compensation in return for a greater risk of injury or fatality. The estimated trade-off between lower wages and marginal reductions in fatal occupational risk—that is, workers' willingness to pay for marginal reductions in such risk—yields an imputed value of an avoided fatality: The willingness-to-pay amount for a reduction in risk divided by the reduction in risk.[117] [118] OSHA has used this approach in many recent proposed and final rules.[119]

Viscusi and Aldy (August, 2003) conducted a meta-analysis of studies in the economics literature that use a WTP methodology to estimate the imputed value of life-saving programs and found that each fatality avoided was valued at $6.7 million in 2000 dollars. Using the GDP Deflator (BEA, 2021), this $6.7 million base number in 2000 dollars yields an estimate of $9.73 million in 2019 dollars for each fatality avoided. OSHA is also using $9.73 million as the monetary value of each estimated 2021 fatality prevented as a result of the ETS.

Value of Each COVID–19 Related Infection Avoided

OSHA also reviewed the available research regarding the dollar value of preventing a generic injury or illness. Using WTP to value non-fatal injuries or illnesses is the approach recommended in OMB Circular A–4 (OMB, September 17, 2003). In the paper cited immediately above, Viscusi and Aldy (August, 2003) conducted a critical review of 39 studies estimating the value of a statistical injury or illness. The authors found that most studies resulted in estimates in the range of $20,000 to $70,000 per injury or illness (in 2000 dollars), although several studies resulted in higher estimates.[120] A mid-point WTP estimate for a generic injury or illness would therefore be $45,000, to be raised to $65,364 (2019 dollars) to account for the rise in the cost of living since 2000, the base year for the monetized values estimated by Viscusi and Aldy (August, 2003).

For this value to be a representative WTP estimate for the average COVID–19 infection, the severity of the typical COVID–19 infection must be similar to that of the typical OSHA recordable injury or illness. While most COVID–19 infections are asymptomatic or mild and involve maybe two weeks of forgone earnings and minor medical bills (totaling perhaps $1,000–$5,000), others are more severe. Some will involve hospitalization and, in some cases, long-term disability.[121] For those persons who have not received an FDA-authorized COVID–19 vaccine, the percentage of COVID–19 cases involving hospitalization is still fluctuating, with perhaps 10 percent being a reasonable estimate. The medical and foregone earnings cost per hospitalization may range from $10,000 to $300,000 or more.

There is a growing body of literature on chronic illnesses that are linked to prior COVID–19 infections. The coronavirus, once it enters the body, may attach itself to any organ or tissue, including the lungs, heart, kidneys, brain, and nervous system. This can lead to acute or chronic health effects, such as stroke, heart attack, kidney failure, loss of brain function, extreme mental and physical fatigue, and various other deleterious effects.[122] Further discussion and summary of evidence concerning the persistence of COVID–19 symptoms after hospital discharge and the occurrence of longer-term disabilities is presented in *Grave Danger* (Section IV.A of the preamble). The cost of chronic conditions resulting from COVID–19 infections is difficult to estimate because the duration and severity of those chronic conditions, as well as subsequent reductions in life expectancy (not considered in these estimates of ETS health benefits), are not well known at this time. In other rulemakings, however, OSHA has identified costs (all inflated to 2019 dollars) for other chronic diseases, such as chronic silicosis (cost of injury of approximately $400,000 from Miller (November 22, 2005)); chronic bronchitis (approximately $600,000 from EPA (2008)); and chronic beryllium disease (approximately $2.2 million for direct morbidity and medical costs from Bartell et al., (2000)).

Because there is still some uncertainty surrounding the frequency and severity of COVID–19 infections and their distribution, OSHA has chosen to use the earlier estimate presented for a generic non-fatal injury or illness of $65,364 as a reasonable approximation of the WTP value of an avoided COVID–19 non-fatal infection among workers who have not received the COVID–19 vaccine.

Estimated ETS Monetized Health Benefits

With FDA authorization of several COVID–19 vaccines and increased vaccination efforts by the Administration, OSHA believes that by the date of publication of the ETS, approximately 70 percent of HCWs will have been fully vaccinated. Based on early results, the vaccines appear to be reducing the number of COVID–19 cases. Crucially, they appear to be virtually eliminating COVID–19

[115] See, for example, Thaler and Rosen (1976), Sunstein (January, 2004), or Viscusi et al., (January 1, 1988). For a view that such underestimation of the social willingness to pay would be offset, more or less, by an analogous social underestimation of costs, see Bergstrom (March, 2006).

[116] On the former assumption, see the discussion in the FEA in support of the 2016 silica final rule (OSHA–2010–0034–4247; p. II–5 to II–7) (OSHA, March 25, 2016). On the latter, see, for example, the discussion of wage compensation for risk for union versus nonunion workers in Dorman and Hagstrom (October 1, 1998).

[117] For example, if workers are willing to pay $100 each for a 1/100,000 reduction in the probability of dying on the job, then the imputed value of an avoided fatality would be $100 divided by 1/100,000, or $10,000,000. Another way to consider this result would be to assume that 100,000 workers made this trade-off. On average, one life would be saved at a cost of $10,000,000.

[118] Note that, consistent with the economics literature, most of the available value-of-a statistical-life (VSL) estimates are for reducing the risk of an acute (immediate) fatality. They do not include an individual's willingness to pay to avoid an illness prior to fatality, which is separately estimated in the following section.

[119] See, for example, the preliminary economic analysis for the proposed hexavalent chromium rule (Document ID OSHA–H054A–2006–0064–1466 (OSHA, 2004)), the benefits analysis for the final hexavalent chromium rule (Document ID OSHA–H054A–2006–0064–2530 (OSHA, 2016b)), and the preambles for the proposed and final respirable crystalline silica rules (78 FR 56274; 81 FR 16286).

[120] That some studies used an overall injury/illness rate, and others used only injuries or illnesses resulting in lost workdays, partly explains the variation in these estimates.

[121] For deaths that would occur after workers are hospitalized for COVID–19, the benefit of the avoided fatality was included in the previously-described WTP value of an avoided acute fatality. OSHA has not included in its estimates of ETS benefits the value of a premature death due to a chronic COVID–19 disability, because the likelihood of such occurrences is too speculative to be estimated at this time.

[122] Both the medical and popular press have recognized the lingering and possibly longer-term multi-organ health effects of the disease and given it a name: ''long COVID.'' See for example Huzar (April 12, 2021) and Walton (April 11, 2021).

fatalities and significantly reducing both the number and severity of COVID–19 infections among the vaccinated population. Still, none of the vaccines are 100 percent effective, and their usefulness against newer strains of COVID–19 remains uncertain. With that as background, OSHA has adjusted the baseline number of COVID–19 infections for HCWs by the vaccine effectiveness.[123] OSHA will use the same Value of Statistical Illness (adjusted for inflation) of $65,364 used in previous rules. In addition, OSHA has reduced the estimated number of COVID–19 fatalities prevented by 75 percent for HCWs to account for vaccination in the workforce, but retained the WTP value of $9.73 million for each fatality avoided.

The monetized values of infections and fatalities prevented by the ETS, accounting for HCW vaccination, are shown Table VI.B.46 below. Table VI.B.46 also includes the subsequent estimated health benefits of the ETS under various scenarios after taking into account the effect of worker vaccinations in the baseline. Table VI.B.47 presents the results when the estimates in Table VI.B.46 are subject to a sensitivity test using 56 percent overall effectiveness of the ETS, while recognizing the presence of worker vaccinations in the baseline and accounting for 40 percent community spread versus 20 percent in the baseline analysis.[124]

Table VI.B.46: Benefits Summary by Scenario at 75 Percent (HCW) ETS Overall Effectiveness with 75 Percent Baseline Vaccination among HCWs

	Primary	Alternative
Health Care Workers		
Infections Prevented	295,284	232,961
Monetized Value of Infections Prevented	$19,300,929,013	$15,227,259,797
Deaths Prevented	776	545
Monetized Value of Deaths Prevented	$7,550,800,224	$5,299,900,981
Total Monetized Value (HCW)	$26,851,729,237	$20,527,160,778

Table VI.B.47: Benefits Summary by Scenario with 56 Percent Overall Effectiveness for HCW with 40% Community Spread, and with 75 Percent Baseline Vaccination among HCWs Sensitivity Analysis

	Primary	Alternative
Health Care Workers		
Infections Prevented	221,463	174,721
Monetized Value of Infections Prevented	$14,475,696,760	$11,420,444,848
Deaths Prevented	466	327
Monetized Value of Deaths Prevented	$4,530,480,134	$3,179,940,589
Total Monetized Value (HCW)	$19,006,176,894	$14,600,385,437

d. Low-Case Sensitivity Analysis

Cases have declined significantly in recent weeks, and perhaps a combination of natural causes, herd immunity, vaccinations, and government policy will result in case numbers continuing to fall dramatically. To consider this possibility, a sensitivity analysis that takes into account dramatically lower case and fatality counts is presented below. Rather than choosing a relatively low historic month, like June 2020 (847,000 new cases, 21,635 deaths), OSHA creates a future fictional month, called ''month 13'', based on 20 percent of the average monthly cases over the pandemic (April 2020–May 2021:32,798,861 cases, or 2,522,989 cases/month). This is 504,598 cases and taking 20 percent of total fatalities, 8,860 fatalities. This estimate would be considerably lower than the May 2021 monthly case count of 861,373 cases and 14,943 fatalities. ''Month 13'' also has about one-quarter of the cases of the ''primary'' scenario, and about 58 percent of the fatalities of the ''primary'' scenario.[125]

Using all of the other assumptions about preventiveness, community spread, and vaccines, explained above, the fictitious ''month 13'' month would translate into significant benefits over a six-month period, including 72,893 HCW cases prevented over six months, 192 HCW fatalities prevented, and monetized benefits of $6.6 billion during that period.

h. Conclusion

In this chapter, OSHA examined the potential of the ETS to prevent infections and deaths from COVID–19

[123] The vaccines are about 85.2 percent effective against severe illness, so for example the overall effectiveness rate for a vaccine given to 30 percent of a population would be (0.3 × 100%) + (0.7 × 0.148) = 40.3%.

[124] 56 percent = 70 percent preventiveness × (1–20 percent community spread).

[125] OSHA presents these lower numbers of cases and fatalities as a sensitivity analysis rather than in the primary estimate in part because the primary estimate is used consistently in both benefits and costs. Assumptions about the number of cases impact both costs and benefits, and OSHA used the higher numbers from the primary estimate for a more conservative (*i.e.,* higher) projection of costs, thereby ensuring a more robust economic feasibility analysis. OSHA believes the numbers of cases and fatalities that are included in the primary scenario are more appropriate for the purposes of these analyses, while the cases identified in the sensitivity analysis provide sufficient contrast in the event that the case numbers were to drop dramatically.

among workers in the U.S. OSHA analyzed the possible numbers of cases in the absence of an ETS using historical monthly data on infections and fatalities during the pandemic. The monthly baseline scenarios were based on a primary and an alternative estimate. The primary estimate reflects cases and fatalities during March/April 2021 while the alternative estimate is based on an average monthly level of cases and fatalities for all the pandemic months (April 2020–April 2021).

The benefits of the ETS simply reflect the reduction in infections and fatalities under different estimates of the overall effectiveness of the ETS (75 percent for HCWs and 56 HCWs as a sensitivity test) and assuming an average vaccination rate of 75 percent for HCW. Monetized benefits were calculated based on WTP estimates developed in the academic literature and applied in prior OSHA rules. Infections and deaths prevented among all health care workers, based on the primary estimate, are 295,284 and 776, respectively. Monetized benefits for the primary estimate, assuming a 75 percent overall effectiveness rate, are $26.8 billion (with the alternative scenario yielding monetized benefits of $20.5 billion).

OSHA's ''primary'' benefits estimate is the agency's preferred scenario. The ''primary'' scenario uses numbers of cases and deaths that occurred from March 19, 2021 through April 19, 2021 and assumes an average vaccination rate of 75 percent for HCW 75 percent overall effectiveness rate for the HCW.

OSHA's analysis indicates that over a 6-month period the ETS would prevent 776 deaths at a cost of about $4 billion, while the value of fatalities avoided is $7.5 billion. This simple calculation ignores the additional health benefits provided by avoided infections.

i. Other (Non-Health) Benefits of the ETS

It is also helpful to put this rule in context. OSHA's regulatory authority extends only to workplaces, and not to society as a whole. As a result, its feasibility analyses are necessarily limited to what is feasible for the workplaces subject to its authority, and the benefits analyses it performs for other purposes also focus on the benefits to workers. Therefore, the foregoing analysis follows the normal OSHA practice of considering only the costs and benefits to workers and their employers and fulfills the agency's legal and analytical obligations with respect to the ETS.

The pandemic, however, affects the economy as a whole, and affects workplaces within that context. Although the primary purpose of this COVID–19 emergency temporary standard (ETS) is to help prevent health care worker infections and deaths due to the pandemic, the ETS also helps create conditions that will facilitate an equitable economic recovery. While vaccines show much promise, it will take months before all of the workforce is fully vaccinated, and even then there is uncertainty about existing vaccines' efficacy against new virus variants. Workplace safety measures such as physical distancing, face coverings, and physical barriers are still needed in parts of the healthcare sector to prevent immediate infections and reduce the spread of infections and, thereby, speed and strengthen the economic recovery (Chudik et al., April, 2021). Such measures will not only safeguard the health and employment status of vulnerable workers, but will also provide visible forms of protections to patients to restore consumer confidence.

More importantly, the ETS benefits society by reducing the spread of the virus. An uninfected health care worker cannot infect others in the community, resulting in better control of the pandemic overall. If the pandemic is better contained in this industry, widespread economic functions have a greater chance of continuing.

Healthcare workers who are less worried about being infected and losing their lives or ability to work are more likely to have the confidence to engage in normal consumption rather than saving to guard against medical costs and loss of income. Thus, the protections of this ETS will lower concerns about infection and help give individuals a sense of safety and security, which will in turn help stimulate economic activity.

The economic impacts of the pandemic have been unevenly distributed across demographic and socioeconomic groups and have exacerbated inequalities. The initial negative impact on employment was larger for women, minorities, the less educated, and the young, even after accounting for industry and occupation (Lee et al., January 1, 2021). Lockdowns of schools and businesses to prevent the spread of COVID–19, which the successful implementation of the ETS will help avoid, have had particularly large effects on vulnerable groups, such as women, due to the disproportionate burden women face in caring for children (Caselli et al., 2020). Particularly, low-income workers in frontline healthcare industries are disproportionately Black, Hispanic, female, and foreign born (Leibenluft and Olinsky, April 20, 2020). Again, OSHA expects the stimulative effects of the ETS will help ameliorate these equity concerns created by the pandemic.

Beyond their direct function in protecting workers, several of the provisions of the ETS have important economic effects. One area of particular importance is that of paid medical removal protection (MRP). MRP is a crucial part of this emergency temporary standard. Paid MRP benefits are not the same as paid sick leave, since the former are to ensure that (potentially) contagious workers who cannot work remotely or in isolation may be removed from the workplace without losing pay, thereby encouraging them to take part in the kind of COVID–19 exposure prevention program created by this standard. But the benefits of paid MRP are similar to paid sick leave for these purposes. Indeed, like paid sick leave, paid MRP encourages workers who have been exposed to the virus to self-isolate, thereby containing and mitigating the spread of the virus. Paid MRP, like paid sick leave, allows workers who are (potentially) infected to stay home rather than infect their coworkers as collateral damage (OECD, 2020). Keeping these workers out of the physical workplace lowers the transmission of COVID–19 and saves lives (McLaren and Wang, December 2020). States that gained access to paid sick leave through the Families First Coronavirus Response Act (FFCRA) saw around 400 fewer confirmed cases per state per day relative to the pre-FFCRA period and to states that had already enacted sick pay mandates before enactment of the FFCRA (Pichler et al., October 15, 2020).

Paid sick leave also helps reduce income inequality. The ability to take paid family or medical leave is highly unequal. Low-wage workers are less likely to have access to paid leave and tend to take unpaid leave at higher rates than other groups, though they take less leave overall (Sawhill et al., December 5, 2019). A 2017 study of the distributional impact of three policy models for providing paid sick days found that a national paid sick day policy would benefit proportionately more women than men and proportionally more workers of color than white workers, compared to the then current policy. Low-income workers would see their share of paid sick days increase the most (IMPAQ International LLC, January, 2017). While the American Rescue Plan of 2021 does not extend the mandate for paid sick leave, as discussed above, the feasibility of this provision is enhanced by the tax credits that are available to employers

who provide MRP as required by the standard.

Paid sick leave also helps ward against the impact of losing the sick workers, and their families, as consumers. It is worth noting that the American Rescue Plan of 2021 also includes stimulus checks to individuals in the amount of $1,400, which is roughly the amount of the maximum required weekly payments under the MRP provision of the ETS, although the ETS does not prevent employers from paying high-paid workers their full wages or salary. This reflects the significance of the impact that the loss of even a single week's income can have on the economy, and the ETS would prevent this loss on the consumer side.

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Appendix VI.B.A: Healthcare and Other Covered Occupations in the Scope of the ETS

Error! Reference source not found. lists the BLS occupations used by OSHA to designate employees in settings where healthcare and healthcare support services are performed and the entities that employ them.

Table VI.B.A.1: Healthcare Occupations with Occupational Exposure to COVID-19

Occupation Title	Occupation Code
Medical and Health Services Managers	11-9110
Biochemists and Biophysicists	19-1021
Microbiologists	19-1022
Biological Scientists, All Other	19-1029
Epidemiologists	19-1041
Chemists	19-2031
Psychologists, All Other	19-3039
Sociologists	19-3040
Biological Technicians	19-4020
Chiropractors	29-1010
Dentists, General	29-1021
Oral and Maxillofacial Surgeons	29-1022
Orthodontists	29-1023
Prosthodontists	29-1024
Dentists, All Other Specialists	29-1029
Dietitians and Nutritionists	29-1030
Optometrists	29-1040
Pharmacists	29-1050
Anesthesiologists	29-1061
Family and General Practitioners	29-1062
Internists, General	29-1063
Obstetricians and Gynecologists	29-1064
Pediatricians, General	29-1065
Psychiatrists	29-1066
Surgeons	29-1067
Physicians and Surgeons, All Other	29-1069
Physician Assistants	29-1070
Podiatrists	29-1080
Occupational Therapists	29-1122
Physical Therapists	29-1123
Radiation Therapists	29-1124
Recreational Therapists	29-1125
Respiratory Therapists	29-1126
Speech-Language Pathologists	29-1127
Exercise Physiologists	29-1128
Therapists, All Other	29-1129
Registered Nurses	29-1140

Table VI.B.A.1: Healthcare Occupations with Occupational Exposure to COVID-19

Occupation Title	Occupation Code
Nurse Anesthetists	29-1150
Nurse Midwives	29-1160
Nurse Practitioners	29-1170
Audiologists	29-1180
Health Diagnosing and Treating Practitioners, All Other	29-1199
Clinical Laboratory Technologists and Technicians	29-2010
Dental Hygienists	29-2020
Cardiovascular Technologists and Technicians	29-2031
Diagnostic Medical Sonographers	29-2032
Nuclear Medicine Technologists	29-2033
Radiologic Technologists	29-2034
Magnetic Resonance Imaging Technologists	29-2035
Emergency Medical Technicians and Paramedics	29-2040
Dietetic Technicians	29-2051
Pharmacy Technicians	29-2052
Psychiatric Technicians	29-2053
Respiratory Therapy Technicians	29-2054
Surgical Technologists	29-2055
Ophthalmic Medical Technicians	29-2057
Licensed Practical and Licensed Vocational Nurses	29-2060
Medical Records and Health Information Technicians	29-2070
Opticians, Dispensing	29-2080
Orthotists and Prosthetists	29-2091
Hearing Aid Specialists	29-2092
Health Technologists and Technicians, All Other	29-2099
Occupational Health and Safety Specialists	29-9011
Occupational Health and Safety Technicians	29-9012
Athletic Trainers	29-9091
Genetic Counselors	29-9092
Healthcare Practitioners and Technical Workers, All Other	29-9099
Home Health Aides	31-1011
Psychiatric Aides	31-1013
Nursing Assistants	31-1014
Orderlies	31-1015
Occupational Therapy Assistants	31-2011
Occupational Therapy Aides	31-2012
Physical Therapist Assistants	31-2021
Physical Therapist Aides	31-2022
Massage Therapists	31-9010
Dental Assistants	31-9091
Medical Assistants	31-9092
Medical Equipment Preparers	31-9093
Medical Transcriptionists	31-9094
Pharmacy Aides	31-9095
Phlebotomists	31-9097
Healthcare Support Workers, All Other	31-9099
Food Servers, Nonrestaurant	35-3040
Dining Room and Cafeteria Attendants and Bartender Helpers	35-9010

Table VI.B.A.1: Healthcare Occupations with Occupational Exposure to COVID-19

Occupation Title	Occupation Code
Food Preparation and Serving Related Workers, All Other	35-9099
Janitors and Cleaners, Except Maids and Housekeeping Cleaners	37-2011
Maids and Housekeeping Cleaners	37-2012
Building Cleaning Workers, All Other	37-2019
Ambulance Drivers and Attendants, Except Emergency Medical Technicians	53-3010
Source: BLS OES data (BLS, March 29, 2019)	

Appendix VI.B.B: Average Loaded Wages by NAICS Code and Healthcare Setting

Table VI.B.B.1 presents the average loaded wages for covered employees by NAICS code and healthcare setting. Both averages are weighted by covered employment.

Table VI.B.B.1: Average Loaded Wage for Covered Healthcare Employees in Affected Industries

Setting	NAICS Code	NAICS Description	Loaded Wage Rate	
			NAICS Average	Setting Average
General Hospitals	622110	General Medical and Surgical Hospitals	$53.76	$53.76
Other Hospitals	622210	Psychiatric and Substance Abuse Hospitals	$47.04	$49.50
	622310	Specialty (except Psychiatric and Substance Abuse) Hospitals	$50.98	
Nursing Homes	623110	Nursing Care Facilities (Skilled Nursing Facilities)	$30.77	$28.65
Long Term Care (excluding nursing homes)	623311	Continuing Care Retirement Communities	$24.12	$21.97
	623312	Assisted Living Facilities for the Elderly	$24.12	
	623210	Residential Intellectual and Developmental Disability Facilities	$20.88	
	623220	Residential Mental Health and Substance Abuse Facilities	$28.86	
	623990	Other Residential Care Facilities	$24.15	
Other Patient Care	621111	Offices of Physicians (except Mental Health Specialists)	$78.97	$67.22
	621112	Offices of Physicians, Mental Health Specialists	$78.97	
	621210	Offices of Dentists	$59.47	
	621310	Offices of Chiropractors	$46.11	
	621320	Offices of Optometrists	$62.86	
	621330	Offices of Mental Health Practitioners (except Physicians)	$63.27	
	621340	Offices of Physical, Occupational and Speech Therapists and Audiologists	$53.03	
	621391	Offices of Podiatrists	$52.60	
	621399	Offices of All Other Miscellaneous Health Practitioners	$52.60	
	621410	Family Planning Centers	$57.44	
	621420	Outpatient Mental Health and Substance Abuse Centers	$53.75	
	621491	HMO Medical Centers	$57.44	
	621492	Kidney Dialysis Centers	$57.44	
	621498	All Other Outpatient Care Centers	$57.44	
	621991	Blood and Organ Banks	$31.94	
Home Health Care and Temp Labor	561311	Employment Placement Agencies	$32.88	$48.31
	621610	Home Health Care Services	$48.39	
First Aid and Emergency Care	446110	Pharmacies and Drug Stores	$49.39	$36.29
	621493	Freestanding Ambulatory Surgical and Emergency Centers	$57.44	
	621910	Ambulance Services	$27.52	

Table VI.B.B.1: Average Loaded Wage for Covered Healthcare Employees in Affected Industries

Setting	NAICS Code	NAICS Description	Loaded Wage Rate	
			NAICS Average	Setting Average
	621999	All Other Miscellaneous Ambulatory Health Care Services	$31.94	
	922160	Public Firefighter-EMTs	$31.94	
School/Industry Clinics	611110	Elementary and Secondary Schools	$32.89	$38.16
	611210	Junior Colleges	$27.86	
	611310	Colleges, Universities, and Professional Schools	$44.41	
	611710	Educational Support Services	$50.03	
	711211	Sports Teams and Clubs	$19.30	
Correctional Facility Clinics	561210	Facility Support Services	$21.65	$21.65
Sources and Notes: Wage rates are estimated using BLS (May 23, 2018). OSHA estimated loaded the wages using a fringe benefits rate of 44.4% (estimated using BLS (December 14, 2018) Employer Costs for Compensation data for all civilian workers in the healthcare and social assistance industries) and OSHA's standard estimate of a 17% overhead rate.				

Appendix VI.B.C: Average Cost per Establishment by 6-Digit NAICS Code

Table VI.B.C.1 presents the average incremental cost per establishment for compliance with the ETS.

Table VI.B.C.1: Average Cost per Establishment for the ETS, by 6-Digit NAICS

NAICS	NAICS Description	Cost per Establishment
446110	Pharmacies and Drug Stores	$2,663
561210	Facility Support Services	$3,094
561311	Employment Placement Agencies	$2,484
611110	Elementary and Secondary Schools	$2,387
611210	Junior Colleges	$2,565
611310	Colleges, Universities, and Professional Schools	$4,743
611710	Educational Support Services	$1,960
621111	Offices of Physicians (except Mental Health Specialists)	$5,739
621112	Offices of Physicians, Mental Health Specialists	$3,343
621210	Offices of Dentists	$4,358
621310	Offices of Chiropractors	$2,778
621320	Offices of Optometrists	$2,824
621330	Offices of Mental Health Practitioners (except Physicians)	$2,152
621340	Offices of Physical, Occupational and Speech Therapists and Audiologists	$4,251
621391	Offices of Podiatrists	$2,960
621399	Offices of All Other Miscellaneous Health Practitioners	$2,812
621410	Family Planning Centers	$3,931
621420	Outpatient Mental Health and Substance Abuse Centers	$3,279
621491	HMO Medical Centers	$17,091
621492	Kidney Dialysis Centers	$5,038
621493	Freestanding Ambulatory Surgical and Emergency Centers	$3,597
621498	All Other Outpatient Care Centers	$6,961
621610	Home Health Care Services	$5,311
621910	Ambulance Services	$4,624
621991	Blood and Organ Banks	$9,048
621999	All Other Miscellaneous Ambulatory Health Care Services	$3,248
622110	General Medical and Surgical Hospitals	$110,455
622210	Psychiatric and Substance Abuse Hospitals	$8,616
622310	Specialty (except Psychiatric and Substance Abuse) Hospitals	$21,121
623110	Nursing Care Facilities (Skilled Nursing Facilities)	$11,482
623210	Residential Intellectual and Developmental Disability Facilities	$2,398
623220	Residential Mental Health and Substance Abuse Facilities	$2,047
623311	Continuing Care Retirement Communities	$8,277
623312	Assisted Living Facilities for the Elderly	$3,148
623990	Other Residential Care Facilities	$1,726
711211	Sports Teams and Clubs	$2,015
922160	Public Firefighter-EMTs	$4,824
Sources and notes: See section VI.B.B.III for a description of calculations and sources.		

Appendix VI.B.D: Adjustment to Economic Analysis for Pandemic Shock and To Forecast Out to ETS Time Period

For many regulatory economic analyses, the agency uses the most up-to-date economic data as its baseline to describe the current state of the economy, as discussed above. It then applies the anticipated changes due to the new OSHA standard or regulation to that baseline. However, even the most current data OSHA uses in a typical economic analysis—including employment, number of establishments, revenue—represent economic conditions from at least one calendar year in the past. Even with that lag in the data due to reporting and compilation time, the basic structure of the economy changes slowly, so the

recent past is a reasonable predictor of the near future.

Given the unique circumstances of the pandemic and its economic disruption, OSHA's usual approach does not make sense for the present analysis. The agency has therefore also made adjustments to the baseline industry profile to account for the economic conditions that are expected to persist during the time period in which this ETS will be in effect.

The baseline employment and revenue numbers were obtained from the 2017 Economic Census (the most current information available from the Economic Census) (U.S. Census Bureau, 2021). Revenue values were adjusted to 2019 dollars using the BEA's GDP deflator (BEA, 2021). OSHA adopts these adjusted 2019 revenue data as representing the state of the economy before the pandemic hit in 2020. Similarly, OSHA uses 2018 OES data for wages, brought forward to 2019 using the GDP deflator to be consistent with revenue data (BLS, March 29, 2019). To adjust for the economic effects of the pandemic and provide a more reasonable estimate of employment and revenue numbers for the period during which the ETS will be in effect, the agency used other national datasets to derive percentage changes to this baseline 2019 data.

To adjust for changes in employment since 2019, OSHA relies on the BLS' Current Employment Statistics (CES), which is published monthly and provides estimates by NAICS code (BLS, December, 2020). At the time of this analysis, the December 2020 CES, which contains full data through November 2020, had been published. The agency uses average employment, within each NAICS industry, over all months of 2019 as the ''normal'' base economy before COVID–19 arrived. OSHA then uses the percentage difference between the reported 2019 employment and the reported employment from November 2020 as its measure of the pandemic shock, and adjusts the 2019 data by this percentage. The average employment decline across all covered NAICS industries over the period 2019 to November 2020 is three percent.

The adjustment described above is intended to make the employment estimates per establishment more representative of conditions as of the end of 2020. The ultimate objective, however, is to estimate economic conditions during the forthcoming 6-month period. The exact timing of the ETS at the time of this analysis is not known; OSHA assumes that the end of the ETS occurs later in 2021. The agency uses forecasts of aggregate growth in GDP from the well-known Conference Board (The Conference Board, May, 2021) to extend its employment estimates from the end of 2020 through the 3rd quarter of 2021. See Table VI.B.D.1 for the Conference Board's forecasts.[126]

Table VI.B.D.1: The Conference Board Base Case Economic Outlook, 2019-2020-2021
(Forecast, Percentage Change, Seasonally Adjusted Annual Rates)

	2021				2019	2020	2021
	I	II	III	IV	ANNUAL	ANNUAL	ANNUAL
	Q	Q	Q	Q			
Real GDP	2	3.6	6.1	4.6	2.2	-3.5	4.1
Source: *https://www.conference-board.org/research/us-forecast, accessed 1/28/2021*							

For revenue (and by extension, profits) OSHA also uses various estimates to adjust the data forward from the 2019 baseline. First, the agency uses the percentage change in GDP by industry, reported by the BEA, to adjust revenue and profits through the 3rd quarter of 2020 (see Table VI.B.D.2).[127]

[126] Since GDP is not produced by labor alone, and hence employment should not be strictly proportional to GDP, the agency makes a further adjustment to account for this. One method is to assume GDP takes the form of an aggregate Cobb-Douglas function, $GDP=L^bK^{(1-b)}$, where L is aggregate employment, K is capital (but here represents everything other than employment), and b is between 0 and 1. The Cobb-Douglas function has constant returns to scale. If, as some economists argue a better representation has increasing returns to scale, this will actually lower our estimate of the amount of labor growth entailed by a given amount of growth in GDP. This would similarly be true for any type of Solow residual-like technological change. In either case, less labor will be needed to reach a given GDP level. In this simple setup, b in fact equals the labor share of income in GDP (the wage, w, is the marginal product of capital $w=dGDP/dL=b*(K/L)^{1-b}$. Then total wages is $w*L=b*L*(K/L)^{1-b}=b\ L^bK^{(1-b)}=b*GDP$. Hence the wage share=$w*L/GDP=b*GDP/GDP=b$). For the wage share we do have estimates, see FRED variable LABSHPUSA156NRUG, which most recently has an estimate for 2019 of 59.7 percent. Note a recent paper (Autor et al., February 3, 2020) on the labor share issue is ''The Fall of the Labor Share and the Rise of Superstar Firms.'' Finally to see how this is reflected in employment growth estimates, if the Cobb-Douglas assumption holds, then with growth, g, OSHA has future GDP as $(1+g)*GDP = (1+g)*L^bK^{(1-b)} = ((1+g)*L)^b((1+g)K)^{(1-b)}$ so employment grows by $(1+g)^b$ or $(1+g)^{.597}$. This is the adjustment OSHA made to GDP growth, to account for other factors used in production, in calculating future employment growth.

[127] GDP data are available, at the time of this analysis, through the 3rd quarter 2020 at the 2 digit NAICS level (BEA, March 29, 2021).

Table VI.B.D.2: Gross Domestic Product by Industry Group, Level and Change from Preceding Period

	Billions of chained (2012) dollars								
	2019	Seasonally adjusted at annual rates					Change from preceding period		
		2019	2020				2019	2020	
		Q3	Q4	Q1	Q2	Q3		Q2	Q3
Gross domestic product	**19,091.7**	**19,141.7**	**19,254.0**	**19,010.8**	**17,302.5**	**18,596.5**	**403.9**	**-1,708.3**	**1,294.0**
Private industries	**16,804.2**	**16,853.2**	**16,952.4**	**16,720.2**	**15,109.1**	**16,355.3**	**388.7**	**-1,611.1**	**1,246.1**
Educational services, health care, and social assistance	1,659.7	1,664.0	1,673.6	1,645.0	1,404.2	1,592.8	45.1	-240.8	188.7
Educational services	224.8	225.6	227.3	225.5	198.8	207.8	4.7	-26.7	8.9
Health care and social assistance	1,436.1	1,439.5	1,447.5	1,420.4	1,205.6	1,386.8	40.5	-214.8	181.1
Arts, entertainment, recreation, accommodation, and food services	728.4	735.5	732.4	678.7	366.6	529.0	10.7	-312.1	162.4
Arts, entertainment, and recreation	202.2	204.2	203.5	188.6	79.4	111.7	4.1	-109.2	32.4

Table VI.B.D.2: Gross Domestic Product by Industry Group, Level and Change from Preceding Period

	Billions of chained (2012) dollars								
	2019	Seasonally adjusted at annual rates					Change from preceding period		
		2019	2020				2019	2020	
		Q3	Q4	Q1	Q2	Q3		Q2	Q3
Government	**2,229.5**	**2,232.6**	**2,247.1**	**2,233.0**	**2,133.7**	**2,185.7**	**21.3**	**-99.3**	**52.0**
Federal	713.6	718.6	721.9	725.3	731.9	742.9	5.8	6.6	11.0
State and local	1,515.2	1,513.5	1,524.6	1,507.7	1,404.7	1,445.2	15.5	-103.0	40.5

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At the time of this analysis, the BEA only has an aggregate GDP growth estimate for the 4th quarter of 2020, which is 4.0 percent; that aggregate estimate is used to bring the data to the end of 2020.[128] While costs for the rule only occur during the time the ETS is in effect, the amount of time that firms have to pay for those costs, through direct revenues, loans, or other means, is not necessarily limited to the ETS period itself. In theory, the firm could continue paying the costs through the remaining life of the firm. Here the agency limits the revenue used for the feasibility analysis to six months, which extends to the end of 2021. Again, the agency uses the aggregate GDP forecasts of the Conference Board, shown above in Table VI.B.D.1, to estimate revenues through 2021.

Chaining these various datasets together, OSHA estimates final percentage changes in employment and revenue/profits through 3rd quarter 2021. There was a big decrease in employment, revenue, and profits in the middle of 2020 due to the pandemic but there has since been a rebound and GDP forecasts are somewhat positive going forward. Of course, there is a great deal of uncertainty in forecasts at this time, but OSHA believes it has made reasonable estimates of current and future conditions based on public government datasets and other substantial evidence in the record. For employment, the overall average percentage change across all 6-digit NAICS industries from 2019 to 3rd quarter 2021 is −2.9%. The same average for revenue is 2.5%.

[128] (BEA, May 26, 2021).

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VII. Additional Requirements

A. Regulatory Flexibility Act

Whenever an agency is required by the Administrative Procedure Act, 5 U.S.C. 553, or another law, to publish a general notice of proposed rulemaking, the Regulatory Flexibility Act (RFA), 5 U.S.C. 601 *et seq.,* requires the agency to prepare an initial regulatory flexibility analysis (IRFA). 5 U.S.C. 601(2), 603(a). Since this ETS ''shall serve as a proposed rule'' for a final standard under section 6(c)(3) of the OSH Act, it is treated as a general notice of proposed rulemaking under the RFA. An agency may waive or defer the IRFA in the event a rule is promulgated in response to an emergency that makes compliance with the requirements of section 603 impracticable. 5 U.S.C. 608(a). The agency hereby certifies that compliance with the IRFA requirement is impracticable under the circumstances. OSHA prepared this ETS on an expedited basis in response to a national emergency affecting the lives and health of the nation's healthcare workers; the IRFA is inherently a relatively lengthy process that would be impracticable to undertake for a standard of such broad applicability in the limited time available. Because OSHA is not preparing an IRFA for the ETS, the agency is also not required to convene a small entity panel under section 609(b).

B. Unfunded Mandates Reform Act (UMRA), 2 U.S.C. 1501 et seq.

Section 202 of the Unfunded Mandates Reform Act of 1995 (UMRA), 2 U.S.C. 1532, requires agencies to assess the anticipated costs and benefits of a rule before issuing ''any general notice of proposed rulemaking'' that includes a Federal mandate that may result in expenditures in any one year by state, local, or Tribal governments, or by the private sector, of at least $100 million, adjusted annually for inflation. The assessment requirement also applies to ''any final rule for which a general notice of proposed rulemaking was published.'' The agency has satisfied the assessment requirement in section 202 through its analysis of the ETS's benefits and economic feasibility.

C. Executive Order 13175

Section 5 of E.O. 13175, on Consultation and Coordination with Indian Tribal Governments, requires agencies to consult with tribal officials early in the process of developing regulations that: (1) Have tribal implications, that impose substantial direct compliance costs on Indian governments, and that are not required by statute; or (2) have tribal implications and preempt tribal law. 65 FR 67249, 67250 (Nov. 6, 2000). E.O. 13175 requires that such consultation occur to the extent practicable. OSHA held a listening session to hear the concerns of tribal representatives during the preparation of this ETS.

D. National Environmental Policy Act

OSHA has reviewed this ETS according to the National Environmental Policy Act (NEPA) of 1969, 42 U.S.C. 4321 *et seq.,* the regulations of the Council on Environmental Quality, 40 CFR chapter V, subchapter A, and the Department of Labor's NEPA procedures, 29 CFR part 11. The agency has determined that the rule will have no significant impact on air, water, or soil quality; plant or animal life; the use of land; or other aspects of the external environment. The ETS will likely generate some additional materials that will enter the waste stream ends at landfills, but that amount will be marginal and is not expected to impact current waste management practices or channels. First, OSHA's economic analysis identifies a relatively small, temporary and fixed increase in disposable materials. Even absent the exclusions for ambulatory care providers that screen out COVID–19 patients, the ETS would result in the following approximate totals of additional disposable items: 197 million gloves, 403 million surgical masks, 15 million N–95 respirators, 108 million disposable gowns, and 15 million disposable face shields. The personal protective equipment used for COVID–19 related care is a small fraction of that which is used for all other healthcare purposes. OSHA has estimated that most personal protective equipment would increase by 10% during the 6 months the ETS is expected to remain in effect. Moreover, the number of gloves is insignificant when compared to aggregate number of gloves already typically used by hospitals and other healthcare employers. For context, hospital supply analysts recently estimated that the ''global demand for nitrile exam gloves exceeds production capacity by about 215 billion units, or about 40 percent'' (Premier Data, April 1, 2021). That means that roughly 86 billion gloves are already being produced to meet existing demand, and the amount of gloves required by this standard would be fewer than 0.2% of that number. Furthermore, based on the agency's knowledge of the healthcare industry, OSHA believes that it is already standard practice for the vast majority of health care staff, if not all, to be wearing some type of face covering even if they are not currently wearing facemasks or respirators as defined in the ETS. The use of facemasks and N–95 respirators actually represent a transfer of disposable products rather than an increase in overall waste: one type of disposable product with roughly the same physical dimensions would replace another in landfills.

Second, as acknowledged in the economic analysis for the ETS, OSHA's estimates are significant overestimates of the actual numbers of PPE that would be required by the ETS because they do not account for the very significant carve-out for ambulatory healthcare settings through which many employers will be able to avoid all of the requirements of the ETS by screening out people with suspected or confirmed COVID–19 and excluding them from the employer's facility (see § 1910.502(a)(2)(iii).

Finally, this ETS is expected to be in place for only six months. By comparison, OSHA's permanent Bloodborne Pathogens standard requires roughly the same types of disposable PPE for healthcare staff. OSHA certified that the Bloodborne standard would not have a significant environmental impact on the basis that the ''incremental impacts on landfills'' resulting from the increase in the use of disposable items required by the standard, such as personal protective equipment, syringes, and sharps disposal containers would increase in tonnage of ''approximately 50,000 tons per year,'' which would increase the annual solid waste generation of approximately 160 million tons per year ''by less than 0.1% per year'' (56 FR 64088 (Dec. 6, 1991). Given that amount of disposable PPE required by the Bloodborne standard on an annual basis will certainly be much higher than the cumulative 6 months of PPE necessitated by the ETS, OSHA's conclusion regarding the environmental impact of the ETS is consistent with its previous certification of no significant adverse environmental impact in the Bloodborne standard.

Based on the foregoing evidence and analysis, OSHA finds that the ETS will have no significant adverse environmental impacts.

E. Congressional Review Act

This ETS is considered a major rule under the Congressional Review Act (CRA), 5 U.S.C. 801 *et seq.* Section 801(a)(3) of the CRA normally requires a 60-day delay in the effective date of a major rule. 5 U.S.C. 801(a)(3), 804(2). However, section 808(2) of the CRA allows the issuing agency to make a rule effective sooner than otherwise provided by the CRA if the agency makes a good cause finding that notice and public procedure are impracticable, unnecessary, or contrary to the public interest. 5 U.S.C. 808(2). OSHA finds that there is good cause to make this rule effective upon publication because notice and public procedure with respect to this ETS are both impracticable and contrary to the public interest, given the expedited timeline on which this standard was developed and the grave danger threatening healthcare workers' lives and health (see *Grave Danger* and *Need for the ETS,* both in Section IV of this preamble). Congress authorized OSHA to take swift action in promulgating an ETS to address this type of grave danger, and provided explicitly that an ETS is effective upon publication, 29 U.S.C. 655(c)(1); delaying the effective date of such an expedited process would thwart that purpose. It is specifically because of the emergency nature of this rulemaking that the OSH Act allows for OSHA to proceed without the extensive public input the agency normally solicits in issuing occupational safety and health standards. 29 U.S.C. 655(c)(1). For rules to which section 808(2) applies, the agency may set the effective date. In this case, consistent with the OSH Act requirement cited above, the ETS takes immediate effect upon publication in the **Federal Register**.

F. Administrative Procedure Act

The Administrative Procedure Act (APA) normally requires notice and comment, and a 30-day delay of the effective date of a final rule, for recordkeeping and reporting regulations promulgated under section 8(c) of the OSH Act. 29 U.S.C. 657(c); 5 U.S.C. 553(b), (d). This ETS contains recordkeeping and reporting requirements tailored to address COVID–19 illness. To the extent that these requirements are not already exempt from the APA's requirements for notice and comment and delay in effective date under section 6(c) of the Act, OSHA invokes the ''good cause'' exemption to the APA's notice requirement because the agency finds that notice and public procedure are impracticable and contrary to the public interest under 5 U.S.C. 553(b)(3)(B). As explained in more detail in *Grave Danger* and *Need for the ETS* (both in Section IV of the preamble), this finding is based on the critical importance of implementing the requirements in this ETS, including the recordkeeping and report provisions, as soon as possible to address the grave danger that COVID–19 presents to healthcare workers. For the same reason, OSHA finds good cause to waive the normal 30-day delay in the effective date of a final rule from the date of its publication in the **Federal Register**. See 5 U.S.C. 553(d)(3). As noted above, the ETS is required by the OSH Act to take immediate effect upon publication. 29 U.S.C. 655(c)(1).

G. Consensus Standards

OSHA must consider adopting existing national consensus standard that differ substantially from OSHA's standard if the consensus standard would better effectuate the purposes of the Act. See section 12(d)(1) of the National Technology Transfer and Advancement Act of 1995 (15 U.S.C.A. 272 Note); see also 29 U.S.C. 655(b)(8). OSHA is not aware of any applicable national consensus standards addressing the grave danger posed by COVID–19 specifically. OSHA is, however, incorporating by reference several consensus standards for face shields and CDC guidance. See § 1910.509, on incorporation by reference. OSHA considered incorporation of ASTM F3502–21 in this ETS, as required. However, the agency has determined that it is infeasible for the timeframe of this ETS to incorporate this consensus standard or to otherwise establish additional criteria for face coverings beyond that already recommended by the CDC due to the time needed to manufacture and distribute such a new product (see the discussion of face coverings in the *Need for Specific Provisions,* which is located in Section V of the preamble).

H. Executive Order 13045

Executive Order 13045, on Protection of Children from Environmental Health Risks and Safety Risks, requires that Federal agencies submitting covered regulatory actions to OIRA for review pursuant to Executive Order 12866 must provide OIRA with (1) an evaluation of the environmental health or safety effects that the planned regulation may have on children, and (2) an explanation of why the planned regulation is preferable to other potentially effective and reasonably feasible alternatives considered by the agency (62 FR 19885 (4/23/1997)). Executive Order 13045 defines ''covered regulatory actions'' as rules that may (1) be economically significant under Executive Order 12866, and (2) concern an environmental health risk or safety risk that an agency has reason to believe may disproportionately affect children. Because OSHA has no reason to believe that the risk from COVID–19 disproportionately affects children, the ETS is not a covered regulatory action and OSHA is not required to provide OIRA with further analysis under section 5 of the executive order. However, to the extent children are exposed to COVID–19 either as employees or at home as a result of family members' workplace exposures to COVID–19, the ETS should decrease children's exposures to the virus.

I. Federalism

The agency reviewed this ETS according to Executive Order 13132, on Federalism, which requires that Federal agencies, to the extent possible, refrain from limiting State policy options, consult with States before taking actions that would restrict States' policy options, and take such actions only when clear constitutional authority exists and the problem is of national scope. 64 FR 43255 (8/10/1999). The Executive Order allows Federal agencies to preempt State law only with the express consent of Congress. In such cases, Federal agencies must limit preemption of State law to the extent possible.

The Occupational Safety and Health Act is an exercise of Congress's Commerce Clause authority, and under Section 18 of the Act, 29 U.S.C. 667, Congress expressly provided that States may adopt, with Federal approval, a plan for the development and enforcement of occupational safety and health standards. OSHA refers to States that obtain Federal approval for such plans as ''State Plans.'' Occupational safety and health standards developed by State Plans must be at least as effective in providing safe and healthful employment and places of employment as the Federal standards. Subject to these requirements, State Plans are free to develop and enforce their own occupational safety and health standards.

This ETS complies with E.O. 13132. The problems addressed by this ETS for COVID–19 are national in scope. As explained in *Grave Danger* (Section IV.A. of the preamble), healthcare employees face a grave danger from exposure to COVID–19 in the workplaces where protections are required by this ETS. Healthcare employees across the country face the danger of exposure to COVID–19 at

work, and as explained in *Need for the ETS* (Section IV.B. of the preamble), a national standard is needed to ensure that a uniform, baseline approach is taken to protect them. The SARS–CoV–2 virus is highly communicable and infects workers without regard to state borders, making a national approach necessary. Accordingly, the ETS establishes minimum requirements for employers in every State to protect healthcare employees from the risks of exposure to COVID–19. In States without OSHA-approved State Plans, Congress expressly provides for OSHA standards to preempt State occupational safety and health standards in areas addressed by the Federal standards. In these States, the ETS limits State policy options in the same manner as every standard promulgated by the agency. Furthermore, nothing in the ETS is intended to limit general public health measures instituted by state or local governments that go beyond, and are not inconsistent with, the requirements of the ETS. In States with OSHA-approved State Plans, this ETS does not significantly limit State policy options. Any special workplace problems or conditions in a State with an OSHA-approved State Plan may be dealt with by that State's standard, provided the standard is at least as effective as this ETS. Several State Plans have adopted COVID–19 workplace requirements, and OSHA has consulted with them in developing this emergency temporary standard.

J. State Plans

When Federal OSHA promulgates an emergency temporary standard, States and U.S. Territories with their own OSHA-approved occupational safety and health plans (''State Plans'') must either amend their standards to be identical or ''at least as effective as'' the new standard, or show that an existing State Plan standard covering this area is ''at least as effective'' as the new Federal standard. 29 CFR 1953.5(b). Adoption of the ETS by State Plans must be completed within 30 days of the promulgation date of the final Federal rule, and State Plans must notify Federal OSHA of the action they will take within 15 days. The State Plan standard must remain in effect for the duration of the Federal ETS.

Of the 28 States and Territories with OSHA-approved State Plans, 22 cover both public and private-sector employees: Alaska, Arizona, California, Hawaii, Indiana, Iowa, Kentucky, Maryland, Michigan, Minnesota, Nevada, New Mexico, North Carolina, Oregon, Puerto Rico, South Carolina, Tennessee, Utah, Vermont, Virginia, Washington, and Wyoming. The remaining six States and Territories cover only state and local government employees: Connecticut, Illinois, Maine, New Jersey, New York, and the Virgin Islands.

This ETS imposes new requirements to protect healthcare workers across the nation from COVID–19.

K. Paperwork Reduction Act

I. Overview

The Emergency Temporary Standard (ETS) for occupational exposure to COVID–19 (Coronavirus Disease 2019) being published at 29 CFR part 1910, subpart U, (29 CFR 1910.502, *et seq.*) contains collection of information requirements that are subject to review by the Office of Management and Budget (OMB) under the Paperwork Reduction Act of 1995 (PRA), 44 U.S.C. 3501, et seq, and OMB's regulations at 5 CFR part 1320. The PRA defines a ''collection of information'' to mean ''the obtaining, causing to be obtained, soliciting, or requiring the disclosure to third parties or the public, of facts or opinions by or for an agency, regardless of form or format'' (44 U.S.C. 3502(3)(A)).

This ETS will protect healthcare employees from occupational exposure to COVID–19. The ETS adds new Subpart U to OSHA's standards in 29 CFR part 1910. Subpart U is divided into several parts, and § 1910.502 contains information collection requirements.

Under the PRA, a Federal agency cannot conduct or sponsor a collection of information unless OMB approves it, and the agency displays a currently valid OMB control number (44 U.S.C. 3507). Also, notwithstanding any other provision of law, no employer shall be subject to penalty for failing to comply with a collection of information if the collection of information does not display a currently valid OMB control number (44 U.S.C. 3512). The PRA has special provisions for emergency situations applicable to the ETS. Under 44 U.S.C. 3507(j) and OMB's implementing regulations (5 CFR 1320.13), OMB can authorize a collection of information without regard to the normal clearance procedures if the relevant agency determines that the collection of information ''is essential to the mission of the agency'' and ''public harm is reasonably likely to result if normal clearance procedures are followed'' or ''the use of normal clearance procedures . . . is reasonably likely to cause a statutory or court ordered deadline to be missed.'' OSHA has requested, and OMB has authorized, the use of these emergency procedures for this ETS because protecting the health of the healthcare employees covered by the protections in this ETS is essential to OSHA's mission and employee health will be harmed if this ETS is not issued in an expeditious manner. The agency requested that OMB assign the information collections an OMB control number for 180 days in accordance with 44 U.S.C. 3507(j)(1). On [June 11, 2021, the Department of Labor submitted to OMB for approval an Information Collection Request (ICR) containing a full analysis and description of the burden hours and costs associated with the collections of information in the ETS to OMB. A copy of the ICR is available to the public at *http://www.reginfo.gov*. OSHA will publish a separate notice in the **Federal Register** that will announce the results of OMB's review. That notice will also include a final list of OMB approved collections of information and total burden hours and costs imposed by the new standard.

The collections of information found in the ETS are listed below.

II. Summary of Information Collection Requirements

The following paragraphs provide information about this ICR.

1. *Title:* COVID–19 Emergency Temporary Standard (29 part CFR 1910, subpart U).

2. *Type of Review:* Emergency.

3. *OMB Control Number:* 1218–0277.

4. *Affected Public: Business or other for-profit.* This rule applies to employers in healthcare who have employees that may have occupational exposure to COVID–19 while engaging in work activities.

5. *Description of the ICR:* The COVID–19 ETS contains collection of information requirements that will assist both employers and employees in addressing the risk of occupational exposure to COVID–19. Specifically, OSHA has found that these requirements are necessary to address the grave danger to healthcare employees from transmission of the SARS–CoV–2 virus in the workplace, resulting in COVID–19 that can be fatal. Some of the key means for preventing this transmission at the workplace are keeping people distanced to make the potential transmission of the virus less likely, identifying infected employees who need to be excluded from the workplace, and recordkeeping and information exchanges necessary to help prevent infected employees from spreading the virus in the workplace. To be effective, these measures require information exchanges, such as signage

to direct employees or visitors where to stand, as well as collection of information such as whether an employee has tested positive for COVID–19. To identify the best way to address workplace-specific hazards, OSHA also requires employers to involve their employees in the development of a COVID–19 plan to identify areas where physical distancing or other controls are needed, or may be difficult, so that the employer can implement controls or processes to better protect employees. OSHA notes that some of these requirements may necessitate the sharing of personal and confidential information. OSHA has tailored its requirements to minimize these types of information exchanges, but the agency finds that the information required to be gathered, recorded, or shared subject to the limitations specified, are each necessary to protect workers from a grave danger.

This information collection request for the COVID–19 ETS is described below:

Section 1910.502—Healthcare

The COVID–19 ETS provisions for healthcare contain collection of information requirements applicable to all healthcare workplaces where any employee provides healthcare services or healthcare support services. The collection of information requirements in this section require employers to develop and implement a written COVID–19 plan, perform health screening and medical management (including additional requirements related to patient screening), maintain records of their COVID–19 Plans and COVID–19 exposures and infections among their workers, and report work-related COVID–19 hospitalizations and fatalities to OSHA.

6. *Summary of the Information Collection Requirements:* Below is a summary of the collection of information requirements identified in the COVID–19 ETS. See Table VII.–1. Each of the provisions of the ETS identified below, including the requirements resulting in collections of information and the reasons the agency is requiring them, are discussed in more detail in Section VIII. *Summary and Explanation* of the ETS. OSHA's rationale for identifying the various provisions as requiring a collection of information, as well as the impact of the information collections, is also discussed in more detail in Item 8 of the ICR. A copy of this ICR is available to the public at: *http://www.reginfo.gov/public/do/PRAOMBHistory?ombControlNumber=1218-0277*.

Table VII.-1 – Healthcare Collection Requirements Contained in § 1910.502.

#	Section	Collection of Information
1	1910.502(a)	**(a)(2)(iii), (iv), and (v) Scope** – screening of patients/visitors/residents during home healthcare visit
2	1910.502(c)	**COVID-19 Plan –** development of plan and assessment of workplace
3	1910.502(d)	**(d) Patient screening and management –** screening patients to identify potential COVID-19 cases
4	1910.502(h)	**(h) Physical distancing** – instructions for maintaining distance
5	1910.502(l)	**(l)(1), (2) & (3) Health screening and medical management**. Health screenings to prevent infected employees from entering the workplace, and notifications to employees if the employer becomes aware that an infected employee has been in the workplace.
6	1910.502(l)	**(4)(ii) & (iii) Medical removal from the workplace.** Temporary removal of employees from the workplace because of COVID-19 symptoms or close contact with an infected person at the workplace; prerequisites for employees returning to the workplace following removal.
7	1910.502(q)	**(q) Recordkeeping**. – COVID 19 log to record the number of infected employees at the workplace, regardless of where they were infected; making this log available to affected employees and their representatives
8	1910.502(r)	**(r) Reporting COVID-19 fatalities and hospitalizations to OSHA.**

7. *Number of respondents:* 748,816.

8. *Frequency of responses:* One time; on occasion; quarterly.

9. *Number of responses:* 8,428,134.

10. *Average time per response:* Varies.

11. *Estimated total burden hours:* 19,260,202.

12. *Estimated cost (capital-operation and maintenance):* $3,016,812.57.

III. Request for Comment

Although the ETS takes effect immediately, with implementation dates for several provisions specified in the Dates provisions of § 1910.502, it is

a temporary standard that can only be made permanent following an opportunity for public notice and comment. OSHA therefore invites the public to submit comments to OMB, in addition to OSHA, on the proposed collections of information with regard to the following:

- Whether the proposed collections of information are necessary for the proper performance of the Agency's functions, including whether the information is useful;
- The accuracy of OSHA's estimate of the burden (time and cost) of the collections of information, including the validity of the methodology and assumptions used;
- The quality, utility, and clarity of the information collected; and
- Ways to minimize the compliance burden on employers, for example, by using automated or other technological techniques for collecting and transmitting information.

Comments maybe be submitted to OSHA. In addition to submitting comments directly to the agency, members of the public who wish to comment on the agency's information collection requirements in this ETS may send written comments to the Office of Information and Regulatory Affairs, Attn: OMB Desk Officer for the DOL–OSHA (RIN 1218–AD36), Office of Management and Budget, Room 10235, Washington, DC 20503. You may also submit comments to OMB by email at: *OIRA_submission@omb.eop.gov*. Please reference the ICR Reference Number 202106–1218–004 in order to help ensure proper consideration. The agency encourages commenters also to submit their comments related to the agency's clarification of the information collection requirements to the rulemaking docket (Docket Number OSHA–2021–0003), along with their comments on other parts of the proposed rule. For instructions on submitting these comments to the rulemaking docket, see the sections of this **Federal Register** notice titled **DATES** and **ADDRESSES**.

References

Premier Data. (2021, April 1). The state of PPE supply one year into COVID–19. *https://www.premierinc.com/newsroom/blog/premier-data-the-state-of-ppe-supply-one-year-in-to-covid-19*. (Premier Data, April 1, 2020).

VIII. Summary and Explanation

A. Scope and Application

This ETS applies to employers in settings where any employee provides healthcare services or healthcare support services. This includes: Employees in hospitals, nursing homes and assisted living facilities; emergency responders; home healthcare workers; and employees in ambulatory care facilities. These settings are collectively referred to as ''healthcare'' in this *Summary and Explanation*.[129]

The focus of the ETS is on protecting healthcare workers in settings where suspected or confirmed COVID–19 patients are treated. The Director of the CDC's National Institute for Occupational Health (NIOSH) recently wrote to OSHA expressing concern that workers ''in settings that provide treatment to patients with suspected or confirmed COVID–19 face a particularly elevated risk of being infected with SARS–CoV–2'' because the delivery of such care ''requires repeated instances of close contact with infected patients'' and healthcare workers ''will be of greater risk of exposure to new SARS–CoV–2 variants'' because they will be among the first to be exposed to people carrying the variants as they emerge and those infected seek medical care (Howard, May 22, 2021). OSHA does not distinguish between healthcare services provided outdoors from those same services provided indoors. For example, the risks to an emergency medical technician who provides mouth-to-mouth resuscitation to a patient are the same whether the care is provided outdoors or indoors. Additionally, while the CDC has stated that the risk of transmission outdoors is low for general activities, that guidance specifically states that it ''applies in non-healthcare settings'' (CDC, May 13, 2021).

The heightened risk for healthcare workers is discussed in more detail in the *Grave Danger* section.

This standard also addresses the heightened risk faced by employees of long-term care facilities where the congregate living situation and weakened immune systems of many of the residents can lead infections such as COVID–19 to spread rapidly between patients or residents and then to the healthcare staff who care for them. Like employees who work at hospitals, clinics, and other healthcare facilities, employees who work at long-term care facilities include both healthcare practitioners, who may have direct and close contact with patients and residents, as well as healthcare support staff who could also be exposed directly to patients and residents, or indirectly through aerosols that can remain suspended in rooms for various periods of time or settle and contaminate surfaces. If the presence of COVID–19 patients does lead to more infection of those providing direct healthcare services, those infected workers can then spread the virus to healthcare support personnel who have not yet been vaccinated to prevent that. Medical examiners and support personnel face similar danger in settings where autopsies are performed on suspected or confirmed COVID–19 victims, particularly where aerosol generating procedures are employed. These heightened risks are also discussed further in the grave danger section.

Thus, the standard targets healthcare settings where OSHA has found the elevated risk associated with care of persons with confirmed and suspected COVID–19, and associated activities, constitute a grave danger. Accordingly, it exempts out settings where this elevated risk does not exist. This does not mean there is not a significant risk of COVID–19 infection in the settings exempted from this standard, and the OSH Act's general duty clause may require employers to take steps to protect employees even in settings where an exception applies.

OSHA recognizes that the grave danger is most elevated in those healthcare settings where people with suspected or confirmed COVID–19 are expected to be treated, but it also acknowledges that there is a subset of healthcare providers who elect not to treat such people and instead screen them out to prevent them from entering their facilities. Paragraph (a)(2) of the ETS therefore includes several scope exclusions for such employers, which are addressed in more detail in the following summary and explanation. This is not the only exception—several other exceptions are identified and explained in the following paragraphs—but focusing the ETS on settings where COVID–19 is reasonably expected to be present is particularly significant because it is intended to tailor the ETS to address the grave danger OSHA has identified and the need for the ETS to address that danger.

Paragraph (a)(1) provides that the ETS applies to all settings where any employee provides healthcare services or performs healthcare support services except as otherwise provided later in paragraph (a). It is important to note that, for the most part, the ETS is

[129] In addition to the scope exceptions contained in the ETS itself, which are discussed in this section, there may be situations where the ETS does not apply by operation of the OSH Act. For example, the ETS does not apply where states with OSHA-approved occupational safety and health programs (''State Plans'') have coverage (see 29 U.S.C. 667), State Plans must adopt and enforce COVID–19 requirements that are at least as effective as the ETS. Finally, the ETS does not apply to state and local government employers in states without State Plans (see 29 U.S.C. 652(5)).

settings-based; that is, if any employee in any setting performs one of the tasks enumerated in paragraph (a)(1), each employer with employees in that setting must (except as otherwise provided in paragraph (a)) follow the ETS, even though some of these employees might not engage in the enumerated tasks. Thus, for example, the ETS would generally apply to protect all employees in a hospital (*e.g.,* employees working in the cafeteria, employees performing administrative tasks in the hospital), not just those employees providing healthcare services or performing healthcare support services (*e.g.,* housekeeping). OSHA takes a settings-based approach in the ETS, rather than a task-based approach, to ensure that the ETS is consistent with the CDC's COVID–19 guidance, which also takes a settings-based approach that most healthcare employers are accustomed to, and to protect all employees in these high-risk settings from the hazard of COVID–19, which can be spread from the direct patient care areas to other areas through a variety of personnel interactions and exposures.

The term ''setting'' can encompass several types of scenarios. On the one hand, if a service is performed in a facility whose primary function is the provision of healthcare services (such as a hospital, urgent care facility, or outpatient clinic), all areas in the facility would be considered part of the same setting. For example, a pharmacy or optical department in a hospital would be considered part of the hospital setting. On the other hand, an embedded healthcare clinic in a prison, manufacturing facility, or school would be treated as a healthcare setting that is separate from the remainder of the prison, manufacturing facility, or school (*i.e.,* the non-healthcare setting).

In the case of mobile healthcare services, where licensed healthcare providers enter a non-healthcare setting to provide services (*e.g.,* emergency response or home healthcare), this ETS applies only to the provision of the healthcare services (*i.e.,* the measures necessary to ensure safe work practices for the work tasks that the employees providing the healthcare services are expected to perform) and not to the entire setting itself. For example, if a nurse provides in-home healthcare while a cleaning person happens to be working separately in the house, the ETS applies to the nurse but would not apply to the cleaning person. OSHA does not intend the ETS to apply generally to non-healthcare settings even though mobile healthcare services may be required. For further discussion of this issue, please see discussion of paragraph (a)(3)(ii), below.

Healthcare services are defined in paragraph (b) as services that are provided to individuals by professional healthcare practitioners, who generally have either licensure or credentialing requirements (*e.g.,* doctors, nurses, emergency medical personnel, oral health professionals) for the purpose of promoting, maintaining, monitoring, or restoring health. Healthcare services are delivered through various means including: Hospitalization, long-term care, ambulatory care (*e.g.,* treatment in physicians' offices, dentists' offices, and medical clinics), home health and hospice care, emergency medical response, and patient transport. For the purposes of this ETS, healthcare services include autopsies, which are typically performed by licensed medical examiners. As discussed earlier, while healthcare services are provided in healthcare settings (*e.g.,* hospitals, ambulatory care facilities, such as dentists' offices and doctors' offices, ambulatory surgical centers, medical clinics embedded in schools, correctional facilities, and industrial settings, ambulances, long-term care facilities, such as nursing homes and skilled nursing facilities, urgent care centers), they are also provided in non-healthcare settings (*e.g.,* EMT treating a patient at the site of an accident).

Healthcare support services is defined in paragraph (b) to mean services that facilitate the provision of healthcare services. Healthcare support services include patient intake/admission, patient food services, equipment and facility maintenance, housekeeping services, healthcare laundry services, medical waste handling services, and medical equipment cleaning/reprocessing services. Moreover, healthcare support services can occur both in healthcare settings and in other settings, although the ETS does not apply to healthcare support services not performed in a healthcare setting. For further discussion of this issue, please see discussion of paragraph (a)(2)(vi) below.

Paragraph (a)(2) serves to limit the applicability of the ETS and provides that the ETS does not apply to the following: (i) The provision of first aid by an employee who is not a licensed healthcare provider; (ii) the dispensing of prescriptions by pharmacists in retail settings; (iii) non-hospital ambulatory care settings where all non-employees are screened prior to entry and people with suspected or confirmed COVID–19 are not permitted to enter those settings; (iv) well-defined hospital ambulatory care settings where all employees are fully vaccinated and all non-employees are screened prior to entry and people with suspected or confirmed COVID–19 are not permitted to enter those settings; (v) home healthcare settings where all employees are fully vaccinated and all non-employees are screened prior to entry and people with suspected or confirmed COVID–19 are not present; (vi) healthcare support services not performed in a healthcare setting (*e.g.,* off-site laundry, off-site medical billing); or (vii) telehealth services performed outside of a setting where direct patient care occurs.

Per paragraph (a)(2)(i), the ETS does not apply to the provision of first aid by an employee who is not a licensed healthcare provider. First aid typically refers to medical attention that is usually administered immediately after an injury occurs and at the location where it occurred. It often consists of a one-time, short-term treatment and requires relatively little technology or training to administer. First aid may include cleaning minor cuts, scrapes, or scratches; treating a minor burn; applying bandages and dressings; the use of non-prescription medicine; draining blisters; removing debris from the eyes; massage; and drinking fluids to relieve heat stress. First aid may also include cardiopulmonary resuscitation (which includes chest compressions, rescue breathing, and, as appropriate, other heart and lung resuscitation techniques) of a sick or injured person until medical treatment by a licensed healthcare provider can be administered.

The ''first aid'' exception to the ETS applies regardless of setting. Thus, for example, if an employee who is not a licensed healthcare provider is expected to administer first aid as part of their job duties in an industrial facility, the ETS does not apply even if first aid is provided to a person who develops COVID–19 symptoms while on the job. OSHA included this exemption to make clear that this ETS does not impose extra healthcare-related requirements for employees who are not licensed healthcare providers when they provide first aid. However, first aid provided by licensed healthcare providers (*e.g.,* a nurse or emergency responder) is covered by this ETS.

The ETS is aimed at protecting employees facing those COVID–19 hazards that constitute a grave danger. To this end, the scope exemptions in paragraphs (a)(2)(ii) through (a)(2)(vii) narrowly tailor the ETS to those settings where there is a reasonable expectation that persons with suspected or confirmed COVID–19 will be present.

Paragraph (a)(2)(ii) exempts the dispensing of prescriptions by pharmacists in retail settings (*e.g.,* pharmacies in grocery stores). Treatment or testing of COVID–19 patients would not be expected there. This is a situation where employees dispense medications in a setting and in a manner that is more similar to that of other retail employees dispensing other goods in retail establishments. OSHA emphasizes that the exception for the dispensing of prescriptions by pharmacists in retail settings does not apply when this activity is performed in healthcare settings such as hospitals or ambulatory care clinics. Such pharmacists are covered by the ETS because they are located in settings where treatment of people with suspected or confirmed COVID–19 is more likely to occur.

It is important to note that the ''retail pharmacist'' exception applies only to the dispensing of prescriptions and not to other healthcare services that a pharmacist might provide (*e.g.,* vaccination, testing). Moreover, OSHA will not consider the setting in which prescriptions are dispensed to be a retail setting if other healthcare services are performed in the same setting as the dispensing of prescriptions. Thus, for example, if a pharmacist performs COVID–19 testing in the same setting where they dispense prescriptions, OSHA will consider that setting to be a healthcare setting and not a retail setting. In such cases, the employer will have a reasonable expectation that persons with suspected or confirmed COVID–19 will be present.

Paragraphs (a)(2)(iii) and (a)(2)(iv) provide exemptions from the ETS for certain ambulatory care settings. As defined in paragraph (b), *ambulatory care* means healthcare services performed on an outpatient basis, without admission to a hospital or other facility. It is provided in settings such as: Offices of physicians and other healthcare professionals; hospital outpatient departments; ambulatory surgical centers; specialty clinics or centers (*e.g.,* dialysis, infusion, medical imaging); and urgent care clinics. Ambulatory care does not include home healthcare settings for the purposes of this ETS.

Paragraph (a)(2)(iii) provides that the ETS does not apply to non-hospital ambulatory care settings where all non-employees are screened prior to entry and people with suspected or confirmed COVID–19 are not permitted to enter those settings. This exception is intended to exclude from the standard certain healthcare providers that do not treat, and instead exclude from their facilities, people with suspected or confirmed COVID–19, either because such treatment is not related to the nature of their practice or because the provider chooses not to engage in such treatment as a matter of policy. The exception will apply so long as the employer meets the exception's conditions: The employer must screen each non-employee prior to entry, make a determination based on that screen whether the non-employee has suspected or confirmed COVID–19, and bar entry to that non-employee if it is determined that the non-employee has suspected or confirmed COVID–19.

Under paragraph (b), a person with *confirmed COVID–19* (or a *COVID–19 positive* person) is one who has a confirmed positive test for, or who has been diagnosed by a licensed healthcare provider with, COVID–19. Examples of persons with *suspected COVID–19* are those who indicate (during a COVID–19 screening, for example) that they have symptoms of COVID–19, or who present at a healthcare facility to receive a COVID–19 test. Per paragraph (b), *COVID–19 symptoms* mean the following: Fever or chills; cough; shortness of breath or difficulty breathing; fatigue; muscle or body aches; headache; new loss of taste or smell; sore throat; congestion or runny nose; nausea or vomiting; diarrhea. As will be discussed below, under the ETS, employers must have systems and processes in place to allow them to ascertain whether persons have suspected or confirmed COVID–19. OSHA has not attempted to define the term ''suspected COVID–19'' further because it expects that most employers in healthcare settings will have the capability to identify individuals suspected of health ailments. For example, health care employers should suspect that a person may have COVID–19 if the person indicates that they have COVID–19 symptoms or if they disclose that they are getting tested because of a close contact with a person who has COVID–19. Outside of routine or otherwise mandated COVID–19 testing, a person who is taking a COVID–19 test should generally be treated as suspected to have COVID–19 until the results of the test are known.

Paragraph (b) also specifies that *screen* means asking questions to determine whether a person is COVID–19 positive or has symptoms of COVID–19. OSHA notes that screening can typically be accomplished through questioning. However, employers may choose to employ other methods in addition to the required questions, such as temperature checks, in the conduct of screening. Screening may also include confirming that individuals are abiding by the employer's policies and procedures for wearing face coverings and assessing the individual's recent exposure to COVID–19.

Screening may take several forms depending on the design and size of the facility. For example, at each entrance there may need to be an employee present to perform a health screening on each individual entering the facility. In most cases, OSHA expects that facilities will screen patients by calling them prior to their scheduled appointment to ask the required screening questions. In some cases, the facility may permit non-employees to enter momentarily for in-person screening by an employee who performs the screening while maintaining a distance of 6 feet.

To meet this exception, the employer must not only screen patients and family members or others accompanying patients to their appointments, but also every non-employee who seeks to enter the non-hospital ambulatory care setting. In this context, ''non-employee'' means any person who is not an employee of the employer who owns or controls the setting. This would include, for example, contractors who enter the setting to perform work (*e.g.,* work on the HVAC system).

Examples of when the exclusion provided under paragraph (a)(2)(iii) would apply could be in a podiatrist office, an optometrist's office, or an oral healthcare setting (*e.g.,* dentistry, orthodontics), if the employer develops and implements policies and procedures to screen all non-employees prior to entry and does not permit those with suspected or confirmed COVID–19 entry into the facility. The employer could state that the office will not treat, and will reschedule appointments for, any patients who are experiencing symptoms of COVID–19 or are COVID–19 positive. This would exclude them from this ETS. If, however, the employer continues to see patients with suspected or confirmed COVID–19, the employer must comply with the provisions of this ETS.

Per paragraph (a)(2)(iv), this ETS does not apply to well-defined hospital ambulatory care settings where all employees are fully vaccinated and all non-employees are screened prior to entry and people with suspected or confirmed COVID–19 are not permitted to enter those settings. This is essentially the same exception as for ambulatory care settings outside the hospital except there are two extra layers of employee protection for when the ambulatory care setting is inside a hospital: The area must be well-defined such that it distinct from the rest of the

hospital (may have a separate entrance, etc.)—for example, radiology departments, dialysis centers, or laboratories; and all of the employees in that area must be fully vaccinated (as defined in paragraph (b), *fully vaccinated* means 2 weeks or more following the final dose of a COVID–19 vaccine). This exception recognizes that there are likely to be patients suspected or confirmed to have COVID–19 in some portions of the hospital and the need to prevent mixing between areas with COVID-related care and those well-defined areas that are expected to be free of COVID–19. The requirement to have all employees fully vaccinated provides employees with an additional protection against the increased chance that they might nonetheless be exposed to suspected or confirmed COVID–19 patients, given the hospital setting.

OSHA notes that though the exception in paragraph (a)(2)(iv) might apply to employees while they are in a well-defined hospital ambulatory care setting, the exception is setting-based and does not travel with that employee. Thus, for example, the exception would not apply when a fully vaccinated employee enters the hospital, before they enter the well-defined ambulatory care setting, or when they have lunch in a cafeteria that is open to all employees, or go to a bathroom outside of the well-defined area.

Under paragraph (a)(2)(v), the ETS does not apply in home healthcare settings where all employees are fully vaccinated and all non-employees are screened prior to the employees' entry into a patient's home and people with suspected or confirmed COVID–19 are not present in that home. To meet the conditions of the exception, employers will need to screen patients and any other non-employees who will be present in the household during the home visit (*e.g.,* other family members, friends, contractors, HVAC technicians, etc.) before the employees enter that setting. If the employer does not make reasonable efforts to ensure that all non-employees present in the household have been screened, the exemption would not apply. OSHA recognizes, however, that because these employers do not control the settings where home healthcare will be provided, there is also a reduced ability to screen all people in the location. Additionally, many home healthcare employees' duties require extended exposure and greater involvement in more intimate direct patient care tasks (*e.g.,* bathing, toileting, feeding) that are performed in the breathing zone of the patient and likely to result in higher exposures. To address this and provide an additional layer of controls to ensure that employees are protected in these settings, the employer must ensure that all employees are fully vaccinated before they enter the home healthcare setting to meet the exception in paragraph (a)(2)(v). Because the employer must ensure that people with suspected or confirmed COVID–19 are not present during the home visit to fall within the exception, the employer must specify a clear contingency for situations where an employee arrives at the home healthcare setting and finds an unexpected non-employee in the setting: That non-employee must be screened, the employee must leave that home, or the employer may allow the employee to continue at the home provided that the employer complies with all requirements of the ETS.

OSHA notes that a momentary entry by an unvaccinated employee (or employee whose vaccination status is not known)—delivering mail or picking up blood samples taken by a nurse during a home visit—would not disqualify the employer from the exceptions in paragraphs (a)(2)(iv) or (a)(2)(v). However, if the unvaccinated employee stays and conducts other activities in the setting that extend beyond momentary entry, then the workplace would not qualify as ''fully vaccinated'' and the ETS protections would be required during all periods where the employee remains in the setting.

OSHA notes also that an employer seeking to fall under one of the exceptions in paragraphs (a)(2)(iii), (a)(2)(iv), or (a)(2)(v) must be able to demonstrate that it conducts screenings and excludes non-employees with suspected or confirmed COVID–19 in order to be eligible for the exemptions, as well as that it has determined employees' vaccination status (if applicable).

With regards to determining employees' vaccination status, there are a number of ways employers could approach this. For example, small employers may know that all employees are already vaccinated because it was a topic of conversation as people became eligible and received the vaccine. Other employers may have required employees to be vaccinated and will have records of vaccinations because they or their agents, as permitted under other laws, administered a vaccine. Still others could, when otherwise not prohibited by law, ask employees to either provide documentation of, or attest to, their vaccination status. If an employer is unable to determine the vaccination status of an employee, the employer would need to comply with the ETS as though the employee is not vaccinated.

OSHA also notes that, if a setting meets an exception in paragraphs (a)(2)(iii), (a)(2)(iv) or (a)(2)(v), the momentary entry by a non-employee (for example, a delivery person) would not render the ETS applicable to the setting even though the non-employee is not screened prior to entry. For example, if a delivery person were not screened prior to entering the setting, this would not trigger application of the ETS if the delivery person placed the delivery in the entryway or the setting and then immediately left. However, if the delivery person intends to stay and conduct other activities in the setting that extend beyond momentary entry, to continue to fall within the relevant exception, the employer would need to screen the delivery person prior to entry and not permit the delivery person to enter the setting if they had suspected or confirmed COVID–19.

A note to paragraphs (a)(2)(iv) and (a)(2)(v) provides that OSHA does not intend to preclude the employers from the scope exemption in paragraphs (a)(2)(iv) and (a)(2)(v) solely because they have employees who are unable to be vaccinated. OSHA expects that one benefit of these exceptions will be that more employers will encourage all of their employees to be vaccinated. However, OSHA also recognizes that some workers may not be able to be vaccinated because of either medical conditions, such as allergies to vaccine ingredients, or certain religious beliefs. OSHA has determined that it is not appropriate to preclude the employers of workers who are unable to be vaccinated from any possibility of falling within the exception. Under various anti-discrimination laws, these workers are entitled to ask for a reasonable accommodation from their employer. Employers of workers who are eligible for a reasonable accommodation under disability or other civil rights laws may therefore take advantage of the exemption if, and only if, they provide workers who are unable to be vaccinated with a reasonable accommodation, absent undue hardship, that prevents the worker from being exposed to COVID–19.[130]

[130] Note that OSHA is not stating that unvaccinated workers are entitled, as an accommodation, to access to the carve-out area on a sustained basis. The accommodation must be arranged with the employer in accordance with applicable law. OSHA's intent is simply to provide the employer with an option to avail itself of the exception if the employer wishes to do so and satisfies the conditions.

This scope exception only applies in a well-defined hospital ambulatory care or home healthcare settings where all employees are fully vaccinated, and only allows for reasonable accommodations, absent undue hardship, for workers who are unable to be vaccinated for the reasons described above. And the reasonable accommodation must ensure the accommodated worker is not exposed to the COVID–19 hazard. OSHA is not setting forth specific reasonable accommodations that an employer must utilize, but only requiring that the accommodated worker not be exposed to COVID–19 hazards. OSHA encourages employers to utilize the Department of Labor's Office of Disability Employment Services Job Accommodation Network (*askjan.org*) for assistance in helping identify appropriate accommodations.

Paragraph (a)(2)(vi) provides that the ETS does not apply to healthcare support services not performed in a healthcare setting (*e.g.,* off-site laundry, off-site medical billing), and paragraph (a)(2)(vii) provides that the ETS does not apply to telehealth services performed outside of a setting where direct patient care occurs. The purpose of these exceptions, like other exceptions discussed, is to narrowly tailor the ETS to those settings where there is a reasonable expectation that persons with suspected or confirmed COVID–19 will be present.

Healthcare support services, such as laundering hospital linens, gowns, and scrubs, medical waste handling, and medical equipment maintenance and reprocessing, are often performed in healthcare settings. For example, a laundry facility may be located in the basement of a hospital. The ETS applies to the provision of these healthcare support services (and all other work) when performed in healthcare settings (unless an exception to the standard applies) for the reasons explained earlier regarding OSHA's decision to take a settings-based approach to regulation.

However, when healthcare support services such as medical billing or other administrative activities, or laundering services, are performed in an off-site office building that does not otherwise qualify as a healthcare setting, the ETS does not apply in these off-site facilities.

Some healthcare services are delivered remotely (*i.e.,* telehealth services). Telehealth services might be delivered from within a setting where direct patient care occurs (such as a nurse providing telehealth services from a doctor's office in a hospital or ambulatory care clinic where patients are also seen in person). In these cases, the ETS applies (absent another exception). The ETS does not, however, cover telehealth services delivered from settings where no direct patient care occurs (such as an employee's home or a suite in an office building where no direct patient care occurs). In these cases, the exception in paragraph (a)(2)(vii) applies. It should be noted that, under paragraph (b), *direct patient care* means hands-on, face-to-face contact with patients for the purpose of diagnosis, treatment, and monitoring.

Paragraph (a)(3)(i) provides that, where a healthcare setting is embedded within a non-healthcare setting (*e.g.,* nurse's office in a school, medical clinic in a manufacturing facility or prison, walk-in clinic in a retail setting such as a grocery store, physician's office or dentist's office embedded in an office building), the ETS applies only to the embedded healthcare setting and not to the remainder of the physical location. OSHA notes that each medical, dental, or similar practice embedded in an office building would be a separate healthcare setting from the other medical, dental, or similar practices in the office building, even if all tenants in the office building are medical, dental, or similar practices.

Paragraph (a)(3)(ii) provides that, where emergency responders or other licensed healthcare providers enter a non-healthcare setting to provide healthcare services, the ETS applies only to the provision of the healthcare services by that employee. In this limited situation, the ETS applies to healthcare services provided by employee(s) in a setting. This provision would apply, for example, where a physician assigned to work in an embedded clinic or an emergency medical responder enters the floor of a manufacturing plant or the residential area of a prison to provide healthcare services to a sick employee or sick prisoner. In such circumstances, the ETS would apply to the provision of healthcare services by the physician or emergency responder, but would not apply to all other employees in the setting. For example, the ETS would not apply to plant workers or prison guards who remain on the manufacturing plant floor or in the prison residential area while the physician provides healthcare services to the sick employee or prisoner. The requirements of the ETS that are location-based would not apply to the provision of healthcare services in this situation (*e.g.,* ventilation outside of the embedded clinic, barriers).

Paragraph (a)(4) of the ETS is a limited exception applicable to vaccinated employees in certain situations. That paragraph provides that the ETS's requirements for PPE (paragraph (f)), physical distancing (paragraph (h)), and physical barriers (paragraph (i)) do not apply to employees who are fully vaccinated when they are in well-defined areas of a workplace where there is no reasonable expectation that any person with suspected or confirmed COVID–19 will be present. The requirements in the ETS for PPE, physical distancing, and physical barriers are designed to both protect employees on an individual basis from the COVID–19 hazard and reduce the risk that an individual employee will transmit the virus to others. Thus, for example, the requirement in paragraph (f) that the employer provide and ensure that each employee wears facemasks in certain situations serves to protect other employees from the COVID–19 hazard because facemasks act as a source control in addition to providing some protection for the wearer against COVID–19 transmission.

Although the exception goes beyond the CDC guidance allowing vaccinated healthcare workers to go without masks, distancing, or barriers only when in a space entirely populated by vaccinated workers, OSHA is incorporating the exemption in paragraph (a)(4) into the ETS because, as is further discussed in *Grave Danger* (Section IV.A of this preamble), the Centers for Disease Control and Prevention (CDC) has acknowledged a growing body of studies indicating that there is significantly lowered risk of transmission of COVID–19 from vaccinated persons to unvaccinated persons (CDC, May, 13, 2021).

Examples of well-defined areas of a workplace for the purpose of this ETS are billing or other administrative offices, employee break rooms, or employee meeting areas. In any of these well-defined area, there is typically no reasonable expectation that any person with suspected or confirmed COVID–19 will be present. As noted in the summary and explanation of the COVID–19 plan required under paragraph (c)(4), in order to avail themselves of this vaccinated-employee exception, employers must assess their workplaces to determine where the applicable well-defined areas exist and must have a process for determining which employees are vaccinated.

It should be noted that this exemption will never apply to areas of healthcare facilities (well-defined or not) where there is a reasonable expectation that persons with suspected or confirmed COVID–19 may be present, such as in emergency rooms, or patient waiting

areas or hospital wards open to treating COVID–19 patients. In such areas, paragraphs (f), (h), and (i) of the ETS will apply to all employees, including those employees who are fully vaccinated.

Note 1 to paragraph (a) indicates that state or local government mandates or guidance (*e.g.,* legislative action, executive order, health department order) that go beyond and are not inconsistent with the ETS are not intended to be limited by this ETS. OSHA recognizes that many states have taken action to protect employees with mandatory requirements that may not be appropriate for an ETS on a national level, and that states have additional powers that OSHA does not (*e.g.,* criminal sanctions). OSHA does not intend to preempt these powers or requirements. For example, OSHA does not intend to preempt state or local requirements for customers to wear face coverings whenever they enter a hospital or other health care facility, or in public places generally.

Note 2 to paragraph (a) encourages employers to follow public health guidance from the CDC even when not required by the ETS. This would include following CDC guidance for healthcare settings even where employees are fully vaccinated.

References

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B. COVID–19 Plan

Paragraph (c) includes provisions for the development and implementation of a COVID–19 plan, as well as requirements regarding what needs to be in the plan. The development of a COVID–19 plan, including comprehensive policies and procedures, is required in order to prevent or minimize employee exposure to COVID–19 in the workplace. All of the requirements in paragraph (c) must be included in the employer's COVID–19 plan.

Paragraph (c)(1) requires employers to develop and implement a COVID–19 plan for each workplace. As defined in paragraph (b), a *workplace* is a physical location (*e.g.,* fixed, mobile) where the employer's work or operations are performed. *Physical location* is also defined in paragraph (b). It means a site (including outdoor and indoor areas, a structure or a group of structures) or an area within a site where work or any work-related activity occurs (*e.g.,* taking breaks, going to the restroom, eating, entering or exiting work). A physical location includes the entirety of any space associated with the site (*e.g.,* workstations, hallways, stairwells, breakrooms, bathrooms, elevators) and any other space that an employee might occupy in arriving, working, or leaving. As explained in paragraph (c)(1), if an employer has multiple workplaces that are substantially similar, its COVID–19 plan may be developed by workplace type rather than by individual workplace so long as any site-specific information is included in the plan. For example, if an employer has developed a corporate COVID–19 plan that includes information about job tasks or exposure scenarios that apply in multiple workplaces, this information can be used in the development of COVID–19 plans for individual workplaces.

In general, paragraphs (c)(2) through (c)(6) describe the process by which the COVID–19 plan must be developed and implemented, and paragraph (c)(7) lists policies and procedures that must be included in the COVID–19 plan. However, the COVID–19 plan is adaptable to the physical characteristics of the workplace and the job tasks performed by employees, as well as the hazards identified by the employer when designing their COVID–19 plan. As explained in a note to paragraph (c), employers may also include other policies, procedures, or information necessary to comply with any applicable federal, state, or local public health laws, standards, and guidelines in their COVID–19 plans.

Under paragraph (c)(2), an employer with more than 10 employees is required to develop and implement a written COVID–19 plan. While OSHA has concluded that a COVID–19 plan is necessary for all employers covered by the ETS, OSHA has determined that only employers with more than 10 employees need to have a written plan. This cutoff of 10 employees is consistent with OSHA's employer size cutoff for both the COVID–19 log requirement in this ETS and in the partial exemption from recordkeeping requirements in 29 CFR 1904.1. In the case of employers with 10 or fewer employees, the agency does not believe that there is a high likelihood of misunderstanding when employers communicate their COVID–19 plans to employees verbally. As a result, OSHA does not believe the added burden on small employers of establishing a written plan is necessary, particularly given the need for rapid implementation of the ETS. However, small employers may opt to create written COVID–19 plans if they find doing so is helpful in developing and implementing their COVID–19 plans.

In contrast, the agency is concerned that when employers have more than 10 employees there is likely sufficient complexity in the employer's operation that putting the COVID–19 plan in writing is necessary to establish clear expectations and prevent miscommunication. For example, employers with more than 10 employees may have employees working in multiple locations or on multiple shifts, increasing the likelihood that verbally communicating the employer's COVID–19 plan will be ineffective. Therefore, OSHA believes that having a written COVID–19 plan that employees of larger employers can easily access is essential to ensure those employees are informed about policies, programs, and protections implemented by their employers to protect them from COVID–19-associated hazards. This approach is consistent with OSHA's practice of allowing employers with 10 or fewer employees to communicate their emergency action plans (29 CFR 1910.38) and fire prevention plans (29 CFR 1910.39) orally to employees.

An employer may have already developed and implemented a COVID–19 plan to protect employees from exposure to COVID–19. Existing COVID–19 plans may fulfill some of the requirements in this section. It is not OSHA's intent for employers to duplicate current effective COVID–19 plans, but each employer with a current COVID–19 plan must evaluate that plan for completeness to ensure it satisfies all of the requirements of this section. Employers with existing plans must modify and/or update their current COVID–19 plans to incorporate any missing required elements, and provide training on these new updates or modifications to all employees. Employers with more than 10 employees must ensure their existing COVID–19 plan is in writing.

For those employers who do not already have a COVID–19 plan in place, OSHA will be releasing significant

compliance assistance materials, including a model healthcare-specific plan to accompany the standard, which will significantly streamline this step for many businesses. In addition, the Centers for Disease Control and Prevention (CDC) has developed *Guidance for Businesses and Employers Responding to Coronavirus Disease 2019* (CDC, March 8, 2021) and *Healthcare Facilities: Managing Operations During the COVID–19 Pandemic* (CDC, March 17, 2021), that may be helpful to employers in developing a plan. OSHA has also published key resources for all businesses, including *Protecting Workers: Guidance on Mitigating and Preventing the Spread of COVID–19 in the Workplace* (OSHA, January 29, 2021), *Guidance on Returning to Work* (OSHA, June 18, 2020) and *Guidance on Preparing Workplaces for COVID–19* (OSHA, March 9, 2020).[131] (OSHA and the U.S. Department of Health and Human Services developed the latter jointly.) The *Guidance on Preparing Workplaces for COVID–19* document is based on traditional infection prevention and industrial hygiene practices, and is meant to help employers and employees identify risk levels in workplace settings and determine appropriate control measures to implement. The *Guidance on Returning to Work* document complements *Guidance on Preparing Workplaces for COVID–19* and focuses on the need for employers to develop and implement strategies for hand hygiene, cleaning and disinfection of high-touch surfaces, physical distancing, identification and isolation of sick employees, workplace controls and flexibilities, and employee training. The *Protecting Workers: Guidance on Mitigating and Preventing the Spread of COVID–19 in the Workplace* document is intended to help employers and workers implement a coronavirus prevention program, with several essential elements, and better identify risks which could lead to exposure and contraction.

Additionally, the U.S. Equal Employment Opportunity Commission (EEOC) has developed guidance regarding *What You Should Know About COVID–19 and the ADA, the Rehabilitation Act, and Other EEO Laws* (EEOC, May 28, 2021). Employers are encouraged to review this guidance as they develop their COVID–19 plan, including policies and procedures for health screenings, as well as return to work plans. Additional information about labor, disability, and employment laws is available on the Summary of the Major Laws of the Department of Labor web page (DOL, 2020).

Paragraph (c)(3) requires the employer to designate one or more workplace COVID–19 safety coordinators to implement and monitor the COVID–19 plan. In order to perform these tasks effectively, the safety coordinator(s) should be able to understand and identify COVID–19 hazards in the workplace. The COVID–19 safety coordinator(s) must be knowledgeable in infection control principles and practices as they apply to the workplace and employee job operations. For example, safety coordinator(s) must be knowledgeable about the CDC's infection control recommendations, as well as employer policies and procedures implemented in accordance with the same (*e.g.,* the patient screening and management strategies implemented pursuant to paragraph (d)(3)). Additionally, the safety coordinator(s) must have the authority to ensure compliance with all aspects of the COVID–19 plan so that they can take prompt corrective measures when hazards are identified. For employers with more than 10 employees, the name of the safety coordinator(s) must be documented in the written COVID–19 plan.

Employers must designate a safety coordinator(s) to implement and monitor the COVID–19 plan, but the exact responsibilities of a safety coordinator(s) may vary based on the employer and workplace. Possible safety coordinator responsibilities may include conducting inspections of the workplace. Regular inspections would provide a mechanism for safety coordinator(s) to ensure the COVID–19 plan is being implemented appropriately and to monitor the ongoing effectiveness of the plan. During inspections, the safety coordinator(s) could observe employees to ensure they are physically distancing and using appropriate PPE. At places like reception or triage counters, where employees would have encounters with members of the public, the safety coordinator(s) could conduct inspections to ensure that there are appropriately-sized physical barriers installed between employees and visitors. If an employer relies on its safety coordinator to monitor compliance with the requirements of its COVID–19 plan and this ETS, it must provide the safety coordinator with adequate training on how to discharge those duties.

Paragraph (c)(4)(i) requires the employer to conduct a workplace-specific hazard assessment to identify potential workplace hazards related to COVID–19. The hazard assessment process is intended to help employers identify and understand where COVID–19 hazards potentially exist and what controls must be implemented in their workplace in order to minimize the risk of transmission of COVID–19. As part of the hazard assessment, employers must inspect the entire workplace to find existing and potential risks of employee exposure to COVID–19. The hazard assessment must include an evaluation of employees' potential workplace exposure to all people present at the workplace, including coworkers, employees of other entities, members of the public, customers or clients, independent contractors, visitors, and other non-employees. Places and times where people may congregate or come in contact with one another must be identified and addressed, regardless of whether employees are performing an assigned work task or not. For instance, people may congregate during meetings or training sessions, as well as in and around entrances, bathrooms, hallways, aisles, walkways, elevators, breakrooms or eating areas, and waiting areas. All of these areas must be identified and addressed as part of the hazard assessment. Employers must consider how employees and other persons enter, leave, and travel through the workplace, in addition to addressing potential COVID–19 hazards employees are exposed to at fixed work locations.

Employers have flexibility to determine the best approach to accomplish the overall hazard assessment. For example, the hazard assessment could be adapted and tailored to specialized clinical services, the physical characteristics of the workplace, the number of people in the workplace, or the prevalence of COVID–19 in the surrounding community. Employers may also want to consult state or local public health laws, standards, and guidelines in determining how best to conduct their hazard assessments. While conducting the hazard assessment, employers must assess each employee's potential COVID–19 exposure but can do so generally. An employer could make a reasonable assessment based on commonalities of tasks, environmental factors, and work practices for one shift and prescribe the same protective

[131] OSHA's *Guidance on Returning to Work* (OSHA, June 18, 2020), *Guidance on Preparing Workplaces for COVID–19* (OSHA, March 9, 2020), and *Protecting Workers: Guidance on Mitigating and Preventing the Spread of COVID–19 in the Workplace* (OSHA, January 29, 2021) have now been archived. However, the information in these documents can still be a useful resource for employers as they develop or re-evaluate their COVID–19 plans.

controls and work practices to other shifts or exposure groups of employees with similar hazards and risk. For example, a hospital employer may not need to conduct an individual hazard assessment for each receptionist in an emergency room entrance area because the COVID–19 hazards to which the receptionists are exposed would be the same. However, if a particular receptionist has additional responsibilities (*e.g.,* greeting patients, intake for all COVID–19 patients, cleaning of barriers), those tasks must be taken into consideration as part of the overall hazard assessment.

When conducting hazard assessments, employers should document the following information to assist them in developing and implementing their COVID–19 plans:

- Specific hazards or risk factors identified
- A plan to abate the identified hazards or risk factors in a timely manner
- Date(s) the assessment was performed
- The names and titles of the individuals who participated in the evaluation and contributed to the written plan
- A description of the actions to be taken
- Actions planned to address and prioritize mitigation of identified hazards or risk factors
- Identification of high-risk area(s), tasks, and occupations
- Communication of the status of planned or completed actions to employees who may be affected by the identified hazards or risk factors
- The dates by which planned actions are to be completed
- Written documentation of completed actions including:
  - What method(s) of control was/were decided upon
  - Area(s) where control(s) was/were implemented
  - Specific date(s) of completion
  - The names and titles of the individuals who authorized and managed implementation of control

When an employer identifies a COVID–19-related exposure hazard during the hazard assessment, the employer must implement controls to eliminate or mitigate the hazard, such as physical distancing, physical barriers where appropriate and when distancing is infeasible, PPE, and cleaning and disinfection protocols. These hazard controls must be consistent with the relevant requirements in other paragraphs of this ETS. The employer must develop a reasonable plan to abate identified COVID–19 hazards.

OSHA acknowledges that some of the controls required under other paragraphs of this ETS may be potentially infeasible in some situations. However, even in cases where an employer can demonstrate that a particular control is appropriate but is not feasible, the employer should still identify and implement alternative measures to protect employees from COVID–19 exposure(s) to the extent feasible. This ETS relies on a multi-layered strategy to minimize employee exposure to COVID–19, and each of the controls provides a layer of protection for employees. Therefore, when an employer is not implementing a control that is appropriate but is not feasible, the employer should take alternative abatement measures to account for the loss of that protective layer.

A finding of infeasibility is made on a case-by-case basis and is highly dependent on the specific circumstances and facts in each workplace. The concept of an infeasibility defense for non-compliance with an OSHA standard is well-established under OSHA case law and is always potentially available to employers. In general, compliance with an OSHA standard is feasible when it is capable of being done. Situations where some of the controls required under this ETS may be infeasible might include where employees cannot maintain 6 feet of distance from all other people in the workplace and also cannot remain behind physical barriers while providing services (see the *Summary and Explanation* for Physical Distancing for additional discussion about distancing requirements). In these situations, employers should consider implementing additional measures to protect their employees.

An employer might identify other hazards during its hazard assessment that warrant providing additional PPE to its employees, beyond what is required by other paragraphs of this ETS. For example, there may be employees whom the employer would not be required to provide respirators pursuant to paragraph (f)(2) because the employees are not exposed to a person with suspected or confirmed COVID–19. However, those employees may face increased likelihood of COVID–19 exposure because they work in an environment where people with COVID–19 may be present. An employer may also have an employee who has an underlying medical condition or other risk factors (*e.g.,* chronic obstructive pulmonary disease, heart condition, pregnancy) that would place that employee at greater risk for severe illness if they get COVID–19 (CDC, May 13, 2021). In these situations, employers could consider upgrading the PPE provided to employees if their health condition does not prevent it. As explained in paragraph (f)(4)(i), if an employer provides a respirator in lieu of the required facemask, then the employer must comply with the requirements under the COVID–19 Emergency Temporary Standard — Mini Respiratory Protection Program (29 CFR 1910.504, herein referred to as the mini respiratory protection program section). This ETS reduces the burden on employers and employees who choose to upgrade to a respirator by allowing them to use respirators pursuant to the mini respiratory protection program section. Additional information about the mini respiratory protection program section can be found in the summary and explanation for that section.

Paragraph (c)(4)(ii) requires employers seeking to be exempt from providing controls under paragraph (a)(4) to include policies and procedures in their COVID–19 plans to determine employees' vaccination status. Although this requirement only applies to employers seeking the exemption under paragraph (a)(4), the following discussion is also relevant to employers seeking the exemption from the scope of the ETS under paragraphs (a)(2)(iv) and (a)(2)(v). Employers seeking these exemptions must determine employees' vaccination status in order to determine whether the exemption from the ETS applies. In order to make the determination of which workers are fully vaccinated, employers could, for example, vaccinate their workforce themselves; review CDC vaccination cards or similar verification issued by a pharmacy, healthcare provider, or other vaccinator; if available, review state-issued passes; or simply ask workers to attest whether they have been fully vaccinated. If the employer is not able to determine that an employee is fully vaccinated, the employer must treat that employee as not fully vaccinated. Additional information about the exemptions in paragraph (a)(4) can be found in the *Summary and Explanation* for paragraph (a) (*Scope and application*).

Under paragraph (c)(5), the employer must seek the input and involvement of non-managerial employees and their representatives, if any, in the hazard assessment and the development and implementation of the COVID–19 plan. An employer can seek feedback from employees through a variety of means, including safety meetings, a safety committee, conversations between a supervisor and non-managerial employees, a process negotiated with the exclusive bargaining agent (if any), or any other similarly interactive

process. Other tools that may be helpful for employers in soliciting feedback from employees may include employee surveys or a suggestion box. The method of soliciting employee input is flexible and may vary based on the employer and the workplace. For example, a large employer with many employees may find a safety committee with representatives from various job categories combined with anonymous suggestion boxes to be more effective than individual conversations between supervisors and non-managerial employees. In the case of a unionized workplace, a safety committee established through a collective bargaining agreement may be the appropriate source for this input based on the definition and scope of the committee's work. In contrast, a small employer might determine that an ongoing interactive process between the employer and employees (*e.g.,* regular safety meetings) is a more effective means of soliciting employee feedback.

The employer must monitor each workplace to ensure the ongoing effectiveness of the COVID–19 plan and update it as needed, as required in paragraph (c)(6). For example, COVID–19 plans may need to be updated as more information about COVID–19 becomes available from the CDC, or state and local agencies. Additionally, the safety coordinator might learn of a deficiency during an inspection or from another employee. Any deficiencies identified must be immediately addressed, and re-training of all affected employees must occur.

Paragraph (c)(7) requires an employer's COVID–19 plan to address the hazards identified during the hazard assessment required by paragraph (c)(4), and to include policies and procedures in accordance with paragraphs (c)(7)(i) through (c)(7)(iii). Paragraph (c)(7)(i)requires employers to develop policies and procedures to minimize the risk of transmission of COVID–19 for each employee, as required by paragraphs (d) through (n). Information about the requirements of those paragraphs can be found in the corresponding sections of the *Summary and Explanation.* Each of these elements, when implemented together, provide multiple layers of protection for employees. As explained in the note to paragraph (c)(7)(i), although the employer's COVID–19 plan must account for the potential COVID–19 exposures to each employee, the plan can do so generally and need not address each employee individually. For example, employers could address unvaccinated employees collectively when pointing to hazards from exposure to other unvaccinated employees, patients, or visitors and instructing them what protective actions those employees are expected to follow for specific situations such as when a visitor enters without the source control of a face covering.

The provisions in paragraph (c)(7)(ii) address effective communication and coordination among employers. Specifically, these provisions prescribe the information-sharing responsibilities of employers who share the same physical location. OSHA intends this requirement to help prevent employees of one employer from creating hazards for employees of a different employer, and to facilitate information-sharing between employers when one employer has the authority to address ventilation, barrier installation, or cleaning in an area occupied by employees of a different employer. As explained above, physical location means a site, or an area within a site, where work or any work-related activity occurs. The full definition for *physical location* can be found in paragraph (b). The provisions in (c)(7)(ii) are necessary to ensure that critical information-sharing and coordination take place at all workplaces covered by the ETS.

When employees of different employers share the same physical location, paragraph (c)(7)(ii)(A) requires that each employer communicate its COVID–19 plan to all other employers present and coordinate to ensure that each of its employees is protected. Additionally, employers must adjust their COVID–19 plans to address any particular COVID–19 hazards presented by the other employer's employees who share the physical location.

Paragraph (c)(7)(ii)(A) does not apply to delivery people, messengers, and other employees who only enter a workplace briefly to drop off or pick up items. For example, if an employee of a delivery company enters a workplace to deliver a package and then immediately leaves the workplace, the employers regularly present at the physical location (*e.g.,* the employer receiving the package) and the delivery company do not need to communicate their COVID–19 plans in accordance with this paragraph.

Multiple employers working in the same physical location occurs regularly. For example, in a hospital setting, an employer might subcontract nursing or housekeeping tasks to other employers. When this happens, each employer performing work at the site must communicate their COVID–19 plans to the other employers and coordinate with them to ensure all employees are adequately protected from COVID–19 exposure. If the subcontracted employee is not properly protected and becomes infected, that employee could pose a transmission risk to other healthcare staff. In some cases, multiple employers may need to work collaboratively for either or both employers to become eligible for exceptions involving vaccinated employees. Paragraph (c)(7)(ii)(B) contains a notification requirement for employers with one or more employees working in a physical location controlled by another employer. Specifically, those employers must notify the controlling employer when their employees are exposed to conditions at the location that do not meet the requirements of this section. Examples of conditions that might not meet the requirements of this section that would need to be reported could include communal high-touch surfaces (*e.g.,* elevator buttons or bathroom facilities) that are not being adequately cleaned, or a physical barrier that has fallen down.

The communication and coordination provisions in paragraph (c)(7)(ii) are in addition to, and do not modify, OSHA's existing multiemployer citation policy, including a controlling employer's obligation to exercise reasonable care to detect and prevent violations on the worksite.

Lastly, paragraph (c)(7)(iii) includes requirements for employers whose employees enter private residences or other physical locations controlled by people not covered by the OSH Act (*e.g.,* homeowners, sole proprietors). These employers must include policies and procedures in their COVID–19 plans to protect their employees entering those locations, including procedures for leaving the worksite if protections prove inadequate. Several methods of protecting employees are discussed in the technological feasibility section of this document.

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C. Patient Screening/Management

Patient screening and management strategies aim to identify and manage those individuals who may have COVID–19 before entering a facility so that appropriate precautions can be implemented to prevent transmission to others within the workplace. Therefore, paragraph (d) includes provisions for screening and management of persons, including patients, entering settings where direct patient care is provided. The patient screening and management required under paragraph (d) is in addition to health screening for employees that is required under paragraph (l)(1). The additional screening required under paragraph (d) does not extend to employers covered by the ETS that do not provide direct patient care.

Paragraph (d)(1) requires employers in settings where direct patient care is provided to limit the number of entrances to the facility, as well as provide a monitoring system for each point of entry to ensure that persons do not enter the facility without going through screening. Paragraph (d)(1) does not apply to emergency responders or other licensed healthcare providers entering a non-healthcare setting or private residence to provide healthcare services. For example, this provision would not apply to a paramedic providing care to a person in their private residence.

Under paragraph (d)(2), employers must screen all individuals who enter the facility (*e.g.,* clients, patients, residents, delivery people and other visitors, and other non-employees). As defined in paragraph (b), *screen* means asking questions to determine whether a person is COVID–19 positive or has symptoms of COVID–19. Although it is not a perfect tool, screening is an important aspect of a multi-layered approach to minimizing workplace exposures to COVID–19. Employers must include their screening and management procedures in their COVID–19 plans, which must be written if the workplace setting has more than 10 employees (see paragraphs (c)(7)(i), (c)(2)). As noted following paragraph (d), the use of telehealth services, when appropriate and available, is encouraged. For example, employers may use phone or video platforms to conduct screening on a patient, client, resident, or other visitor prior to their arrival at the facility/workplace. Employers could also schedule patients for telehealth visits, where medically appropriate. Using telehealth in these ways helps to reduce the number of individuals entering a facility/workplace as well as reduce employee exposure, while not compromising the health of the patient.

OSHA notes that it views asking questions about COVID–19 symptoms and illness as the minimum requirement for screening. Employers may choose to employ other methods in addition to the required questions, such as temperature checks, in the conduct of screening. Screening may also include confirming that individuals are abiding by the employer's policies and procedures for wearing face coverings in the facility, in accordance with paragraph (d)(3), as well as assessing individuals' recent exposures to COVID–19.

Under this same provision (paragraph (d)(2)), employers are also required to establish policies to triage any individual who may be experiencing COVID–19 symptoms or illness. The screening and triage process is a tool to identify patients who require specific patient management practices under paragraph (d)(3) in order to protect both employees and other patients or visitors. In some cases, visitors who present with COVID–19 symptoms or illness may be restricted from entering and referred to a physician or different facility for proper evaluation. Other triage policies could include: Rescheduling of surgery, physician visit, or home health visit; referral for treatment and isolation of the patient to a separate area; or if at a home visit, leaving the residence and rescheduling the visit. When an in-person visit is unavoidable, each employer must develop policies and procedures, including those required by the remaining provisions of the ETS, to triage those patients who are identified through screening as having COVID–19 symptoms or illness and ensure employee protection from COVID–19 transmission. Those patients should either be isolated in a separate area (*e.g.,* examination room) with the door closed or asked to wait in their vehicle to be called in for their appointment. The CDC offers additional guidance on triaging patients (CDC, February 25, 2021).

Paragraph (d)(3) requires employers to implement other applicable patient management strategies. OSHA notes that in this context, patient management strategies must address the management of individuals other than patients who enter the facility for patient-related reasons, such as family members or others who accompany patients to ambulatory care appointments or visit hospitalized patients or nursing home residents.

The applicable patient management strategies the employer must implement under paragraph (d)(3) must be in accordance with the ''CDC's COVID–19 Infection Prevention and Control Recommendations'', which is incorporated by reference as specified in 29 CFR 1910.509 (CDC, February 23, 2021). For example, that document provides for patients and visitors to wear well-fitting source control (cloth masks, facemasks, or respirators) and for appropriate patient placement to help reduce the risk of COVID–19 transmission. OSHA expects employers to comply with these and other patient management strategies in the ''CDC's COVID–19 Infection Prevention and Control Recommendations,'' to the extent they are applicable.

As another example of a patient management strategy, patients who have been admitted may need to be screened daily for new fever onset or other suspected COVID–19 symptoms, as they may require additional medical treatment, or may need placement on appropriate Transmission-Based Precautions (see next section). If the admitted patient develops a high fever and persistent cough, which may indicate a possible COVID–19 infection, that patient may need to be isolated in a private room and placed under Droplet Precautions or Airborne Precautions. Transmission-Based Precautions are further described in the *Summary and Explanation* of Standard and Transmission-Based Precautions.

Other patient management strategies include posting visual alerts (*e.g.,* signs,

posters) at the entrance and in other strategic places (*e.g.,* waiting areas, elevators) relevant to patient management practices that provide instructions in appropriate languages and education levels about wearing face coverings, maintaining physical distancing, and performing timely hand hygiene and proper respiratory etiquette. It may also be necessary to provide face coverings for patients and visitors, as well as supplies for hand and respiratory hygiene, including hand sanitizer (with at least 60% alcohol), tissues, and no-touch waste receptacles at entrances, in waiting areas, and at patient check-ins.

References

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D. Standard and Transmission-Based Precautions

Standard and Transmission-Based Precautions are the cornerstone for all infection prevention activities to prevent the transmission of communicable diseases to employees, patients, and other non-employees in healthcare settings. Under paragraph (e), employers are required to develop and implement policies and procedures that adhere to Standard and Transmission-Based Precautions in accordance with ''CDC's Guidelines for Isolation Precautions'' (incorporated by reference, § 1910.509) to reduce the transmission of COVID–19. The Standard and Transmission-Based Precautions required by the ETS only extend to exposure to SARS–CoV–2 and COVID–19 protection. The agency does not intend the ETS to apply to other workplace hazards. The ''CDC's Guidelines for Isolation Precautions'' (Siegel et al., 2007) is an authoritative standard for infection prevention and control.

Standard Precautions must be implemented regardless of the presence of a suspected or confirmed infectious agent, such as COVID–19. The use of Standard Precautions thus relies on the assumption that every patient, all potentially-contaminated materials, and all human remains in healthcare settings are potentially infected or colonized with an infectious agent. Standard Precautions are similar to, but more extensive than, ''universal precautions,'' which are required by OSHA's Bloodborne Pathogens standard (the BBP standard, 29 CFR 1910.1030), to prevent contact with blood or other potentially infectious materials (as that term is defined in the BBP standard). Standard Precautions were developed to integrate principles of universal precautions into broader principles pertaining to routes of exposure other than the bloodborne route, such as via the contact, droplet, or airborne routes. For example, although the BBP standard might not apply, Standard Precautions would be utilized when employees are exposed to urine, feces, nasal secretions, sputum, vomit, and other body fluids, and also when employees are exposed to mucous membranes and non-intact skin (Siegel et al., 2007). Standard Precautions assume that when there is exposure to these materials, the materials potentially contain infectious agents that could be transmitted via the contact, droplet, or airborne routes.

The infection prevention and control methods used under Standard Precautions will likely be similar to, but more extensive than, what employers should already be implementing to protect employees against exposures under the BBP standard. Standard Precautions not only include the infection control methods specified as universal precautions (*e.g.,* hand hygiene, the use of certain types of PPE based on anticipated exposure, safe injection practices, and safe management of contaminated equipment and other items in the patient environment), but also include, for example, respiratory and cough etiquette (Siegel et al., 2007).

Transmission-Based Precautions are infection control practices that are used in tandem with Standard Precautions but are based on the way an infectious agent(s) may be transmitted. Transmission-Based Precautions are the second tier of basic infection control and are to be used in addition to Standard Precautions for patients who may be infected or colonized with certain infectious agents, such as COVID–19, for which additional precautions are needed to prevent infection transmission. Unlike Standard Precautions, Transmission-Based Precautions are only implemented if the presence of an infectious agent, such as COVID–19, is suspected or confirmed.

There are three categories of Transmission-Based Precautions: Contact Precautions, Droplet Precautions, and Airborne Precautions (Siegel et al., 2007).[132] For diseases that have multiple routes of transmission, more than one category of Transmission-Based Precautions must be used. Whether one category or multiple categories of Transmission-Based Precautions are used, they are always used in addition to Standard Precautions. As described in *Grave Danger* (Section IV.A. of this preamble), COVID–19 is capable of contact, droplet, and airborne transmission in healthcare settings. As such, employers must follow the appropriate precautions specified for these transmission pathways, as applicable to their workplaces.

An extensive review of current policies and procedures will help employers ensure that paragraph (e) is met; when necessary, employers must develop and implement any missing policies and procedures to adhere to Standard and Transmission-Based Precautions. Additional details on Standard and Transmission-Based Precautions are also available in *Need for Specific Provisions* (Section V of this preamble).

OSHA notes that the CDC has issued general and COVID–19-specific recommendations that can inform employers developing and implementing both Standard and Transmission-Based Precautions in accordance with ''CDC's Guidelines for Isolation Precautions'' (Siegel et al., 2007). In developing policies and procedures in accordance with paragraph (e), employers can look to a variety of sources, including *Interim Infection Prevention and Control Recommendations for Healthcare Personnel During the Coronavirus Disease 2019 (COVID–19) Pandemic* (CDC, February 23, 2021); *Discontinuation of Transmission-Based Precautions and Disposition of Patients with COVID–19 in Healthcare Settings (Interim Guidance)* (CDC, February 16, 2021); and *Collection and Submission of Postmortem Specimens from Deceased Persons with Confirmed or Suspected*

[132] Contact Precautions are designed to prevent transmission of infectious agents spread by direct or indirect physical contact with an infected or contaminated individual, item, or surface. Droplet Precautions are designed to prevent transmission of infectious agents spread by direct respiratory or mucous membrane contact with infectious droplets. Airborne Precautions are designed to prevent transmission of infectious agents that remain infectious over long distances and time when suspended in the air. (Siegel et al., 2007).

COVID–19: Postmortem Guidance (CDC, December 2, 2020). As discussed in *Technological Feasibility* (Section VI.A. of this preamble), many employers subject to the ETS have already implemented these guidelines in their workplaces, and the control practices contained in these guidelines are technologically feasible.

References

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E. Personal Protective Equipment (PPE)

I. Facemasks

Paragraph (f) contains requirements for personal protective equipment (PPE). The PPE requirements in paragraph (f) apply to employees in covered workplaces, with the exception of fully-vaccinated employees in well-defined areas where there is no reasonable expectation that any person with suspected or confirmed COVID–19 will be present (see paragraph (a)(4) and the *Summary and Explanation* for paragraph (a)). First, paragraph (f)(1) addresses the use of facemasks. Facemasks are required by the ETS because they offer both source control (*i.e.,* reducing the spread of large respiratory droplets to others by covering an infected person's mouth and nose) and protection for the wearer. As defined in paragraph (b), *facemasks* are surgical, medical procedure, dental, or isolation masks that are FDA-cleared, authorized by an FDA EUA, or offered or distributed as described in an FDA enforcement policy. A detailed discussion on the use of facemasks is in *Need for Specific Provisions* (Section V of the preamble).

Paragraph (f)(1)(i) imposes the requirement that employers must provide, and ensure that employees wear, a facemask that meets the definition in paragraph (b) of this section. Facemasks provide protection against exposure to splashes, sprays, and spatter of body fluids from patients and others. Many employees in healthcare are exposed to, and therefore need protection from, this hazard. This requirement is based on CDC recommendations (CDC, February 23, 2021), and OSHA has previously established that facemasks are essential PPE for employees in healthcare, under both the general PPE standard (29 CFR 1910.132) and the Bloodborne Pathogens standard (29 CFR 1910.1030).

Paragraph (f)(1)(ii) requires that employers ensure a facemask is worn over the nose and mouth when an employee is indoors and when occupying a vehicle with other people for work purposes. To be worn properly, facemasks need to completely cover the wearer's mouth and nose, and fit snugly against the sides of the face without gaps. Employers must train employees on when and how to properly wear a facemask in accordance with paragraph (n). Additionally, to ensure facemasks are worn properly, an employer might appoint a manager or senior employee to check that each employee is properly wearing a facemask at the start of and throughout each shift. To serve as additional reminders for employees, employers may want to display signs/posters throughout the facility about proper facemask usage.

Paragraph (f)(1)(ii) further requires employers to provide a sufficient number of facemasks to each employee as needed to comply with paragraph (f) and to ensure that each employee changes facemasks at least one per day, whenever they are soiled or damaged, and more frequently as necessary (*e.g.,* patient care reasons). Facemasks can become soiled or dirty by splashes, sprays, or spatters, from contact with a contaminated surface, or by touching/adjusting it with contaminated hands. Because facemasks can become soiled after each use with bacteria and viruses, including the virus that causes COVID–19, it is important they are replaced as specified in this paragraph, including when they are soiled or damaged. Thus, employers are required to provide a sufficient number of facemasks to each employee to ensure compliance with these provisions. Employers might consider providing supplemental face shields (further described below) to wear over facemasks, which would reduce the frequency with which they become soiled and the rate at which employees would have to change them during the day.

Paragraph (f)(1)(iii) contains exceptions to the facemask requirements imposed in paragraph (f)(1)(ii) of this section. First, as described in paragraph (f)(1)(iii)(A), when an employee is alone in a room, they are not required to wear a facemask. However, if the employee exits the room or another individual enters the room, facemasks are required.

Under another exception, paragraph (f)(1)(iii)(B), employees are not required to wear facemasks while eating or drinking at the workplace, as long as each employee is at least 6 feet apart or separated by physical barriers from all other people. Employers may accomplish this by staggering break times, allowing use of non-traditional break areas (*e.g.,* conference rooms), or letting employees eat or drink outside where there may be more space, to ensure each employee is at least 6 feet apart while eating or drinking. Additional information on physical distancing and physical barriers is discussed further in the *Summary and Explanation* for paragraphs (h) and (i), respectively.

The next exception, under paragraph (f)(1)(iii)(C), provides that facemasks are not required for employees when they are wearing respiratory protection in accordance with 29 CFR 1910.134 or paragraph (f) of this section. Employees required to use respiratory protection in accordance with 29 CFR 1910.134 for certain workplace hazards unrelated to the COVID–19 pandemic are exempt from the facemask requirements outlined in paragraph (f)(1) while they are wearing the respirators. Respirators provide some source control but also more critical protection to the wearer. Similarly, while employees are wearing respirators in connection with the COVID–19 hazard, as required in paragraphs (f)(2)–(f)(3) and (f)(5), they are exempt from the facemask requirement. Finally, employees using respirators in compliance with the mini respiratory protection program section of this standard for voluntary respirator use are also exempt from the facemask requirement in paragraph (f)(1) while wearing a respirator. This is discussed in further detail in paragraph (f)(4) on

employee use of respirators when they are not required.

Paragraph (f)(1)(iii)(D) contains another exception for facemask use when it is important to see a person's mouth (*e.g.,* communicating with an individual who is deaf or hard of hearing) and the conditions do not permit a facemask that is constructed of clear plastic (or includes a clear plastic window). In such situations, the employer must ensure that each employee wears an alternative to protect the employee, such as a face shield, if the conditions permit it.

Similarly, paragraph (f)(1)(iii)(E) contains an exception for employees who cannot wear facemasks due to a medical necessity, medical condition, or disability as defined in the Americans with Disabilities Act (42 U.S.C. 12101 *et seq.*), or due to a religious belief. Exceptions must be provided for a narrow subset of persons with a disability who cannot wear a facemask or cannot safely wear a facemask, because of the disability, as defined in the Americans with Disabilities Act (42 U.S.C. 12101 *et seq.*), including a person who cannot independently remove the facemask. The remaining portion of the subset who cannot wear a facemask may be exempted on a case-by-case basis as required by the Americans with Disabilities Act and other applicable laws. In all such situations, the employer must ensure that each employee wears a face shield for the protection of the employee, if their condition or disability permits it. Accommodations may also need to be made for religious beliefs consistent with Title VII of the Civil Rights Act.

Under the final exception, contained in paragraph (f)(1)(iii)(F), a facemask is not required for an employee if the employer can demonstrate that the use of a facemask presents a hazard to the employee of serious injury or death (*e.g.,* arc flash, heat stress, interfering with safe operation of equipment). This exception ensures employees remain protected from other potential or known workplace hazards that could lead to injury. In such situations, the employer must ensure that each employee wears an alternative to protect the employee, such as a face shield, if the conditions permit it. OSHA notes that specialized facemasks, or other specialized equipment that does not meet the definition of a facemask in paragraph (b), may be available to protect against the relevant hazard and also allow effective protection against COVID–19. Any employee not wearing a facemask under this exception must remain at least 6 feet away from all other people unless the employer can demonstrate it is not feasible. Finally, under this exception, the employee must resume wearing a facemask when not engaged in the activity where the facemask presents a hazard.

A note to paragraph (f)(1)(iii)(F) states that, with respect to paragraphs (f)(1)(iii)(D)–(F), the employer may determine that the use of a face shield without a facemask, in certain settings, is not appropriate due to other infection control concerns. These infection control concerns, along with the rationale for this note, are discussed in detail in *Need for Specific Provisions* (Section V of the preamble).

II. Face Shields

Paragraph (f)(1)(iv) outlines requirements for face shields. As defined in paragraph (b), *face shields* are devices, typically made of clear plastic, that (i) are certified to ANSI/ISEA Z87.1, which is incorporated by reference in 29 CFR 1910.509; or (ii) cover the wearer's eyes, nose, and mouth to protect from splashes, sprays, and spatter of body fluids, wrap around the sides of the wearer's face (*i.e.,* temple-to-temple), and extend below the wearer's chin. These specifications are critical design parameters for face shields to effectively contain respiratory droplets and prevent droplet transmission.

Paragraph (f)(1)(iv) first states that when a face shield is required to comply with paragraph (f), or is otherwise required by the employer, the employer must ensure that the face shields are cleaned at least daily and are not damaged. Like facemasks, face shields can become soiled or dirty by splashes, sprays, or spatters, from contact with a contaminated surface, or by touching or adjusting the face shield with contaminated hands. Each time they are worn, face shields can become contaminated with bacteria and viruses, including the virus that causes COVID–19, which poses a risk of transmission to employees upon contact. Additionally, damaged face shields may not fit properly and thus not meet the required specifications, thereby reducing their effectiveness. Thus, employers must ensure that face shields are regularly cleaned and are not used if damaged.

When an employee provides their own face shield, paragraph (f)(1)(iv) specifies that such face shield must meet the definition in paragraph (b) and the employer is not required to reimburse the employee for that face shield. In order to encourage the voluntary use of face shields, OSHA is not imposing a separate duty on employers to inspect or clean employee-provided face shields. Because OSHA anticipates that employees choosing to voluntarily bring in their own face shields for extra protection will also wear their face shields outside of work, employees are expected to continue to care for them and provide proper cleaning as necessary. The general availability of cleaning supplies in the workplace, particularly if employer-provided face shields were also available, would be sufficient to allow workers to clean their own personal face shields as appropriate. More significantly, while employer-provided face shields must be thoroughly cleaned and disinfected because they might be shared between employees, this particular reason for cleaning would not apply to personal face shields, which would not be shared. Inspection is not required for employee-provided face shields because the most likely damage to a face shield (*e.g.,* failure of the head harness or strap, or cracks in the face shield) would render the face shield unusable or be blatantly obvious and employees could revert to an employer-provided face shield, if required.

III. Respirators and Other PPE

Paragraphs (f)(2) through (f)(5) contain requirements addressing the provision and use of respirators and other PPE. Information on why OSHA is requiring the provision and use of respirators is discussed in greater detail in *Need for Specific Provisions* (Section V of this preamble).

As defined in paragraph (b), a *respirator* is a type of PPE that is certified by NIOSH under 42 CFR part 84 or is authorized under an EUA by the FDA. These specifications are intended to ensure some consistent level of testing, approval, and protection and to prevent the use of counterfeit respirators that will not offer adequate protection, which is important because respirators are intended to protect the wearer when directly exposed to hazards. Respirators protect against airborne hazards by removing specific air contaminants from the ambient (surrounding) air or by supplying breathable air from a safe source. Common types of respirators include filtering facepiece respirators (FFRs), elastomeric respirators, and powered air-purifying respirators (PAPRs). Face coverings, facemasks, and face shields are not respirators.

Paragraph (b) also contains definitions for the types of respirators referred to in the definition of respirator. A *filtering facepiece respirator* (FFR) is a negative-pressure particulate respirator with a non-replaceable filter as an integral part of the facepiece or with the entire facepiece composed of the non-

replaceable filtering medium. N95 FFRs are the most common type of FFR and are the type of respirator most often used to control exposures to infections transmitted via the airborne route. When properly worn, N95 FFRs filter at least 95% of airborne particles (CDC, January 11, 2021). An *elastomeric respirator,* also defined in paragraph (b), is a tight-fitting respirator with a facepiece that is made of synthetic or rubber material that permits it to be disinfected, cleaned, and reused according to the manufacturer's instructions. Elastomeric respirators are equipped with replaceable cartridges, canisters, or filters. Lastly, a *powered air-purifying respirator* (PAPR) is an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering. In general, an employer may provide and ensure the use of any of these respirator types to comply with the requirements in paragraphs (f)(2) through (f)(5).

Paragraph (f)(2) addresses the provision and use of respirators and other PPE for exposure to a person with suspected or confirmed COVID–19. A detailed discussion of OSHA's rationale for requiring employers to provide and ensure the use of respirators and other PPE for exposure to a person with suspected or confirmed COVID–19 is in the *Need for Specific Provisions* (Section V of the preamble).

Paragraph (f)(2) requires two types of PPE whenever employees have ''exposure'' to a person with suspected or confirmed COVID–19. In this context, exposure refers to close proximity, which includes being within 6 feet or in the same room. As part of their COVID–19 hazard assessments, employers must assess their facilities and practices and identify areas where employees are reasonably anticipated to be exposed to a person with suspected or confirmed COVID–19. This understanding of exposure is consistent with the process employers are expected to follow under OSHA's Bloodborne Pathogens standard, 29 CFR 1910.1030.

Employers should always anticipate that personnel involved in direct patient care will have exposure whenever they are treating patients who are suspected or confirmed to have COVID–19. For example, when the patient or client is suspected or confirmed to have COVID–19, exposure should be anticipated in the following types of situations:

- Medical examinations, regardless of where they are conducted;
- Medical assistant performing a nasal swab on a patient at a COVID–19 testing location;
- Home healthcare aide bathing a patient in the patient's home;
- A dental hygienist setting plates in a patient's mouth for x-rays of a patient in a dental office.

In other cases, whether an employer should reasonably anticipate exposure to persons with suspected or confirmed COVID–19 depends on the employee's location and job duties. Thus, for example, employers should anticipate that an employee conducting screening and triage of patients in an emergency room would have exposure to persons with suspected or confirmed COVID–19, as their job involves determining whether patients have symptoms that are consistent with a COVID–19 diagnosis. Likewise, a security guard stationed at the entrance of an emergency room or COVID–19 testing location should anticipate some exposure to visitors with COVID–19. On the other hand, exposure would not normally be anticipated for a security guard stationed at an employee-only entrance where the employees are regularly screened for COVID–19 symptoms. A few other examples of employees whose anticipation of exposure would vary by job task or locations include the following:

- Housekeeping or other healthcare support personnel whose duties involve entry into a room (or enclosed space, such as a partitioned patient area in an emergency room) of a suspected or confirmed COVID–19 patient to exchange laundry, clean, or remove trash.
- A maintenance person who enters the room of a patient with suspected or confirmed COVID–19 or changes a light in a hallway while such patients are nearby.
- A nutritionist entering the room of a resident with suspected or confirmed COVID–19 in a nursing home to discuss dietary requirements.

As part of the COVID–19 plan development, employers must take steps to minimize avoidable exposure of employees like janitors and housekeeping personnel to persons with suspected or confirmed COVID–19. For example, employers can implement administrative controls to restrict visitors who are suspected to have COVID–19 to specific areas and away from as many staff as possible. Employers can also designate a limited group of janitors, food service, or maintenance staff to handle all entries into rooms of suspected or confirmed COVID–19 patients and defer maintenance or other services until after the patient has left the room and there is an opportunity for an air exchange. Employers can implement policies restricting the movement of patients who are suspected or confirmed to have COVID–19, keep the doors to their rooms closed, and locate them in specific areas of the facility where there is less likelihood of unexpected interaction with staff.

The types of PPE necessary to reduce employee risks from these exposures are specified in paragraphs (f)(2)(i) and (f)(2)(ii). First, under paragraph (f)(2)(i), the employer must provide a respirator to each employee and ensure that it is provided and used in accordance with OSHA's Respiratory Protection standard (29 CFR 1910.134). Second, under paragraph (f)(2)(ii), the employer must provide gloves, an isolation gown or protective clothing, and eye protection to each employee and ensure that the PPE is used in accordance with OSHA's PPE standard, 29 CFR part 1910, subpart I. The Respiratory Protection standard requires, among other things, that the employer develop and implement a written respiratory protection program with required worksite-specific procedures and elements for required respirator use. The program must include several elements, such as procedures for fit testing and medical evaluations of employees. In any setting covered under the ETS where employees are exposed to persons with known or suspected COVID–19, employers are required to provide and ensure the use of N95 FFRs or higher-level respirators and follow all requirements under 29 CFR 1910.134.

The COVID–19 pandemic has had an unprecedented impact on the availability of FFRs, particularly N95 FFRs. While earlier in the pandemic there were shortages and supply chain disruptions, more recently the CDC acknowledged that the supply and availability of NIOSH-approved respirators have increased significantly over the last several months (CDC, April 9, 2021). Nonetheless, there may be times when individual employers experience limitations or disruptions to the supply of FFRs. Thus, a note to paragraph (f)(2) provides that, when there is a limited supply of FFRs, OSHA will permit employers to follow the CDC's ''Strategies for Optimizing the Supply of N95 Respirators'' (CDC, April 9, 2021). OSHA will examine whether there is a limited supply of FFRs on a case-by-case basis, and intends this note to apply only for the limited time when there is a limited supply of FFRs. For example, where respirators or associated supplies and services are readily available, this note will not apply. The note to paragraph (f)(2) also encourages employers to select elastomeric respirators or PAPRs instead of FFRs to

prevent shortages and supply chain disruption, where possible. Since elastomeric respirators and PAPRs are reusable, they offer the advantage of repeated use by employees, both during and beyond the pandemic. It should be noted that elastomeric respirators and PAPRs have specific use limitations and restrictions that need to be understood when determining whether they are appropriate for specific applications (CDC, October 13, 2020). Therefore, employers should evaluate and determine whether elastomeric respirators or PAPRs are suitable for particular tasks prior to using them as alternatives to FFRs. For example, an elastomeric respirator with an exhalation valve should not be used during surgical procedures due to concerns that air coming out of the valve may contaminate the sterile field (CDC, October 13, 2020).[133] Additionally, PAPRs should not be used in surgical settings due to concerns that the blower exhaust and exhaled air may contaminate the sterile field (CDC, April 9, 2021).

Paragraph (f)(3) addresses the provision and use of respirators and other PPE during aerosol-generating procedures (AGPs) performed on persons with suspected or confirmed COVID–19, which, under this paragraph, includes AGPs performed on suspected or confirmed COVID–19 cases during autopsies. As defined in paragraph (b), an AGP is a medical procedure that generates aerosols that can be infectious and are of respirable size. The definition lists a number of types of procedures that are considered to be AGPs for purposes of the ETS (see below for additional discussion of the listed procedures). AGPs performed on persons with suspected or confirmed COVID–19 are more likely to generate higher concentrations of potentially infectious respiratory aerosols than coughing, sneezing, talking, or breathing; therefore, employees performing or assisting in the conduct of AGPs performed on persons with suspected or confirmed COVID–19 are at an increased risk for COVID–19 exposure and infection (CDC, March 4, 2021). Given the risks associated with AGPs performed on persons with suspected or confirmed COVID–19, the ETS requires the provision and use of respirators and other PPE when AGPs are performed on such persons. A detailed discussion of OSHA's rationale for requiring employers to provide and ensure the use of respirators and other PPE in these circumstances is in the *Need for Specific Provisions* (Section V of the preamble).

Development of a comprehensive list of AGPs for healthcare settings has not been possible due to limitations in available data on which procedures may generate potentially infectious aerosols and the challenges in determining if reported transmissions during AGPs are due to aerosols or other exposures (CDC, March 4, 2021). Furthermore, there is neither expert consensus, nor sufficient supporting data, to create a definitive and comprehensive list of AGPs for this ETS (CDC, March 4, 2021). For example, based on limited available data, it is uncertain whether aerosols generated from some procedures, such as nebulizer administration and high-flow oxygen delivery, may be infectious. More specifically, aerosols generated by nebulizers are derived from medication in the nebulizer, and it is uncertain whether potential associations between performing this common procedure and increased risk of infection might be due to aerosols generated by the procedure or due to increased contact between those administering the nebulized medication and infected patients (CDC, March 4, 2021).

Therefore, the only medical procedures that are considered AGPs for the purposes of this ETS are: Open suctioning of airways; sputum induction; cardiopulmonary resuscitation; endotracheal intubation and extubation; non-invasive ventilation (*e.g.,* BiPAP, CPAP); bronchoscopy; manual ventilation; medical/surgical/postmortem procedures using oscillating bone saws; and dental procedures involving ultrasonic scalers, high-speed dental handpieces, air/water syringes, air polishing, and air abrasion. Examples of procedures that are considered AGPs under the ETS are a dentist or dental hygienist using an ultrasonic scaler on a patient; a nurse intubating a patient; an emergency medical technician (EMT) performing cardiopulmonary resuscitation on a patient; and a coroner or medical examiner using an oscillating bone saw during an autopsy. These and the other commonly performed procedures listed above are considered AGPs because they create uncontrolled respiratory secretions. They are also consistent with those identified by the CDC as the most common AGPs in healthcare settings (CDC, March 4, 2021; CDC, December 4, 2020; CDC, December 2, 2020).

Paragraph (f)(3) requires that for AGPs performed on a person with suspected or confirmed COVID–19, the employer must provide: (i) A respirator to each employee and ensure that it is provided and used in accordance with the Respiratory Protection Standard (29 CFR 1910.134); and (ii) gloves, an isolation gown or protective clothing, and eye protection to each employee and ensure that the PPE is used in accordance with the PPE standard (29 CFR part 1910, subpart I). These requirements are similar to those in paragraph (f)(2), discussed above.

There are two notes to paragraph (f)(3). The first note provides that, for AGPs performed on a person with suspected or confirmed COVID–19, employers are encouraged to select elastomeric respirators or PAPRs instead of FFRs. OSHA included this note in the regulatory text because of the high risk associated with AGPs conducted on persons with suspected or confirmed COVID–19. One published article explained why filters certified as 99, 100, or HEPA (high-efficiency particulate air), but not N95s, are appropriate for AGPs. Howard (May 12, 2020) concluded that the correct selection of respirators for AGPs is ''of the utmost importance in the current COVID–19 pandemic'' because ''high-risk aerosol-generating procedures may create aerosolization of high viral loads that represent increased risk to healthcare workers.''

PAPRs provide a higher level of respiratory protection than N95 FFRs. PAPRs reduce the aerosol concentration inhaled by the wearer to at least 1/25th of that in the air, compared to a 1/10th reduction for FFRs (CDC, November 3, 2020). Because they provide higher-level respiratory protection than N95 FFRs, the CDC encourages the use of PAPRs during AGPs regardless of the pathogen (*i.e.,* not just for protection against COVID–19) (CDC, November 3, 2020). Furthermore, the CDC encourages the use of PAPRs during autopsy procedures on deceased persons who had COVID–19 due to the likelihood of generation of contagious aerosols during various autopsy procedures (CDC, December 2, 2020).

Elastomeric respirators provide at least the level of respiratory protection as N95 FFRs. Half-mask elastomeric respirators offer the same level of protection as N95 FFRs (*i.e.,* both N95 FFRs and half-mask elastomeric respirators reduce the aerosol concentration inhaled by the wearer to 1/10th of that in the air).[134] Full-face

[133] There are some newly designed NIOSH-approved half-mask elastomeric respirators that can not only protect the wearer, but also provide adequate source control by filtering the wearer's exhaled air that may contain harmful viruses or bacteria (NIOSH, March 1, 2021).

[134] For more information on the minimum level of protection that can be expected from any class of respirator (*e.g.,* FFR, PAPR, half-mask elastomeric respirator) when the respirator is properly selected and used, see NIOSH/OSHA's (May 2015) *Hospital Respiratory Protection*

elastomeric respirators provide greater protection because of better sealing characteristics and less face-seal leakage (and also provide protection to more of the face including the eyes) (CDC, October 13, 2020). Full-face elastomeric respirators reduce the aerosol concentration inhaled by the wearer to at least 1/50th of that in the air (CDC, October 13, 2020).

The second note to paragraph (f)(3) is a reminder that additional requirements, besides respirator requirements, specific to AGPs on people with suspected or confirmed COVID–19 are contained in paragraph (g). Additional information on paragraph (g) is discussed later in the *Summary and Explanation.*

Paragraph (f)(4) addresses the optional use of respirators by employees when not required by the ETS. OSHA recognizes that there will be cases where either an employer or an employee believes that protection is needed beyond the facemask required by paragraph (f)(1). Therefore, under paragraph (f)(4)(i), the employer may upgrade an employee's protection by providing a respirator to the employee when only a facemask is required by paragraph (f)(1). For example, an employer that operates a hospital may choose to provide, or an employee may choose to wear, a respirator instead of a facemask where an employee is performing administrative work in an area of the hospital where there is no reasonable anticipation of exposure to persons with suspected or confirmed COVID–19. Per paragraph (f)(4)(ii), where the employer provides the employee with a facemask as required by paragraph (f)(1) of the section, the employer must permit the employee to wear their own respirator instead of a facemask. In both circumstances, the employer must comply with the mini respiratory protection program section of the ETS (29 CFR 1910.504). OSHA intends this flexibility, combined with lowered administrative requirements, to encourage more respirator use because properly worn respirators will provide significantly improved protection from COVID–19. Again, for a detailed discussion of the mini respiratory protection program section, please see the relevant discussion in this *Summary and Explanation* and *Need for Specific Provisions* (Section V of the preamble).

Paragraph (f)(5) addresses the provision and use of respirators and other PPE based on Standard and Transmission-Based Precautions. Under this paragraph, the employer must provide PPE (*e.g.,* respirators, gloves, gowns, goggles, face shields) to each employee in accordance with Standard and Transmission-Based Precautions in healthcare settings in accordance with CDC's ''Guidelines for Isolation Precautions,'' which is incorporated by reference into the ETS. The employer must also ensure that the PPE is used in accordance with OSHA's PPE Standard, 29 CFR part 1910, subpart I. OSHA provides a more in-depth explanation and discussion of Standard and Transmission-Based Precautions in the relevant section of this *Summary and Explanation,* as well as *Need for Specific Provisions* (Section V of the preamble).

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F. Aerosol-Generating Procedures on Suspected or Confirmed COVID–19 Patients

As discussed in *Need for Specific Provisions* (Section V of this preamble), aerosol-generating procedures (AGPs) are well-known to be high-risk activities for exposure to respiratory infections. As such, paragraph (g) addresses policies and procedures that employers must implement to protect employees who perform AGPs on persons with suspected or confirmed COVID–19. This includes aerosol-generating postmortem procedures (*e.g.,* autopsies) because human remains can still produce infectious droplets and particles (*i.e.,* ''person'' includes ''human remains'' for the purpose of paragraph (g)).

As defined in paragraph (b), *AGPs* are medical procedures that generate aerosols that can be infectious and are of respirable size. For the purposes of the ETS, only the following medical procedures are considered AGPs: Open suctioning of airways; sputum induction; cardiopulmonary resuscitation; endotracheal intubation and extubation; non-invasive ventilation (*e.g.,* BiPAP, CPAP); bronchoscopy; manual ventilation; medical/surgical/postmortem procedures using oscillating bone saws; and dental procedures involving ultrasonic scalers,

Program Toolkit at *https://www.osha.gov/sites/default/files/publications/OSHA3767.pdf.*

high-speed dental handpieces, air/water syringes, air polishing, and air abrasion. For further information on why these procedures are considered AGPs under the ETS, please see *Need for Specific Provisions* (Section V of this preamble).[135]

If an AGP is performed on a person with suspected or confirmed COVID–19, per paragraph (g)(1), the employer must limit the number of employees present during the procedure to only those essential for patient care and procedure support. This will ensure that as few employees as possible are exposed to infectious aerosols.

As noted in *Grave Danger* (Section IV.A. of this preamble), COVID–19 may spread through airborne transmission during AGPs. To this end, paragraph (g)(2) requires that when an AGP is performed on a person with suspected or confirmed COVID–19, the employer must ensure it is performed in an existing airborne infection isolation room (AIIR), if available. An *AIIR,* under paragraph (b), is defined as a dedicated negative-pressure patient-care room, with special air handling capability, which is used to isolate persons with a suspected or confirmed airborne-transmissible infectious disease. AIIRs include both permanent rooms and temporary structures (*e.g.,* a booth, tent or other enclosure designed to operate under negative pressure). For further discussion on the need for adequate ventilation and AIIRs during AGPs, please see *Need for Specific Provisions* (Section V of this preamble) and the *Summary and Explanation* for ventilation (paragraph (k)(2)).

There are a limited number of AIIRs available across the United States, and the COVID–19 pandemic has created added demand for AIIRs (Wilson, April 16, 2020). Based on this, OSHA concludes that the use of AIIRs needs to be prioritized for those persons that present the greatest exposure risk to employees (which, for the purposes of the ETS, means those persons with suspected or confirmed COVID–19). OSHA's decision to require the use of AIIRs only when AGPs are performed on persons with suspected or confirmed COVID–19 is consistent with the CDC's guidance on the use of AIIRs during AGPs (CDC, February 23, 2021).

[135] CDC guidelines recommend avoiding AGPs during postmortem activities if possible. The guidelines also provide that, if aerosol generation is likely and unavoidable (*e.g.,* when using an oscillating saw), appropriate engineering controls and PPE should be used, and that these precautions, combined with the use of Standard Precautions, will help prevent direct contact with infectious material, percutaneous injury, and other hazards related to moving human remains and handling embalming chemicals (CDC, December 2, 2020).

If an AIIR is not available for an AGP on a person with suspected or confirmed COVID–19 (because, for example, the facility does not have an AIIR), the employer may transfer the patient to a facility with an available AIIR, if feasible. Employers may also consider the use of a ventilated headboard with a canopy if an AIIR is not available. However, if the procedure must be performed in the facility that does not have an available AIIR, the employer should still isolate the person to the extent feasible and distance that person from others when isolation is not feasible. For example, the employer could ensure that the procedure is performed in an isolated area of the facility. Moreover, the employer will need to comply with other provisions of the ETS, as well as all other applicable OSHA standards, during the conduct of the procedure (*e.g.,* providing employees with and ensuring they use respirators and other PPE in accordance with paragraph (f), and complying with requirements for ventilation in paragraph (k)).

Paragraph (g)(3) requires that, after an AGP is performed on a person with suspected or confirmed COVID–19, the employer must clean and disinfect the surfaces and equipment in the room or area where the AGP was performed. The employer must also develop and implement policies and procedures in accordance with paragraphs (c) and (j) to ensure prompt, proper cleaning and disinfection of the surfaces and equipment in the room or area.

Finally, a note to paragraph (g) provides that respirator and other PPE requirements for use during AGPs are contained in paragraph (f)(3). This note serves as a cross-reference.

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G. Physical Distancing

The virus that causes COVID–19 spreads mainly through droplet transmission between people who are in physical proximity to each other. Adequate physical distancing to prevent droplet transmission of infectious diseases is generally considered to be at least 6 feet, as addressed under *Need for Specific Provisions* (Section V of the preamble). Therefore, paragraph (h)(1) requires employers to ensure that each employee is separated from all other people by at least 6 feet when indoors. In cases where the employer can demonstrate that maintaining 6 feet of physical distance is not feasible for a specific activity, paragraph (h)(2) requires the employer to ensure that each employee is as far apart as feasible from all other people in the workplace. The requirements of paragraph (h) do not apply to momentary exposure while people are in movement, such as when coworkers pass each other in a hallway. However, this exception has important limits, as discussed further below.

Paragraph (a)(4) provides one notable exception to the physical distancing requirements of paragraph (h) for employees who are fully vaccinated when those employees are in well-defined areas where there is no reasonable expectation that any person with suspected or confirmed COVID–19 will be present. When those conditions are satisfied, the fully vaccinated employees are not required to maintain 6 feet of distance from any other people. By operation of this exception, employees who are not fully vaccinated are not required to maintain 6 feet of distance from any fully vaccinated employee; however, they must continue to follow distancing requirements as to all other persons because employers may not be able to confidently ascertain the vaccination status of non-employees. This exception might arise, for example, if an employer provides a training or holds a conference for its employees in a conference room where no patients or persons with suspected or confirmed COVID–19 will be present. In that example, the employer is not required to keep vaccinated employees separate from any other people by 6 feet; however, if employees in attendance are not fully vaccinated, the employer would be required to ensure that the unvaccinated employees maintain sufficient physical distance from all people other than the fully vaccinated employees, such as other non-employee attendees, trainers, or conference presenters. In another example, where

there is an employee breakroom, any employee who is fully vaccinated would not be required to maintain physical distancing from any other persons while using the breakroom. Again, however, any employee who is not fully vaccinated would still be required to maintain at least 6 feet of distance from any persons other than their fully vaccinated co-workers who might enter the space. In order for fully vaccinated employees to be exempt from the requirement for physical distancing in accordance with paragraph (a)(4), paragraph (c)(4)(ii) of the standard requires the employer's COVID–19 plan to include policies and procedures for determining employees' vaccinations status. For further explanation of the exception for fully vaccinated employees from some requirements of the ETS, see the *Summary and Explanation* discussion of paragraph (a)(4), above.

Employers must rely on the results of the hazard assessment performed under paragraph (c)(4) to determine when and where physical distancing is necessary in the workplace. The hazard assessment requires employers to evaluate their workplaces to determine potential workplace hazards related to COVID–19. This evaluation will involve determining when, where, and under what circumstances employees come within 6 feet of other people during the course of their workdays or work shifts. After identifying where this is occurring, employers must then implement, per their COVID–19 plans, policies and procedures to comply with the physical distancing requirements in paragraph (h).

To comply with the physical distancing requirements of the ETS, employers must ensure there is at least a full 6 feet of distance between each employee and any other person, such that neither person's body intrudes into that 6 feet of space. The employer must evaluate situations where employees are expected to come close to any other individuals, including coworkers, patients or residents, visitors, delivery or repair persons, and any other people present at the workplace. Employers must also consider all areas accessed by employees when determining how to implement the physical distancing requirements. To be in compliance, an employer must ensure that 6 feet of distance can be maintained when employees are: At their workstations, whether they are fixed or mobile; arriving at and leaving a worksite; traveling within a worksite to their designated workstations; using locker rooms to change in and out of work clothing or PPE; using restroom facilities and break areas; and otherwise performing their work duties and activities incidental to those duties. (OSHA notes, however, the exception for fully vaccinated employees in certain well-defined areas, discussed above.)

The note to paragraph (h) describes several ways employers can implement physical distancing that would be in compliance with this standard. OSHA recognizes that the provided list of examples is not exhaustive and that some options may be infeasible in some workplace settings. The agency also recognizes that physical distancing policies will need to be specific for each workplace. The note to the physical distancing provision is simply meant to provide a brief list of some of the primary options for physical distancing that employers are expected to consider in determining how to comply. For example, if an employee's job activities can be completed entirely remotely, then physical distancing could be easily maintained through telework or other remote work arrangements. Employers should maximize their reliance on telework or remote work whenever possible.

When employees have job activities that must be done on-site or on-location, other physical distancing approaches will be required. To comply with physical distancing requirements, employers may need to reconfigure workstations. Workstations could be spread out or relocated to more spacious areas to ensure that employees at the workstations are at least 6 feet away from each other. Workstations near high-traffic areas may need to be moved to places with less foot traffic if physical distance cannot be maintained.

Shared workstations (*e.g.,* security checkpoints, nursing stations) may also need to be reconfigured to ensure physical distancing can be maintained. However, for shared workstations that require extended use over the course of a workday, it may be useful to schedule when employees can use those stations by adjusting the timing of their use or providing alternative locations. In settings where security checkpoints are used, stations can be spread farther apart or additional, unused desks can be utilized. Similarly, individual workspaces at nursing stations can be spread farther apart, and visual cues can be used to ensure nurses and other healthcare employees remain 6 feet apart when communicating.

For workplaces that utilize shift work, minimal-contact shift changes, in which employees maintain at least 6 feet of distancing during shift turnover, can be considered. For these shift transitions, detailed notes, virtual communications, and virtual oversight could be substituted for in-person contact to help ensure important information is not overlooked. Shift changes at healthcare facilities that involve a large number of people may be particularly challenging in terms of physical distancing. At these times, many employees may be entering or leaving through a limited number of doors or using the same equipment to clock in or clock out. It may also be foreseeable that weather conditions (*e.g.,* rain, heat, cold) could result in employees congregating at facility entrances and exits. In these situations, employers can consider permitting employees to utilize additional entry or exit points, installing additional time clock equipment, or staggering arrival and departure times to limit employee interactions. Visual cues, such as signs or floor markings, can be utilized in parking lots, sidewalks, lobbies, and other walking areas to designate clear entry and exit routes and to remind employees and non-employees to remain physically distant, especially during high-traffic times of the day.

Employers can also consider adjusting work processes to achieve physical distancing. If workstations and work processes cannot be physically rearranged in a way that allows 6 feet of distance at all times, employers must consider additional measures, such as reducing capacity and occupancy limits or altering work procedures. The following measures could help ensure compliance with paragraph (h): Limiting the types of services provided; limiting occupancy in the establishment; installing visual cues (*e.g.,* signs and floor markers) to remind employees and others to maintain 6 feet between individuals; enforcing one-way traffic flow; and using verbal public service announcements to remind employees and non-employees to practice physical distancing.

Changing work procedures and utilizing available technologies can also minimize or eliminate the necessity for close physical proximity between employees and other people. For example, employers may implement contactless transaction methods through mobile devices for payments, signing documents, and pick-up and/or delivery confirmations. Similarly, employers can consider adopting policies for booking appointments by phone or online, curbside pickup, and drive-through options to reduce the need for contact with customers or patients. Phones or other visual recording and streaming devices may also be useful in some facilities to perform physically-distanced equipment and safety

inspections. Employers could maximize the use of telehealth to consult with patients and clients through phone or video visits, where appropriate.

Subject to the exception for fully vaccinated employees in well-defined areas where there is no reasonable expectation that any person with suspected or confirmed COVID–19 will be present, employers must also ensure that employees maintain physical distancing during meetings, trainings, and conferences. This could be achieved through the use of additional rooms to decrease group sizes or by scheduling these activities to occur virtually. When on-site or hands-on training, such as specialized equipment training, is necessary, employers could consider holding one-on-one sessions instead of large group sessions to minimize exposure risk. An employer could also consider offering activities at multiple times to decrease the number of attendees in each session.

If ensuring physical distancing in compliance with paragraph (h)(1) is not feasible given how work is currently scheduled, employers can consider staggering work shifts. This would result in fewer people in the workplace at a time, which should facilitate physical distancing. Employers can also consider scheduling employees for fewer, longer shifts instead of shorter, more-frequent shifts to minimize employee turnover within the facility.

Unless the exception for fully vaccinated employees in certain well-defined areas applies, employers must also pay attention to physical distancing during break times and within common areas where employees normally congregate (*e.g.,* nursing stations, locker rooms). To maintain physical distance, employers may decide to replace or add to existing break areas by using training or conference rooms that provide more space for employees to spread out. Also, tables and chairs may be spaced out, removed, or blocked off to limit occupancy and create distanced seating arrangements. Chairs could be placed 6 feet apart and only on one side of a table to ensure employees are not facing each other while eating. An employer could also stagger break times to reduce the number of employees using those spaces at any one time.

Also, where the exception in paragraph (a)(4) does not apply, physical distancing must be implemented in workplace restrooms and locker rooms. Some sinks, urinals, and stalls may need to be closed or blocked off to ensure adequate space is maintained. There may be certain times, such as during breaks, when the number of users outnumbers the facilities available given the imposition of the distancing requirement. Employers may find that additional restrooms or queues outside of restrooms are needed to ensure that an appropriate number of individuals are inside each restroom and that physical distance is maintained outside of those spaces. If queues are needed, visual floor markers may be useful to reinforce physical distancing requirements. If restrooms have lounge areas, removing lounge furniture can prevent people from congregating. In small facilities, employers may have to limit access to a small restroom to only one person at a time to maintain physical distancing.

As stated in paragraph (h)(1), physical distancing is not required for momentary exposures while people are in movement. As discussed further in the *Need for Specific Provisions* (Section V of the preamble), an employee generally needs to be both close enough to an infectious person and near them long enough to get an infectious dose of COVID–19. The time of exposure is cumulative; multiple short exposures over the course of a day can add up to a long enough period of time to receive an infectious dose of the virus. Therefore, OSHA interprets this exception for momentary exposures as applying only in situations where the momentary exposures happen on an infrequent or occasional basis. If an employee quickly passes another person in a hallway or aisle a few times a day, the distancing requirement of paragraph (h)(1) would not apply. On the other hand, physical distancing requirements would be required for short conversations in a hallway or at a work station, as well as in other situations involving frequent, brief contact.

Similarly, the exception for momentary exposures in paragraph (h)(1) does not apply to two employees in a workplace who repeatedly pass by each other to perform their tasks. For example, physical distancing (from employees and non-employees alike) is required where employees are regularly moving around to check on patients. If employees must pass each other repeatedly during a shift, the employer must ensure employees maintain a physical distance of 6 feet in accordance with the standard.

Paragraph (h)(2) applies if an employer can demonstrate that it is not feasible to maintain 6 feet of physical distance for a certain activity. In such cases, paragraph (h)(2) requires employers to ensure that the employee is as far apart from all other people as feasible. The requirement in paragraph (h)(2) recognizes that, even where 6 feet of distance cannot be maintained, keeping as much distance between people as possible can help lower the possibility of transmission of COVID–19, especially when combined with the other protections required by the ETS.

Paragraph (h)(2) acknowledges that there will be situations in some workplaces in which maintaining 6 feet of distance at all times is not possible. For example, there may be situations where a room or other workspace is less than 6 feet in length and width and two employees must be in it at one time. This could include spaces in vehicles, such as emergency responders in an ambulance. If the employer can demonstrate that the space cannot be expanded, and that both employees must be in that space at the same time (*i.e.,* that there are no other feasible alternatives that would permit 6 feet of physical distancing), the employer satisfies its burden under paragraph (h)(1) to demonstrate infeasibility. The employer would then be required, pursuant to paragraph (h)(2), to ensure that as much distance as possible is maintained between the two employees in that space. The ETS also generally requires the employer to ensure the use of physical barriers at fixed work locations outside of direct patient care areas where each employee is not separated from all other people by at least 6 feet (see paragraph (i)) and the use of facemasks or respirators (see paragraph (f)).

Maintaining physical distance between a healthcare provider and patient is not always feasible when conducting an in-person exam or providing medical treatment, particularly within a small exam room. However, it is more likely that physical distance of 6 feet can be maintained when healthcare providers are asking patients questions about their medical history or problems they are experiencing. Again, the agency requires employers to ensure 6 feet whenever possible. However, employees who provide medical care will also be protected by other aspects of the ETS, including the use of facemasks or respirators and other PPE, depending on the circumstances, and cleaning and disinfection requirements (see paragraphs (f) and (j), respectively).

Other job duties that may require employees to be within 6 feet of others include patient transport, operations security, multi-person maintenance tasks, and confined space work. Physical distancing of 6 feet may be difficult to maintain at all times in constricted areas, even after the employer has reallocated work tasks or redesigned workflow to maximize distancing. In all cases, the burden is on

the employer to demonstrate that it is infeasible to comply with the required physical distancing for a specific activity. And in such cases, employers must ensure that employees maintain as much physical distance as feasible under paragraph (h)(2) and that physical distancing is layered with the other means of protection required by this standard (*e.g.,* facemask use, cleaning and disinfection, installation of physical barriers).

Physical distancing may also be challenging to maintain at a shared worksite or shared facility. In such a case, coordination with other employers will be critical to determining when and where employees should perform their tasks at the site. Also, as noted previously with reference to emergency responders in an ambulance, when employees operate or ride in work vehicles with other people in them (*e.g.,* ambulances, shuttle buses), it might not always be possible to maintain 6 feet of distancing. Employers must first consider reducing capacity in the vehicle to allow for 6 feet of physical distancing under paragraph (h)(1). When that is not feasible, employers must ensure that employees maintain as much distance as possible while in the vehicle (paragraph (h)(2)).

Although paragraph (h)(1) requires employers to ensure physical distancing of at least 6 feet, respiratory droplets may at times be capable of traveling across longer distances, as discussed further in *Grave Danger* (Section IV.A. of the preamble). However, as explained in the *Need for Specific Provisions* (Section V of the preamble), COVID–19 infections require exposure to a certain quantity of viral particles, and exposures beyond 6 feet involve exposure to fewer particles. Therefore, OSHA has concluded that a distance of 6 feet sufficiently minimizes viral transmission in conjunction with the other aspects of the layered infection control approach required under this ETS. While the agency requires that employers, at a minimum, ensure 6 feet of distance between people in the workplace, the agency also recommends that employers implement physical distancing of more than 6 feet whenever possible.

H. Physical Barriers

Physical barriers intercept respiratory droplets, which can contain COVID–19, and prevent them from being transmitted from person to person. As such, physical barriers are an important component of this ETS when workers cannot be separated from all other people by at least 6 feet. Paragraph (i) requires barriers to be installed at each fixed work location outside of direct patient care areas where each employee is not separated from all other people by at least 6 feet of distance, except where the employer can demonstrate it is not feasible to install the barrier.

Paragraph (a)(4) provides an exception to the physical barrier requirements of paragraph (i) for employees who are fully vaccinated when those employees are in well-defined areas where there is no reasonable expectation that any person with suspected or confirmed COVID–19 will be present. When those conditions are satisfied, barriers are not required to separate fully vaccinated employees from those who are not fully vaccinated. Barriers must be provided in accordance with paragraph (i) to separate employees who are not fully vaccinated from other employees who are not fully vaccinated and all non-employees because employers will not be able to confidently ascertain the vaccination status of non-employees. In order for fully vaccinated employees to be exempt from the requirement for physical barriers in accordance with paragraph (a)(4), paragraph (c)(4)(ii) of the standard requires the employer's COVID–19 plan to include policies and procedures for determining employees' vaccinations status. For further explanation of the exception for fully vaccinated employees from some requirements of the ETS, see the *Summary and Explanation* discussion of paragraph (a)(4), above.

In paragraph (i), the barriers must be sized (*e.g.,* height, width) and located so that they block face-to-face pathways between the employee and other individuals, based on where each person would normally stand or sit. If necessary, barriers may have a pass-through space at the bottom to be used to pass items from one side of the barrier to the other. In healthcare and healthcare support services, physical barriers are not required in patient care areas or resident rooms, as stated in the note to paragraph (i).

Fixed locations where barriers may be required under paragraph (i) include entryways, lobbies, check-in desks, admission desks, screening sites, intake and triage areas, hospital pharmacy windows, security guard stations, and bill-payment counters; again, barriers would only be required for these work locations where physical distancing cannot be achieved. For example, a barrier may be required at a bill-payment counter if employees or visitors are not able to maintain 6 feet of physical distancing while at the counter.

As noted following paragraph (i), physical barriers are not required in direct patient care areas, such as treatment rooms, examination rooms, and resident rooms in hospitals, long-term care facilities, rehabilitation facilities, hospice facilities, or other in-patient healthcare facilities. *Direct patient care,* as defined in paragraph (b), is hands-on, face-to-face contact with patients for the purpose of diagnosis, treatment, and monitoring. The CDC does not recommend the installation of barriers between healthcare professionals and their patients during direct patient care, so OSHA is not requiring them, even when they might be feasible. Employers in healthcare may consider installing barriers in direct patient care areas if appropriate. However, in areas where direct patient care is not provided, barriers are required when individuals cannot maintain at least 6 feet of physical distancing under this provision.

As part of the hazard assessment under paragraph (c)(4), employers need to determine which job activities and fixed work locations require physical barriers. This involves a determination, for each fixed work location, of whether the employee(s) at that work location can be separated from other people by at least 6 feet of distance. The implementation of physical barriers in the workplace, including how many are needed, where they are needed, and how they should be installed, may vary with the size and type of the workplace, along with the work activities performed there. As such, the provision that requires physical barriers is presented in a manner that gives the employer flexibility to adapt the design, location, size, and materials of physical barriers to specific workplace conditions, policies, procedures, tasks, and layouts, as well as state and local legal requirements such as zoning and fire codes. Despite this performance language, employers must ensure that the barriers are installed when and where they are required, in accordance with paragraph (i), and that the barriers meet the other criteria in the provision, including those for material, location, and size.

Physical barriers are only required for fixed work locations outside of direct patient care areas when an employee is not separated from all other people by at least 6 feet of distance. A fixed work location is a workstation where an employee is assigned to work for significant periods of time, or at which the employee spends much of their workday or shift, even if they leave that workstation intermittently as part of their work. Although the employee may

be required to move away from that fixed location to perform their job, in many cases they would be required to return to the fixed location throughout the day. Under paragraph (i), physical barriers are not required at non-fixed workstations. In healthcare settings, examples of non-fixed workstations may include when employees must move from patient-to-patient within a waiting room or check-in area to complete screening procedures. However, if these employees return to a central desk to complete the check-in process or to enter information into a computer for multiple patients, that desk would be considered a fixed work location and would require a barrier. Barriers are also not required in common areas where employees would pass each other, such as hallways or break areas, as these are not fixed workstations.

To be effective, barriers must prevent droplets from passing through them. Therefore, paragraph (i) requires barriers to be solid, meaning they must be impermeable to the droplets that are expelled when an individual is sneezing, coughing, breathing, talking, or yelling. The employer must immediately repair or replace a barrier if it becomes damaged. Examples of solid physical barriers include clear plastic or acrylic partitions and sneeze guards, as well as temporary or permanent walls. In some situations, flexible, transparent plastic sheeting can qualify as a solid physical barrier, but only if it remains in place and blocks face-to-face pathways of air between the users on either side. It is critical that barriers block face-to-face pathways and that they do not flap or otherwise move out of position when they are being used. For example, if flexible plastic sheeting is installed between employees, but the sheeting could easily be swept out of the way in the course of an employee's work tasks or by ventilation, it would not comply with this provision. However, employers may use flexible plastic sheeting if it is installed in a manner such that it remains stationary and is unlikely to be disturbed during use enough to allow droplets to pass through that area (*e.g.,* plastic sheeting hung between employees and anchored—directly or via taut tethers or other devices—to a surface to prevent movement), or the sheeting is weighted or affixed to the ceiling and floor (or other fixture) to prevent its movement and improve stability.

In accordance with paragraph (i), barriers must be made from materials that can be easily cleaned and disinfected. Replacement is also acceptable in lieu of cleaning. Since these barriers are intercepting respiratory droplets that may contain COVID–19, it is important to clean them frequently. Impermeable materials like plastic or acrylic are easy to clean and disinfect. Cleaning and disinfection of physical barriers should occur in accordance with requirements in paragraph (j). This includes cleaning physical barriers at least once a day, as well as disinfecting physical barriers if there has been a COVID–19 positive person present in the workplace. Cleaning and disinfecting products should be chosen to be compatible with the barrier material used. If the cleaning and disinfecting products selected are not compatible with the barrier material, the barrier may become damaged and would then need to be replaced.

Where appropriate, barriers may be made of easily replaceable materials, such as flexible, clear plastic sheeting. Using replaceable materials would allow an employer to dispose of and replace barriers between uses, instead of cleaning and disinfecting more permanent barriers. Barriers constructed out of materials like cloth fabric or mesh would not comply with paragraph (i); these materials are not impermeable and would allow respiratory droplets to pass through them.

Employers must design and install physical barriers in a manner that ensures that, given their positioning, height, and width, the barriers can effectively prevent droplet transmission. Essentially, the barriers must be designed and installed such that any person cannot cough, talk, or breathe on an employee when the employee is in their normal sitting or standing location relative to the workstation. Therefore, the effective design and implementation of physical barriers will differ between workplaces based on job tasks, work processes, and even potential users.

As noted above, paragraph (i) requires barriers to be sized and located so that they block face-to-face pathways between individuals effectively, based on where each person would normally sit or stand. When the individuals on both sides of the barrier will be sitting, the barrier must be high enough, and extend far enough, to block face-to-face pathways between those seated individuals effectively. To ensure compliance with the size and location requirements, employers must account for where the breathing zones of the users on both sides of the barrier will likely be, as a barrier is only effective at reducing an employee's exposure to COVID–19 if it keeps respiratory droplets out of the employee's breathing zone. As described in the *Need for Specific Provisions* (Section V of this preamble), OSHA defines the breathing zone as the area from which a person draws air when they breathe; it extends 10 inches beyond a person's nose and mouth. The location of that breathing zone is critical to designing compliant barriers because of the requirement that barriers block face-to-face pathways between the individuals on both sides of the barriers.

The height of employees and other individuals separated by barriers impacts where their breathing zones will be located, as does whether those individuals will be sitting or standing when at the fixed work location. These factors must, therefore, be taken into account when determining the size and location of each barrier in order to comply with paragraph (i). If employers are certain that only specific employees will be at a particular fixed workstation and will not be exposed to other people (*e.g.,* visitors) of varying heights, then the barrier can be tailored to those factors (*i.e.,* employers can tailor the barrier height to the height of the employees that use that particular workstation). However, in the vast majority of cases, the heights of employees and visitors will vary and, and employers must construct their barriers to at least address average heights. The average height of adults in the US is 63.6 inches for women and 69 inches for men (CDC, May 20, 2020). Employers should consider the height of typical users and their breathing zones to design and install barriers in a way that ensures face-to-face pathways are effectively blocked. Note that OSHA is not mandating a specific barrier height and enforcement will focus on whether the barrier blocks the breathing pathway.[136] For example, for employers who do not know the heights of the people who are likely to be separated by a barrier, OSHA will accept as compliant a barrier that extends to at least 6 and a half feet above the surface on which both people are standing, as this would block face-to-face transmission at the average heights for both females and males while also accounting for their breathing zones. Depending on the job tasks, workstation design, and typical user height, barriers may be able to be shorter (*e.g.,* if both users are sitting) or may need to be taller (*e.g.,* a person is standing on an elevated surface) to ensure that they block face-to-face pathways between users.

[136] In the absence of observable interactions at the barriers, or evidence that the barrier is only used to separate specific persons of known heights, OSHA's enforcement will focus on whether the employer has installed the barriers for the average heights.

If the barrier is installed on a table, desk, countertop, or other surface above floor height, the height of those items would be included in the barrier height. If one user may be sitting and the other may be standing, barriers should be high enough to reflect the height of the standing user as well as the sitting user. The average sitting height of users will vary based on chair height and type, and employers should consider the workstation design when implementing physical barriers. If employees utilize sit-and-stand workstations, barriers would need to be designed to block face-to-face pathways of employees in both sitting and standing positions. If that is not possible, employers should consider suspending the use of sit-and-stand workstations during the pandemic.

To meet the requirement for the barrier to be sized (*e.g.,* height and width) and located to block face-to-face pathways based on where individuals would normally stand or sit, the physical barrier must extend far enough along the workstation to fully contain respiratory droplets that are expelled during sneezing, coughing, breathing, talking, or yelling. In addition to being sufficiently tall, barriers need to be wide enough to protect users on either side during the entire interaction. To ensure compliance, employers also need to consider predictable behaviors and movements of employees and non-employees when designing and installing barriers. The part of paragraph (i) that refers to where each person would normally stand or sit is meant to ensure employees are protected in the event users behave in a way that would reduce the effectiveness of the physical barriers, such as moving to the side of, around, or above the barrier. If such behaviors are predictable, and are not taken into account when designing the barrier, the barrier would not be compliant.

For example, at a service counter, the barrier must be wide enough to block the face-to-face pathway between an employee and a visitor when the employee and visitor are positioned directly across from each other. In situations where the employee and the visitor are positioned diagonally across from each other but still within 6 feet, the barrier must still extend to block those diagonal face-to-face pathways.

Barriers do not need to block all of the face-to-face pathways while employees are briefly moving between the fixed workstations. For healthcare check in areas, a barrier would likely be necessary to separate employees from non-employees at reception desks or other in-take stations where payments are required. Barriers must extend far enough to cover the area where credit card machines are located to ensure that both users' breathing zones are behind the barrier during the entire transaction and to avoid users moving around the barrier at any point during the transaction. If the visitor has to move away from that barrier to access a credit card machine in a manner that would result in a face-to-face pathway between the customer and cashier, the barrier must extend to block those pathways. Employers should also consider visual reminders, like floor markings or signs, to remind employees and non-employees not to step around or move to the side of or above the barrier when interacting with an employee. Additionally, when designing barrier placement and implementation, employers should consider if and how the barrier could alter communication between users. If a barrier is required, but may interfere with effective communication between individuals (*e.g.,* when working with individuals who are hard-of-hearing, when working in an environment with significant background noise), electronic communication devices could be installed. Slotted speaking grates should not be installed in the barrier, as this would allow droplets to pass through the barrier.

Paragraph (i) allows the barrier to have a pass-through space at the bottom for objects. This limited exception to the requirement for the barrier to be solid applies when employees or others need to pass items to someone on the other side of a barrier. For example, when health screening is utilized at a healthcare facility, to screen either employees or non-employees before entry, a barrier could be installed to separate the employee conducting the screening from other individuals. A small pass-through space could be used to facilitate the passing of items between users, such as medical screening questionnaires or COVID–19 testing materials. Such openings should be as small as possible for the given job tasks and activities, and openings should not be placed in front of the breathing zone of any user.

The employer needs to consider the positioning of the individuals on both sides of the barrier before determining where the pass-through space should be located. For example, if a standing user is required to pass items to a seated user on the other side, the pass-through space must not be placed in front of either user's breathing zone. Instead, the opening could be installed to the side of the seated individual. In situations where the barrier extends to the floor, the pass-through space may be located in the middle of the barrier, as long as it is below or to the side of the breathing zones of both users and still effectively blocks face-to-face pathways.

In some cases, when the items being transferred are large, a sliding door may be installed to ensure the effectiveness of the barrier. If a sliding door is used, it must be kept closed except when necessary to transfer an item. As an alternative, work processes can be established to take turns placing and picking up large items from a location to the side of a barrier in order for users on either side of the barrier to maintain 6 feet of physical distance. In addition, employers must ensure that this high-touch surface is cleaned frequently, in accordance with paragraph (j).

Physical barriers are typically mounted on hard surfaces or designed to be free-standing. However, there may be circumstances where an employer may decide to utilize a hanging barrier, depending on the surface below or the work tasks being completed. Barriers may be hung from above, such as from the ceiling or other fixture, as long as they remain stationary and are unlikely to be disturbed during use. Barriers that sway back and forth or do not fully block face-to-face pathways, whether attached from below or hung from overhead, would not comply with this provision. Hanging barriers may also be appropriate in situations where pets or children may be present, such that alternate barrier installations present safety hazards or risks related to barriers falling down. Where hanging barriers are used above a counter or other surface that is raised above the floor, they should extend down as close to that surface as possible, allowing a space for passing items where necessary. If barriers are hung from the ceiling but do not fully extend to the floor or counter, policies should be developed to ensure employees are not placing personal items (*e.g.,* backpacks, umbrellas, cellphones) on the floor or counter below the barrier where they could be contaminated by droplets that land under the barrier. For the same reason, employers must ensure that the surface below the barrier is frequently cleaned in accordance with the cleaning and disinfection provisions in paragraph (j).

While barriers provide protection to employees from COVID–19, their design and installation must also consider employee safety. In the event of an emergency, employees must be able to quickly leave their work area, with their entry and exit not hindered by a physical barrier. Building and fire safety should be considered when installing

barriers. Barriers must not block safety features, such as smoke detectors, sprinklers, carbon monoxide detectors, fire extinguishers, or fire alarms. Employers must properly secure large barriers that could fall and injure an employee. Depending on the size and placement of the barrier, temporary adhesive may be necessary to keep the barrier securely in place. If barriers are mounted on floors, employers should ensure barriers do not present trip-or-fall hazards to employees. Ventilation should also be considered to ensure that the air in one workspace is not funneled around a barrier and directly into another person's workspace.

Barriers serve as a particularly important control when employees are exposed to many different people, each a potential carrier of COVID–19, and the barriers must be provided at fixed workstations even if the employee also has tasks that cannot be performed behind the barrier. The barrier can still reduce the duration of exposure and potentially also the number of sources of exposure the employee faces in the workplace. During these scenarios, barriers are not required when the employee moves away from their fixed workstation, but the other controls required by this standard, such as face masks, physical distancing, and cleaning shared equipment play a vital role in reducing employee exposure. Further, in these types of circumstances, employers must also consider additional controls, such as rearranging work flow to minimize the time an employee has to spend outside of the barrier, or reducing the number of employees at non-fixed workstations at a time, to ensure that the other protections required by the ETS are implemented to the extent feasible.

OSHA also recognizes that some employees may have locations that they go to frequently but may not qualify as a fixed workstation due to the employee's frequent movement throughout the workplace during their work day or shift, and thus physical barriers would not be required.

Under paragraph (i), employers are exempt from compliance with the requirement to install physical barriers when the employer can demonstrate that the use of barriers is infeasible. Barriers may not be feasible during certain tasks that require multiple employees to work cooperatively within 6 feet of one another in a fixed location for an extended period of time. There may be some work settings where two employees must ride in a shared work vehicle and operate shared controls, such as in an ambulance, where barriers would also be considered infeasible as they would be too difficult to install or would block access to the shared controls that both employees need to access. Finally, the agency notes that where barriers are infeasible, it is particularly important to implement the other controls required by this standard, such as facemasks and cleaning and disinfecting are critical to the layered approach of the ETS in reducing employee exposure.

Please see the *Technological Feasibility* section for additional information about barrier installations in different scenarios.

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I. Cleaning and Disinfection

Hand hygiene removes germs from hands, while cleaning and disinfecting surfaces removes harmful contaminants from surfaces. Proper hand hygiene, combined with routine cleaning and situational disinfecting of surfaces, minimizes the risk of COVID–19 transmission through contact with contaminated surfaces. Therefore, the provisions under paragraph (j) include cleaning and disinfection requirements for the workplace. Requirements include cleaning high-touch surfaces and equipment at least once a day, cleaning and disinfecting areas with suspected COVID–19 contamination, and providing employees with readily accessible hand washing facilities or alcohol-based hand rub. The cleaning and disinfection requirements in this ETS are in addition to employers' obligations under OSHA's sanitation standards (29 CFR 1910.141, 1926.51, 1928.110). Because the sanitation standards address workplace hazards other than COVID–19, employers must continue to comply with their obligations under those standards.

The CDC recommends cleaning surfaces, using soap and water or detergent, to remove germs, dirt, and impurities (CDC, April 5, 2021). As defined in paragraph (b), *clean (or cleaning)* means the removal of dirt and impurities, including germs, from surfaces using soap and water or other cleaning agents. Cleaning alone reduces germs on surfaces by removing contaminants and may also weaken or damage some of the virus particles, which decreases risk of infection from surfaces. When no people with confirmed or suspected COVID–19 are known to have been in a space, cleaning once a day is usually sufficient to remove virus that may be on surfaces. To kill any additional germs on surfaces, disinfecting, in addition to cleaning, may be needed. As defined in paragraph (b), *disinfect (or disinfection)* means using an EPA-registered, hospital-grade disinfectant on EPA's ''List N,'' in accordance with manufacturers' instructions to kill germs on surfaces. EPA's ''List N,'' which is incorporated by reference in 29 CFR 1910.509, is a list of disinfectant products that can be used against the virus that causes COVID–19, including ready-to-use sprays, concentrates, and wipes (EPA, April 9, 2021). When used in accordance with manufacturers' instructions, EPA-registered disinfectants selected from List N are expected to kill the virus that causes COVID–19. Manufacturers' instructions include directions on the product's appropriate use site (*e.g.,* home, business, healthcare), surface type (*e.g.,* hard, non-porous surfaces like countertops; porous surfaces like fabrics) and contact time (*i.e.,* the time the product needs to be visibly wet).

Under paragraph (j)(1), in patient care areas, resident rooms (*e.g.,* in-patient long-term care residences, rehabilitation facilities, hospice facilities, other in-patient healthcare facilities), and for medical devices and equipment, an employer must follow standard practices for cleaning and disinfection of surfaces and equipment. These standard practices must be in accordance with ''CDC's COVID–19 Infection Prevention and Control Recommendations'' (CDC, February 23, 2021), and ''CDC's Guidelines for Environmental Infection Control,'' pp. 86–103, 147–148, (CDC, July 23, 2019), both incorporated by reference in 29 CFR 1910.509. Patient care areas do not include non-healthcare settings that emergency responders or other licensed healthcare providers enter to perform healthcare services. Emphasis for cleaning and disinfection should be placed on surfaces that are most likely to become contaminated with pathogens, including those in close proximity to the patient and frequently-touched surfaces in the patient-care environment (*e.g.,* bed rails, bed frames, moveable lamps, tray tables, bedside tables, handles, IV poles, and blood-pressure cuffs).

Paragraph (j)(2)(i) requires employers to clean high-touch surfaces and equipment (other than patient care areas, resident rooms, and medical devices and equipment) at least once a day, following manufacturers' instructions for application of cleaners. Areas covered by paragraph (j)(2)(i) may include patient service counters,

waiting rooms, breakrooms, and offices not used for patient care. Paragraph (b) defines *high-touch surfaces and equipment* to mean any surface or piece of equipment that is repeatedly touched by more than one person. Examples may include doorknobs, light switches, countertops, handles, desks, tables, phones, keyboards, tools, toilets, faucets, sinks, credit card terminals, and touchscreen-enabled devices (*e.g.,* tablets).

Employers must evaluate the workplace to determine which surfaces and equipment need cleaning, and then ensure cleaning is performed at least once each workday. While for most situations, daily cleaning will be sufficient, as part of the hazard assessment required under paragraph (c)(4)(i), employers may determine that some surfaces should be cleaned more than once a day. Examples of items that an employer might consider cleaning more than once per workday include any items that are shared, such as tools, tablets, and remote controls. For locations where visitors, patients, or guests frequently touch the same surfaces and equipment as employees, such as at reception desks and in waiting rooms, an employer might also consider cleaning these surfaces and equipment more frequently.

Employers might also consider cleaning high-touch surfaces and equipment at fixed locations (*e.g.,* workstations, breakrooms) at each shift change and when each employee rotates into the location. For example, when employees work at fixed locations, such as transaction counters (*e.g.,* check-in counter, patient service counter), the employer may consider cleaning between employees (*i.e.,* whenever a new employee rotates into the location). An employer may also consider cleaning high-touch surfaces and equipment in common spaces, such as bathrooms and breakrooms, at each shift change. Examples of high-touch surfaces and equipment in these spaces may include faucets, sinks, handles, and switches. For surfaces that are difficult to clean due to many interstices, such as keyboards and elevator buttons, the employer could apply plastic wrap to those surfaces for easier cleaning (Chen et al., December 1, 2020).

Employers can satisfy their cleaning obligations through a variety of means (*e.g.,* contracting a cleaning service, shared responsibility of employees). If the employer is relying on employees to clean, the employer must provide cleaning supplies at no cost to the employee, and should consider providing individual cleaning supplies to each employee to prevent the need for employees to share those items. Employers must also ensure employees have sufficient time during their work shift to perform cleaning responsibilities, if applicable. To do this, an employer could establish a schedule that specifies the time each day when cleaning of high-touch surfaces and equipment will take place. In determining how much time to allocate for cleaning, the employer must ensure employees have enough time to follow the manufacturers' instructions for cleaners.

When an employer is aware that a person who is COVID–19-positive has been in the workplace within the last 24 hours, paragraph (j)(2)(ii) requires employers to clean and disinfect any areas, materials, and equipment under their control that have likely been contaminated by the person who is COVID–19-positive (*e.g.,* rooms they occupied, items they touched). This requirement applies outside of patient care areas, resident rooms, and medical devices and equipment (for which employers must follow CDC guidance for cleaning and disinfection in accordance with paragraph (j)(1)). In making determinations under paragraph (j)(2)(ii) about which areas, materials, and equipment have likely been contaminated, OSHA expects employers will be informed by relevant CDC guidance, the specifics of any notice received about a COVID–19-positive person in the workplace (see paragraph (l)(3)(i)), such as when and where they were present, and relevant information on the COVID–19 log (see paragraph (q)(2)(ii)).

Under this provision, cleaning and disinfection of areas and equipment other than patient care areas, resident rooms, and medical devices and equipment, must be done in accordance with ''CDC's Cleaning and Disinfecting Guidance,'' which is incorporated by reference in 29 CFR 1910.509 (CDC, April 5, 2021). This includes closing off areas used by the sick person and waiting at least several hours before cleaning and disinfecting. While cleaning and disinfecting, this includes opening outside doors and windows or using other methods to increase air circulation when feasible, using products from EPA's List N, and wearing a facemask and gloves. OSHA notes that if the employer learns about a COVID–19-positive person more than 24 hours after the person was in the area or used the materials or equipment, the employer does not need to close off any areas or wait any longer before cleaning in accordance with the rest of the CDC guidance. When the CDC guidance recommends closing off spaces before cleaning and disinfecting, employers do not necessarily need to close all operations if they can close off just the affected areas. An employer should always focus on cleaning and disinfecting frequently touched surfaces. However, if the employer is aware that a person who is COVID–19-positive has occupied the space, all potentially contaminated surfaces, regardless of touch frequency, need to be cleaned and disinfected. Only after the space has been cleaned and disinfected can it be reopened for use (CDC, April 5, 2021).

Paragraph (j)(3) requires employers to provide alcohol-based hand rub that is at least 60% alcohol or provide readily accessible hand washing facilities for use by employees. Practicing hand hygiene is an effective way to prevent the spread of COVID–19. *Hand hygiene* is defined in paragraph (b) to mean cleaning and/or disinfecting one's hands using standard handwashing methods with soap and running water or an alcohol-based hand rub that is at least 60% alcohol. In most clinical healthcare settings, unless hands are visibly soiled, an alcohol-based hand rub is preferred over soap and water due to evidence of better compliance compared to soap and water. However, CDC recommends healthcare workers wash their hands for at least 20 seconds with soap and water when hands are visibly dirty, before eating, and after using the restroom (CDC, May 17, 2020). To promote frequent and thorough hand hygiene, paragraph (n)(1)(i) requires employers to train employees on the importance of hand hygiene to reduce the risk of spreading COVID–19 infections.

Employers must make available enough facilities (*e.g.,* alcohol-based hand rub dispensers or hand washing stations) and materials (*e.g.,* alcohol-based hand rub, soap, paper towels) so employees can implement recommended hand hygiene practices. When determining the appropriate number and placement of alcohol-based hand rub dispensers or hand washing facilities, employers must consider the physical distancing requirements in paragraph (h). Employers can consider placing hand hygiene stations near building doors to promote hand hygiene whenever employees enter the worksite and near vending machines or where employees may eat (*e.g.,* breakrooms, cafeterias) to ensure hand hygiene prior to eating. When an employee's job tasks require PPE, employers can also place hand hygiene stations near areas where PPE is put on or removed. In addition, employees whose job tasks require them to be away from hand washing facilities must be provided with sufficient

alcohol-based hand rub to practice recommended hand hygiene. Signs that encourage proper and frequent hand hygiene for employees can be placed near hand hygiene stations to promote good hygiene. The CDC has created hand hygiene materials that may be helpful for employers.

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J. Ventilation

Improving ventilation is a critical component of an effective multi-layered approach to controlling the spread of COVID–19 and is required for compliance with the COVID–19 ETS. Accordingly, paragraph (k) requires that employers who own or control buildings or structures with an existing heating, ventilation, and air conditioning (HVAC) system(s) ensure adequate ventilation in accordance with the specific provisions of the paragraph.[137] This requires employers to verify that the system is functioning as designed.

All of the provisions in paragraph (k) align with guidance from both the CDC and the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) (ASHRAE, 2020a; ASHRAE, 2020b; CDC, March 23, 2021). The provisions in paragraph (k) aim to improve ventilation by diluting and filtering the concentration of potentially infectious particles in the air present in the workplace with fresh, outside air to reduce exposure risk. Additional explanation of the function and effectiveness of ventilation as a COVID–19 control is provided in *Need for Specific Provisions* (Section V of this preamble).

As part of the ventilation provision, employers are required to ensure the HVAC system(s) is used in accordance with the HVAC manufacturer's instructions and the design-specifications of the HVAC system(s), as outlined in paragraph (k)(1)(i). Because each building or structure and its existing HVAC system(s) will be different, employers and building owners/operators may find it necessary to consult with an HVAC professional to ensure that HVAC systems are working as designed to provide adequate ventilation according to these provisions. HVAC professionals can determine the best way to maximize the system's ventilation and air filtration capabilities for each specific room in the building and thereby ensure the system is operating according to the HVAC system(s) design specifications. Whenever implementing ventilation improvements, employers and building owners should maintain other indoor environmental quality parameters, such as moisture, temperature, humidity, and air quality, which may be altered when opening the building's outdoor air intake dampers. Additional guidance on implementing these ventilation changes can be found in *Technological Feasibility* (Section VI.A. of this preamble).

Paragraph (k)(1)(ii) requires that employers ensure the amount of outside air supplied to the HVAC system(s) is maximized to the extent appropriate and compatible with the HVAC system's capabilities. Employers should work with building owners/operators to increase the amount of outdoor air provided in the existing HVAC system(s), if possible and if aligned with the capacity of the system. Maximizing the amount of outdoor air being circulated through the HVAC system(s) to the extent appropriate increases the amount of fresh air available indoors, which decreases the concentration of potentially infectious particles present in the air of that space. When maximizing outside air circulation, employers and building owners should use caution in areas where outdoor environmental contaminants (*e.g.,* extreme heat or cold, humidity, carbon monoxide, molds, pollen) may pose health risks. Information on maximizing outdoor air is discussed in more detail in *Technological Feasibility* (Section VI.A. of this preamble).

Under paragraph (k)(1)(ii), employers must also maximize, to the extent appropriate, the number of air changes per hour (ACHs). ACHs are a measure of the air volume that is added or removed from a space in one hour per the volume of the space, or how frequently the air within that space is replaced per hour. Maximizing ACHs will help dilute the overall potential concentration of COVID–19 particles in the work environment. ACHs are already commonly considered as a part of the environment of care within healthcare facilities (CDC, 2003) and, as such, employers in healthcare settings may already be in compliance with this provision. As with other elements of this provision, a ventilation expert or technician can assist a building owner/operator or employer to maximize ACHs based on the workspace and the design capabilities of the HVAC system(s). HVAC systems must always be maintained and operated in accordance with design and manufacturers' recommendations.

Air filters in HVAC systems remove particles, including aerosolized particles that may contain COVID–19, from recirculated air streams before returning the air to workspaces. Air filters are available in many varieties and are made of different materials such as pleated paper, cloth, woven fiberglass, and polyester. A filter's efficiency is measured by the fraction of particles it is able to remove from the air stream. Increased filter efficiency reduces the risk of COVID–19 transmission. There are several systems for rating filter efficiencies. The most common is the Minimum Efficiency Reporting Value (MERV) rating system developed by ASHRAE. Some air filters use alternative rating systems and do not provide a MERV rating on their packaging. In such cases, employers or building operators can determine the

[137] There may be situations where workplaces have HVAC systems but employers are not in control of the system, such as at healthcare offices or clinics located within larger commercial buildings. In these situations, employers should coordinate with the building owner or operator to ensure that the requirements of paragraph (k) are met. Additionally, the ETS does not require the installation of new HVAC systems to replace or augment functioning systems.

filter's MERV rating by contacting the manufacturer or reviewing the product description on their web page.

Paragraph (k)(1)(iii) requires air filters be rated as MERV–13 or higher, if compatible with the ventilation system (ASHRAE, 2020a; ASHRAE, 2020b). OSHA selected the MERV–13 filter as the minimum filter requirement (assuming compatibility with the system) to follow the recommendation of ASHRAE. Where a MERV–13 or higher filter is not compatible with the HVAC system, employers must use the filter with the highest compatible filtering efficiency for the HVAC system. The CDC recommends upgrading filtration to the highest level possible without significantly reducing design airflow (CDC, March 23, 2021). OSHA agrees with the CDC recommendation that employers should use the highest filtration system compatible with their HVAC system, but because this is a mandatory standard OSHA has specified a minimum filtration level, MERV–13, in order to provide clearer guidance to employers (the CDC recommendation is non-mandatory guidance).

Filters with MERV ratings of 13 or greater are at least 85% efficient at capturing particles similar in size to those carrying the virus that causes COVID–19. Higher-rated filters, such as MERV–14 or greater, capture particles more efficiently, but they also can slow down the air flow. Increasing fan speed can help improve air flow to counterbalance the impact of more efficient filters, but it is not always possible to do so without stressing the HVAC system beyond its capabilities, or without significant increases in energy use.

For that reason, HVAC systems are typically designed for specific filter efficiencies and it is important to use a filter with a MERV value as high as the system can handle (more efficient filtration), but not higher. Some HVAC systems in healthcare facilities may be designed and installed to operate with MERV–7 filters (*e.g.,* in outpatient spaces or resident care areas in assisted living facilities) (ASHE, 2014). Before upgrading to a higher-level filter, employers should evaluate their existing HVAC system(s) to determine if it will be able to operate properly with a MERV–13 or higher filter. In those situations where MERV–13 or higher filters are not compatible with the existing ventilation system, employers must use filters with the highest compatible filtering efficiency for their HVAC system(s) to maintain compliance with paragraph (k)(1)(iii). Employers should also note that the requirement to upgrade filters applies to the ''final'' filter in cases where commercial or industrial HVAC systems have more than one set of filters in series (*e.g.,* the use of pre-filters to extend the service life of final filters). Employers should consult an HVAC technician or specialist before upgrading filter efficiencies in HVAC systems if needed.

Dirty filters can decrease airflow and negatively affect HVAC system performance. Paragraph (k)(1)(iv) requires employers to maintain air filters and replace them as necessary to ensure the proper function and performance of the HVAC system(s). Air filters must be maintained and replaced in accordance with design and manufacturers' recommendations. This would include, for example, the establishment of a planned replacement schedule that identifies the frequency under which filters should be replaced. Additionally, it is recommended that a supply of replacement filters is kept on hand to ensure timely replacement. When replacing filters, employers should follow manufacturers' recommendations for appropriate PPE and provide PPE in accordance with other OSHA standards.

Paragraph (k)(1)(v) requires that employers ensure all intake ports that provide outside air to the HVAC system are cleaned, maintained, and cleared of any debris that may affect the function and performance of the HVAC system. This would include, for example, the establishment and implementation of a planned maintenance schedule that identifies the frequency with which the removal of dust and debris from ductwork, vents, and intake ports must occur. These tasks should be completed as frequently as necessary to ensure the function and performance of the HVAC system are maintained, which can be determined with the assistance of an HVAC technician or the building operator. Outdoor air intakes must be inspected regularly to ensure they are not blocked or obstructed, and dampers must be evaluated to ensure their proper functionality, in accordance with ASHRAE recommendations (ASHRAE, 2020a). Employers may consider assessing indoor supply air diffusers and return air grilles to ensure they are not blocked or obstructed, are working properly, and their surfaces are clean.

Paragraph (k)(2) requires healthcare employers to maintain and operate existing airborne infection isolation rooms (AIIR) in accordance with their original design and construction criteria, where AIIRs are used. AIIRs are required in healthcare settings when performing aerosol-generating procedures on someone with suspected or confirmed COVID–19, subject to feasibility. AIIRs lower the risk of cross-contamination between patient rooms and reduce the risk of transmission of COVID–19 between patients and employees (NIH, October 9, 2020). According to the CDC, AIIRs are rooms kept at negative pressure relative to the surrounding areas with a minimum of 6 ACHs, and 12 ACHs are recommended for newly constructed or recently renovated spaces (CDC, February 23, 2021). The doors on AIIRs should be kept closed except during entry or exit, and air from within AIIRs should be exhausted directly to the outside of the building or should be filtered through high-efficiency particulate air (HEPA) filters before it is recirculated (CDC, February 23, 2021). Employers must ensure that the proper negative-pressure function of AIIRs is maintained. Again, employers and building owners/operators should consult with a ventilation professional to ensure that AIIRs are operating as designed. As described in note 1 to paragraph (k), this provision does not require the installation of new AIIRs to replace or augment functioning systems in healthcare facilities.

Employers should demonstrate a good-faith effort in achieving the requirements outlined in paragraph (k) in the allotted time (*i.e.,* within 30 days of the effective date of this standard, pursuant to paragraph (s)(2)(ii)). This would include evaluating the existing HVAC system, having conversations with building owners and operators, attempting to schedule appointments with HVAC technicians, and implementing changes to improve ventilation as much as feasible in their workplace. Additional information on the timing of implementation of ventilation requirements can be found in the **SUMMARY** and explanation of **DATES.**

As note 2 to paragraph (k) states, employers should also consider other measures to improve ventilation in accordance with guidance from the CDC (CDC, March 23, 2021). While not required under this standard, there are a variety of controls employers should consider to maximize ventilation and filtration in buildings and structures without HVAC systems or in addition to existing HVAC systems. OSHA is recommending these, rather than requiring them, because there are too many variables regarding when they are appropriate to make requirements simple and clear in the regulatory text or to provide clear guidance as to when employers would and would not be in compliance. Additional measures could include increasing airflow to occupied

spaces, such as by opening windows and doors, if possible. Measures that work to increase the amount of fresh air available could be used during work hours, but also before and after occupancy to flush the workspace.

Under note 2 of paragraph (k), employers should also consider ways to maximize ventilation in vehicles when feasible. To do so, the driver can open the windows, as weather permits. Similar to in buildings, avoid opening windows and doors if doing so would pose health or safety risks to employees or other occupants, such as exposure to outdoor environmental contaminants (*e.g.,* extreme heat or cold, humidity, carbon monoxide, air pollution, molds, pollen). Additionally, the air ventilation or air conditioning should be set to non-recirculation mode to prevent the same, potentially contaminated, air from recirculating throughout the vehicle (CDC, February 17, 2021).

Employers may consider using portable air cleaners fitted with high-efficiency particulate air (HEPA) filters, especially in high-occupancy areas or spaces with poor ventilation (ASHRAE, 2020a). Portable air cleaners pull surrounding air in, filter it, and recirculate cleaner air back into the room. If using portable air cleaners, employers should consider the size of the room or space where the unit will be used. Most manufacturers specify the size of the space for which their units are designed. The Clean Air Delivery Rate (CADR) is a measure of the effectiveness and capacity of the portable air cleaner. The higher the CADR, the more particles the air cleaner can filter and the larger the area it can serve. Units equipped with high-efficiency particulate air (HEPA) filters typically achieve a higher CADR and can remove at least 99.97% of dust, pollen, mold, viral particles, and any airborne particles with a size of 0.3 microns (μm) or greater, including particles containing the virus that causes COVID–19. Portable air cleaners would be most effective if placed as close to potential sources of COVID–19 as possible to increase effective capture of the infectious particles. Additionally, portable air cleaners should be placed to avoid blocking airflow, and as such they should not be placed behind furniture or curtains. If portable air cleaners are being used, employers should avoid creating directional airflow across employees by drawing contaminated air past breathing zones of employees. Avoid the use of fans around or above portable air cleaners which can create currents that direct air away from the filters and thereby reduce the efficiency of the air cleaner.

Finally, it is also recommended that all local exhaust fans (*e.g.,* in restrooms) are functional and operating at full capacity when the building or structure is occupied (ASHRAE, 2020a; ASHRAE, 2020b; CDC, March 23, 2021).

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K. Health Screening and Medical Management

To reduce the risk of transmitting the virus that causes COVID–19 and possible infection to employees and others in the workplace, it is essential to screen employees for illness, prevent infectious employees from entering the workplace, and notify any employees who may have been unexpectedly exposed to an individual with COVID–19 while not wearing a respirator and other appropriate PPE. It is also critical to ensure that employees are not disincentivized by fear of lost pay from notifying their employer of COVID–19-related concerns that will require their removal from the workplace. An employee with COVID–19 who does not report their condition to their employer for fear of losing essential income endangers everyone else at the workplace. The provisions under paragraph (l) allow for early intervention to identify and remove from the workplace employees who have or are likely to have COVID–19, and to ensure that the employees receive sufficient protections to encourage honest communication with their employers. Screening employees for COVID–19 and removing them from the workplace when they are infected or likely to be infected is critical for an effective workplace infection prevention program and required for compliance with these sections.

I. Screening

Paragraph (l)(1) discusses the requirements employers have for screening employees. As defined in paragraph (b), *screen* means asking questions to determine whether a person is COVID–19 positive or has symptoms of COVID–19. As also defined in paragraph (b), *COVID–19 symptoms* may include fever or chills; cough; shortness of breath or difficulty breathing; fatigue; muscle or body aches; headache; new loss of taste or smell; sore throat; congestion or runny nose; nausea or vomiting; or diarrhea. The CDC has recognized each of these symptoms as potentially indicative of COVID–19 (CDC, February 22, 2021). As further discussed in *Grave Danger* (Section IV.A. of this preamble), symptomatic cases of COVID–19 can cause a range of illness, from mild cases to severe or critical cases requiring hospitalization. Paragraph (l)(1)(i) requires the employer to screen each employee before each workday and each shift. Under this provision, screening may be conducted by asking employees to self-monitor before reporting to work or may be done through in-person methods conducted by the employer. To ensure this screening requirement is properly implemented, employers are required to educate and train all employees on the signs and symptoms of COVID–19, and on the employer's policies and procedures for reporting illness, as specified under paragraphs (n)(1)(i) and (n)(1)(viii).

Employers who choose to have employees self-monitor for COVID–19 symptoms can assist employees in that effort by providing them with a short fact sheet to remind them of the symptoms of concern. Employers may also consider posting a sign stating that any employee entering the workplace

certifies that they do not have symptoms of COVID–19, to reinforce the obligation to self-screen before entering the workplace.

Employers who choose to conduct in-person employee screening for COVID–19 symptoms may ask the employee if they are experiencing symptoms consistent with COVID–19. Employers should conduct this screening before employees come into contact with others in the workplace, such as co-workers, customers, patients, or visitors. When implementing in-person screening, there are additional considerations and responsibilities under this ETS as well as other potentially applicable laws. Some individuals assisting with in-person screening at the worksite may not be medical professionals, thus it is important that the employer ensure that those individuals have any training that is required as specified under paragraph (n)(1). This training must include knowledge about the signs and symptoms of COVID–19, the employer's policies and procedures for health screening, as well as job tasks they would have to complete while conducting health screening.

When doing in-person screening, employers must protect employee privacy and ensure that findings are kept confidential as required under the Americans with Disabilities Act (EEOC, May 28, 2021) and in accordance with other applicable laws. To maintain privacy, employers should ask employees about symptoms in an area where others cannot hear the responses (*e.g.,* private room). To ensure screeners and employees waiting to be screened are protected, an employer must continue to maintain compliance with all requirements of this standard for physical distancing, physical barriers, and facemask use; thus, employers may need to provide physical barriers to separate employees and screeners and ensure that employees waiting to be screened can maintain adequate physical distancing between each other (see paragraphs (f), (h), and (i)).

Employers have discretion in choosing whether to implement self-monitoring or in-person screening; an employer can also choose to utilize both methods. Both options have advantages and disadvantages that may make them better suited for different types of work environments. In-person screening allows the screener to remind the employee about COVID–19 symptoms instead of relying on the employee to recall the symptoms of concern. Additionally, in-person screening may be easier for small healthcare employers (*e.g.,* a small urgent care clinic). For small healthcare facilities, it would likely be efficient for the employer to ask employees if they are experiencing certain symptoms in a private area. In-person screening may present more challenges to larger healthcare facilities (*e.g.,* a hospital), where many employees may be arriving to work within the same timeframe. In those cases, if employers choose to conduct in-person screenings, the employer should ensure screenings are conducted in a timely manner to minimize potential exposure both to other employees waiting to be screened and to the screener.

Having employees self-monitor for COVID–19 symptoms before reporting to work also has some advantages that employers may find beneficial, such as protecting the employee's privacy, eliminating the risk of potentially exposing others when commuting to the workplace (*e.g.,* passengers on public transportation), and avoiding close contact between potentially infected employees and others when conducting in-person screenings.

If the screening process reveals that an employee is experiencing COVID–19 symptoms, the employer should determine whether the symptoms require the employee's immediate removal from the workplace, discussed in further detail below. The employer needs to be aware that screening will not identify some employees who have COVID–19. Some individuals with COVID–19 may be pre-symptomatic (*i.e.,* have not developed symptoms yet) or asymptomatic (*i.e.,* do not develop symptoms over the course of infection) but can still transmit the virus. Therefore, in settings covered by the standard, employers must continue to follow all requirements of the standard, using employee health screening as only one component of a multi-layered approach.

Paragraph (l)(1)(ii) specifies that if the employer requires a COVID–19 test for screening purposes, the employer must provide the test to each employee at no cost to the employee. As defined in paragraph (b), a *COVID–19 test* means a test for SARS–CoV–2 that is both: (1) Cleared or approved by the U.S. Food and Drug Administration (FDA) or is covered by an Emergency Use Authorization (EUA) from the FDA to diagnose current infection with the SARS–CoV–2 virus; and (2) administered in accordance with the FDA clearance or approval or the FDA EUA, as applicable. Although it is not required under this ETS, OSHA understands that some employers might choose to require employees to be tested for COVID–19 before entering the workplace. Relatedly, employers may require employees to undergo COVID–19 testing for other work-related reasons, such as required screening before or after travel to another state to perform work duties. If the employer chooses to require testing, it must ensure it is using a COVID–19 test that satisfies the definition in this standard, and the employer must pay the employee for all costs associated with the test. This includes, for example, costs of the test itself, as well as any time spent getting the test or time spent waiting for test results before the employee is allowed to enter the workplace. If getting the test requires the employee to travel to a location that is not at the workplace, the employer must pay the employee for the time spent traveling and for any travel costs (*e.g.,* transportation fare, gasoline). For more information about the employer's obligation to implement the requirements of this standard at no cost to employees, see the summary and explanation discussion of *No Cost to Employees* below. Employers should be aware that testing will not detect every employee who has COVID–19. For example, false negative results could occur if the employee is infected but is tested at a point in time where the levels of virus being shed are below the detection limit of the test being performed. For that reason, employers conducting testing must continue to follow all requirements of this standard.

II. Employee Notification to Employer of COVID–19 Illness or Symptoms

Paragraph (l)(2) pertains to employee notification of COVID–19 illness or symptoms. Under this paragraph, the employer must require each employee to promptly notify the employer of four different circumstances. First, each employee must be required to promptly notify their employer when the employee learns they are COVID–19 positive (*i.e.,* confirmed positive test for, or has been diagnosed by a licensed healthcare provider with, COVID–19) (paragraph (l)(2)(i)). Thus, employers must require employees to report their illness if they are COVID–19 positive as confirmed by either a positive test or a licensed healthcare provider's diagnosis. Second, employers must ensure that each employee promptly notifies their employer if the employee has been told by a licensed healthcare provider that they are suspected to have COVID–19 (paragraph (l)(2)(ii)). Third, employers must ensure that each employee promptly notifies their employer if the employee is experiencing recent loss of taste and/or smell with no other explanation (paragraph (l)(2)(iii)). If the employee

reports having a recent loss of taste and/or smell, the employer should inquire as to whether there is any other explanation for the symptom apart from COVID–19, but the employer is not required to ask nor is the employee required to share any specific information about an alternative condition that may explain the symptom. (Alternative causes for recent loss of taste and/or smell could include, *e.g.,* a non-COVID–19 respiratory infection, sinus infection, or non-infectious neurological disorder, such as Parkinson's disease.) Finally, under paragraph (l)(2)(iv), employers must ensure each employee promptly notifies their employer if the employee is experiencing both a fever (≥100.4 °F) and new unexplained cough associated with shortness of breath. Again, if the employee reports having these symptoms, the employer should inquire as to whether there is any other explanation for the fever (*e.g.,* an infection that is not related to COVID–19) or cough associated with shortness of breath apart from COVID–19 (*e.g.,* a non-COVID–19 respiratory illness; a non-infectious condition such as chronic obstructive pulmonary disease). And again, the employer is not required to ask nor is the employee required to share any specific information about the alternative explanation for the symptoms. To distinguish from situations where shortness of breath is expected (*e.g.,* while conducting strenuous exercise or tasks), the employer could frame the question in terms of whether the employee is experiencing shortness of breath while at rest or in a way that makes it more difficult to perform their job tasks or everyday activities. The COVID–19 symptoms included in these latter two notification categories should be included in the employer's required daily screening so that employees are particularly cognizant of monitoring for those symptoms in order to report them to their employer.

As noted, each of these notifications is required to be made to the employer ''promptly.'' For employees who are not at the workplace when they meet a notification criterion, ''promptly'' notifying the employer would mean notifying the employer before the employee is scheduled to start their shift or return to work. In the event that the employee is in the workplace when meeting a notification criterion (*e.g.,* the employee starts experiencing a reportable symptom of COVID–19), ''promptly'' notifying the employer means notifying the employer as soon as safely possible. For example, if a nurse caring for patients starts to develop an unexplained loss of taste while at work, the nurse should immediately notify their employer of their COVID–19 symptom while avoiding exposing any other employees or non-employees. The procedures for these notification requirements can be based on current protocols that are in place for employees to notify the employer if they are not able to come to work or need to leave work because of illness or injury. The employer must train all employees on the employer's policies and procedures for notifying the employer of illness and symptoms, as specified under paragraph (n)(1)(viii). This should include training employees on who to contact and how to contact that person. For example, employees can be informed to contact individuals such as their direct supervisor or the COVID–19 safety coordinator(s) required by paragraph (c)(3). Employees must be given this person's contact information, such as their email, workplace phone number, or cellphone number, so that this information can be privately and confidentially communicated to the employer. If an employer takes all steps required under this paragraph but an employee fails to report required information, the ETS does not dictate that any disciplinary action be taken against the employee. If an employer is cited by OSHA under this provision under such circumstances, the employer is entitled to contest the citation if it can establish an employee misconduct defense in accordance with applicable case law.

Each of these notification requirements are important measures to ensure employers can take adequate steps to protect their employees from the hazard of COVID–19 because each notification requirement is connected to a parallel requirement in (l)(4) to remove the employee at issue from the workplace. As described in *Need for Specific Provisions* (Section V of the preamble), it is important to remove employees who are confirmed or suspected to have COVID–19 from the workplace to prevent the transmission of the virus that causes COVID–19 to other employees. However, because COVID–19 symptoms are non-specific and common with other infectious and non-infectious conditions, OSHA has determined that it is not economically feasible to remove all employees experiencing any potential symptom of COVID–19. Thus, OSHA has limited required notification—and subsequent removal—to the symptoms discussed above in paragraphs (l)(2)(iii)-(iv). As discussed in further detail below, the decision to require notification of these particular symptoms is based on a strategy that protects the safety of other employees in the workplace by identifying criteria most likely to capture COVID–19 employees within the constraints of feasibility. This does not, however, prevent employers from using a broader range of symptoms to exclude additional employees, as long as they ensure those employees also do not suffer any adverse action as a result of that removal as consistent with paragraph (l)(5)(v), discussed below.

OSHA considered several symptom lists to trigger notification and removal of employees, each discussed in greater detail in *Need for Specific Provisions* (Section V of this preamble). First, OSHA considered basing notification and removal on the CDC list of symptoms. However, that list is extremely broad and includes many common symptoms that are not specific to COVID–19, such as fever or chills, cough, fatigue, muscle or body aches, headache, congestion or runny nose, nausea or vomiting, and diarrhea. Use of these symptoms could require removal of large swaths of the workforce, many of whom may not have COVID–19, and payment of accompanying medical removal protection benefits. This would pose economic feasibility concerns (see *Economic Feasibility,* Section VI.B), and it could leave employers, especially small healthcare providers, without an adequate workforce to continue operations in many cases. OSHA next considered basing notification and removal on the Council of State and Territorial Epidemiologists (CSTE) surveillance definition for COVID–19. However, while that list is narrower than the CDC list, it still contains many common, non-specific symptoms and thus presents the same concerns. For example, the CSTE list would require removal of any employee experiencing just a cough, which OSHA expects would result in removal of many employees who do not have COVID–19. And although the CSTE definition also includes consideration for more than one symptom (*e.g.,* fever in addition to sore throat), many of the symptoms that can be combined are also non-specific and could potentially lead to removal of many employees who do not have COVID–19.

Accordingly, OSHA found it necessary to develop its own list of symptoms requiring notification and removal from the workplace, based on the evidence discussed in *Need for Specific Provisions* (Section V of the preamble), that adequately identifies infection hazards within the realities of economic feasibility. As noted above,

these symptoms include: recent loss of taste and/or smell with no other explanation; or fever (≥100.4 °F) and new unexplained cough associated with shortness of breath. OSHA has determined that recent loss of taste and/or smell, without another explanation, is a symptom that is highly specific for COVID–19 and the least likely symptom to result in removing an employee from the workplace who does not have COVID–19. The other symptoms—fever, cough, and shortness of breath—are three of the symptoms that are most common to COVID–19, but fever and cough are non-specific for COVID–19; accordingly, requiring removal of any employee who has just fever or cough could result in the removal of many employees who do not have COVID–19. However, a combination of fever, cough, and shortness of breath is likely to result in higher specificity that helps to avoid excluding employees who do not have COVID–19. Therefore, requiring removal where an employee is experiencing all three of these common COVID–19 symptoms will ultimately lead to removal of employees who are likely to have COVID–19, while not compromising an employer's ability to continue operations by removing employees who do not have COVID–19. As discussed further in Section VI.B, *Economic Feasibility,* OSHA has found removal in these circumstances feasible.

OSHA's determination that employees must notify their employer, and be removed from the workplace when they are experiencing the above symptoms, is based on the best evidence currently available to the agency. However, OSHA recognizes that it is operating at the frontiers of science and it will, accordingly, continue to monitor the science, and will make appropriate modifications to the ETS or adjustments in enforcement policy as warranted by the evidence. Moreover, nothing in this ETS precludes an employer from requiring employees to notify the employer of additional symptoms of COVID–19 not specified by this paragraph.

It is crucial that employees promptly inform their employer of these circumstances because this information allows the employer to take actions to protect other employees, including most critically by removing employees who pose a direct threat of infection to other employees in the workplace. The information conveyed by these notifications also allows the employer to take other important steps to protect its employees, including cleaning and disinfecting areas that may have been contaminated (as required under paragraph (j)(2)(ii)). In addition, the employer can start the required notifications to other employees who may have been exposed to a COVID–19-positive employee, as described in further detail below.

III. Employer Notification to Employees of COVID–19 Exposure in the Workplace

Paragraph (l)(3) pertains to employer notification requirements to employees regarding COVID–19 exposure in the workplace. An employer's obligation under this section begins whenever the employer is notified that a person who has been in its workplace is COVID–19-positive. Subject to a limited exception with respect to certain COVID–19-positive patients (discussed in further detail below), this notification obligation is triggered by *any* COVID–19-positive person at the workplace, including employees, clients, patients, residents, vendors, contractors, customers, delivery people, visitors, or other non-employees. Employers could be notified of an infected person in the workplace by numerous sources including the affected individual themselves, as well as the local or state health department, a family member of a person confirmed to have COVID–19, or another employer (*e.g.,* an employer of a facility where a temporary employee was working). The employer could also be notified by an employee who spoke to any of the individuals listed above (*e.g.,* an administrative assistant), and forwarded the message to the employer. Once an employer is notified of a COVID–19-positive person who has been in its workplace, the employer has three separate notification obligations that must be completed within 24 hours.

First, under paragraph (l)(3)(i)(A), the employer must notify each employee who has been in close contact in the workplace with the person who is COVID–19 positive while not wearing a respirator and any other required PPE. ''Other required PPE'' in this provision (as well as in paragraphs (l)(3)(i)(B) and (C)) refers to the other parts of the PPE ensemble worn in addition to respirators when employees are exposed to people with suspected or confirmed COVID–19, *e.g.,* gloves, gowns, and eye protection. Employees in healthcare settings are likely to be exposed to ill persons as part of their job and have an understanding of Standard and Transmission-Based Precautions. Therefore, they have an understanding of pre- and asymptomatic transmission and how it affects their risk of contracting COVID–19. Many times employees in healthcare settings who are wearing respirators and other required PPE are doing so because they are knowingly treating suspected or confirmed COVID–19 cases (as required by paragraph (f)(2)), so there is no need to inform them of potential exposure. In some cases, employees in healthcare may only be required to wear a facemask but are wearing both a respirator and other PPE either voluntarily or at their employer's request. Employees who choose to voluntarily upgrade their PPE presumably do so based on an understanding that they could be exposed to someone who is pre- or asymptomatic, even when all the other controls (*e.g.,* patient screening and placement) are properly implemented. An employer choosing to upgrade PPE is exceeding the minimum requirements of the standard, thus implying that such an employer is conscientious and would train employees on the possibility of pre- and asymptomatic transmission. Therefore, employees who are wearing PPE voluntarily or because their employer chose to exceed the minimum requirements of the standard are likely already aware of the potential for pre- and asymptomatic exposure and the need to be especially vigilant in screening for COVID–19 symptoms. OSHA does not find notification of close contacts or exposures to individuals with COVID–19 necessary in these circumstances.

The notification to these employees under paragraph (l)(3)(i)(A) must state the fact that the employee was in close contact with someone with COVID–19 along with the date(s) that the contact occurred. As defined in paragraph (b), *close contact* means being within 6 feet of any other person for a cumulative total of 15 minutes or more over a 24-hour period during that person's potential period of transmission. The potential transmission period runs from 2 days before the person felt sick (or, for asymptomatic people, 2 days prior to test specimen collection) until the time the person is isolated. Examples of cumulative exposures for 15 minutes could be 3 exposures for 5 minutes each or 1 exposure for 5 minutes and a second exposure for 10 minutes, over a 24-hour period. This definition in terms of proximity, duration, and timing of exposure is consistent with CDC's current definition of close contact, which is ''an operational definition'' used as the criteria for conducting contact tracing (CDC, February 25, 2021). It is based on the assumption that infection risk increases at decreased distances and increased duration of exposure to an infected person during the transmission period.

It is important to notify this category of employees because individuals who have had close contact with a person who is COVID–19-positive are at the highest risk of contracting COVID–19. Timely notice of potential close contact with persons who are COVID–19-positive will allow employees who have had close contact to seek medical advice and be tested. Notifying those employees about the date that contact occurred will allow them to verify that they were exposed. It also allows them to provide that information to a licensed healthcare provider or public health agency to determine factors such as optimal time for testing. In addition, this gives employees necessary information to be particularly vigilant in monitoring their own health and symptoms, and to take steps to potentially avoid exposing others in their household or community.

The second notification requirement, under paragraph (l)(3)(i)(B), requires the employer to notify all other employees who worked in a well-defined portion of a workplace (*e.g.,* a particular floor) where the person with confirmed COVID–19 was present during the potential transmission period if the employees were not wearing a respirator and any other required PPE. As stated above, the potential transmission period runs from 2 days before the person felt sick (or, for asymptomatic people, 2 days prior to test specimen collection) until the time the person is isolated. This notification must specify the date(s) the person with COVID–19 was in the workplace during the potential transmission period. This notification is required if the employer is aware that any person with confirmed COVID–19 (employee or non-employee) was present in a facility for any length of time, even if relatively brief.

OSHA has determined that it is important to notify this category of employees even though they are generally at lower risk of developing COVID–19 and do not meet the criteria for notification under CDC contact tracing recommendations. Notifying these employees is important because it can remind them to be aware of possible symptom development in the less likely event that they do develop COVID–19. It will also allow employees who may be at risk of developing COVID–19 in special circumstances, despite the lack of close contact, to seek advice from local or public health departments. CDC notes that infections can sometimes occur from contact transmission. Thus, notifying a janitor that an employee from a floor they service developed COVID–19 would allow the janitor to seek information about possible risk from tasks such as emptying trash contaminated with used tissues or paper towels. As indicated above, notifying those employees about the date the person with COVID–19 was in the workplace during the potential transmission period will allow them to verify that they were exposed, as well as provide the date(s) to a licensed healthcare provider or public health agency to determine factors such as optimal time for testing. Furthermore, determining which locations of a workplace a COVID–19-positive person may have visited can also inform the employer about ways to improve transmission prevention efforts, and improve the COVID–19 plan under paragraph (c). For example, an employer may learn that a delivery person confirmed to have COVID–19 visited many departments throughout a hospital while making deliveries. Such information could help the employer realize that numbers of persons exposed could be minimized by leaving deliveries in the lobby and designating individuals from certain areas of the building to pick up deliveries while maintaining physical distance from others in the building.

Finally, under paragraph (l)(3)(i)(C), the employer must also notify other employers whose employees have been in close contact with the COVID–19-positive person in the workplace, or worked in a well-defined portion of a workplace (*e.g.,* a particular floor) in which the COVID–19 positive person was present during the potential transmission period if the employees were not wearing respirators and any other required PPE. Again, the potential transmission period runs from 2 days before the person felt sick (or, for asymptomatic people, 2 days prior to test specimen collection) until the time the person is isolated. The notification must specify the date(s) the person with COVID–19 was in the workplace during the potential transmission period and the location(s) where the person with COVID–19 was in the workplace. And again, this notification is required if an employer is aware that any person with confirmed COVID–19 (employee or non-employee) was present in a facility for any length of time, even if relatively brief.

The purpose of notifying other employers whose employees had close contact with or were in the same well-defined portion of a workplace as the COVID–19 positive person during the potential transmission period is to ensure that employees who are not directly employed by the business or facility (*e.g.,* host employer) where they were potentially exposed will also be notified of exposures. Examples of employers who would need to be notified include contracting agencies, temporary staffing agencies, vendors, and delivery services. Providing them with the information required under paragraph (l)(3)(i)(C) will allow the employers and employees to determine if they could have been exposed, and will allow the employee to contact a licensed healthcare provider or local or state public health official for information to help them determine factors such as optimal time for testing. Because the host employer is the one who controls the workplace, OSHA expects that the host employer would have the details to determine which employees at the workplace could have had close contact with, and which could have been in the same well-defined area as, someone who is COVID–19 positive. This would allow the host employer to inform other employers (*e.g.,* contractors, temporary staffing agencies, vendors, delivery services) if one of their employees had close contact with or could have been in the same well-defined area as a COVID–19-positive person during their transmission period. This would then allow employers such as contractors, temporary staffing agencies, vendors, and delivery services to notify their employees, as required under paragraphs (l)(3)(i)(A) and (B).

Each of the three notification requirements in paragraphs (l)(3)(i)(A)–(C) is subject to one exception, found in paragraph (l)(3)(iii). That exception provides that the notification provisions are not triggered by the presence of a patient with confirmed COVID–19 in a workplace where services are normally provided to suspected or confirmed COVID–19 patients (*e.g.,* emergency rooms, urgent care facilities, COVID–19 testing sites, COVID–19 wards in hospitals). This exception recognizes that the notifications required by paragraph (l)(3)(i)(A)–(C) are not necessary in workplace settings where employees already expect to be working near suspected or confirmed COVID–19 patients and are, therefore, already aware of their potential for exposure. However, this exception is limited to scenarios where services are normally provided to patients who are suspected or confirmed to have COVID–19. For example, this exception would not apply to a mammography center at a hospital not otherwise excepted from the ETS that conducts screening to identify patients who have COVID–19 and excludes them from receiving services at the center. If that center learns that a person who is COVID–19 positive visited the center during the

period of transmission, the employer would be required to notify all employees who were not wearing a respirator and other PPE and either had close contact with the person or were in the same well-defined portion of the workplace as the person. In another example, a hospital has a designated wing for COVID–19 patients, but a COVID–19 patient is mistakenly taken to a non-COVID–19 wing for treatment first. The employer would be required to notify all employees who were not wearing a respirator and other PPE and either had close contact or were in the same well-defined portion of the workplace as the COVID–19 patient, outside of the COVID–19 wing.

Each of these three notification requirements is critical to ensuring that individuals who are at potential risk of developing COVID–19 are promptly made aware of that risk so that they can take appropriate steps to monitor their health. As previously noted, the employer is required to make all of these notifications within 24 hours of learning that a COVID–19-positive person was in the workplace. OSHA has determined that this time period is necessary to ensure that employees receive timely information about a potential risk to their own health and to the health of those around them, as the notified employees may now be infectious themselves as a result of their exposure to a COVID–19-positive person. Prompt notification would allow the employee to start taking precautions such as physically distancing from household members to prevent transmission in the event that the employee is or becomes infectious. When making required notifications, employers should notify each individual in a language and manner they understand via a phone call, text message, email, or in person (if using protections such as physical distancing and face coverings). However, in some cases, such as when close contact did not occur and all persons who could have been potentially exposed in a general area may not be known (*e.g.,* bathroom, building floor), the employer could satisfy notification requirements by posting notices in languages that employees understand in common areas. This may include posting notices in break rooms, time clock areas, or restrooms, as well as using alternative modes of communication needed to reach employees with disabilities.

In certain circumstances it may be difficult for employers to determine every person who is required to be notified of a COVID–19 exposure or close contact in the workplace. Employers should try and get as many details as possible about areas of the workplace visited and other areas where employees could have been exposed. Employers will often learn about a COVID–19-positive person in their workplace through the local public health authorities (CDC, October 22, 2020), and they should cooperate with those authorities in identifying potentially exposed employees. Employers should use reasoned judgment based on the information that is available to them in making the determination of who is required to be notified under this standard. Notification obligations exist under the standard where it is more likely than not that a COVID–19 person was either in close contact with an employee, or in the same well-defined area as an employee. However, OSHA recommends that employers should err on the side of over-inclusion where not otherwise clear and make notifications whenever it is likely that a close contact or exposure has occurred.

Paragraph (l)(3)(ii) provides that notifications required by paragraph (l)(3)(i) must not include any employee's name, contact information (*e.g.,* phone number, email address), or occupation and the employer should avoid sharing any unnecessary information that might reveal the employee's identity. This provision is necessary to ensure compliance with the ADA and other applicable laws. To notify employees while still protecting the infected employee's identity, employers could use vague descriptions such as ''a person confirmed to have COVID–19 was recently in the workplace and you may have been exposed.'' However, OSHA is aware that even if no personally identifiable information is provided, other employees may be able to figure out the identity of the person with COVID–19. For example, at a small urgent care clinic, it may be obvious that a certain employee has not been reporting to work. As long as the employer does not reveal any of the personally identifiable information described above and has made a good-faith effort to comply with this provision, the employer will be considered to have complied with this provision even if it is possible for others to figure out the identity of the affected employee. However, the employer should review other guidance on privacy and confidentiality of medical information from other relevant agencies (see, *e.g.,* EEOC, May 28, 2021). Paragraph (l)(3)(ii) is not intended to preclude the sharing of information that is permitted between medical providers under the Health Insurance Portability and Accountability Act (HIPAA).

IV. Medical Removal From the Workplace

Paragraph (l)(4) contains requirements regarding medical removal of employees from the workplace. There are three triggers for employer obligations under this paragraph. The first is if an employer knows that an employee is COVID–19 positive (*i.e.,* the employee meets the criteria in paragraph (l)(2)(i)). The second is if an employer knows that an employee meets the criteria in paragraph (l)(2)(ii) through (l)(2)(iv)—that is, the employee has been told by a licensed healthcare provider that they are suspected to have COVID–19; they are experiencing recent loss of taste and/or smell with no other explanation; or they are experiencing both fever (≥100.4 °F) and new unexplained cough associated with shortness of breath. The third is if an employer is required to notify an employee of close contact in the workplace to a person who is COVID–19 positive in accordance with paragraph (l)(3)(i)(A). These triggers result in different exclusion requirements.

Under the first trigger, where an employer knows an employee is COVID–19-positive, paragraph (l)(4)(i) requires the employer to immediately remove the employee from the workplace and keep the employee removed until the employee meets the return to work criteria in paragraph (l)(6), as discussed below. OSHA determined that directing an employee who is COVID–19 positive to stay home until return to work criteria are achieved is critical to preventing the transmission of COVID–19 in the workplace.

Following the second trigger, when an employer knows that an employee meets the criteria in paragraph (l)(2)(ii) through (l)(2)(iv), paragraph (l)(4)(ii) requires the employer to immediately remove the employee from the workplace. The employer then may choose between two options. The first option, described in paragraph (l)(4)(ii)(A), is to keep the employee removed until the employee meets return-to-work criteria. The second option, described in paragraph (l)(4)(ii)(B), is to provide a COVID–19 polymerase chain reaction (PCR) test at no cost to the employee and keep the employee removed until the employer is notified by the employee of the test results. If the test results are negative, the employee may return to work immediately. If the test results are positive, the employer must comply with paragraph (l)(4)(i) and keep the

employee removed until the employee meets return-to-work criteria. If the employee refuses to take the test, the employer must continue to keep the employee removed from the workplace until return-to-work criteria are met, but is not obligated to provide the medical removal protection benefits described in paragraph (l)(5)(iii). Additionally, absent undue hardship, employers must make reasonable accommodations for employees who cannot take the test for religious or disability-related medical reasons, consistent with applicable non-discrimination laws. For example, in such circumstances OSHA would expect the employer to consider accommodations such as providing a different kind of test or medical evaluation that does not raise the same religious or medical concerns; making arrangements for the employee to work in isolation or remotely; or proceeding as if the test results were positive, and keeping the employee removed until return-to-work criteria are met, while providing medical removal protection benefits.

As the standard does not indicate how the employee must notify the employer about the results of the test, the employer has flexibility to decide on the method of notification. For example, the results could be provided to the employer as a verbal report from the employee of the results, as a written note from the appropriate medical professional disclosing only the results, or via other methods that conform to applicable confidentiality and privacy laws.

Following the third trigger, when an employer is required to notify an employee of close contact in the workplace with a person who is COVID–19 positive, paragraph (l)(4)(iii)(A) requires the employer to immediately remove the employee from the workplace. The employer then has a choice between two different actions. The first option is that the employer may keep the employee removed from the workplace for 14 days. The second option is to keep the employee removed and provide a COVID–19 test, at no cost to the employee, at least 5 days after the exposure that triggered the notification requirement. If the test results are negative, the employee may return to work after 7 days have passed following the exposure. If the test results are positive, the employer must comply with paragraph (l)(4)(i) and keep the employee removed until the employee meets return to work criteria specified in paragraph (l)(6). If the employee refuses to take the test, the employer must continue to keep the employee removed from the workplace for 14 days, but is not obligated to provide the medical removal protection benefits described in paragraph (l)(5)(iii). Absent undue hardship, employers must make reasonable accommodations for employees who cannot take the test for religious or disability-related medical reasons, as described above.

Paragraph (l)(4)(iii)(B) contains an exception to the removal requirements following the third trigger. An employee who would otherwise be required to be removed after exposure in the workplace does *not* need to be removed if the employee does not have a recent loss of taste and/or smell or fever combined with cough and shortness of breath, *and* the employee has been fully vaccinated against COVID–19 (meaning two or more weeks have passed after receiving the final dose) or the employee has had COVID–19 and recovered from it within the past 3 months. OSHA included this exception for fully vaccinated employees because it is consistent with CDC recommendations, as described in more detail in *Need for Specific Provisions* (Section V of the preamble). The exemption for asymptomatic employees who were confirmed to have COVID–19 and recovered within the last three months from removal is also consistent with CDC recommendations. As explained in more detail in Section V, the CDC has analyzed accumulating evidence indicating that persons who have recovered from laboratory-confirmed COVID–19 and remain symptom-free may not have to quarantine again if exposed within three months of the illness. Although the evidence does not definitively demonstrate the absence of reinfection within a three-month period, CDC concluded that the benefits of avoiding unnecessary quarantine likely outweigh the risks of reinfection as long as other precautions such as physical distancing, face coverings, and hygiene continue to be implemented. OSHA will continue to follow this issue closely and will make adjustments to the ETS or modify enforcement activities as appropriate when additional information becomes available and/or if the CDC recommendations are updated.

OSHA identified the triggers for medical removal to create a policy that ensures the safety of other employees in the workplace, consistent with economic feasibility constraints and the employer's need to maintain a sufficient workforce to continue operations. OSHA determined that requiring the removal of employees who are COVID–19 positive or who are suspected to be COVID–19 positive based on medical advice is essential to prevent the transmission of the virus that causes COVID–19 through the workplace. Employees who are confirmed COVID–19 positive pose a clear and direct hazard to their co-workers, and those who are suspected to be COVID–19 positive also present a significant hazard to their co-workers because of the likelihood that they do, in fact, have COVID–19.

Removal of employees based on symptoms is less straightforward because many symptoms of COVID–19 are common with other diseases or health conditions. As explained above in the section on notification requirements, OSHA determined it would not be feasible or reasonable to require the removal of any employee who merely experiences *any* symptom of COVID–19, because many COVID–19 symptoms are also symptoms of less dangerous illnesses such as the common cold or conditions that are not infectious, such as allergies. Therefore, removing any employee experiencing these symptoms alone would likely mean the removal of many employees who do not have COVID–19, which could be unduly burdensome to the employer. As discussed in *Need for Specific Provisions* (Section V of the preamble), OSHA identified the symptoms of recent loss of taste and/or smell and fever coupled with new unexplained cough and shortness of breath as removal triggers because this symptom or symptom combination is highly specific for COVID–19, and under the scenarios of the studies described in Section V, would likely result in the removal of relatively few employees who do not have COVID–19.

OSHA encourages employers who are able to do so to have a more robust program of medical removal. To this end, a note to paragraph (l)(4)(ii) explains that the symptoms OSHA has selected as requiring removal constitute only a partial list of the symptoms that CDC has recognized as being COVID–19 symptoms. Employers may choose to go beyond the minimum requirements laid out in the ETS and remove employees who display additional symptoms from the CDC list (such as chills, fatigue, or congestion; fever in the absence of cough; or cough in the absence of fever) or refer those employees to a healthcare provider.

OSHA has also determined that individuals who have had close contact with someone in their workplace who is COVID–19-positive are at risk of contracting COVID–19. As has been established in *Grave Danger* (Section IV.A. of this preamble), COVID–19 readily transmits in healthcare workplaces where employees come into

contact with patients who are suspected or confirmed to have COVID–19, often for extended periods of time and often in areas that are poorly ventilated. Thus, if an employee has had a close contact in a healthcare workplace, the likelihood that they may be COVID–19 positive is sufficiently high that the employee should be removed from the workplace, pending the results of a COVID–19 test, in order to mitigate any risk of transmission to other employees. OSHA determined that requiring removal of these employees, at least until the employee has received a negative COVID–19 test, strikes the appropriate balance between reducing the risk to others in the workplace and maintaining adequate staffing. As discussed above, employees who have been fully vaccinated or who have recently recovered from COVID–19 need not be removed at all, as long as they are not experiencing a recent loss of taste and/or smell or fever combined with cough and shortness of breath because of the lower likelihood that they would have COVID–19 at this time. The timeframes for testing and return to work of employees in the third category are drawn from CDC guidance, and the scientific rationale supporting those timeframes is discussed in *Need for Specific Provisions* (Section V of the preamble).

Finally, paragraph (l)(4)(iv) provides that whenever an employee is removed from the workplace as outlined above, the employer may require the employee to work remotely or in isolation, if suitable work is available. For example, a physician who ordinarily performs telehealth visits from a hospital office could be required to work from home as long as the appropriate technology is available. Alternately, the physician could work alone in a separate office away from the hospital (*i.e.,* in isolation) to avoid contact with other people. This provision helps ensure continuity of healthcare services by allowing a job function to be performed when the employee is able to work from home or in an isolated setting. In cases where working remotely is not possible, OSHA encourages employers to consider flexible and creative solutions. For example, a temporary reassignment to a position that can be performed by telework might be a possibility. However, if an employee is too ill to work, remote work should not be required; and sick leave or other leave should be made available as consistent with the employer's general policies and any applicable laws.

OSHA's removal requirements as outlined in this paragraph are intended to set the floor for what is required; however, as stated above OSHA encourages employers who are able to do so to have a more robust program of medical removal, as indeed some employers have already done. In addition to removal based on other COVID–19 symptoms, employers may consider removal based on certain exposure or close contacts employees have had outside of the workplace. Similarly, employers may consider removal of employees if the employer learns that the employee was notified by a state or local public health authority to quarantine or isolate; the employer might even be contacted by such an authority directly. Although the ETS does not require removal in those situations, the state or local public health authority may impose separate obligations or the employer might choose to remove employees in those circumstances, above and beyond what is required by this ETS.

V. Medical Removal Protection Benefits

Paragraph (l)(5) requires, with some limitations, that employers continue to pay employees who have been removed from the workplace under the medical removal provisions found in paragraph (l)(4). OSHA determined that requiring continued pay for removed employees under the listed circumstances is necessary to ensure that employees do not refrain from reporting their COVID–19-positive status or symptoms out of the fear of losing essential income. It is also necessary to ensure that during contact tracing, COVID–19-positive employees do not refrain from reporting close contacts with their co-workers out of fear that those co-workers will suffer a loss of pay.

The requirement to maintain pay for removed workers applies to employers that have more than 10 employees on the date the section becomes effective. OSHA created this exception for very small employers—those with 10 or fewer employees—to ensure consistency with the exceptions in other parts of the ETS. As noted earlier, the ETS does not require these small employers to maintain written COVID–19 plans (paragraph (c)(2)), and exempts them from certain recordkeeping requirements (paragraph (q)(1)). OSHA acknowledges the concern that removal may leave smaller employers without an adequate workforce to continue operations in some cases. For instance, even a small outbreak at a healthcare facility with fewer than 10 employees could cause the facility to lose a large percentage of its current staff (*e.g.,* one confirmed positive case and 2 additional employees removed due to close contact) with their specific knowledge of the facility's operations. OSHA also created the exception to the requirement to provide benefits to employees who are removed from the workplace because, compared to larger employers, employers with 10 or fewer employees are more likely to have to close temporarily if enough staff are removed and could be particularly susceptible to challenges of providing benefits payments while the business is temporarily closed, as well as weathering any significant duration of time between the outlay of pay to removed employees and the receipt of tax offsets. OSHA is therefore requiring medical removal protection benefits to be paid only by employers that have more than 10 employees.

When an employee is working remotely or in isolation in accordance with paragraph (l)(4)(iv), the employer must continue to pay that employee the same regular pay and benefits the employee would have received had the employee not been absent from work, until the employee meets the return-to-work criteria discussed below. If the employee is able to work remotely or in isolation, then the employee is entitled to payment for all time worked, including overtime, when applicable. When an employee has been removed from the workplace under paragraph (l)(4) (*i.e.,* and is not working remotely or in isolation), the employer must also continue to pay the employee the same regular pay and benefits the employee would have received had the employee not been absent from work, but that regular pay does not include overtime pay even if the employee had regularly worked overtime hours in recent weeks. If an employee is removed from work multiple times as required by the ETS, such as because of being exposed at different times at the workplace to people with COVID–19, the employer must pay the employee during removal on each occasion.

When an employee has been removed and is not able to work remotely or in isolation, however, the amount the employer is required to pay is capped at a maximum per week. The employer must continue to provide the benefits to which the employee is normally entitled and must also pay the employee the same regular pay the employee would have received had the employee not been absent from work, up to $1,400 per week, until the employee meets the return to work criteria specified in paragraph (l)(4)(iii) or (l)(6). For employers with fewer than 500 employees, the same requirements for benefits and pay apply as for larger employers, except that beginning in the third week of the employee's removal,

the required payment is reduced to only two-thirds of the same regular pay, up to $200 per day ($1,000 per week in most cases). The cap amounts are specified in paragraphs (l)(5)(iii)(A) and (B).

For all employers, the cap is $1,400 per week per employee for the first two weeks of removal. OSHA considered an analysis by the Council of Economic Advisers (CEA) in determining the level at which to set the cap. This analysis found workers well into the middle class were ''liquidity constrained,'' and therefore would be responsive to the incentives of medical removal pay (CEA, February 18, 2021). Based on an analysis of the expected cost of MRP versus income distribution, CEA found that a minimum threshold of $1,300 per week would be appropriate. It also noted a number of factors that would support increasing the threshold, including the advent of rapid testing and the spread of vaccination, both of which lower the cost of MRP. While the CEA analysis is based on a review of general economic data not specifically targeted to healthcare industries, there is no evidence to suggest that healthcare is meaningfully different from other industries with regard to incentivizing employee reporting. OSHA finds that the increased amount of $1,400 per week is appropriate because it ensures adequate incentive effects of replacement pay for a large majority of the affected workforce.

For employers with fewer than 500 employees, the cap is $1,400 per week for the first two weeks an employee is removed from work, but is reduced to only two-thirds of regular pay, up to $200 a day (equivalent to $1,000 per week over a 40-hour, 5-day work week) beginning in the third week, if the employee's removal continues that long. This lower cap amount beginning in the third week is consistent with the maximum amount of tax credits that employers with fewer than 500 employees may claim after the first 80 hours of leave under the ARP (IRS, April 2021). Larger employers with 500 or more employees must continue to pay up to $1,400 per week even after the initial two weeks an employee is removed from work. (The cap does not preclude employers from paying more than either of these amounts, however.) OSHA expects most employees should be able to return to work within 10 days of developing symptoms or 14 days (2 work weeks) from removal, and only a relatively small number will need to remain out for a longer period of time because of COVID–19 symptoms.

Paragraph (l)(5)(iv) provides that if an employee who has been removed from the workplace and is not working remotely or in isolation receives compensation for lost earnings from any other source, such as employer-paid sick leave, administrative leave, or a publicly-funded compensation program, then the employer may reduce the amount paid to the removed employee by however much the employee receives from the outside source. For example, if a removed employee who is not working remotely or in isolation has accumulated paid sick leave, the employer may require the employee to use that paid sick leave before paying medical removal benefits under this paragraph. If an employee has paid leave available, but the employer is unable to require the employee to use the leave (as may be the case with federal employers) and the employee opts not to use it, then the employer may still reduce the amount paid under this paragraph by the amount of paid leave the employee has available but is opting not to use. Likewise, if a removed employee receives, for example, $300 a week from a state or local government benefits program for quarantined or isolated employees, the employer's obligation to pay medical removal benefits to the removed employee would be reduced by $300 per week.

OSHA recognizes that certain employees who are COVID–19 positive may be required to be removed from the workplace for some time. For example, as explained in *Need for Specific Provisions* (Section V of the preamble), some people such as those with severe illness or immune disorders might be infectious and need to be removed for 20 days or more. However, most employees required to be removed will be out of the workplace for a relatively short period of time, and can return to work after as little as ten days from their positive test or from when symptoms first appeared, as described further in the discussion of paragraph (l)(6), below. Employees removed under paragraph (l)(4)(iii)(A) after close contact with a COVID–19 positive person in the workplace can return to work as soon as seven days after the close contact if their employer-provided COVID–19 test is negative. Additionally, an employer's obligation to provide paid medical removal benefits ends when an employee meets the return-to-work criteria (*i.e.,* is no longer likely infectious), even if the employee is experiencing persistent debilitating effects of the disease and is unable to work for that reason. If a state or local health department requires an employee to continue isolating after the return to work criteria in this ETS are met, those entities may impose separate requirements, but the ETS would not require the employer to continue providing paid medical removal benefits.

Under paragraph (l)(5)(v), when employees return to work after their removal period, they must not be subject to any adverse action or deprivation of rights or benefits because of their removal. This means that an employer cannot take actions such as terminating the employment of a removed employee or demoting the employee to a lower-paying position, regardless of the length of time spent away from the workplace. Protecting employees' job status and prohibiting adverse actions by the employer as a result of a COVID–19-related exclusion is crucial for ensuring that employees report COVID–19 positive status or symptoms to the employer. If employees fear job loss or other adverse actions as a result of removal for a COVID–19-related reason, they will likely be reluctant to make these reports. OSHA realizes there may be situations where an employee with COVID–19 is out of work for months before they are well enough to return to work, and the employer may need to fill the employee's position during the removal period. In this situation, OSHA would expect that the employer would fill the position with a temporary employee, who is made aware that the temporary assignment will end once the removed employee returns to work. The removed employee's position should not be permanently filled by a replacement unless the employee notifies the employer, or the employer is able to verify, that the employee will not be returning to their former position. The provision is consistent with Section 11(c) of the OSH Act, 29 U.S.C. 660(c)(1), which prohibits discrimination or discharge of any employee for exercising any right afforded under the Act.

VI. Return to Work

Paragraph (l)(6) contains requirements related to an employee's return to work after a COVID–19-related workplace removal. It provides that an employer's decision to return an employee to work must be made in accordance with guidance from a licensed healthcare provider or applicable guidance from the CDC which are incorporated by reference (CDC, February 16, 2021; CDC, February 18, 2021a; CDC, February 18, 2021b), unless state or local public health authorities specify a longer period of removal. The purpose of this provision is to ensure that an employee who has or likely has COVID–19 does

not return to work until it is highly likely that there is no longer a significant risk of transmitting disease.

CDC's recommendations for isolation are only broad guidance; the appropriate duration for any given individual may differ depending on factors such as disease severity or the health of the employee's immune system. For this reason, the ETS requires that employers make decisions about an employee's return to work in accordance with guidance from a licensed healthcare provider (who would be better acquainted with a particular employee's condition) or CDC guidance. For example, the ''CDC's Isolation Guidance,'' referenced in paragraph (l)(6) states that a COVID–19 positive person can stop isolating when three criteria are met: (1) At least ten days have passed since the first appearance of the person's symptoms; (2) the person has gone at least 24 hours without a fever (without the use of fever-reducing medication); and (3) the person's other symptoms of COVID–19 are improving (excluding loss of taste and smell). If a person has tested positive but never experiences symptoms, then the person can stop isolating after ten days from the date of their positive test. If a licensed healthcare provider recommends a longer period of isolation for a particular employee, however, then the employer would need to abide by those longer periods rather than returning the employee to work after ten days. Employers are also free to require employees to remain removed for a longer period than the ETS requires. For example, an employer that serves a vulnerable population of clients may want to use extra caution and require employees to stay isolated past the time when a licensed healthcare provider says the employee may return to work. The employer's obligation to pay medical removal benefits under paragraph (l)(5)(iii) ceases when the employee meets the return-to-work criteria listed in paragraph (l)(6), even if the employer chooses to require a longer removal period.

Finally, in a note to paragraph (l), OSHA recognizes that CDC's ''Strategies to Mitigate Healthcare Personnel Staffing Shortages'' allows elimination of quarantine for certain healthcare workers, but only as a last resort, if the workers' absence would mean there are no longer enough staff to provide safe patient care, other specific amelioration strategies have already been tried, patients have been notified, and workers are utilizing additional PPE at all times (CDC, March 10, 2021). OSHA recognizes that in these limited circumstances, there are different feasibility constraints, as contemplated by the CDC, that may be appropriate, and OSHA will enforce the requirements of paragraph (l) in accordance with these considerations.

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L. Vaccination

Vaccination is a vital tool that will help reduce the presence and severity of COVID–19 cases in the workplace. As discussed further in *Need for Specific Provisions* (Section V of the preamble), vaccination protects employees from developing COVID–19, or from developing a severe case of the disease if they do contract it. The CDC has also determined that vaccination may reduce the risk that the vaccinated person will transmit COVID–19 to another person, such as to other employees (CDC, April 2, 2021; CDC, April 12, 2021). Despite the robust protection against COVID–19 that vaccination affords, many individuals have not yet received the vaccine, including a disproportionate number of Black and Latinx people (CDC, May 24, 2021). Of those people who have not yet been vaccinated, at least some are hesitant to receive the vaccine. For example, the U.S. Census Bureau reported that, as of April 26, 2021, 18.2% of U.S. adults age 18 or older were unsure if they would receive a COVID–19 vaccine, or would ''definitely not'' or ''probably not'' receive a COVID–19 vaccine (U.S. Census Bureau, May 5, 2021). Additionally, in a March 2021 survey, McKinsey & Company found that 15% of respondents stated that they were unlikely to get vaccinated (Azimi et al., April 9, 2021). Despite their increased risk of exposure to the virus, some healthcare workers are hesitant to receive a COVID–19 vaccine. As early as December 2020, a survey found that 15% of healthcare workers who were offered a COVID–19 vaccine refused to take one (Surgo, January 2021). Similarly, in a survey of healthcare workers conducted from early January to late February 2021, 15% responded that they would ''definitely not'' or ''probably not'' receive a COVID–19 vaccine (The Delphi Group, March 12, 2021). More recently, a poll conducted in February and early March 2021 by the Kaiser Family Foundation (KFF) and the Washington Post found that 30% of front-line healthcare workers were either unsure about getting vaccinated or not planning to do so (KFF and Washington Post, March 2021; Wan et al., March 19, 2021).

Vaccine hesitancy is attributable to several factors, but a principal driver of vaccine hesitancy among healthcare

workers is concern about potential side effects. In the Delphi Group survey, more than 70% percent of vaccine-hesitant healthcare workers stated that they were concerned about a side effect (The Delphi Group, March 12, 2021). In the KFF/Washington Post survey, 82% of vaccine-hesitant healthcare workers responded that concern about potential side effects was a major factor in their decision-making (KFF and Washington Post, March 2021).

Although an individual's decision to receive or not receive a COVID–19 vaccination may turn on several considerations, removing logistical barriers to obtaining vaccination is key to encouraging workers to choose vaccination. One such barrier for many employees is concerns about taking time off of work to receive the vaccine and recover from any potential side effects (SEIU Healthcare, February 8, 2021). In a survey conducted of unvaccinated adults in April 2021, 48% of respondents said that they were very or somewhat concerned that they might miss work if the vaccine side effects make them feel sick, and 20% said they were very or somewhat concerned that they may need to take time off to go and get the vaccine (KFF, May 6, 2021). Black and Hispanic adults were particularly worried about the potential time necessary to recover from vaccine side effects, with 64% of unvaccinated Hispanic adults and 55% of unvaccinated Black adults expressing concern that they might have to miss work due to the side effects of a COVID–19 vaccine. According to a recent study, Black and Hispanic workers constitute nearly 30% of the healthcare workforce (Rho et al., April 2020). In the McKinsey survey, 12% of respondents stated that the time away from work to be vaccinated or due to side effects is a barrier to vaccination (Azimi et al., April 9, 2021). Recent news and journal articles further evince this concern (*e.g.,* Cleveland Documenters, 2021; Roy et al., December 29, 2020).

To address this barrier to vaccination, while also promoting a more equitable delivery of vaccines, paragraph (m) provides that employers must support COVID–19 vaccination for each employee through reasonable time off and paid leave (*e.g.,* paid sick leave, administrative leave, etc.) for the full vaccination series (*i.e.,* each required dose) and any side effects experienced following vaccination. OSHA finds that requiring employers to support employee vaccination through reasonable time and paid leave will encourage employee vaccinations and thereby help ensure effective protection against COVID–19 at the workplace. In the KFF survey, 28% of unvaccinated respondents who did not want to get the vaccine as soon as possible said that they would be more likely to obtain vaccination if their employer gave them paid time off to get vaccinated and recover from any side effects (KFF, May 6, 2021).

Additionally, McKinsey found from its survey that paid time off for vaccination and the recovery period post-vaccination was the single most-influential action for encouraging employee vaccination, with 75% of respondents indicating that such paid time off would significantly or moderately increase the likelihood that they would get vaccinated (Azimi et al., April 9, 2021). The KFF and Washington Post survey further evinces that this support is needed in the healthcare industry; 12% of non-self-employed healthcare workers stated that their employer was falling short in ensuring that employees have the ability to get vaccinated, and 33% of such workers stated that their employer was falling short in providing paid sick leave for employees who have COVID–19, which supports an inference that at least some healthcare workers also lack paid sick leave to recover from the side effects of a COVID–19 vaccine dose (KFF and Washington Post, March 2021).

Paid time off for vaccination may be particularly critical at this stage in the pandemic for employees in long-term health care and home health care. The Pennsylvania Homecare Association surveyed its members in March and found that ''56% of employees wanted the vaccine—up from 50% in January—but only 32% had been able to get it.'' (Burling, March 28, 2021).

Under paragraph (b), the term *vaccine,* as used in this ETS, is defined as a biological product authorized or licensed by the FDA to prevent or provide protection against COVID–19, whether the substance is administered through a single dose or a series of doses. As of May 1, 2021, there are three vaccines authorized by the FDA for emergency use to prevent COVID–19 that therefore meet the definition of COVID–19 vaccine as used in this ETS: The Pfizer-BioNTech vaccine, the Moderna vaccine, and the Johnson & Johnson (Janssen) vaccine, which received Emergency Use Authorizations (EUA) on December 11, 2020, December 18, 2020, and February 27, 2021, respectively (CDC, March 3, 2021; Oliver et al., December 18, 2020; Oliver et al., January 1, 2021; McClung et al., November 27, 2020; FDA, December 2020; FDA, January 2021; FDA, February 27, 2021). Any vaccine subsequently authorized or licensed for use by the FDA would also meet the definition of vaccine used in this standard. The definition of vaccine includes substances that are administered through a single dose or a series of doses. Therefore, when more than one dose is required by the FDA for a particular type of vaccine, all the requirements discussed below apply to the entire series of doses. Currently, the Pfizer-BioNTech and Moderna vaccines require a series of two doses, and the Johnson & Johnson (Janssen) vaccine only requires one dose.

Paragraph (m) requires that employers support COVID–19 vaccination for their employees by making reasonable time and paid leave available to the employee for vaccination and recovery from any side effects. Reasonable time may include, but is not limited to, time spent during work hours related to the vaccination appointment(s), such as registering, completing required paperwork, all time spent at the vaccination site (*e.g.,* receiving the vaccination dose, post-vaccination monitoring by vaccine provider), and time spent traveling to and from the location for vaccination (including travel to an off-site location (*e.g.,* a pharmacy), or situations in which an employee working remotely (*e.g.,* telework) or in an alternate location must travel to the workplace to receive the vaccine). Paid leave provided may include paid sick leave or administrative leave. The paid leave can be in the form of an employee's accrued sick leave, if available, or in additional paid leave provided by the employer for this purpose. Paid leave for vaccination purposes generally can be recovered by an employer with fewer than 500 employees as a tax credit under the leave provisions of the ARP (IRS, April 2021).

Employers may set a cap on the amount of time and paid leave available to employees to receive each dose of the vaccine and to recover from any side effects, but the cap must be reasonable. Accordingly, the amount of reasonable time and paid leave that an employer must make available to employees may vary depending on the circumstances. Generally, OSHA presumes that, if an employer makes available up to four hours of paid leave for each dose of the vaccine, as well as up to 16 additional hours of leave for any side effects of the dose(s) (or 8 hours per dose), the employer would be in compliance with this requirement. OSHA understands that employers may be able to provide much less than four hours if employees do not need to travel for vaccinations, for example, if they are provided onsite.

Employers must make reasonable time and paid leave available for employees to receive all vaccination doses during work hours. If an employee chooses to receive the vaccine outside of work hours, employers are not required to grant time and paid leave for the time that the employee spent receiving the vaccine during non-work hours. However, even if employees receive the vaccine outside of work hours, employers must still afford them reasonable time and paid leave to recover from any side effects that they experience during scheduled work time.

An employer may make some effort to facilitate voluntary vaccination of its employees by, for example, hosting a vaccine clinic at the workplace (*e.g.,* mobile trailer) or partnering with another entity, such as a pharmacy or healthcare provider, so that employees can be vaccinated at the workplace or at an off-site location. If an employer chooses to make the vaccine available to its employees, it must support full vaccination (*i.e.,* provide both doses in a vaccination series, if applicable), again by assuring the availability of reasonable time and paid leave to each employee to receive the full vaccination series and recover from any side effects they may experience. Any additional costs incurred by the employer to bring vaccination on-site would, likewise, have to be covered by the employer, though such an approach would likely require fewer paid leave hours for vaccine administration (but not side effects), because of reduced travel time.

As discussed in the *Summary and Explanation* for requirements implemented at no cost to employees (paragraph (p)), the employer is responsible for all costs associated with implementing the requirements of the standard, including the costs of complying with the vaccination support requirement. The employer must pay employees for reasonable time spent receiving a vaccination during work hours, including any time spent on required paperwork, vaccine administration, post-vaccination monitoring, and travel time. The employer must also pay employees for reasonable time spent recovering from any side effects that they experience as a result of vaccination. However, to align the provision with the tax incentives of the ARP, employers are not obligated to reimburse employees for transportation costs (*e.g.,* gas money, train/bus fare, etc.) incurred to receive the vaccination, such as the costs of travel to an off-site vaccination location (*e.g.,* a pharmacy), or travel from an alternate work location (*e.g.,* telework) to the workplace to receive a vaccination dose. Paid leave provided may include paid sick leave or administrative leave.

Paragraph (m) does not require employees to be vaccinated for COVID–19. Employers should consult applicable law and/or labor management contracts concerning employee vaccination. While OSHA encourages all eligible employees to take advantage of the protection offered by vaccination, the agency recognizes that some employees may decline vaccination for a number of reasons, including underlying medical conditions or conscience-based objections (moral or religious). At the same time, nothing in the ETS precludes an employer from taking steps beyond the requirements of this standard to encourage employees to get vaccinated, as appropriate under applicable laws and/or labor management contracts. The EEOC provides guidance on COVID–19 vaccination as it relates to equal employment opportunity laws (EEOC, May 28, 2021).

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M. Training

Training is critical to controlling the spread of COVID–19 in the workplace and an important component of the COVID–19 program required by this ETS. Paragraph (c) requires employers to develop and implement workplace-specific COVID–19 plans. As part of developing their plans, employers must conduct a hazard assessment to identify potential workplace hazards related to COVID–19. This hazard assessment will help employers identify the specific hazards their employees face and ensure the employers' COVID–19 plans are appropriately tailored to the workplace. The hazard assessment will also help employers develop workplace-specific policies and procedures to mitigate the risk of COVID–19 transmission. Training on these policies and procedures is an essential part of this ETS because it helps to ensure that employees understand the sources of potential exposure to COVID–19, the workplace-specific control measures implemented to reduce exposure to the hazard, and the requirements of this ETS. The effectiveness of the ETS would be undermined if employees did not have sufficient knowledge and understanding of all aspects of the COVID–19 policies and procedures implemented by their employers for recognizing and preventing potential occupational exposures to COVID–19.

Accordingly, paragraph (n)(1) requires employers to provide training to each employee. The training employers provide pursuant to this paragraph must be in a language and at a literacy level the employee understands. Additionally, the employer must ensure the employee comprehends all of the training elements required in this paragraph. If an employer has employees that speak different languages or are at different literacy levels, the employer must ensure all training materials are presented in a way that each employee can understand. This may require an employer to create different training materials for different groups of employees (*e.g.,* materials in different languages). When translation of training materials is required, employers must ensure the translation is one the employees can clearly understand. Training employees in a manner they understand enables employees to maximize the effectiveness of the workplace controls they utilize and helps ensure that the employer's training program is successful. Employers must provide reasonable accommodation, as required by the Americans with Disabilities Act, if needed by an employee with a disability.

The implementation of training programs, including how training is conducted and by whom, may vary based on the size and type of workplace or business, and employers have some flexibility to adapt training to their specific workplace. However, employers must ensure each of their employees comprehends the training elements required in this ETS. Those key elements are listed in paragraphs (n)(1)(i)–(xii). Employers can offer training in a variety of formats, including online, virtual, instructor-led, or application-based methods, but employers must ensure that employees comprehend the training materials and that they have an opportunity to get answers to their questions (see paragraph (n)(4)). Following training, employees must be able to demonstrate their understanding of the materials. There are different ways employers can ensure comprehension of the training materials, including a knowledge check (*e.g.,* written or oral assessment) or discussion after the training. Post-training assessments may be particularly useful for ensuring employee participation and comprehension when employers offer online training.

Paragraph (n)(3) requires employers to ensure training is overseen or conducted by a person knowledgeable in the covered subject matter as it relates to the employee's job duties. This individual must be knowledgeable about the various requirements described in this section, including all provisions within paragraph (n), as well as infection control policies and procedures. Additionally, paragraph (n)(4) requires employers to ensure training provides an opportunity for interactive questions and answers with a person knowledgeable in the covered subject matter as it relates to the employee's job duties. For example, an employer could utilize a virtual or online training but would need to ensure that training includes the ability to ask questions and receive answers. In order to ensure that employees comprehend the material presented during training, it is critical that employees have the opportunity to ask questions and receive answers promptly. When video- or computer-based trainings are used, this may require the employer to make available a qualified trainer to address questions after the training, or to offer a telephone hotline where employees can ask questions.

Paragraph (n)(1)(i) requires employers to provide a general explanation of COVID–19, including how the disease is transmitted (including pre-symptomatic

and asymptomatic transmission), the importance of hand hygiene to reduce the risk of spreading COVID–19 infections, ways to reduce the risk of spreading COVID–19 through the proper covering of the nose and mouth, the signs and symptoms of the disease, risk factors for severe illness, and when to seek medical attention, as part of their training materials. Additional information about COVID–19 that may aide employers in providing this portion of the training can be found in *Grave Danger* (Section IV.A. of the preamble) and in COVID–19-related guidance from the CDC (CDC, February 22, 2021; CDC, March 17, 2021; CDC, January 8, 2021; CDC, April 22, 2020; CDC, November 24, 2020; CDC, May 13, 2021a; CDC, May 13, 2021b). Employers should stay updated and inform employees on the latest guidance from the CDC related to COVID–19 to ensure that their training features the most up-to-date information available.

Paragraph (n)(1)(ii) requires employers to provide training on employer-specific policies and procedures on patient screening and management. This training must cover the patient screening and management requirements under paragraph (d), including how patient screening will occur. More information about employers' patient screening and management obligations can be found in the *Summary and Explanation* for Patient Screening and Management.

Paragraph (n)(1)(iii) requires employers to provide employees with an explanation of the tasks and situations in the workplace that could result in potential COVID–19 infection. Employees' job duties affect their level of occupational risk. Therefore, employee training will vary based on the workplace and the employee's job duties. Occupational risk may also change as employees take on different tasks, requiring the employer to provide additional training. For example, if cross-training on multiple job tasks or functions is occurring due to increased employee shortages and absenteeism related to COVID–19 illness, quarantine, or isolation, employers must ensure that each employee receives training about potential COVID–19 exposure for all job tasks and duties they are asked to engage in. The hazard assessments required by paragraph (c)(4)(i) will help employers determine employees' potential workplace exposure to COVID–19 and, consequently, the training they will need to receive.

OSHA recognizes that COVID–19 control practices rely upon a multi-layered and overlapping strategy of controls. Thus, paragraph (n)(1)(iv) requires employers to provide training on all workplace-specific policies and procedures to prevent the spread of COVID–19 that are applicable to the employee's duties. This may include training on policies and procedures related to physical distancing, physical barriers, Standard and Transmission-Based Precautions, ventilation, aerosol-generating procedures, and other COVID–19-related control measures in the workplace. Employees play a particularly important role in reducing exposures because appropriate application of work practices and controls determines exposure levels. As such, training in those practices and controls is necessary for employees to implement them effectively.

OSHA recognizes that there are a number of different types of multi-employer arrangements in healthcare settings (*e.g.,* contracted healthcare providers, licensed independent practitioners with privileges to practice in various workplaces). To ensure employees are adequately protected from COVID–19 exposure in multi-employer workplaces, paragraph (n)(1)(v) requires employers to train employees on employer-specific multi-employer workplace agreements related to infection-control policies and procedures, the use of common areas, and the use of shared equipment that affect employees at the workplace. *Common areas,* as defined in paragraph (b), are indoor or outdoor locations under the control of the employer that more than one person may use or where people congregate (*e.g.,* building lobbies, reception areas, waiting rooms, restrooms, break rooms, eating areas, conference rooms).

Paragraph (f) of the ETS contains PPE requirements associated with COVID–19. Paragraph (n)(1)(vi) requires employers to provide training on employer-specific policies and procedures for PPE worn to comply with this ETS. Specifically, paragraphs (n)(1)(vi)(A)–(D) mandate that this training cover: When PPE is required for protection against COVID–19; limitations of PPE for protection against COVID–19; how to properly put on, wear, and take off PPE; and how to properly care for, store, clean, maintain, and dispose of PPE. Additionally, paragraph (n)(1)(vi)(E) requires that employers provide training on any modifications to donning, doffing, cleaning, storage, maintenance, and disposal procedures needed to address COVID–19 when PPE is worn to address workplace hazards other than COVID–19. This means that when employees are using PPE for non-COVID–19 occupational hazards, employers must train those employees on how to prevent the transmission of COVID–19 associated with their use of that PPE. The S*ummary and Explanation* for Personal Protective Equipment provides additional information on PPE requirements.

Paragraph (n)(1)(vii) requires employers to train each employee on workplace-specific policies and procedures for cleaning and disinfection. This training must be consistent with the cleaning and disinfection requirements in paragraph (j). Training must include instruction on the proper and safe use of cleaning and disinfection supplies provided by the employer. For example, if an employee is tasked with cleaning high-touch surfaces in the lobby of a long-term care center, the employer must train the employee on which supplies to use, as well as how to properly and safely use those supplies.

Certain tasks may require employers to provide employees additional training related to cleaning and disinfection. For example, paragraph (j)(2)(ii) requires employers to clean and disinfect materials, areas, and equipment that have likely been contaminated by a person who is COVID–19-positive, in accordance with CDC guidance. Employers must ensure employees tasked with cleaning and disinfecting those materials, areas, and equipment receive training on the cleaning and disinfection protocols established in accordance with the CDC guidance. Additionally, under paragraph (j)(1), in patient care areas, resident rooms, and for medical devices and equipment, employers must follow standard practices for cleaning and disinfection of surfaces and equipment in accordance with applicable CDC guidelines. Therefore, employers must train employees tasked with cleaning and disinfecting those areas and surfaces in accordance with the CDC guidance. Additional information regarding cleaning and disinfection is available in the S*ummary and Explanation* for Cleaning and Disinfection.

Paragraph (n)(1)(viii) requires employers to train employees on all employer-specific policies and procedures for health screening and medical management. This training must cover all health screening and medical management requirements under paragraph (l), including when and how health screening will occur, what the screening will include, and how frequently employees will be screened. It is particularly important that employees are informed about the requirement that they notify their

employer of COVID–19 illness or symptoms, as described in paragraph (l)(2). Additionally, employees must receive training on how and when their employer will notify them of workplace exposures, as described in paragraph (l)(3). Employees must be informed that these notifications will contain only the information necessary to provide notice of potential workplace exposures (*e.g.,* the fact that a close contact occurred or could have occurred, the date(s), and the general location(s)). Employees must also be informed that these notifications will not include the name, contact information (*e.g.,* phone number, email address), or occupation of the employee who is COVID–19 positive. Additional information about appropriate information to be included in the notifications required by paragraph (l)(3) can be found in the *Summary and Explanation* for Health Screening and Medical Management. Employees must also receive training on the situations in which removal from the workplace is required and when employees who have been removed can return to work, as described in paragraphs (l)(4) and (l)(6). Further, training must be provided on the medical removal protection benefits required by paragraph (l)(5). Additional information about employer requirements related to health screening and medical management can be found in the *Summary and Explanation* for Health Screening and Medical Management.

Paragraph (n)(1)(ix) requires that employers provide training on available sick leave policies, any other COVID–19-related benefits to which the employee may be entitled to under applicable federal, state, or local laws, and other supportive policies and practices. Employers must train employees on their company sick leave policies. Employers should consider implementing sick leave policies that are flexible, consistent with public health guidance, and encourage potentially contagious employees to stay home. Employers must also train employees on any federal, state, or local laws under which they may be entitled to COVID–19-related benefits. Other examples of potential supportive policies and practices could include: coordinating leave policies with businesses that provide your workplace with contract or temporary employees; maintaining flexible leave policies for those caring for sick household members or with child care responsibilities; providing telework and flexible workday options; and communicating with insurance companies to provide information to employees about medical care in the event of a COVID–19 outbreak.

OSHA believes that it is important for employees to be familiar with the ETS and have access to relevant employer-specific policies and procedures in order to comply. Thus, paragraph (n)(1)(x) requires employers to identify the safety coordinator(s) specified in the COVID–19 plan as part of employees' training so they know who to contact with questions or concerns. Additionally, paragraph (n)(1)(xi) requires employers to train employees on the requirements of this ETS. For example, employees must be informed that they will be provided reasonable time and paid leave for vaccination and any side effects experienced following vaccination, as required by paragraph (m). Furthermore, paragraph (n)(1)(xii) requires that employees be informed about how to obtain a copy of this ETS, as well as any relevant employer-specific policies and procedures developed under this ETS, including the employer's written COVID–19 plan, if a written plan is required.

Prior to the effective date of this ETS, some employers likely provided some training to their employees in response to the ongoing COVID–19 pandemic. As explained in the note to paragraph (n)(1), employers may rely on that training to the extent that it meets the relevant training requirements under paragraph (n). However, if an employer intends to rely on training already provided to satisfy its training requirements under this ETS, then it must review and evaluate the training already provided and determine whether it covers all of the training requirements under this section. If the previous training is missing any of the required elements, then the employer must train its employees on those elements to come into compliance with the ETS. For example, if an employer has already provided recent training on the modes of transmission of COVID–19, the employer would not need to conduct that part of the training again to meet its initial training requirements under this ETS. Thus, the employer would not be required to expend resources to meet a requirement it has already met. However, the employer would need to provide training to its employees that satisfies the other requirements in paragraph (n).

Paragraph (n)(2), requires employers to provide additional training when changes occur related to the employee's risk of contracting COVID–19 at work, when policies or procedures change, and when there is an indication that the employee has not retained the necessary understanding or skill. Both initial and supplemental employee training (under paragraphs (n)(1) and (n)(2), respectively) are important components of an effective approach to controlling the spread of COVID–19. Initial training provides employees with the knowledge and skills they will need to protect themselves against occupational exposure. Initial training also emphasizes the importance of following workplace policies and procedures to mitigate the spread of COVID–19. Supplemental training is important to ensure employees continue to have the knowledge and skills they need to protect themselves as conditions change. Frequent review and updates to training are especially important under this ETS as more information about COVID–19, as well as updated medical recommendations and public health practices in relation to preventing COVID–19 transmission, become available.

Paragraph (n)(2)(i) requires additional training when changes occur that affect the employee's risk of contracting COVID–19 at work. For example, changing outbreak conditions in a community may directly affect an employee's exposure risks for contracting COVID–19, including at work. Therefore, additional training would be necessary when newly-available information from the CDC, WHO, OSHA, or local public health departments renders prior training inadequate or outdated to protect employees from COVID–19 (*e.g.,* new information on how COVID–19 is most likely to be transmitted). Additionally, if an employer assigns an employee new or different job tasks, that employee may be exposed to new COVID–19 hazards at work and additional training would be required.

Paragraph (n)(2)(ii) requires additional training when policies or procedures are changed. Therefore, if the employer alters its workplace policies and procedures related to COVID–19, employees must receive training on those particular changes. For example, under paragraph (c), employers must monitor the workplace to ensure the ongoing effectiveness of their COVID–19 plans and update them as needed. When monitoring the workplace, the employer may find that the COVID–19 plan must be updated to better address the COVID–19 transmission risks its employees are exposed to. Employees must receive training on any new or altered policies and procedures that the employer implements as a result. Such additional training ensures that employees are able to actively participate in protecting themselves from COVID–19 exposure in

the workplace when policies and procedures change.

Paragraph (n)(2)(iii) requires employers to provide additional training to an employee when there is an indication that the employee has not retained the necessary understanding or skill. For example, if an employer observes employees not wearing PPE or wearing it improperly, not correctly practicing physical distancing, or not appropriately using physical barriers, the employer would have an indication that the employees have not retained their understanding of the necessary training elements. In such cases, the employer would need to provide additional training to the employees. However, where the employer discovers that the employee understands a particular workplace rule (such as wearing a facemask) but is nonetheless willfully not complying with it, retraining is not necessary if the employer takes steps to enforce the rule.

Training and information requirements are routine components of OSHA standards (OSHA, 2015). The inclusion of training and information requirements reflects the agency's conviction, as noted above, that informed employees are essential to the implementation of any effective occupational safety and health policies and procedures, and employer safety and health programs. OSHA believes that informing and training employees about the COVID–19 hazards to which they are potentially exposed will contribute substantially to reducing the incidence of infections caused by workplace exposure to COVID–19.

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N. Anti-Retaliation

Paragraph (o) includes provisions to ensure employees are aware of their rights under the standard, and that they are protected from retaliation for exercising those rights. Specifically, the paragraph requires that employers inform each employee of their right to the protections required by the standard (see paragraph (o)(1)(i)). Employers are also required to inform each employee of the prohibition on employers discharging or in any manner discriminating against any employee for exercising their right to the protections required by the standard, or for engaging in actions that are required by the standard (see paragraph (o)(1)(ii)). In addition, it explicitly prohibits employers from discharging or in any manner discriminating against any employee for exercising their right to the protections required by the standard, or for engaging in actions that are required by the standard (see paragraph (o)(2)).

OSHA's authority to promulgate the anti-retaliation provision of the ETS stems from section 6(c) of the Act, which requires the Agency to promulgate an ETS when necessary to protect employees from grave danger posed by a new hazard such as COVID–19. Once OSHA has established as a threshold matter, based on substantial evidence in the record, that an ETS is necessary to protect employees from COVID–19, OSHA has almost ''unlimited discretion'' to devise the means to achieve that goal and need only demonstrate that each specific provision of the standard is ''reasonably necessary'' to protect employees from exposure to COVID–19. See *United Steelworkers of Am.* v. *Marshall,* 647 F.2d 1189, 1230, 1237, 1241 (D.C. Cir. 1981); see also *Forging Industry Ass'n* v. *Sec'y of Labor,* 773 F.2d 1436, 1447 (4th Cir. 1985).

The anti-retaliation provision in paragraph (o) is a reasonably necessary component of the ETS because employee participation—such as staying home when they test positive for COVID–19 to protect others, maintaining physical distancing, and alerting the employer to COVID–19 hazards—is critical to mitigating the spread of COVID–19 at the workplace, and fear of retaliation would undermine the effectiveness of the ETS. Although anti-retaliation protections may not be integral to all OSHA standards given the statutory bar on retaliation under section 11(c) of the OSH Act (29 U.S.C. 660(c)(1)), anti-retaliation protections are especially critical to the effectiveness of the ETS because of the emergency nature of the COVID–19 pandemic and the central role employee participation plays in effectuating the ETS's purpose.

This is not the first time OSHA has implemented explicit anti-retaliation protections in a regulation where such protections were necessary to effectuate the purposes of the OSH Act. In 2016, OSHA amended its Recordkeeping regulation to require certain employers to report data from their OSHA injury and illness records to OSHA electronically each year, and to ensure the accuracy of those records consistent with the Agency's authority under sections 8 and 24 of the Act (29 U.S.C. 657, 673), the regulation included a prohibition on retaliating against employees for reporting work-related injuries and illnesses. See *Improve Tracking of Workplace Injuries and Illnesses,* 81 FR 29624, 29627 (May 12, 2016); *codified at* 29 CFR 1904.35. In that rulemaking, OSHA received numerous comments indicating that fear of retaliation motivated employees to conceal work-related injuries and illnesses from their employers. See 81 FR at 29670. Similar concerns are implicated here, where fear of retaliation could motivate employees to conceal information or refrain from taking action critical to mitigating the spread of COVID–19 in the workplace, such as reporting their COVID–19 status to their employer and staying home from work after testing positive, and alerting the employer to COVID–19 hazards in the workplace. In enforcement proceedings before the Occupational Safety and Health Review Commission, two administrative law judges have upheld OSHA's authority to promulgate the anti-retaliation provision of its Recordkeeping regulation, 29 CFR 1904.35(b)(1)(iv). *Sec'y of Labor* v. *U.S. Postal Service,* No. 18–0188, 2020 WL 4514847, at *14–17

(May 18, 2020), *set aside on other grounds,* 2020 WL 4514846 (July 28, 2020) (holding that the regulation was validly promulgated and citing an order of another ALJ reaching the same conclusion). A facial challenge to the validity of the Recordkeeping rule's anti-retaliation provision is pending in the U.S. District Court for the Western District of Oklahoma. See *Nat'l Ass'n of Home Builders* v. *Acosta,* CIV–19–009–PRW (W.D. Okla., Jan. 4, 2017).

The anti-retaliation provision of the ETS partially overlaps with the statutory retaliation bar in section 11(c)(1) of the OSH Act, 29 U.S.C. 660(c)(1), which provides no person shall discharge or in any manner discriminate against any employee because such employee has filed any complaint or instituted or caused to be instituted any proceeding under or related to [the OSH] Act or has testified or is about to testify in any such proceeding or because of the exercise by such employee on behalf of himself or others of any right afforded by [the] Act.

But the fact that the anti-retaliation provision in the ETS dovetails with the anti-retaliation goals of section 11(c) does not limit OSHA's authority to promulgate it. See *United Steelworkers, AFL–CIO* v. *St. Joe Resources,* 916 F.2d 294, 296–98 (5th Cir. 1990) (holding that section 11(c) is not an exclusive remedy, and OSHA had the authority to order back pay to remedy a violation of OSHA's Lead standard even where section 11(c) would require the same relief). And, to the extent the OSH Act may not unambiguously resolve this question, OSHA's interpretation of section 6(c) as authorizing the Agency to promulgate the anti-retaliation requirement in this ETS is entitled to deference under *Chevron USA, Inc.* v. *NRDC,* 467 U.S. 837 (1984). See *Mourning* v. *Family Publication Serv., Inc.,* 411 U.S. 356, 369 (1973) (upholding agency's authority to promulgate regulations ''reasonably related to the purposes of the enabling legislation''); *Pub. Citizen Health Rsch. Grp.* v. *U.S. Dep't of Lab.,* 557 F.3d 165, 178 (3d Cir. 2009), *as amended* (May 15, 2009) (affording *Chevron* deference to OSHA's ''choice of methodology to implement the [OSH Act]'').

The anti-retaliation provision of this ETS is necessary to protect employees from the grave danger posed by COVID–19 because it is critically important for employees to be aware of, and to be able to exercise, their rights under the standard given that employee participation is essential to mitigating the spread of COVID–19 in the workplace. For example, employees who are COVID–19-positive must be able to notify their employer of their condition without fear of retaliation in order to protect others in the workplace; if an employee refrains from reporting their condition to the employer due to fear of retaliation, the employee would not be removed from the workplace and could spread the infection to other employees. Similarly, employees must be able to notify their employer of other COVID–19 hazards in the workplace—such as co-workers refusing to wear PPE or wearing it improperly—without fear of retaliation; if an employee does not report a hazardous condition due to fear of retaliation, the employer may not become aware of the hazard and would not be able to address it. A workplace free from the threat of retaliation promotes collaboration between employers and employees in the effort to minimize the risk of transmission of COVID–19.

OSHA publicly tracks complaints alleging retaliation. The agency's website shows that, as of May 30, 2021, 5,389 complaints of retaliation related to workplace protections from COVID–19 had been received (OSHA, June 1, 2021). Over 800 of these complaints were from the healthcare industry. During the pandemic, OSHA has received an increased number of complaints from workers alleging retaliation generally (*i.e.,* not just related to COVID–19), which OSHA attributes primarily to COVID–19-related incidents. OSHA received a total of 13,648 retaliation complaints from April 1, 2020 to April 30, 2021 (including COVID–19-related complaints), compared to 10,973 total complaints during the same timeframe in 2019–20, and 10,037 total complaints during the same timeframe in 2018–19. Approximately 37 percent of the docketed COVID–19-related complaints OSHA has completed investigating have resulted in merit findings or settlements involving positive outcomes for complainants.

Retaliation takes many forms; it occurs when an employer (through a manager, supervisor, or administrator) fires an employee or takes any other type of adverse action against an employee for engaging in protected activity. Adverse actions include discipline; reducing pay or hours; reassignment to a less desirable position; denying overtime or promotion; intimidation or harassment; and any other action that would dissuade a reasonable employee from raising a concern about a possible violation or engaging in other protected activity. See *Burlington Northern & Santa Fe Railway Co.* v. *White,* 548 U.S. 53, 57 (2006) (holding, in the Title VII context, that the test for determining whether a particular action is materially adverse is whether it ''could well dissuade'' a reasonable person from engaging in protected activity).

Although the ETS does not change the substantive obligations of employers to refrain from retaliating against employees for engaging in protected activity under section 11(c), the anti-retaliation provision in the ETS serves two additional purposes. First, it increases awareness of the protections provided to employees. Second, it provides OSHA with an enhanced enforcement tool for ensuring that employees are protected from retaliation for exercising their right to the protections required by the ETS, and for engaging in actions required by the ETS. In other words, the anti-retaliation provision of the standard serves a preventive purpose as well as a remedial one. ''The breadth of agency discretion is, if anything, at zenith when the action assailed relates primarily not to the issue of ascertaining whether conduct violates the statute, or regulations, but rather to the fashioning of policies, remedies and sanctions, . . . in order to arrive at maximum effectuation of Congressional objectives.'' *United Steelworkers,* 647 F.2d at 1230 n.64 (citation omitted).

Regarding the standard's preventive purposes, the requirement for employers to inform each employee of their rights under the standard and the prohibition on retaliation serves to educate employees who might not otherwise be aware of their rights. The explicit prohibition on retaliation reminds employers of their obligation not to discharge or discriminate against employees for exercising their right to the protections required by the ETS, or for engaging in actions required by the ETS. The standard thus serves to enhance protections against retaliation by increasing awareness of those protections among both employees and employers. By increasing awareness, OSHA believes that the provision will prevent acts of retaliation from occurring in the workplace and encourage employees to exercise their right to the protections required by the ETS, to engage in actions required by the ETS, and to communicate their COVID–19 status to the employer to mitigate the spread of COVID–19 in the workplace.

Employers have flexibility regarding how they will inform employees of their rights and the prohibition on retaliation. This information can be provided along with other training required under the standard, or it can be provided separately. Employees can be informed

in writing, verbally during a staff meeting, or using other methods. Employers are able to choose any method of informing employees, so long as each employee is apprised of the information specified in the standard.

Regarding the standard's remedial purposes, the prohibition on retaliation in the standard provides OSHA with a means of addressing workplace retaliation that is vitally important for protecting employees from the grave danger presented by COVID–19 in the workplace. Under section 11(c), an employee who believes they have been retaliated against may file a complaint with OSHA, and if, after investigation, the Secretary has reasonable cause to believe that section 11(c) has been violated, then the Secretary may file a complaint against the employer in U.S. District Court seeking ''all appropriate relief,'' including reinstatement and back pay (29 U.S.C. 660(c)(2)). However, section 11(c) only authorizes the Secretary to take action against an employer for retaliating against an employee if the employee files a complaint with OSHA within 30 days of the retaliation (29 U.S.C. 660(c)). The ETS provides OSHA with an additional enforcement tool for promoting employee engagement in mitigating the spread of COVID–19 in the workplace, which is critical given the grave and unusual danger COVID–19 poses to workers. Some employees may not have the time or knowledge necessary to file a section 11(c) complaint or may fear additional retaliation from their employer if they file a complaint. The standard allows OSHA to issue citations to employers for retaliating against employees, and require abatement including back pay and reinstatement, even if no employee has filed a section 11(c) complaint within 30 days of the retaliation. OSHA has six months from the occurrence of a violation to issue a citation under the standard (29 U.S.C. 658(c)).

In addition, OSHA can address retaliation directly and relatively quickly by issuing a citation, whereas litigation in U.S. District Court under section 11(c) is a much slower process. Moreover, OSHA can issue a single citation addressing retaliation against multiple employees—for example, if OSHA discovers during an inspection that the employer terminated multiple employees who tested positive for COVID–19, or multiple employees who wore their own N95 respirators—without identifying which employee(s), if any, filed a complaint with OSHA. In contrast, complaints under section 11(c) must identify each individual complainant. With cases related to COVID–19, it is critically important for OSHA to be able to act as quickly and efficiently as possible to ensure that employees are provided the protections required by the standard, and are taking the precautions required to protect each other from COVID–19, without fear of retaliation. Any delay in addressing retaliation in these circumstances could result in additional cases of COVID–19 in the workplace, for example if employees hide their COVID–19 status or refrain from taking precautions required to protect themselves and other employees from COVID–19 because they fear retaliation from the employer.

The standard does not abrogate or interfere with the rights or restrictions contained in section 11(c) of the OSH Act. An employee who wishes to file a complaint under section 11(c) may do so within the statutory 30-day period regardless of whether OSHA is investigating an alleged violation of the standard involving the same underlying conduct. Where OSHA's investigation substantiates the violation, OSHA will determine (in consultation with the complainant, where appropriate) whether to pursue a remedy under section 11(c) or through a citation under the ETS, but not both. A note to paragraph (o) is included in the regulatory text to provide an additional reminder of the protections from retaliation provided under section 11(c).

References

Occupational Safety and Health Administration (OSHA). (2021, June 1). COVID–19 Response Summary: Summary Data for Federal Programs—Whistleblower Data. *https://www.whistleblowers.gov/covid-19-data*. (OSHA, June 1, 2021).

O. Requirements Implemented at No Cost to Employees

Paragraph (p) specifies that the implementation of all requirements of the standard, with the exception of any employee self-monitoring conducted under paragraph (l)(1)(i), must be at no cost to employees. This provision is included to make it clear that the employer is responsible for costs associated with implementation of the standard. The requirement is consistent with the OSH Act, which requires employers to ensure a safe and healthful work environment. It is also consistent with OSHA's past practice in numerous rulemakings. In indicating that the implementation of all requirements of this standard must be at no cost to the employee, OSHA considers costs to include not only direct monetary expenses to the employee, but also the time and other expenses necessary to perform required tasks.

It is vitally important that the protections of the ETS are provided at no cost to employees. For example, OSHA concluded in the agency's final rule on Employer Payment for Personal Protective Equipment (PPE) that requiring employers to pay for PPE results in significant safety benefits because employees are more inclined to use PPE if it is provided to them at no cost (72 FR 64341, 64344). As described in *Need for Specific Provisions* (Section V of this preamble), facemasks, face shields, respirators, and other PPE are critical to minimizing the risk of COVID–19 transmission in the workplace. Employer payment for these items therefore serves to enhance the protection of employees from COVID–19 hazards. Similarly, employees are more likely to take advantage of other workplace protections if they are provided at no cost. For example, in one instance where employees were transported to and from a hospital at company expense for a work-related medical exam, and they received their normal pay during transportation, waiting, and examination time, employee participation was 100%. When subsequent examinations were scheduled outside working hours and employees were not provided with transportation or compensated for their time, participation dropped to 58%. See *Phelps Dodge Corp.* v. *OSHRC,* 725 F.2d 1237, 1238 (9th Cir. 1984).

The requirement that protections under the standard be provided at no cost to employees applies broadly to the provisions of the standard. For example, paragraph (f) includes requirements for facemasks, face shields, and in some circumstances, respirators and other PPE.[138] These items must be provided at no cost to employees. Paragraph (f)(1)(iv) provides an exception to this requirement for employees who provide their own face shields. When the employer allows employees to use their own face shields, the employer is not required to reimburse the employees for the cost of those face shields.

In addition, paragraph (f)(4)(ii) requires the employer to permit an employee to wear their own respirator

[138] This Summary and Explanation of paragraph (p) highlights *some* of the requirements that must be implemented at no cost to employees. This discussion is intended to be illustrative of the requirement that, with limited exceptions, employees are not to bear the costs of implementing the standard; it is not intended to be an exclusive list of the standard's no cost requirements. As stated in paragraph (p), the implementation of *all* requirements of the standard, with the exception of any employee self-monitoring conducted under paragraph (l)(1)(i), must be at no cost to employees.

instead of a required facemask. In this circumstance, when an employee provides and uses their own respirator, the employer is not obligated to pay the employee for the cost of procuring or maintaining the respirator. OSHA believes it is reasonable for the employee to assume responsibility for the cost of the respirator in this circumstance because the employee is choosing to wear PPE that is more protective than what is required under the standard. The employer must provide the protections required by the standard at no cost to employees, but is not obligated to pay for protections beyond those required, or for alternatives chosen by the employee.

Paragraph (l)(1)(i) requires the employer to screen each employee before each work day and each shift. The provision allows for employee self-monitoring as well as screening in-person by the employer. Where employers elect to conduct screening by having employees self-monitor before reporting to work, the standard does not require them to compensate employees for any incidental costs they incur (*e.g.,* the time needed to respond to a questionnaire).

Paragraph (l)(1)(ii) explicitly indicates that any COVID–19 test required by the employer for screening purposes must be provided at no cost to the employee. If a test is covered and paid for by an employee's employer-provided health insurance, and the employee does not incur any other expenses (*e.g.,* leave time), the test has been provided at no cost to the employee. Similarly, any COVID–19 test provided under paragraph (l)(4)(ii)(B) must be provided free of cost to the employee. If testing under either of these provisions requires travel by the employee, the employer is required to bear the cost of travel (*e.g.,* mileage for personal vehicle use, public transportation fare), and the employee must be paid at their regular rate of pay for time spent receiving the test, including travel time.

Paragraph (m) requires that employers support COVID–19 vaccination through reasonable time and paid leave for its employees. Paragraph (m) requires employers to cover the time off needed for full vaccination and for recovery from vaccine side effects, through provision of paid leave to all employees who decide to get vaccinated, resulting in the requirements of the standard being provided at no cost to employees (transportation costs are not required to be covered by employers).

Paragraph (n) requires the employer to ensure that each employee receives training, in a language and at a literacy level the employee understands, so that the employee comprehends specified elements regarding COVID–19, associated hazards in the workplace, the measures in place to protect employees from those hazards, and other specified topics. Employers must provide this training, including reasonable accommodation as required by the Americans with Disabilities Act if needed by an employee with a disability, at no cost to the employee. The employee must be paid for time spent receiving training. If an employee must travel away from the workplace to receive training, the employer is required to bear the cost of travel, and the employee must be paid for travel time. Any training or other communications provided under paragraph (o)(1), which requires employers to inform each of their employees about certain anti-retaliation-related topics, must similarly be provided at no cost to employees.

P. Recordkeeping

Section 8(c)(1) of the Act requires employers to ''make, keep and preserve, and make available to the Secretary [of Labor] or the Secretary of Health and Human Services, such records regarding his activities relating to this Act as the Secretary, in cooperation with the Secretary of Health and Human Services, may prescribe by regulation as necessary or appropriate for the enforcement of this Act or for developing information regarding the causes and prevention of occupational accidents and illnesses.'' Section 8(c)(2) of the Act specifically directs the Secretary of Labor to promulgate regulations requiring employers to maintain accurate records of work-related injuries and illnesses. Section 8(c)(3) of the Act requires employers to ''maintain accurate records of employee exposures to potentially toxic materials or harmful physical agents which are required to be monitored or measured under section 6 [of the Act.]'' In accordance with section 8(c), and after consultation with HHS, OSHA has included recordkeeping requirements in paragraph (q). This paragraph includes requirements for the creation, maintenance, and availability of certain COVID–19-related records, including the retention of the COVID–19 plan required by paragraph (c), the establishment and maintenance of a COVID–19 log, as well as the availability of records to employees, employee representatives, and OSHA.

Although the Act provides OSHA with authority to require all employers covered by OSHA to keep records, one major class of employers is not required to keep records under paragraph (q). Paragraph (q)(1) provides that small employers with 10 or fewer employees on the effective date of this section are not required to comply with the recordkeeping provisions in paragraph (q)(2) or (q)(3). The approach to the scope in this section is generally consistent with the partial exemption in 29 CFR 1904.1, which provides that an employer in any industry with 10 or fewer employees at all times during the last calendar year is not required to maintain OSHA records of occupational injuries and illnesses during the current year unless required to do so in writing by OSHA.

The size exemption in paragraph (q)(1) is based on the total number of employees in a firm, rather than the number of employees at a particular location or establishment. An exemption based on individual establishments would be difficult to administer, especially in cases where an individual employee, such as a physician or nurse, regularly reports to work at several establishments. Under the 10-or-fewer employee exception in this paragraph, OSHA expects, based on the agency's analysis of healthcare employers as part of its economic analysis, that approximately 70% of healthcare employers potentially covered by this ETS would not be required to maintain records required under paragraph (q)(2) or make such records available under paragraph (q)(3) of this section.

All individuals who are ''employees'' under the OSH Act are counted in the total; the count includes all full-time, part-time, temporary, and seasonal employees. For businesses that are sole proprietorships or partnerships, the owners and partners would not be considered employees and would not be counted. Another example of individuals who are not considered to be employees under the OSH Act are unpaid volunteers (see 66 FR 5916, 6038).

Additionally, OSHA's regulation at 29 CFR 1904.2 partially exempts certain lower-hazard industry groups from the requirement for keeping occupational injury and illness records. However, the partial exemption in 29 CFR 1904.2 does not apply to the recordkeeping requirements in paragraph (q) of this section. All covered employers, even those that are partially-exempt under OSHA's recordkeeping regulation, must comply with the recordkeeping requirements in this paragraph if they have more than 10 employees on the effective date of this section. Also, although exempted from maintaining records under paragraph (q) of this section, employers with 10 or fewer

employees are required to report to OSHA each work-related COVID–19 fatality and in-patient hospitalization as required by paragraph (r) of this section.

Paragraph (c)(6) requires employers to monitor each workplace to ensure the ongoing effectiveness of the COVID–19 plan and update it as needed. Employers may also revise an original plan and implement an updated plan due to the evolving nature of the COVID public health emergency. Paragraph (q)(2)(i) requires covered employers to retain all versions of the COVID–19 plans implemented to comply with this ETS while the ETS remains in effect. As discussed in more detail below, the retention of the finalized, implemented COVID–19 plans (not drafts) will aid employers, employees, and employee representatives in several ways, including assisting with the evaluation of the efficacy of policies and procedures employers have taken iteratively in response to changing circumstances. As discussed above, paragraph (c) requires employers with more than 10 employees to develop, implement, and update a written COVID–19 plan for each workplace. Since paragraph (c) requires employers to update their written COVID–19 plan as needed, paragraph (q)(2)(i) requires employers to retain all versions of the plan while this ETS is in effect.

One of the main purposes for the retention requirement is to provide employees, former employees, and their representatives with access to the written plan. As discussed below, paragraph (q)(3)(i) requires employers to provide access to employees and employee representatives to all versions of the written COVID–19 plan.[139] OSHA believes that access to the plan will not only inform employees about the contents of the document, but will also lead to increased employee involvement in the development and updating of the plan. In addition, OSHA believes retention of all versions of the plan will ultimately assist employers in the prevention of COVID–19 exposure in their workplaces. Retention of all versions of the plan will enable employers to better evaluate the effectiveness of policies and procedures they have taken to limit exposure to COVID–19 and will ensure that employees and their representatives can provide meaningful contributions to the review and improvement of the COVID–19 plan. Additionally, making all versions of the plan available to OSHA (as required by paragraph (q)(3)(iv)) will allow the agency to verify the effectiveness of employee protections.

Under paragraph (q)(2)(ii), employers with more than 10 employees on the effective date of this section are required to establish and maintain a COVID–19 log and record each instance identified by the employer in which an employee is ''COVID–19-positive,'' meaning that person has a confirmed positive test for, or has been diagnosed by a licensed healthcare provider with, COVID–19, *regardless of whether the instance is connected to exposure to COVID–19 at work.* However, the COVID–19 log should not record incidences for employees who work exclusively from home and thus could not expose others in the workplace. As explained in a Note to paragraph (q)(2)(ii), the COVID–19 log is intended to assist employers with tracking and evaluating instances of employees who are COVID–19-positive without regard to whether those employees were infected at work. While the workplace is immediately impacted by having a COVID–19-positive employee because of the potential exposure to others, it can often be difficult to determine quickly whether that employee was infected at work or elsewhere, so OSHA has relieved employers of the burden of trying to make that determination for the COVID–19 log. Because of the need to quickly identify and track potential workplace exposure trends and inform others in the workplace about potential exposures, as well as implement other requirements of the standard (*i.e.,* medical removal from the workplace), it is more urgent to record an instance where an employee is COVID–19-positive and the details surrounding that instance than to wait to determine whether the instance was work-related. OSHA believes that the requirement to establish and maintain a COVID–19 log will ultimately assist employers in preventing workplace transmission, even when cases arise that do not originate in the work environment.

Paragraph (q)(2)(ii)(A) provides that the COVID–19 log must contain, for each instance, the employee's name, one form of contact information (*e.g.,* phone number or email address), occupation, location where the employee worked, the date of the employee's last day at the workplace, the date of the positive test for, or diagnosis of, COVID–19, and the date the employee first had one or more COVID–19 symptoms, if any were experienced. When making entries on the COVID–19 log, employers should only enter the specific information required to be entered. The recording of additional information (not required to be entered) may result in privacy concerns for the employee who is the subject of the entry.

The main purpose of the COVID–19 log is to assist employers in tracking whether there is a COVID–19 outbreak at the worksite. Information about specific occupations and locations where employees have worked can be used to pinpoint where exposure has occurred. For example, if the occupation of the infected employee is ''healthcare assistant'', the location is ''floors 3 through 5'', and those floors consist mainly of patient examination and hospital rooms, the employer may be able to conclude that the employee had spent time working with other health care providers in rooms on those floors and may be able to determine what times exposures in each place would have occurred based on other patient and provider records.

Also, entering information on the COVID–19 log about an employee with non-work-related COVID–19 illness assists an employer in tracking how and when the disease entered the workplace. By entering information about all employee cases of COVID–19, the time needed by employers to make work-relatedness determinations is eliminated, and thus results in information being entered on the COVID–19 log in a timely manner. In addition, the information entered on the log may assist an employer in determining whether the employer's policies and procedures have been effective in the prevention of COVID–19 in their workplace.

Additionally, paragraph (q)(2)(ii)(B) requires employers to make entries on the COVID–19 log within 24 hours of learning that an employee is COVID–19-positive. The 24-hour timeframe ensures that information about an employee's confirmed or diagnosed illness is timely entered on the COVID–19 log. At some worksites, timely information entered on the COVID–19 log may assist employees and their representatives, who have a right of access to certain information on the log, in preventing the spread of the disease throughout a facility. Specifically, the timely entry of COVID–19 illness information on the log may assist employee representatives in identifying exposure trends in different areas of a workplace.

[139] Consistent with 29 CFR part 1904.35(a)(3), OSHA interprets the term ''employee'' as used in paragraph (q)(3)(i)–(iii) to include former employees. In accordance with this interpretation, OSHA also interprets the phrases ''their personal representatives'' and ''their authorized representatives,'' as used in paragraph (q)(3)(i) and (q)(3)(iii), to include the personal and authorized representatives of former employees. These interpretations are limited to these provisions. Note, as discussed in more detail below, that for former employees and their representatives, the requirement to provide access to the written COVID–19 plan under paragraph (q)(3)(i) is limited to the versions of the plan that were implemented during the former employees' employment.

The COVID–19 log required by the ETS differs from the OSHA 300 log that employers are required to maintain under the OSHA injury and illness recordkeeping regulation at 29 CFR part 1904. Most importantly, under 29 CFR part 1904, employers are required to make several determinations regarding the recordability of specific injuries and illnesses before information is entered on the 300 log. For example, employers are not required to record non-work-related illnesses and injuries on their OSHA 300 logs. Therefore, in order to determine whether to record COVID–19 illness on the OSHA 300 log, employers must determine whether the illness is work-related. Under paragraph (q)(2)(ii), employers are required to enter information on the COVID–19 log regardless of whether an employee's illness is the result of a work-related exposure. Also, under 29 CFR part 1904, employers must generally provide access to the 300 log to employees, former employees, and their representatives with the names of injured or ill employees included on the form. By contrast, employers must maintain the COVID–19 log as though it is a confidential medical record and must not disclose it except when providing access as required by paragraph (q)(3), or other federal law. As a result, while some COVID–19 illnesses may qualify for entry on both logs, the OSHA 300 log may not be used as a substitute for the COVID–19 log required by this section.

Finally, as explained in a Note to paragraph (q), employers must continue to record all work-related confirmed cases of COVID–19 on their OSHA Forms 300, 300A, and 301, or on equivalent forms, if required to do so under 29 CFR part 1904. The recordkeeping regulation at 29 CFR part 1904 includes additional requirements for the recording of work-related COVID–19 illness from this ETS. Under 29 CFR part 1904, COVID–19 is a recordable illness and employers are responsible for recording cases of COVID–19 if: (1) The case is a confirmed case of COVID–19 as defined by the Centers for Disease Control and Prevention (CDC); (2) the case is work-related as defined by 29 CFR 1904.5; and (3) the case involves one or more of the general recording criteria in set forth in 29 CFR 1904.7 (*e.g.,* medical treatment beyond first aid, days away from work).

Paragraph (q)(2)(ii)(B) also requires that the information in the COVID–19 log be maintained as though it is a confidential medical record and must not be disclosed except as required by this ETS or other federal law. OSHA historically has recognized that occupational safety and health records maintained by employers may contain information of a sufficiently intimate and personal nature that a reasonable person would wish to remain confidential. While the entries of information on the COVID–19 log may be brief, they may contain information that could result in a serious confidentiality or privacy concern if disclosed to other employees, former employees, or their representatives. Accordingly, under this section, the disclosure of personal information entered on the COVID–19 log is limited to the access provisions set forth in paragraph (q)(3), or as required by other federal laws. Otherwise, employers must maintain the log as though it is a confidential medical record.[140]

One of the major federal regulations addressing the privacy of individuals' health information is the U.S. Department of Health and Human Services (HHS) regulations at 45 CFR parts 160 and 164, known as the Health Insurance Portability and Accountability Act of 1996 (HIPAA) ''Privacy Rule.'' The Privacy Rule protects the privacy of individually identifiable health information (referred to as ''protected health information'' or ''PHI'') maintained or transmitted by HIPAA-covered entities [141] and their business associates. The Privacy Rule is also balanced to ensure that appropriate uses and disclosures of PHI can be made when necessary to treat a patient, to protect the nation's public health, and for other important purposes. A covered entity may not use or disclose PHI except as permitted or required by the Privacy Rule (see 45 CFR part 164.502).

The term ''covered entity'' includes health plans, health care clearing houses, and health care providers who transmit health information in electronic form. For OSHA purposes, this mainly refers to a health care provider, defined in the Privacy Rule as any person or organization that furnishes, bills, or is paid for health care in the normal course of business.

The HIPAA Privacy Rule excludes certain individually identifiable health information from the definition of PHI. For example, employment records held by a covered entity in its role as an employer are not PHI and the HIPAA Privacy Rule would not affect the disclosure of health information contained in employment records to OSHA (see 45 CFR part 160.103).

With respect to disclosures of PHI made by covered entities directly to OSHA, the agency notes that the Privacy Rule specifically permits disclosures of PHI without an individual's authorization for certain purposes. Of particular significance is 45 CFR part 164.512, ''Uses and disclosures for which an authorization or opportunity to agree or object is not required.'' These standards do not compel a covered entity to disclose PHI. Instead, they permit the covered entity to make the requested disclosure without obtaining authorization from the individuals who are the subjects of the PHI. Section 164.512(a) of the Privacy Rule permits covered entities to use and disclose PHI, without an individual's authorization, when they are required to do so by another law. HHS has made clear that this provision encompasses an array of binding legal authorities, including statutes, agency orders, regulations, or other federal, state, or local governmental actions having the effect of law (see 65 FR 82668). As a result, the Privacy Rule, in and of itself, generally does not provide a justification for a covered entity to refuse to disclose PHI to OSHA as required by an OSHA standard or regulation. Based on its finding that the ETS is necessary to address the grave danger that the SARS–CoV–2 virus presents to workers, OSHA further finds that the COVID–19 log is critical to convey the specified information in a timely manner that is critical for worker protection.

A covered entity may also disclose PHI without an individual's authorization to ''public health authorities'' and to ''health oversight agencies'' (see 45 CFR parts 164.512(b) and (d)). The preamble to the Privacy Rule issued in 2000 specifically mentions OSHA as an example of both

[140] Please note that the employer is still required to enter work-related COVID–19 cases on the 300 log pursuant to 29 CFR part 1904 and must provide access to them under 29 CFR part 1904.35(b)(2)(iv). However, employees do have the right to ask employers to record their injury or illness on the 300 log as a ''privacy concern case.'' In such a case, employers do not enter the employee's name on the 300 log. Instead, the employer enters ''privacy case'' in the space normally used for the employee's name. Per 29 CFR part 1904.29(b)(6), the employer would then keep a separate, confidential list of the case numbers and employee names for their privacy concern cases so they can update the cases and provide the information to the government if asked to do so (see 29 CFR part 1904.29(b)(6)–(9)). Also, 29 CFR part 1904.29(b)(9) provides that, even after the employee's name has been removed, if an employer has a reasonable basis to believe that the information describing a privacy concern case may identify the employee, the employer may use discretion in describing the case on the OSHA recordkeeping forms to protect the identity of the employee while still accomplishing the purpose of keeping the record.

[141] ''Covered entities'' are health plans, health care clearinghouses, and health care providers who conduct certain standard transactions electronically (see 45 CFR 160.103).

(see 65 FR 82492, 82526). Accordingly, while employers must maintain the COVID–19 log in a manner consistent with federal and state privacy requirements, they generally may not refuse to disclose PHI when required or requested by OSHA based solely on the provisions of the Privacy Rule. Also, because paragraph (q)(3) of this ETS includes a specific, legally enforceable right of access, the Privacy Rule permits employers to disclose certain PHI to employees, former employees, and their representatives, to the extent the disclosure is ''required by law'' (and must do so as required by the ETS).

Paragraph (q)(2)(ii)(C) provides that the COVID–19 log must be maintained and preserved while this section remains in effect. The purpose of this retention requirement is twofold. First, retention of the log allows employers to review previously entered information over a long period of time. This can be useful to determine which policies and procedures at a workplace have been effective in reducing occupational exposure to COVID–19. Second, retention of the log allows for access of the entered information by employees, former employees, and their representatives, and OSHA, which can facilitate tracing of potential exposures at a particular worksite and at other worksites where infected employees may have traveled.

The maintenance requirement in paragraph (q)(2)(ii)(C) does not specify a particular method by which employers must maintain the log. Employers have flexibility in choosing a method for maintaining the information on the log. In making these decisions, employers should consider using a method that gives them the ability to effectively enter, update, and retain the information on the log while this section remains in effect, and ensures that the entered information is both accurate and secured. Also, employers should use a method that can allow for transmission of data when employees, former employees, and their representatives, and OSHA, request access to information under paragraph (q)(3), especially when information is maintained at a centralized location.

For purposes of centralized recordkeeping, the COVID–19 log may be maintained at a location other than the establishment, such as a company's central office. Employers with several distinct establishments or workplaces may keep several versions of the log at a centralized location. However, if the COVID–19 log(s) is maintained at a central location, the employer must ensure that the information on the log can be accessed by employees, employee representatives, and OSHA at the relevant worksite in accordance with the requirements of the ETS.

Finally, if a business changes ownership while the ETS is in effect, the selling employer is responsible for transferring information on the COVID–19 log to the new owner. Under these circumstances, the previous owner is responsible for transferring all of the information entered on the COVID–19 log to the new owner, and the new employer becomes responsible for retaining that COVID–19 log. This will help ensure that the new employer is aware of previously entered COVID–19 exposure information, and that employees and their representatives who remain after the sale, as well as former employees and their representatives, will have continued access to all of the COVID–19 log information at their workplace or former workplace.

Paragraph (q)(3) includes requirements for the access, upon request, by employees, former employees, and their representatives to records retained or maintained by employers under paragraph (q). In addition, paragraph (q)(3) includes requirements for records access for the Assistant Secretary. One of the goals of the access requirements is to enhance employee involvement in the process for preventing COVID–19 exposure in the workplace. OSHA believes employee access to information about COVID–19 is an essential part of an effective COVID–19 plan. When employees do not have access to accurate information about hazards they face in their workplace, the likelihood increases that employees may suffer occupational injuries and illnesses. This would mean, for purposes of COVID–19, that employers and employees would not have information they need to prevent the outbreak and spread of the virus in their workplace.

Paragraph (q)(3) specifies that the employer must provide the records specified in paragraph (q)(3)(i)–(iv) to the specified individuals for examination and copying by the end of the next business day after a request. By requiring prompt production of these records, the provision ensures that requesters, who are limited to employees and their representatives, can have the information necessary to take an active role in their employers' efforts to prevent COVID–19 exposure in the workplace.

Paragraph (q)(3)(i)–(iv) provides more details about which records the employers must provide access to and to whom that access must be provided. Paragraph (q)(3)(i)–(iii) focuses on records access for employees and their representatives. As noted above, and consistent with 29 CFR 1904.35(a)(3), OSHA interprets the term ''employee'' as used in paragraph (q)(3)(i)–(iii) to include former employees. In accordance with this interpretation, OSHA also interprets the phrases ''their personal representatives'' and ''their authorized representatives,'' as used in paragraphs (q)(3)(i) and (iii), to include the personal and authorized representatives of former employees. These interpretations are limited to these provisions.

In addition, for purposes of paragraph (q)(3), the term ''representative'' is intended to have the same meanings as in 29 CFR 1904.35(b)(2), which encompasses two types of employee representatives. The first is a personal representative of the employee or former employee, who is a person the employee or former employee designates, in writing, as his or her personal representative, or is a legal representative of a diseased or legally incapacitated employee or former employee. The second is an authorized representative, which is defined as an authorized collective bargaining agent of one or more employees working at the employer's worksite. Authorized representatives do not require separate written authorization to access the version of the COVID–19 log described in paragraph (q)(3)(iii) because they have received broad authorization (see below for more details regarding this version of the log).

Under paragraph (q)(3)(i)–(iii), employees, former employees, and their representatives have three specific access rights. First, pursuant to paragraph (q)(3)(i), employees and their representatives have access to all versions of the written COVID–19 plan at any workplace where the employee or former employee has worked. Second, pursuant to paragraph (q)(3)(ii), any employee, former employee, and anyone having written consent of that employee or former employee have access to the COVID–19 log entry for that employee or former employee. Finally, under paragraph (q)(3)(iii), employees, former employees, and their representatives have a right to access a version of the COVID–19 log that removes the names of employees, contact information, and occupation, and only includes, for each employee in the COVID–19 log, the location where the employee worked,[142]

[142] The employer should use discretion when possible. This location should be specific enough to accomplish the purpose of this recordkeeping in alerting people where the COVID–19 hazard was located, but avoid the level of specificity that might

Continued

the last day that the employee was at the workplace before removal, the date of that employee's positive test for, or diagnosis of, COVID–19, and the date the employee first had one or more COVID–19 symptoms, if any were experienced. As noted above, the employer must provide these records to these individuals upon request for examination and copying not later than by the end of the next business day after the request.

Employee, and employee representative, access to this information is critical to ensuring full employee participation in employer efforts to prevent COVID–19 exposure in the workplace. For example, access to the COVID–19 log may be helpful for a requesting employee in determining the likelihood of COVID–19 exposure in specific occupations or areas at a workplace. Also, access to information by employee representatives allows them to potentially evaluate exposure information for the employees they represent in different areas throughout a worksite. In addition, access to the information on the COVID–19 log provides a useful check on the accuracy of information entered by the employer and provides greater employee involvement in the COVID–19 protection program at the workplace.

Former employee access to these records is important as well. OSHA finds that the needs of former employees for access to records that could speak to their health are as compelling as the needs of current employees. Therefore, as noted above, OSHA interprets the term ''employee'' as used in paragraph (q)(3)(i)–(iii) to provide records access to former employees and their representatives. Employers should note, however, that they may limit the access of a former employee and their representatives to versions of the written COVID–19 plan and the COVID–19 log that were current or otherwise relevant to the former employee's time of employment. In other words, as to the requirement in paragraph (q)(3)(i) to provide all versions of the written COVID–19 plan to former employees and their representatives, employers need only provide the versions of the plan that were implemented during the former employees' employment. Similarly, as to the requirement in paragraph (q)(3)(iii) to provide the version of the COVID–19 log that removes the names of employees, contact information, and occupation, and only includes, for each employee in the COVID–19 log, the location where the employee worked, the last day that the employee was at the workplace before removal, the date of that employee's positive test for, or diagnosis of, COVID–19, and the date the employee first had one or more COVID–19 symptoms, if any were experienced, to former employees and their representatives, employers are only required to provide log entries for dates on which the former employee was employed by the employer.

Employers should note that employee privacy is protected under the access to records provisions in paragraph (q)(3). Unlike the OSHA 300 log, employers are not permitted to disclose the names of employees or occupations entered on the COVID–19 log when they provide the COVID–19 log to employees, former employees, or their representatives for copying under paragraph (q)(3)(iii). However, paragraph (q)(3)(ii) does allow a limited exception to this privacy requirement. Specifically, as noted above, upon request, employers must provide access to the COVID–19 log entry for an individual employee or former employee to that employee or former employee, or to anyone having that employee or former employee's written permission. Consequently, employees, former employees, their representatives, and others can request and receive access to entries about another employee or former employee with that employee or former employee's written permission.

In order to create the version of the COVID–19 log that would be provided under paragraph (q)(3)(iii), an employer must remove the names, contact information, and occupation of employees. Other information on the COVID–19 log relating to the location where the employee worked, the last day the employee was at the workplace before removal, the date of the employee's positive test for, or diagnosis of, COVID–19, and the date the employee first had COVID–19 symptoms, if any were experienced, must be included in the privacy-protected log. This information is critical for employees and their representatives to assess potential exposures to COVID–19 in the workplace and is the only information that may be included on the version of the log provided to employees and representatives under paragraph (q)(3)(iii). Without the provision of this information to employees and their representatives, the only potential check on whether the employer is accurately complying with the notification requirements of the ETS would be OSHA inspections. The agency believes that making this information available to employee representatives in a manner that still addresses privacy concerns will help ensure compliance with the requirements of the ETS and thereby protect workers.

In addition, as noted above, paragraph (q)(2)(ii)(B) provides that the information in the COVID–19 log must be maintained as though it is a confidential medical record and must not be disclosed except as required by this ETS or other federal law. These provisions work together to take steps to preserve employee privacy and confidentiality.

Under the ETS, employees, former employees, and their representatives are entitled to one free copy of each requested record, which is consistent with 29 CFR 1904.35. The cost of providing one free copy to employees, former employees, and/or their representatives is minimal, and these individuals are more likely to access the records if it is without cost. Allowing the employer to charge for a copy of the record would only delay the production of the information. After receiving an initial, free copy of a requested record or document, an employee, former employee, or representative may be charged a reasonable fee for copying duplicative records. However, no fee may be charged for an update to a previously requested record.

Lastly, paragraph (q)(3)(iv) provides OSHA with a specific right of access. Under this paragraph, employers must provide OSHA with access to the records required to be created and maintained by this section. This means that employers must allow OSHA representatives to examine and copy all versions of the COVID–19 written plan, as well as all information entered on the COVID–19 log, when the OSHA representative asks for the records during a workplace safety and health inspection. OSHA does not believe that its inspectors need to obtain employee permission to access and review personally-identifiable information entered on the COVID–19 log. Gaining this permission would essentially make it impossible to obtain full access to the log in a timely manner, which is needed by OSHA to perform a meaningful workplace investigation. Also, without complete access to the information entered on the log, Agency efforts to conduct immediate intervention or remediation of COVID–19 exposure at a specific workplace would be limited. Finally, OSHA representatives need

reveal the employee's identity unnecessarily. In some cases, such as when only a single employee works in a location, it will be infeasible to avoid alerting others to the employee's identity. But in other cases, instead of saying that employee worked at a particular piece of equipment or in a particular portion of a room, the employer could just identify the room where the employee was.

access to the names entered on the log in order to interview employees at the workplace, and to access employee personnel and medical records.

Q. Reporting

OSHA has required employers to report work-related fatalities and certain work-related hospitalizations under its recordkeeping regulation since 1971. These requirements have been an important part of the agency's statutory mission to assure safe and healthful working conditions for all working men and women. All employers covered by the OSH Act, including employers who are partially exempt from maintaining injury and illness records, are required to comply with OSHA reporting requirements at 29 CFR 1904.39. Under OSHA's current reporting regulation, employers are required to report each work-related fatality to OSHA within 8 hours of the event, and each work-related in-patient hospitalization, amputation, and loss of an eye within 24 hours of the event.

The purpose of the reporting requirement in § 1904.39 is to provide OSHA with information to determine whether it is necessary for the agency to conduct an immediate investigation at a specific establishment. Employer reports of work-related COVID–19 fatalities and in-patient hospitalizations are an important element of the agency's efforts to reduce occupational exposure to the virus. After receiving an employer report, OSHA decides whether an inspection is needed to determine the cause of a work-related COVID–19 fatality or in-patient hospitalization, and whether any OSHA standards may have been violated. These reports are critical for the agency to respond quickly to COVID–19 exposure that may pose an ongoing risk to other employees at the worksite. Timely investigation also allows OSHA to view evidence at a workplace soon after a work-related COVID–19 fatality or in-patient hospitalization has occurred, and can make it easier for the agency to gather relevant information from others at the worksite that might be useful in protecting other employees. Moreover, prompt inspection enables OSHA to gather information to evaluate whether its current standards adequately address the workplace hazard presented from COVID–19. The information gathered from employer reports is also used by the agency to form the basis of statistical data on the causes and remediation of work-related COVID–19 fatalities and in-patient hospitalizations.

In order to address the unique circumstances presented by COVID–19, and to facilitate OSHA investigation and better workplace health surveillance, paragraph (r)(1) requires covered employers to report each work-related COVID–19 fatality to OSHA within 8 hours of the employer learning about the fatality, and each work-related COVID–19 in-patient hospitalization to OSHA within 24 hours of the employer learning about the in-patient hospitalization. As discussed in more detail in the following discussion, OSHA is adding these additional COVID–19 reporting requirements because of the delay in the manifestation and progression of symptoms of COVID–19 can lead to hospitalization or fatality outside the normal window for reporting those workplace events.

Paragraph (r)(1)(i) provides that employers must report each work-related COVID–19 fatality to OSHA within 8 hours of the employer learning about the fatality. Under this paragraph, an employer must make a report to OSHA within 8 hours of learning both (1) that an employee has died from a confirmed case of COVID–19, and (2) that the cause of death was the result of a work-related exposure to COVID–19. Employers are only required to report confirmed case of COVID–19 as defined by the Centers for Disease Control and Prevention (CDC) (CDC, May 20, 2020). Typically, the cause of death is determined by the physician who was responsible for a patient who died in a hospital, although the cause of death can also be determined by others such as medical examiners or coroners (Pappas, May 19, 2020).

The requirement in paragraph (r)(1)(i) is similar to the fatality reporting requirement in OSHA's regulation at 29 CFR 1904.39(a)(1), which requires an employer to report to OSHA within 8 hours after the death of any employee as the result of a work-related incident. However, 29 CFR 1904.39(b)(6) requires employers to report a work-related fatality to OSHA only if the fatality occurs within 30 days of ''the work-related incident.'' Prior to this ETS, for purposes of reporting events involving COVID–19, OSHA interpreted the phrase ''the work-related incident'' to mean ''exposure'' in the work environment. Therefore, in order to be reportable under 29 CFR 1904.39(a)(1), a work-related fatality due to COVID–19 needed to have occurred within 30 days of an employee's exposure in the work environment. Given the possibility of long-term illness before death, the 30-day limitation for reporting fatalities to OSHA could restrict OSHA's ability to receive information about work-related COVID–19 fatalities.

To address these issues, OSHA has chosen not to apply the 30-day limitation period from 29 CFR 1904.39(b)(6) to the reporting provision in paragraph (r) (see paragraph (r)(2). Therefore, the requirement to report these fatalities is not limited by the length of time between workplace exposure and death. The reporting of work-related COVID–19 fatalities that occur beyond 30 days from the time of exposure will enable the agency to evaluate more work-related COVID–19 fatalities to determine whether immediate investigations are needed to prevent other employees at the same worksite from being exposed to the virus. Unlike entries in the employer's COVID–19 log, which would typically only be viewed by OSHA if an investigation occurs, the report of these fatalities to OSHA facilitates the agency's timely tracking of this data. Accordingly, paragraph (r)(1)(i) requires employers to report each work-related COVID–19 fatality to OSHA within 8 hours of the employer learning about the fatality regardless of when the exposure in the work environment occurred.

Paragraph (r)(1)(ii) of the standard requires an employer to report each work-related COVID–19 in-patient hospitalization to OSHA within 24 hours of the employer learning about the in-patient hospitalization. Under this paragraph, and similar to OSHA's reporting regulation at 29 CFR 1904.39, an employer must make a report to OSHA within 24 hours of learning that (1) an employee has been in-patient hospitalized due to a confirmed case of COVID–19, and (2) the reason for the hospitalization was the result of a work-related exposure to the illness.

OSHA's current reporting regulation at 29 CFR 1904.39(a)(2) provides that, within 24 hours after the in-patient hospitalization of one or more employees, as the result of a work-related incident, an employer must report the in-patient hospitalization to OSHA. 29 CFR 1904.39(b)(6) requires employers to only report in-patient hospitalizations to OSHA if the hospitalization occurs within 24 hours of the work-related incident. For example, if an employee trips in the workplace and sustains an injury on Monday, but is not hospitalized until Thursday, the employer does not need to report the event. In this example, ''the work-related incident'' occurred on Monday when the employee tripped and was injured in the workplace. Also, under § 1904.39, employers must report in-patient hospitalizations to OSHA within 24 hours of knowing both that the employee has been in-patient

hospitalized and that the reason for the hospitalization was the result of ''the work-related incident'' (see 29 CFR 1904.39(a)(2), (b)(7) and(8)). In non-COVID cases, the work-relatedness of the injury is typically apparent immediately.

Since the beginning of the pandemic, the reporting of work-related COVID–19 in-patient hospitalizations under 29 CFR 1904.39 has presented unique challenges. As noted above, for purposes of reporting COVID–19 fatalities and in-patient hospitalizations, OSHA has interpreted the phrase ''the work-related incident'' in 29 CFR 1904.39(b)(6) to mean an employee's ''exposure'' to COVID–19 in the work environment. Thus, in order to be reportable, an in-patient hospitalization needed to occur within 24 hours of an employee's exposure to COVID–19 in the work environment. Given the incubation period of the virus, and the typical timeframe between exposure and the emergence of symptoms serious enough to require hospitalization, it is extremely unlikely for an in-patient hospitalization to occur within 24 hours of an employee's exposure to the virus.

To address these issues, paragraph (r)(1)(ii) does not limit the COVID–19 reporting requirement to only those hospitalizations that occur within 24 hours of exposure, as in 29 CFR 1904.39(b)(6). This change in the reporting requirement will result in OSHA making more determinations as to whether immediate investigations are needed at additional worksites. Given the severity of the disease, and how quickly it can spread, it is essential that remediation efforts at a workplace be undertaken immediately. As noted above, it is critical for OSHA to respond quickly to hazardous conditions where employees have been hospitalized. The elimination of the 24-hour limitation period will not only allow OSHA to receive more employer reports about work-related COVID–19 in-patient hospitalizations and, as a result, shed light on where severe COVID–19 events are occurring, but it will also enable the agency to respond more quickly and effectively to these situations. Accordingly, employers must report each work-related COVID–19 in-patient hospitalization to OSHA regardless of when the employee's exposure in the workplace occurred (paragraph (r)(1)(ii)). But consistent with OSHA's normal reporting requirements, when hospitalization for a work-related case of COVID–19 does occur, the employer must report it within 24 hours of learning about the hospitalization.

Additionally, for purposes of this section, OSHA defines in-patient hospitalization as a formal admission to the in-patient services of a hospital or clinic for care or treatment (see 29 CFR 1904.39(b)(9) and (10)). The determination as to whether an employee is formally admitted into the in-patient service is made by the hospital or clinic. Treatment in an Emergency Room only is not reportable.

I. Work-Relatedness Determinations

Given the nature of the disease, and the extent of community spread, in some cases, it may be difficult for an employer to determine whether an employee's COVID–19 illness is work-related, especially when an employee has experienced potential exposure both in and out of the workplace. For purposes of this ETS, when evaluating whether a fatality or in-patient hospitalization is the result of a work-related case of COVID–19, employers must follow the criteria in OSHA's recordkeeping regulation at 29 CFR 1904.5 for determining work-relatedness. Applying the criteria in 29 CFR 1904.5 under paragraph (r) of this standard is consistent with how employers make work-relatedness determinations when reporting fatalities and other serious events under 29 CFR 1904.39.

Under § 1904.5, employers must consider an injury or illness to be work-related if an event or exposure in the work environment either caused or contributed to the resulting condition, or significantly aggravated a pre-existing injury or illness. An injury or illness is presumed work-related if it results from events or exposures occurring in the work environment, unless an exception in § 1904.5(b)(2) specifically applies. Under this language, an injury or illness is presumed work-related if an event or exposure in the work environment is a discernable cause of the injury or illness (see 66 FR 66,943 (December 27, 2001)).

According to 29 CFR 1904.5(b)(3), the ''work environment'' includes the employer's establishment and any other location where work is performed or where employees are present as a condition of their employment. Under 29 CFR 1904.5(b)(3), employers should evaluate the employee's work duties and environment and determine whether it is more likely than not that exposure at work caused or contributed to the illness (see 66 FR 5958–59 (January 19, 2001)).

Because of the typical incubation period of 3 to 14 days, an employee's exposure to COVID–19 will usually be determined after the fact. Employers must make reasonable efforts to acquire the necessary information to make good-faith work-relatedness determinations under this section. In addition, the employer should rely on information that is reasonably available at the time of the fatality or in-patient hospitalization.

A work-related exposure in the work environment would likely include close contact with a person known to be infected with COVID–19 or common high-touch areas or items. For example, although work-relatedness must be determined on a case-by-case basis, if a number of COVID–19 illnesses develop among coworkers who work closely together without an alternative explanation, it is reasonable to conclude that an employee's fatality or in-patient hospitalization is work-related. On the other hand, if there is not a known exposure to COVID–19 that would trigger the presumption of work-relatedness, the employer must evaluate the employee's work duties and environment to determine whether it is more likely than not that the employee was exposed to COVID–19 during the course of their employment. Employers should consider factors such as:

- The type, extent, and duration of contact the employee had at the work environment with other people, particularly the general public.
- Physical distancing and other controls that impact the likelihood of work-related exposure.
- The extent and duration of time spent in a shared indoor space with limited ventilation.
- Whether the employee had work-related contact with anyone who exhibited signs and symptoms of COVID–19.

Since 1971, under OSHA's recordkeeping system, employers have been making work-relatedness determinations regarding workplace fatalities, injuries, and illnesses. In general, employers are in the best position to obtain information, both from the employee and the workplace, necessary to make a work-relatedness determination. Although employers may rely on experts and healthcare professionals for guidance, the determination of work-relatedness ultimately rests with the employer.

OSHA anticipates that the vast majority of employers who are subject to the reporting requirements in paragraph (r) of this ETS are already familiar with OSHA's reporting requirements in 29 CFR 1904.39. In fact, many of the healthcare providers subject to this ETS may have been involved in assisting non-healthcare employers in making work-relatedness determinations. OSHA expects that healthcare employers will typically report confirmed cases of COVID–19 among employees working in

areas where suspected or confirmed COVID–19 patients are treated absent evidence suggesting other sources. For example, if a nurse is working on a hospital floor dedicated to the treatment and care of COVID–19 patients, and there is an outbreak among co-workers, it is likely that a COVID illness contracted by the nurse is work-related, absent evidence of an outside exposure.

Finally, OSHA wishes to emphasize that, under OSHA's recordkeeping regulation at 29 CFR part 1904, employers must record on the OSHA 300 log each work-related fatality, injury, and illness reported to OSHA under § 1904.39. The work-relatedness determination for fatality and in-patient hospitalization is no different than the requirement to determine work-relatedness when entering fatalities, injuries and illness on the OSH 300 log. Accordingly, the work-relatedness determination for reporting COVID–19 fatalities and in-patient hospitalizations is a determination that is already required to be made by the employer.

II. Time Periods for Reporting COVID–19 Fatalities and In-Patient Hospitalizations

As noted above, under paragraph (r), employers must report each work-related COVID–19 fatality or hospitalization to OSHA within the specified timeframes based on when any agent or employee of the employer becomes aware of the reportable event. For example, an employer ''learns'' of a COVID–19 fatality or in-patient hospitalization when a supervisor, receptionist, or other employee at the company receives information from a family member or medical professional about an employee fatality or in-patient hospitalization. It is the employer's responsibility to ensure that appropriate instructions and procedures are in place so that managers, supervisors, medical personnel, as well as other employees or agents of the company, who learn of an employee's death or in-patient hospitalization due to COVID–19 know that the company must make a report to OSHA.

Consistent with OSHA's regulation at 29 CFR 1904.39, the reporting clock begins to run with the occurrence of the reportable event. Under paragraph (r), in situations where the employer or the employer's agent does not learn about the work-related COVID–19 fatality or in-patient hospitalization right away, the employer must make the report to OSHA within 8 hours for a fatality, or 24 hours for an in-patient hospitalization, from the time the employer (or the employer's agent) learns about the reportable event. For example, if an employee dies from a work-related case of COVID–19 on Sunday at 6:00 a.m., but the employer does not learn about the death until Monday at 8:00 a.m., the employer has until 4:00 p.m. that day to make the report to OSHA. Similarly, if an employee is in-patient hospitalized for a work-related case of COVID–19 at 8:30 p.m. on Monday, but the employer or the employer's agent(s) does not learn about the hospitalization until 9:00 a.m. the next day (Tuesday), then the employer would be required to make the report to OSHA within 24 hours of learning of the in-patient hospitalization (*i.e.,* by 9:00 a.m. on Wednesday) (see 29 CFR 1904.39(b)(7)).

Likewise, if an employer does not learn right away that a reportable fatality or in-patient hospitalization is work-related, the employer must make the report to OSHA within 8 hours or 24 hours of learning that the death or in-patient hospitalization was the result of a work-related COVID–19 exposure. For example, if an employee is in-patient hospitalized for a case of COVID–19 at 9:00 a.m. on Monday, but the employer does not have enough information to make a work-relatedness determination until 11:00 a.m. on Monday, then the employer would be required to report the hospitalization within 24 hours of learning that the hospitalization was work-related (*i.e.,* by 11:00 a.m. on Tuesday) (see 29 CFR 1904.39(b)(8)).

Finally, if an employer makes a report to OSHA concerning a work-related COVID–19 in-patient hospitalization and that employee subsequently dies from the illness, the employer does not need to make an additional fatality report to OSHA.

III. How To Report COVID–19 Fatalities and In-Patient Hospitalizations and What Information Must be Included in the Report

Paragraph (r)(2) of the standard provides that when reporting work-related COVID–19 fatalities and in-patient hospitalizations to OSHA in accordance with paragraph (r)(1), the employer must follow the requirements in 29 CFR part 1904.39, except for 29 CFR 1904.39(a)(1)–(2) and (b)(6). As explained above, OSHA has included specific provisions for the reporting of work-related COVID–19 fatalities and in-patient hospitalizations that differ from 29 CFR 1904.39. However, when making COVID–19 fatality and in-patient hospitalization reports to OSHA, employers must follow the other reporting procedures set forth in § 1904.39. Specifically, under § 1904.39(a)(3), employers have three options for reporting work-related fatalities and in-patient hospitalizations to OSHA:

1. By telephone to the OSHA Area Office that is nearest to the site of the incident;

2. By telephone to the OSHA toll-free central telephone number, 1–800–321–OSHA (1–800–321–6742);

3. By electronic submission using the reporting application located on OSHA's public website at *www.osha.gov*.

Section 1904.39(a)(3) also allows employers to report work-related fatalities and in-patient hospitalizations to OSHA in person to the OSHA Area Office that is nearest to the site of the incident. However, because many OSHA Area Offices are closed to the public during the COVID–19 pandemic, employers must use one of the three options listed above. In addition, § 1904.39(b)(1) makes clear that, if the OSHA Area Office is closed, an employer may not report a work-related fatality or in-patient hospitalization by leaving a message on OSHA's answering machine, faxing the Area Office, or sending an email. Instead, the employer must make the report by using the 800 number or the reporting application located on OSHA's public website at *www.osha.gov*.

The other provisions in 29 CFR 1904.39 (except for 29 CFR 1904.39(a)(1) and(2) and (b)(6)) also apply to the reports required by paragraph (r). For example, employers should consult 29 CFR 1904.39(b)(2) to determine what information employers must give to OSHA when making reports of COVID–19 fatality or in-patient hospitalization. Per that provision, employers must give OSHA the following information for each fatality or in-patient hospitalization: The establishment name, the location of the work-related incident, the time of the work-related incident, the type of reportable event (*i.e.,* fatality or in-patient hospitalization), the number of employees who suffered a fatality or in-patient hospitalization, the names of the employees who suffered a fatality or in-patient hospitalization, the employer's contact person and his or her phone number, and a brief description of the work-related incident.

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R. Dates

To minimize transmission of COVID–19 in the workplace, it is essential that employers ensure that the provisions of this ETS are implemented as quickly as possible, but no later than the dates outlined in paragraph (s). This paragraph sets forth the effective date of the section and the compliance dates for specific requirements of the standard. Additionally, paragraph (e) of the mini respiratory protection program section of this ETS (29 CFR 1910.504) contains the effective date for that section. The effective date for both the healthcare and the mini respiratory protection program sections, as required by section 6(c)(1) of the OSH Act (29 U.S.C. 655(c)(1)), is the date of publication in the **Federal Register**. The compliance date for all provisions in the healthcare section is 14 days after the effective date, except for paragraphs (i), (k), and (n), which must be complied with within 30 days of the effective date. Given the delayed compliance dates in this section, and the fact that the mini respiratory protection program section applies only to respirator use in accordance with certain provisions in this section, OSHA has determined it is unnecessary to also include compliance dates in the mini respiratory protection program section. The Secretary determined that all requirements under §§ 1910.502 and 1910.504 are necessary and feasible. Given the grave danger to healthcare employees from occupational exposure to COVID–19, as previously described, the effective date and compliance dates provided for this ETS are reasonable and appropriate.

For over a year—since at least January 2020, when the Secretary of Health and Human Services declared COVID–19 to be a public health emergency for the entire United States—all healthcare employers have been made acutely aware of the importance of minimizing employees' exposure to COVID–19 and many have willingly joined the global response to stop the spread of COVID–19. Therefore, OSHA anticipates that many healthcare employers will already be compliant with many of the requirements of this standard by the effective date. However, the rule provides flexibility for employers who may need some time to become compliant with all of the provisions in the ETS. OSHA set the compliance dates to allow sufficient time for employers to obtain and read the standard, figure out its requirements, and undertake the necessary steps for compliance.

OSHA anticipates that employers will be able to implement measures to comply with most provisions of the standard within 14 days. Even in situations where an employer has not previously taken the necessary steps to address COVID–19 hazards in the workplace, the requirements for COVID–19 plans, physical distancing, and most other measures required under the standard can readily be met within the 14-day time period. These measures do not require extensive lead times to implement. Similarly, the mini respiratory protection program in § 1910.504 was expressly designed to simplify compliance for employers, and such a program can be readily implemented.

The standard provides a longer period of time for employers to comply with the requirements for physical barriers. Paragraph (i) requires the use of cleanable or disposable solid barriers at fixed work locations outside of direct patient care areas when physical distancing cannot be maintained, unless the employer can demonstrate barriers are not feasible. Many employers installed physical barriers prior to the publication of this ETS in order to mitigate the risks of COVID–19 exposure, but OSHA anticipates that some employers may need to adjust existing barriers or install new barriers to comply with the standard. Some of these employers may find it necessary to use designs that require custom fabrication or installation by contractors. Consequently, the standard provides 30 days from the date of publication before compliance with the provision addressing physical barriers is required so that employers have adequate time, where necessary, to design and install effective barriers in their workplaces.

The standard also provides a longer period of time for employers to comply with the ventilation requirements. Paragraph (k) requires employers to ensure existing HVAC systems serving their workplace are used in accordance with the HVAC manufacturer's instructions, the design specifications of the HVAC system(s), and the requirements in this paragraph. The ventilation provision also requires employers to ensure the use of MERV–13 filters or the highest-efficiency filters that are compatible with their HVAC system and to replace filters as necessary. OSHA anticipates that some employers may need additional time to assess their existing HVAC systems to ensure they are operating in accordance with the requirements of the standard, including upgrading filters when necessary. For example, some employers may need to make arrangements with an HVAC technician to assess, adjust, and maintain the HVAC system. Consequently, the standard provides 30 days from the date of publication in the **Federal Register** before compliance with the provisions addressing ventilation of workplaces is required.

Finally, OSHA has provided employers with additional time (again, 30 days from the effective date) to comply with the training requirements in paragraph (n). Paragraph (n) requires employers to provide training to each employee and, as per paragraph (n)(3) of that section, to ensure that the training is overseen or conducted by a person knowledgeable in the covered subject matter as it relates to the employee's job duties. Additionally, paragraph (n)(4) requires training which provides an opportunity for interactive questions and answers with a person knowledgeable in the covered subject matter. Because of these additional requirements, OSHA recognizes that employers may need more time to fully meet the training requirements in paragraph (n). Therefore, the standard requires compliance with the training provisions in the healthcare section within 30 days from the date of publication in the **Federal Register**.

Compliance with the requirements of the ETS within the specified dates is achievable. Many employers are likely already in compliance with many of the provisions of the ETS, such as provisions for physical distancing, physical barriers, and cleaning and disinfection. Resources are also readily available to help employers achieve compliance. These resources include guidance issued by OSHA, the CDC, state and local governments, trade associations, and other organizations to help employers understand the risks and successfully minimize the transmission of COVID–19 in the workplace. OSHA therefore concludes that the compliance dates in this ETS are reasonable.

Still, OSHA's experience with promulgating standards shows that, in isolated circumstances, some employers will, despite their best efforts, be unable to comply with all requirements by the specified compliance dates. In particular, OSHA recognizes that requirements for physical barriers and ventilation may involve factors that are outside of the employer's control. For example, in exceptional circumstances, specialized barriers may require design, fabrication, and installation that may require more than 30 days to complete. OSHA is willing to use its enforcement discretion in situations where an

employer can show it has made good-faith efforts to comply with the requirements of the standard, but has been unable to do so.

S. Mini Respiratory Protection Program

Compliance with the mini respiratory protection program section of the ETS (29 CFR 1910.504) is required whenever respirators are used in lieu of required facemasks under § 1910.502. The mini respiratory protection program is designed to improve employee protections during the pandemic by streamlining respiratory protection program requirements under the ETS. This program provides a limited set of requirements for the safe use of respirators; these requirements are meant to be easier and quicker to implement than the more comprehensive respiratory protection program under 29 CFR 1910.134. OSHA designed the mini respiratory protection program to allow employers and employees increased flexibility in selecting respirators while ensuring that employees remain protected. The rationale for including the mini respiratory protection program section in the ETS is discussed in more detail in the *Need for Specific Provisions* (Section V of the preamble).

Paragraph (a) establishes that the mini respiratory protection program section applies only to respirator use in accordance with § 1910.502 (f)(4). In any other situation where respirator use is required under the ETS (or another OSHA standard), the employer must follow the requirements in OSHA's respiratory protection standard, 29 CFR 1910.134. This includes when respirator use is required under § 1910.502 (f)(2)(i) for exposure to people with suspected or confirmed COVID–19; under § 1910.502 (f)(3)(i) for aerosol-generating procedures performed on a person with suspected or confirmed COVID–19; under § 1910.502 (f)(5) based on Standard and Transmission-Based Precautions; and where respirator use is required for protection from any hazards other than COVID–19.

Under § 1910.502 (f)(4), employers must comply with the mini respiratory protection program section when they elect to provide a respirator to an employee instead of a facemask (paragraph (f)(4)(i)) or permit an employee to wear an employee-provided respirator instead of a facemask (paragraph (f)(4)(ii)).

Paragraph (b) of the mini respiratory protection program section contains the definitions used in that section. Most of the definitions have already been discussed in other sections of the preamble. The previously discussed definitions are COVID–19, elastomeric respirator, filtering facepiece respirator, hand hygiene, respirator, and powered air-purifying respirator (PAPR). The definitions of tight-fitting respirator, and user seal check are explained below, where paragraph (d)(2) is discussed.

Paragraph (c) of the mini respiratory protection program section applies to respirators provided by employees, as opposed to employer-provided respirators. When the employer permits an employee to use the employee's own respirator under § 1910.502(f)(4)(ii), the employer must provide the employee with a specific notice, the text of which is included in paragraph (c) of the mini respiratory protection program section. The notice is similar to the notice provided to employees for voluntary respirator use under 29 CFR 1910.134, Appendix D. It explains that respirators can provide effective protection against COVID–19 hazards when properly selected and worn, but notes that a respirator can itself become a hazard if used improperly or not kept clean. The notice also instructs employees to read and follow the respirator manufacturer's instructions and warnings and to ensure that they do not mistakenly use another person's respirator. Further, the notice tells employees that if they need a respirator for a non-COVID–19 hazard, such as a chemical hazard, then their employer must provide them with a respirator and ensure that it is used in accordance with 29 CFR 1910.134. Employers that must comply with this paragraph have substantial flexibility in how they provide the information to the employee. The agency expects that most employers will simply provide the information in written form, either through a printed page of information or electronically through a company email system. Employers could also deliver the information orally through a training session.

Paragraph (d) of the mini respiratory protection program section applies to employer-provided respirators, in contrast to employee-provided respirators. Paragraph (d) applies whenever employers provide respirators, instead of facemasks, to their employees under § 1910.502(f)(4)(i). The use of FFRs, elastomeric respirators, and PAPRs is covered under paragraph (d), although a small number of individual provisions apply only to particular categories of respirators (*e.g.,* paragraph (d)(3)(i) of the mini respiratory protection program section applies only to FFRs).

Paragraph (d)(1) of the mini respiratory protection program section requires employers to ensure that each employee wearing a respirator receives training prior to first use of the respirator and whenever the employee begins using a different type of respirator. Employee training is an essential component of any OSHA standard, and is needed so employees understand the requirements of the standard and what must be done to keep themselves safe. In keeping with other OSHA training requirements, the training must be given in a language and at a literacy level the employee understands. The training must result in employee comprehension of how to inspect, put on, use, and remove the respirator. The employee must also understand the limitations and capabilities of the respirator, including limitations when the respirator has not been fit tested. Because employees are not required to be fit tested under the mini respiratory protection program section as they are under 29 CFR 1910.134, a key aspect of this portion of the training is to emphasize that without a fit test, an employer has less control over whether employees are receiving the full, expected level of protection that a respirator is capable of providing to the wearer. In the absence of a fit test, the employer should inform the employee that a user seal check is very important to determining whether the respirator is properly placed on their face in order to allow the respirator to function as intended. After the training is provided, the employee must also comprehend the proper way to store, maintain, and inspect the respirator; how to perform a user seal check; and how to recognize medical signs and symptoms that may limit or prevent the effective use of the respirator, along with what to do if the employee experiences those signs and symptoms.

Employers have substantial flexibility regarding the format in which training is provided under the mini respiratory protection program section of this ETS. The training can be provided along with the other training required under § 1910.502(n), or it can be provided separately. Training may be provided in-person, remotely through online training, or by distributing educational materials. The requirement for employee comprehension of the training materials does not require a formal test and may be assessed in other ways so long as the employer can ensure that the requirement for comprehension has been met. Employers looking for training resources on respiratory protection can consult OSHA's website for materials and information.

Paragraph (d)(2) of the mini respiratory protection program section requires the employer to ensure that each employee who uses a tight-fitting

respirator performs a user seal check each time they put on the respirator. A *tight-fitting respirator* is defined as a respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator (*e.g.,* filtering facepiece). Tight-fitting respirators include all FFRs (*e.g.,* N95s) and most elastomeric respirators, and under paragraph (d)(2) of the mini respiratory protection program section, they require a user seal check. Many PAPRs used in healthcare settings are loose-fitting and therefore do not require a user seal check. *User seal check* is defined as an action conducted by the respirator user to determine if the respirator is properly seated to the user's face. A user seal check ensures an adequate seal is achieved, and can be conducted by either a positive pressure or negative pressure check.

Under paragraph (d)(2) of the mini respiratory protection program section, employers must ensure that employees perform a user seal check each time a tight-fitting respirator is put on. This requirement is meant to ensure that the respirator is properly seated on the user's face (*i.e.,* that the proper seal has been achieved) whenever they are wearing it. Paragraphs (d)(2)(i)(A) and (B) of the mini respiratory protection program section explain methods for conducting positive pressure and negative pressure seal checks. Both methods require, as the first step, that the employee conducts proper hand hygiene and properly dons their respirator. When conducting hand hygiene in most clinical settings, the CDC recommends use of an alcohol-based hand rub over soap and water, unless hands are visibly soiled; this is due to evidence of better compliance with the use of hand rub compared to soap and water. However, the CDC does recommend that healthcare workers wash their hands for at least 20 seconds with soap and water when hands are visibly dirty, before eating, and after using the restroom (CDC, May 17, 2020).

As described in paragraph (d)(2)(i)(A), the proper method for conducting a positive pressure user seal check is to have the employee exhale into the respirator while covering the filter surface with their hands. If there is no evidence of leaks and the employee can feel a slight outward pressure on the surface of the respirator, proper fit has likely been achieved and the fit is considered satisfactory. The proper method for performing a negative pressure user seal check, under paragraph (d)(2)(i)(B), is to have the employee inhale while covering the filter surface with their hands. Proper fit has likely been achieved, and the fit is considered satisfactory, if the respirator collapses on the face and the employee does not feel air passing between their face and the facepiece of the respirator. Paragraph (d)(2)(ii) of the mini respiratory protection program section requires the employer to ensure that the employee corrects any seal problems discovered during the user seal check by readjusting how the respirator sits on the employee's face, readjusting the nosepiece, if applicable, and readjusting the straps along the sides of the head.

When an employee is required to wear a respirator and a problem with the seal check arises due to interference with the seal by an employee's facial hair, a note to paragraph (d)(2)(i) and (ii) of the mini respiratory protection program section reminds employers that they may provide a different type of respirator to accommodate an employee who cannot trim or cut facial hair due to their religious beliefs. In such cases, if the employee cannot achieve a seal with a FFR or elastomeric respirator, a loose-fitting PAPR may be the only alternative that provides effective protection.

Paragraph (d)(3) of the mini respiratory protection program section describes the requirements employers must follow for reuse of respirators that are provided by the employer, with specific requirements for FFRs (paragraph (d)(3)(i)) and for elastomeric respirators and PAPRs (paragraph (d)(3)(ii)). Reuse of respirators has been necessary in some cases during the COVID–19 pandemic, particularly at the beginning of the pandemic when shortages of respirators were most acute. When respirators are reused, it is important that proper procedures are followed and that reuse is limited to ensure they continue to effectively protect the user.

Paragraph (d)(3)(i) of the mini respiratory protection program section describes the requirements for reuse of FFRs. FFRs are designed and manufactured as disposable items of personal protective equipment that should normally be discarded after a single use. Therefore, the note to paragraph (d)(3)(i) states that reuse of single-use respirators is discouraged. Reuse of FFRs used under this section, however, poses less of a concern than reuse of respirators used in other situations, given that there should be no suspected or confirmed sources of COVID–19 present when such reuse occurs. Even so, it is important that reuse of FFRs is permitted only under the conditions set out in paragraph (d)(3)(i).

There are several requirements for the reuse of FFRs under paragraph (d)(3)(i) of the mini respiratory protection program section. The employer must ensure that an FFR is only reused by one employee, and that it is only reused when not visibly soiled or damaged. The employer must ensure that the employee visually checks the respirator's fabric and seal for damage in adequate lighting. In addition, the employer must ensure that the employee completes the user seal check (as described in paragraph (d)(2) of the same section) before each use. As explained earlier, the user seal check is needed to ensure the respirator is properly seated on the user's face. The employer must also ensure that the employee uses proper hand hygiene before putting on their respirator and conducting the user seal check. Proper hand hygiene will help keep the respirator clean and avoid the transmission of potentially infectious material from the employee's hands to the respirator.

The employer must ensure that each FFR reused in accordance with paragraph (d)(3)(i) of the mini respiratory protection program is not worn for more than five days, in total. This limit is generally consistent with CDC guidance, which recommends that, in the absence of guidance from the manufacturer, reuse be limited to no more than five uses per device to ensure adequate respirator performance (CDC, April 9, 2021). The CDC's technical literature regarding how to ensure safe reuse of an FFR discusses the number of times a user may don a single FFR, as well as variability among FFRs made by different manufacturers. Given these factors, OSHA has set the limit at five days to provide flexibility and improve the feasibility of the standard, while ensuring employees remain protected. It should also be noted that the inspection of the respirator, as well as the user seal check, both of which must be performed by the employee each time a respirator is put on, provide additional safeguards to ensure the respirator is still in proper condition for reuse. It is also important that employers track usage to ensure that each respirator is discarded after five days of use. One way to do so is to attach a small tag to a respirator strap and mark it after each day's use. Similarly, a tag could be attached to the respirator's storage bag to track total use, or the information could be written directly on a paper bag.

Finally, under paragraph (d)(3)(i) of the mini respiratory protection program, employers must also ensure that each reused respirator is stored in a breathable container, such as a paper

bag or hard container with air holes, for at least five calendar days between use. This provides time for pathogens that may be on the respirator to ''die off'' during storage and avoids exposing the employee to those pathogens during subsequent usage. The respirator must also be stored in a dry place to avoid exposure to water and moisture, which could deform the respirator and lead to poor fit.

Combining the five-day total use limitation with the five-day rest requirement, the employer could direct the employee to wear one FFR each day and store it in a breathable paper bag at the end of each day, rotating to the next respirator each day. This strategy requires a minimum of five FFRs per five-day period per employee and an effective and user-friendly tracking system to make sure that each respirator is used in the proper sequence. The five respirators, each used five times, would provide respiratory protection for the employee for 25 days. More information on FFR reuse is available from the CDC (October 19, 2020).

Paragraph (d)(3)(ii) of the mini respiratory protection program section contains the requirements employers must comply with when employees are reusing elastomeric respirators and PAPRs that are provided by the employer. Reusing these respirators is much simpler than reusing FFRs because elastomeric respirators and PAPRs are designed for reuse and made of more durable materials. The employer must ensure that the respirator is not damaged, which will be identified when the employee inspects the respirator before each use. The respirator must be cleaned and disinfected as often as necessary to be maintained in a sanitary condition following the requirements of 29 CFR 1910.134, Appendix B–2. Further, the employer must implement a change schedule for filter cartridges, canisters, or filters that is consistent with the manufacturer's recommendations. For more information about reuse of elastomeric respirators and PAPRs during the pandemic, refer to the CDC Guidance for Contingency and Crisis Strategies (CDC, October 13, 2020; CDC, November 3, 2020, respectively).

Finally, paragraph (d)(4) of the mini respiratory protection program section requires the employer to ensure that an employee discontinues use of a respirator if the employee or supervisor reports medical signs or symptoms related to the employee's ability to use a respirator. These signs and symptoms include shortness of breath, coughing, wheezing, or chest pain. They also include any signs or symptoms related to problems associated with lung or cardiovascular function. If an employee has had a previous medical evaluation that determined they were medically unfit for respirator use, the employer must not provide them with a respirator until they are re-evaluated and medically cleared to use a respirator. These provisions are necessary because the medical evaluation that would normally be required by the 29 CFR 1910.134 respiratory protection standard is not required in the mini respiratory protection program section, and it is important to ensure that employee health is not compromised by respirator use.

Paragraph (e) contains the effective date for the mini respiratory protection program. The effective date is consistent with the effective date for § 1910.502; the mini respiratory protection program section becomes effective on the date of publication. A compliance date specific to the mini respiratory protection program is not included, as compliance with these provisions would be required on the compliance dates for § 1910.502(f) (*i.e.,* within 14 days of publication). For more information on compliance dates, please see the *Summary and Explanation* on Dates (Section VIII of this preamble).

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T. Severability

The severability clause under 29 CFR 1910.505 of this ETS serves two purposes. First, it expresses OSHA's intent that if any section or provision of the ETS is held invalid or unenforceable or is stayed or enjoined by any court of competent jurisdiction, the remaining sections or provisions should remain effective and operative. Second, the severability clause also serves to express OSHA's judgment, based on its technical and scientific expertise, that each individual section and provision of the ETS can continue to sensibly function in the event that some sections or provisions are invalidated, stayed, or enjoined.

Under the principle of severability, a reviewing court will generally presume that an offending provision of a regulation is severable from the remainder of the regulation, so long as that outcome appears consistent with the issuing agency's intent, and the remainder of the regulation can function sensibly without the offending provision. See *K Mart Corp.* v. *Cartier, Inc.,* 486 U.S. 281, 294 (1988) (invalidating and severing subsection of a regulation where it would not impair the function of the statute as a whole and there was no indication the regulation would not have been passed but for inclusion of the invalidated subsection); *Virginia* v. *EPA,* 116 F.3d 499, 501 (D.C. Cir. 1997) (same); *Davis Cnty. Solid Waste Mgmt.* v. *EPA,* 108 F.3d 1454, 1459–60 (D.C. Cir. 1997) (same). The principle of severability has always applied to OSHA's standards, including OSHA's prior ETSs, and reviewing courts have regularly severed invalid provisions, or prohibited invalid applications, of both OSHA's permanent and emergency standards, while allowing the remainder of the standards to continue in effect. See *e.g., Am. Dental Ass'n* v. *Martin,* 984 F.2d 823, 830–31 (7th Cir. 1993) (affirming and allowing most of OSHA's bloodborne pathogens standard to take effect while vacating application of the standard to certain employers); *United Steelworkers of Am., AFL–CIO–CLC* v. *Marshall,* 647 F.2d 1189, 1311 (D.C. Cir. 1980) (affirming and allowing most of OSHA's lead standard to take immediate effect while staying application of the standard to certain industries pending further agency action); *Dry Color Mfrs. Ass'n, Inc.* v. *Dep't of Labor,* 486 F.2d 98, 108–09 (3d Cir. 1973) (vacating and remanding OSHA's ETS on carcinogens as to only 2 of 14 regulated chemicals, allowing ETS to take effect as to

remaining 12 chemicals); *cf. N. Am.'s Bldg. Trades Unions* v. *OSHA,* 878 F.3d 271, 309 (D.C. Cir. 2017) (affirming and allowing all of OSHA's silica standard to take effect while remanding for reconsideration of decision not to require broader medical removal protection provisions).

With respect to this ETS, it is OSHA's intent that all provisions and sections be considered severable. In this regard, the agency intends that: (1) In the event that any provision within a section of the ETS is stayed, enjoined, or invalidated, all remaining provisions within that section shall remain effective and operative; (2) in the event that any whole section of the ETS is stayed, enjoined, or invalidated, all remaining sections shall remain effective and operative; and (3) in the event that any application of a provision is stayed, enjoined, or invalidated, the provision shall be construed so as to continue to give the maximum effect to the provision permitted by law. Although OSHA always intends for a presumption of severability to be applied to its standards, the agency has opted to include an explicit severability clause in this ETS to remove any potential for doubt as to its intent. OSHA determined that such clarity is useful here given the unique nature of this emergency rulemaking proceeding, the unprecedented hazard at issue, and the urgent need for implementation of this ETS without delay. Having identified a grave danger to healthcare employees that requires immediate emergency rulemaking (see Section IV of the preamble), it is OSHA's intent to have as many protective measures in place as quickly as possible to begin to reduce the hazard of exposure to COVID–19 in the workplace. Thus, should a court of competent jurisdiction determine that any provision or section of this ETS is invalid on its face or as applied, the court should presume that OSHA would have issued the remainder of the ETS without the invalidated provision(s) or application(s). Similarly, should a court of competent jurisdiction determine that any provision, section, or application of this ETS is required to be stayed or enjoined, the court should presume that OSHA intends for the remainder of the ETS to take effect as specified in the rule. See *Casa de Maryland, Inc.* v. *Wolf,* 486 F. Supp. 3d 928, 973 (D. Md. 2020) (noting that existence of a severability clause creates a presumption that the agency did not intend the validity of the remaining rules to depend on the validity of the offensive provision and thus without strong evidence to the contrary objectionable provision should be severed); *Consumer Fin. Prot. Bureau* v. *Mortg. Law Grp., LLP,* 182 F. Supp. 3d 890, 894–95 (W.D. Wis. 2016) (finding severability clause a clear expression of agency intent and therefore severing specific offending requirements within an otherwise valid provision); *cf. Alaska Airlines, Inc.* v. *Brock,* 480 U.S. 678, 686 (1987) (holding that inclusion of a severability clause in a statute creates a presumption of Congress's intent).

It is also OSHA's position, based on its technical and scientific expertise, that each of the provisions and sections of the ETS can continue to function sensibly in the event that any specific provisions, sections, or applications are invalidated, enjoined, or stayed. As explained in greater detail in *Need for Specific Provisions* (Section V of this preamble), and specifically in the subsection *Introduction—Effective Infection Prevention Utilizes Overlapping Controls,* the best available evidence shows that each control measure required by this ETS is important both individually and collectively to protect healthcare employees from the grave danger of COVID–19. The ETS requires employers to implement multiple infection control measures together because an infection control program is most effective when it utilizes a suite of overlapping controls in a layered approach. This ensures that no inherent weakness in any one measure will result in an infection incident. As noted in Section V of the preamble, this is commonly referred to as the ''Swiss Cheese Model of Accident Causation,'' which recognizes that each control has certain weaknesses or ''holes,'' and that by stacking several controls together with different weaknesses, the ''holes'' are blocked by the strengths of the other controls. However, while these control measures work best when used together, each individual measure will still independently result in some reduction of risk to employees, regardless of the implementation of any other measure. Indeed, to the extent any individual measures are not implemented, the remaining measures become increasingly more important as a means of reducing the hazard of COVID–19 to which employees are exposed. Accordingly, if a court of competent jurisdiction were to invalidate, enjoin, or stay any protections required by this ETS, the remaining protections would still serve to reduce the risk of employee exposure to COVID–19—becoming more important in that role absent the invalidated, enjoined, or stayed provisions—and, therefore, should be allowed to take effect. Moreover, as described in greater detail in *Technological Feasibility* (Section VI.A. of the preamble), each of the individual protective measures required by this ETS is capable of being implemented independent of all other measures. While OSHA has emphasized throughout this rule that a multilayered approach is intended for the ETS, the various requirements imposed by this ETS are not required to rise or fall as a whole.

OSHA notes that 29 CFR 1910.504, the mini respiratory protection program, applies only to respirator use in accordance with § 1910.502(f)(4). Thus, in the event that § 1910.502(f)(4) specifically is stayed, enjoined, or invalidated, the mini respiratory protection program should also be stayed, enjoined, or invalidated, as it cannot function sensibly in that context. OSHA also notes that in the event that the entirety of 29 CFR 1910.502 is stayed, enjoined, or invalidated, the remaining sections of the ETS—including the mini respiratory protection program, severability, and incorporation by reference—should also be stayed, enjoined or invalidated, as their implementation is dependent on the existence of § 1910.502.

The severability clause contained in the ETS is included to make clear OSHA's intent that the general presumption of severability should be applied to this standard. The clause is further included to make clear that, in the agency's scientific and technical judgment, and with the exceptions noted above, the severance of any provisions, sections, or applications of this ETS will not undercut the structure or function of the rule more broadly. Consequently, in the event that a court of competent jurisdiction stays, enjoins, or invalidates any provision, section, or application of this ETS, the remainder of the rule should be allowed to take effect, particularly given the urgent need to address the grave danger COVID–19 poses to healthcare employees.

U. Incorporation by Reference

OSHA's ETS incorporates by reference a number of consensus standards and evidence-based guidelines. Those documents, which are listed below, will all be fixed in time and made publicly available. To aid readers in locating the publicly available copies of those documents, OSHA has created a new centralized incorporation by reference (IBR) section, 29 CFR 1910.509, that is specific to the ETS provisions in subpart U of 29 CFR part 1910. For the benefit of the reader and for administrative convenience, this centralized IBR section is located in the

same subpart. If the ETS is not made permanent, 29 CFR 1910.509 will expire along with the rest of subpart U. If the ETS is made permanent, OSHA intends to recodify the standards from 29 CFR 1910.509 into 29 CFR 1910.6, the centralized IBR section for part 1910.

In this new section, OSHA is including a list of the titles, editions/versions, and years of the incorporated documents. Stakeholders may consult 29 CFR 1910.509 both to locate all of the documents incorporated by reference in subpart U (the paragraph in which the document is incorporated is listed there) and to find more details regarding how to locate the specific consensus standard and guidelines that have been incorporated by reference in the ETS.

OSHA recognizes that the Centers for Disease Control and Prevention (CDC) and the Environmental Protection Agency (EPA) may update their guidelines based on the most current available scientific evidence, but OSHA is only requiring compliance with the standards or guidelines incorporated by reference, which are fixed in time at the point of publication.

OSHA notes that the ETS largely tracks CDC guidance, some of which is labeled as recommendations or guidance and is not always expressed in mandatory terms. As discussed in the *Need for the ETS* (Section IV.B. of this preamble), while non-mandatory guidance has been effective for informing the public, it is not sufficiently protective, and thus is not a meaningful alternative to a mandatory standard. The CDC has limited regulatory authority, such that many of its recommendations are framed in non-mandatory terms, including the documents incorporated by reference in this ETS. Nevertheless, as discussed in detail elsewhere in this preamble, OSHA has reviewed those materials and determined that compliance with the safety measures and specific instructions in the CDC materials is important to protect workers. OSHA is concerned that converting these hundreds of pages into regulatory text would be cumbersome and make the ETS more difficult for employers and employees to understand and comply with. Moreover, OSHA believes that many employers and employees are already familiar with existing CDC materials and thus incorporation by reference will therefore facilitate compliance. Therefore, while OSHA is incorporating those materials by reference, compliance with the recommendations will be mandatory. OSHA will be able to cite employers who do not follow them. Compliance with all applicable provisions of the incorporated document is required where the provisions into which they are incorporated are mandatory, whether the incorporated document sets out its directions in mandatory language or recommendations. OSHA recognizes that the documents incorporated by reference into the ETS may become outdated when newer versions of those documents are published or other entities revise those documents. In that case, OSHA will work quickly to update the ETS through a new rulemaking or issue enforcement guidance, as appropriate. But OSHA also has a longstanding de minimis enforcement policy to allow employers to rely on documents that are at least as protective.

OSHA is incorporating by reference (in 29 CFR 1910.509) the materials below. A brief description of each consensus standard and guideline is provided in the text below. A description of their use can be found in the Regulatory Text, and *Summary and Explanation* (Section VIII of this preamble), where the standards and guidelines are referenced.

Regulatory Text—§ 1910.502(b)

ANSI/ISEA Z87.1 (2010, 2015, and 2020) Occupational and Educational Personal Eye and Face Protection Devices: These consensus standards, versions dated 2010, 2015, and 2020, provide criteria and requirements for selection, use, and maintenance of the different face and eye protectors to eliminate hazards such as liquid splash and droplets exposures in occupational and educational environments. The 2010 version was updated in 2015 and 2020 to add new and innovative designs and streamline language. These consensus standards are available for purchase at *https://webstore.ansi.org/*.

Regulatory Text—§ 1910.502(j)(2)(ii)

CDC's Cleaning and Disinfecting Guidance (2021): This guidance provides direction on cleaning and disinfecting frequently touched surfaces, materials, and equipment regularly or when contaminated by a person who is COVID–19 positive using appropriate disinfectants and other equipment. This document is available at *www.osha.gov/coronavirus/ets/ibr*.

Regulatory Text—§ 1910.502(d)(3); 1910.502(j)(1)

CDC's COVID–19 Infection Prevention and Control Recommendations (2021): This guidance provides recommendations for routine infection prevention and control practices in healthcare settings to protect healthcare workers. This document is available at *www.osha.gov/coronavirus/ets/ibr*.

Regulatory Text—§ 1910.502(e); 1910.502(f)(5)

CDC's Guidelines for Isolation Precautions (Updated 2019): These guidelines provide direction on developing, implementing, and evaluating infection control programs for healthcare settings across a variety of care. It also provides guidance on reducing the prevalence of hospital-acquired infections. This document is available at *www.osha.gov/coronavirus/ets/ibr*.

Regulatory Text—§ 1910.502(j)(1)

CDC's Guidelines for Environmental Infection Control (2019): These guidelines provide evidence-based strategies for the prevention of environmentally mediated infection among healthcare workers and immunocompromised patients. Pages 86–103 and 147–149 focus on Environmental Services in healthcare settings. This document is available at *www.osha.gov/coronavirus/ets/ibr*.

Regulatory Text—§ 1910.502(l)(6)

CDC's Isolation Guidance (2021): This guidance provides steps to take when someone is experiencing COVID–19 symptoms and/or tested positive for COVID–19. This document is available at *www.osha.gov/coronavirus/ets/ibr*.

Regulatory Text—§ 1910.502(l)(6)

CDC's Return to Work Healthcare Guidance (2021): These guidelines provide guidance for occupational and public health professionals to develop policies to determine when an employee can return to work after quarantine and/or isolation in healthcare settings. This document is available at *www.osha.gov/coronavirus/ets/ibr*.

Regulatory Text—§ 1910.502(b)

EPA's List N (2021): The products listed in this list meet EPA's criteria for use against SARS–CoV–2 (COVID–19) to clean and disinfect surfaces. This document is available at *www.osha.gov/coronavirus/ets/ibr*.

Copies of the consensus standards are available for purchase from the issuing organizations at the addresses or through the other contact information listed in § 1910.509. The CDC and EPA documents are available at no cost through the contact information listed above. In addition, in accordance with § 1910.509(a)(1), these standards are available for inspection at any Regional Office of the Occupational Safety and Health Administration (OSHA), or at the OSHA Docket Office, U.S. Department of Labor, 200 Constitution Avenue NW, Room N–3508, Washington, DC 20210; telephone: 202–693–2350 (TTY number:

877–889–5627). Due to copyright issues, OSHA cannot post consensus standards on the OSHA website or through *www.regulations.gov*.

List of Subjects in 29 CFR Part 1910

COVID–19, Disease, Health facilities, Health, Healthcare, Incorporation by reference, Occupational health and safety, Public health, Quarantine, Reporting and recordkeeping requirements, Respirators, SARS–CoV–2, Telework, Vaccines, Viruses.

Authority and Signature

James S. Frederick, Acting Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, 200 Constitution Avenue NW, Washington, DC 20210, authorized the preparation of this document pursuant to the following authorities: Sections 4, 6, and 8 of the Occupational Safety and Health Act of 1970 (29 U.S.C. 653, 655, 657); Secretary of Labor's Order 8–2020 (85 FR 58393 (Sept. 18, 2020)); 29 CFR part 1911; and 5 U.S.C. 553.

James S. Frederick,

Acting Assistant Secretary of Labor for Occupational Safety and Health.

For the reasons set forth in the preamble, chapter XVII of title 29 of the Code of Federal Regulations is amended as follows:

PART 1910—OCCUPATIONAL SAFETY AND HEALTH STANDARDS

■ 1. Add subpart U to read as follows:

Subpart U—COVID–19 Emergency Temporary Standard

Sec.

1910.502 Healthcare.
1910.504 Mini Respiratory Protection Program.
1910.505 Severability.
1910.509 Incorporation by Reference.

Authority: 29 U.S.C. 653, 655, and 657; Secretary of Labor's Order No. 8–2020 (85 FR 58393); 29 CFR part 1911; and 5 U.S.C. 553.

§ 1910.502 Healthcare.

(a) *Scope and application.* (1) Except as otherwise provided in this paragraph, this section applies to all settings where any employee provides healthcare services or healthcare support services.

(2) This section does not apply to the following:

(i) The provision of first aid by an employee who is not a licensed healthcare provider;

(ii) The dispensing of prescriptions by pharmacists in retail settings;

(iii) Non-hospital ambulatory care settings where all non-employees are screened prior to entry and people with suspected or confirmed COVID–19 are not permitted to enter those settings;

(iv) Well-defined hospital ambulatory care settings where all employees are fully vaccinated and all non-employees are screened prior to entry and people with suspected or confirmed COVID–19 are not permitted to enter those settings;

(v) Home healthcare settings where all employees are fully vaccinated and all non-employees are screened prior to entry and people with suspected or confirmed COVID–19 are not present;

(vi) Healthcare support services not performed in a healthcare setting (*e.g.,* off-site laundry, off-site medical billing); or

(vii) Telehealth services performed outside of a setting where direct patient care occurs.

Note to paragraph (a)(2). OSHA does not intend to preclude the employers of employees who are unable to be vaccinated from the scope exemption in paragraphs (a)(2)(iv) and (v) of this section. Under various anti-discrimination laws, workers who cannot be vaccinated because of medical conditions, such as allergies to vaccine ingredients, or certain religious beliefs may ask for a reasonable accommodation from their employer. Accordingly, where an employer reasonably accommodates an employee who is unable to be vaccinated in a manner that does not expose the employee to COVID–19 hazards (*e.g.,* telework, working in isolation), that employer may be within the scope exemption in paragraphs (a)(2)(iv) and (v) of this section.

(3)(i) Where a healthcare setting is embedded within a non-healthcare setting (*e.g.,* medical clinic in a manufacturing facility, walk-in clinic in a retail setting), this section applies only to the embedded healthcare setting and not to the remainder of the physical location.

(ii) Where emergency responders or other licensed healthcare providers enter a non-healthcare setting to provide healthcare services, this section applies only to the provision of the healthcare services by that employee.

(4) In well-defined areas where there is no reasonable expectation that any person with suspected or confirmed COVID–19 will be present, paragraphs (f), (h), and (i) of this section do not apply to employees who are fully vaccinated.

Note 1 to paragraph (a). Nothing in this section is intended to limit state or local government mandates or guidance (*e.g.,* executive order, health department order) that go beyond the requirements of and are not inconsistent with this section.

Note 2 to paragraph (a): Employers are encouraged to follow public health guidance from the Centers for Disease Control and Prevention (CDC) even when not required by this section.

(b) *Definitions.* The following definitions apply to this section:

Aerosol-generating procedure means a medical procedure that generates aerosols that can be infectious and are of respirable size. For the purposes of this section, only the following medical procedures are considered aerosol-generating procedures: Open suctioning of airways; sputum induction; cardiopulmonary resuscitation; endotracheal intubation and extubation; non-invasive ventilation (*e.g.,* BiPAP, CPAP); bronchoscopy; manual ventilation; medical/surgical/postmortem procedures using oscillating bone saws; and dental procedures involving: Ultrasonic scalers; high-speed dental handpieces; air/water syringes; air polishing; and air abrasion.

Airborne infection isolation room (AIIR) means a dedicated negative pressure patient-care room, with special air handling capability, which is used to isolate persons with a suspected or confirmed airborne-transmissible infectious disease. AIIRs include both permanent rooms and temporary structures (*e.g.,* a booth, tent or other enclosure designed to operate under negative pressure).

Ambulatory care means healthcare services performed on an outpatient basis, without admission to a hospital or other facility. It is provided in settings such as: Offices of physicians and other health care professionals; hospital outpatient departments; ambulatory surgical centers; specialty clinics or centers (*e.g.,* dialysis, infusion, medical imaging); and urgent care clinics. Ambulatory care does not include home healthcare settings for the purposes of this section.

Assistant Secretary means the Assistant Secretary of Labor for Occupational Safety and Health, U.S. Department of Labor, or designee.

Clean/cleaning means the removal of dirt and impurities, including germs, from surfaces using soap and water or other cleaning agents. Cleaning alone reduces germs on surfaces by removing contaminants and may also weaken or damage some of the virus particles, which decreases risk of infection from surfaces.

Close contact means being within 6 feet of any other person for a cumulative total of 15 minutes or more over a 24-hour period during that person's potential period of transmission. The potential transmission period runs from 2 days before the person felt sick (or, for asymptomatic people, 2 days prior to test specimen collection) until the time the person is isolated.

Common areas means indoor or outdoor locations under the control of the employer that more than one person may use or where people congregate (*e.g.,* building lobbies, reception areas, waiting rooms, restrooms, break rooms, eating areas, conference rooms).

COVID–19 (Coronavirus Disease 2019) means the respiratory disease caused by SARS–CoV–2 (severe acute respiratory syndrome coronavirus 2). For clarity and ease of reference, this section refers to ''COVID–19'' when describing exposures or potential exposures to SARS–CoV–2.

COVID–19 positive and *confirmed COVID–19* refer to a person who has a confirmed positive test for, or who has been diagnosed by a licensed healthcare provider with, COVID–19.

COVID–19 symptoms mean the following: Fever or chills; cough; shortness of breath or difficulty breathing; fatigue; muscle or body aches; headache; new loss of taste or smell; sore throat; congestion or runny nose; nausea or vomiting; diarrhea.

COVID–19 test means a test for SARS–CoV–2 that is:

(i) Cleared or approved by the U.S. Food and Drug Administration (FDA) or is authorized by an Emergency Use Authorization (EUA) from the FDA to diagnose current infection with the SARS–CoV–2 virus; and

(ii) Administered in accordance with the FDA clearance or approval or the FDA EUA as applicable.

Direct patient care means hands-on, face-to-face contact with patients for the purpose of diagnosis, treatment, and monitoring.

Disinfect/disinfection means using an EPA-registered, hospital-grade disinfectant on EPA's ''List N'' (incorporated by reference, § 1910.509), in accordance with manufacturers' instructions to kill germs on surfaces.

Elastomeric respirator means a tight-fitting respirator with a facepiece that is made of synthetic or rubber material that permits it to be disinfected, cleaned, and reused according to manufacturer's instructions. It is equipped with a replaceable cartridge(s), canister(s), or filter(s).

Facemask means a surgical, medical procedure, dental, or isolation mask that is FDA-cleared, authorized by an FDA EUA, or offered or distributed as described in an FDA enforcement policy. Facemasks may also be referred to as ''medical procedure masks.''

Face shield means a device, typically made of clear plastic, that:

(i) Is certified to ANSI/ISEA Z87.1 (incorporated by reference, § 1910.509); or

(ii) Covers the wearer's eyes, nose, and mouth to protect from splashes, sprays, and spatter of body fluids, wraps around the sides of the wearer's face (*i.e.,* temple-to-temple), and extends below the wearer's chin.

Filtering facepiece respirator means a negative pressure particulate respirator with a non-replaceable filter as an integral part of the facepiece or with the entire facepiece composed of the non-replaceable filtering medium.

Fully vaccinated means 2 weeks or more following the final dose of a COVID–19 vaccine.

Hand hygiene means the cleaning and/or disinfecting of one's hands by using standard handwashing methods with soap and running water or an alcohol-based hand rub that is at least 60% alcohol.

Healthcare services mean services that are provided to individuals by professional healthcare practitioners (*e.g.,* doctors, nurses, emergency medical personnel, oral health professionals) for the purpose of promoting, maintaining, monitoring, or restoring health. Healthcare services are delivered through various means including: Hospitalization, long-term care, ambulatory care, home health and hospice care, emergency medical response, and patient transport. For the purposes of this section, healthcare services include autopsies.

Healthcare support services mean services that facilitate the provision of healthcare services. Healthcare support services include patient intake/admission, patient food services, equipment and facility maintenance, housekeeping services, healthcare laundry services, medical waste handling services, and medical equipment cleaning/reprocessing services.

High-touch surfaces and equipment means any surface or piece of equipment that is repeatedly touched by more than one person (*e.g.,* doorknobs, light switches, countertops, handles, desks, tables, phones, keyboards, tools, toilets, faucets, sinks, credit card terminals, touchscreen-enabled devices).

Physical location means a site (including outdoor and indoor areas, a structure, or a group of structures) or an area within a site where work or any work-related activity (*e.g.,* taking breaks, going to the restroom, eating, entering, or exiting work) occurs. A physical location includes the entirety of any space associated with the site (*e.g.,* workstations, hallways, stairwells, breakrooms, bathrooms, elevators) and any other space that an employee might occupy in arriving, working, or leaving.

Powered air-purifying respirator (PAPR) means an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

Respirator means a type of personal protective equipment (PPE) that is certified by NIOSH under 42 CFR part 84 or is authorized under an EUA by the FDA. Respirators protect against airborne hazards by removing specific air contaminants from the ambient (surrounding) air or by supplying breathable air from a safe source. Common types of respirators include filtering facepiece respirators, elastomeric respirators, and PAPRs. Face coverings, facemasks, and face shields are not respirators.

Screen means asking questions to determine whether a person is COVID–19 positive or has symptoms of COVID–19.

Surgical mask means a mask that covers the user's nose and mouth and provides a physical barrier to fluids and particulate materials. The mask meets certain fluid barrier protection standards and Class I or Class II flammability tests. Surgical masks are generally regulated by FDA as Class II devices under 21 CFR 878.4040—Surgical apparel.

Vaccine means a biological product authorized or licensed by the FDA to prevent or provide protection against COVID–19, whether the substance is administered through a single dose or a series of doses.

Workplace means a physical location (*e.g.,* fixed, mobile) where the employer's work or operations are performed.

(c) *COVID–19 plan.* (1) The employer must develop and implement a COVID–19 plan for each workplace. If the employer has multiple workplaces that are substantially similar, its COVID–19 plan may be developed by workplace type rather than by individual workplace so long as all required site-specific information is included in the plan.

Note to paragraph (c)(1). For those employers who do not already have a COVID–19 plan in place, OSHA's website contains significant compliance assistance materials, including a model plan.

(2) If the employer has more than 10 employees, the COVID–19 plan must be written.

(3) The employer must designate one or more workplace COVID–19 safety coordinators to implement and monitor the COVID–19 plan developed under this section. The COVID–19 safety coordinator(s) must be knowledgeable in infection control principles and

practices as they apply to the workplace and employee job operations. The identity of the safety coordinator(s) must be documented in any written COVID–19 plan. The safety coordinator(s) must have the authority to ensure compliance with all aspects of the COVID–19 plan.

(4)(i) The employer must conduct a workplace-specific hazard assessment to identify potential workplace hazards related to COVID–19.

(ii) In order for an employer to be exempt from providing controls in a well-defined area under paragraph (a)(4) of this section based on employees' fully vaccinated status, the COVID–19 plan must include policies and procedures to determine employees' vaccination status.

(5) The employer must seek the input and involvement of non-managerial employees and their representatives, if any, in the hazard assessment and the development and implementation of the COVID–19 plan.

(6) The employer must monitor each workplace to ensure the ongoing effectiveness of the COVID–19 plan and update it as needed.

(7) The COVID–19 plan must address the hazards identified by the assessment required by paragraph (c)(4) of this section, and include policies and procedures to:

(i) Minimize the risk of transmission of COVID–19 for each employee, as required by paragraphs (d) through (n) of this section;

Note to paragraph (c)(7)(i). Although the employer's COVID–19 plan must account for the potential COVID–19 exposures to each employee, the plan can do so generally and need not address each employee individually.

(ii) Effectively communicate and coordinate with other employers:

(A) When employees of different employers share the same physical location, each employer must effectively communicate its COVID–19 plan to all other employers, coordinate to ensure that each of its employees is protected as required by this section, and adjust its COVID–19 plan to address any particular COVID–19 hazards presented by the other employees. This requirement does not apply to delivery people, messengers, and other employees who only enter a workplace briefly to drop off or pick up items.

(B) An employer with one or more employees working in a physical location controlled by another employer must notify the controlling employer when those employees are exposed to conditions at that location that do not meet the requirements of this section; and

(iii) Protect employees who in the course of their employment enter into private residences or other physical locations controlled by a person not covered by the OSH Act (*e.g.,* homeowners, sole proprietors). This must include procedures for employee withdrawal from that location if those protections are inadequate.

Note to paragraph (c). The employer may include other policies, procedures, or information necessary to comply with any applicable federal, state, or local public health laws, standards, and guidelines in their COVID–19 plan.

(d) *Patient screening and management.* In settings where direct patient care is provided, the employer must:

(1) Limit and monitor points of entry to the setting. This provision does not apply where emergency responders or other licensed healthcare providers enter a non-healthcare setting to provide healthcare services.

(2) Screen and triage all clients, patients, residents, delivery people and other visitors, and other non-employees entering the setting.

(3) Implement other applicable patient management strategies in accordance with CDC's ''COVID–19 Infection Prevention and Control Recommendations'' (incorporated by reference, § 1910.509).

Note to paragraph (d). The employer is encouraged to use telehealth services where available and appropriate in order to limit the number of people entering the workplace.

(e) *Standard and Transmission-Based Precautions.* Employers must develop and implement policies and procedures to adhere to Standard and Transmission-Based Precautions in accordance with CDC's ''Guidelines for Isolation Precautions'' (incorporated by reference, § 1910.509).

(f) *Personal protective equipment (PPE)*—(1) *Facemasks.* (i) Employers must provide, and ensure that employees wear, facemasks that meet the definition in paragraph (b) of this section; and

(ii) The employer must ensure a facemask is worn by each employee over the nose and mouth when indoors and when occupying a vehicle with other people for work purposes. The employer must provide a sufficient number of facemasks to each employee to comply with this paragraph and must ensure that each employee changes them at least once per day, whenever they are soiled or damaged, and more frequently as necessary (*e.g.,* patient care reasons).

(iii) The following are exceptions to the requirements for facemasks in paragraph (f)(1)(ii) of this section:

(A) When an employee is alone in a room.

(B) While an employee is eating and drinking at the workplace, provided each employee is at least 6 feet away from any other person, or separated from other people by a physical barrier.

(C) When employees are wearing respiratory protection in accordance with § 1910.134 or paragraph (f) of this section.

(D) When it is important to see a person's mouth (*e.g.,* communicating with an individual who is deaf or hard of hearing) and the conditions do not permit a facemask that is constructed of clear plastic (or includes a clear plastic window). In such situations, the employer must ensure that each employee wears an alternative to protect the employee, such as a face shield, if the conditions permit it.

(E) When employees cannot wear facemasks due to a medical necessity, medical condition, or disability as defined in the Americans with Disabilities Act (42 U.S.C. 12101 *et seq.*), or due to a religious belief. Exceptions must be provided for a narrow subset of persons with a disability who cannot wear a facemask or cannot safely wear a facemask, because of the disability, as defined in the Americans with Disabilities Act (42 U.S.C. 12101 *et seq.*), including a person who cannot independently remove the facemask. The remaining portion of the subset who cannot wear a facemask may be exempted on a case-by-case basis as required by the Americans with Disabilities Act and other applicable laws. In all such situations, the employer must ensure that any such employee wears a face shield for the protection of the employee, if their condition or disability permits it. Accommodations may also need to be made for religious beliefs consistent with Title VII of the Civil Rights Act.

(F) When the employer can demonstrate that the use of a facemask presents a hazard to an employee of serious injury or death (*e.g.,* arc flash, heat stress, interfering with the safe operation of equipment). In such situations, the employer must ensure that each employee wears an alternative to protect the employee, such as a face shield, if the conditions permit it. Any employee not wearing a facemask must remain at least 6 feet away from all other people unless the employer can demonstrate it is not feasible. The employee must resume wearing a facemask when not engaged in the

activity where the facemask presents a hazard.

Note to paragraph (f)(1)(iii)(F). With respect to paragraphs (f)(1)(iii)(D) through (F) of this section, the employer may determine that the use of face shields, without facemasks, in certain settings is not appropriate due to other infection control concerns.

(iv) Where a face shield is required to comply with this paragraph or is otherwise required by the employer, the employer must ensure that face shields are cleaned at least daily and are not damaged. When an employee provides a face shield that meets the definition in paragraph (b) of this section, the employer may allow the employee to use it and is not required to reimburse the employee for that face shield.

(2) Respirators and other PPE for exposure to people with suspected or confirmed COVID–19. When employees have exposure to a person with suspected or confirmed COVID–19, the employer must provide:

(i) A respirator to each employee and ensure that it is provided and used in accordance with § 1910.134 and

(ii) Gloves, an isolation gown or protective clothing, and eye protection to each employee and ensure that the PPE is used in accordance with subpart I of this part.

Note to paragraph (f)(2). When there is a limited supply of filtering facepiece respirators, employers may follow the CDC's ''Strategies for Optimizing the Supply of N95 Respirators'' (available at: *https://www.cdc.gov/coronavirus/2019-ncov/hcp/respirators-strategy/index.html*). Where possible, employers are encouraged to select elastomeric respirators or PAPRs instead of filtering facepiece respirators to prevent shortages and supply chain disruption.

(3) Respirators and other PPE during aerosol-generating procedures. For aerosol-generating procedures performed on a person with suspected or confirmed COVID–19, the employer must provide:

(i) A respirator to each employee and ensure that it is provided and used in accordance with § 1910.134; and

(ii) Gloves, an isolation gown or protective clothing, and eye protection to each employee and ensure that the PPE is used in accordance with subpart I of this part.

Note 1 to paragraph (f)(3). For aerosol-generating procedures on a person suspected or confirmed with COVID–19, employers are encouraged to select elastomeric respirators or PAPRs instead of filtering facepiece respirators.

Note 2 to paragraph (f)(3). Additional requirements specific to aerosol-generating procedures on people with suspected or confirmed COVID–19 are contained in paragraph (g) of this section.

(4) Use of respirators when not required. (i) The employer may provide a respirator to the employee instead of a facemask as required by paragraph (f)(1) of this section. In such circumstances, the employer must comply with § 1910.504.

(ii) Where the employer provides the employee with a facemask as required by paragraph (f)(1) of this section, the employer must permit the employee to wear their own respirator instead of a facemask. In such circumstances, the employer must also comply with § 1910.504.

(5) Respirators and other PPE based on Standard and Transmission-Based Precautions. The employer must provide protective clothing and equipment (*e.g.,* respirators, gloves, gowns, goggles, face shields) to each employee in accordance with Standard and Transmission-Based Precautions in healthcare settings in accordance with CDC's ''Guidelines for Isolation Precautions'' (incorporated by reference, § 1910.509) and ensure that the protective clothing and equipment is used in accordance with subpart I of this part.

(g) *Aerosol-generating procedures on a person with suspected or confirmed COVID–19.* When an aerosol-generating procedure is performed on a person with suspected or confirmed COVID–19:

(1) The employer must limit the number of employees present during the procedure to only those essential for patient care and procedure support.

(2) The employer must ensure that the procedure is performed in an existing AIIR, if available.

(3) After the procedure is completed, the employer must clean and disinfect the surfaces and equipment in the room or area where the procedure was performed.

Note to paragraph (g). Respirators and other PPE requirements during aerosol-generating procedures are contained in paragraph (f)(3) of this section.

(h) *Physical distancing.* (1) The employer must ensure that each employee is separated from all other people by at least 6 feet when indoors unless the employer can demonstrate that such physical distancing is not feasible for a specific activity (*e.g.,* hands-on medical care). This provision does not apply to momentary exposure while people are in movement (*e.g.,* passing in hallways or aisles).

(2) When the employer establishes it is not feasible for an employee to maintain a distance of at least 6 feet from all other people, the employer must ensure that the employee is as far apart from all other people as feasible.

Note to paragraph (h). Physical distancing can include methods such as: Telehealth; telework or other remote work arrangements; reducing the number of people, including non-employees, in an area at one time; visual cues such as signs and floor markings to indicate where employees and others should be located or their direction and path of travel; staggered arrival, departure, work, and break times; and adjusted work processes or procedures to allow greater distance between employees.

(i) *Physical barriers.* At each fixed work location outside of direct patient care areas (*e.g.,* entryway/lobby, check-in desks, triage, hospital pharmacy windows, bill payment) where each employee is not separated from all other people by at least 6 feet of distance, the employer must install cleanable or disposable solid barriers, except where the employer can demonstrate it is not feasible. The barrier must be sized (*e.g.,* height and width) and located to block face-to-face pathways between individuals based on where each person would normally stand or sit. The barrier may have a pass-through space at the bottom for objects and merchandise.

Note to paragraph (i). Physical barriers are not required in direct patient care areas or resident rooms.

(j) *Cleaning and disinfection.* (1) In patient care areas, resident rooms, and for medical devices and equipment, the employer must follow standard practices for cleaning and disinfection of surfaces and equipment in accordance with CDC's ''COVID–19 Infection Prevention and Control Recommendations'' and CDC's ''Guidelines for Environmental Infection Control,'' pp. 86–103, 147–149 (both incorporated by reference, § 1910.509).

(2) In all other areas, the employer must:

(i) Clean high-touch surfaces and equipment at least once a day, following manufacturers' instructions for application of cleaners; and

(ii) When the employer is aware that a person who is COVID–19 positive has been in the workplace within the last 24 hours, clean and disinfect, in accordance with CDC's ''Cleaning and Disinfecting Guidance'' (incorporated by reference, § 1910.509), any areas, materials, and equipment under the employer's control that have likely been contaminated by the person who is COVID–19 positive (*e.g.,* rooms they occupied, items they touched).

(3) The employer must provide alcohol-based hand rub that is at least 60% alcohol or provide readily accessible hand washing facilities.

(k) *Ventilation.* (1) Employers who own or control buildings or structures with an existing heating, ventilation, and air conditioning (HVAC) system(s) must ensure that:

(i) The HVAC system(s) is used in accordance with the HVAC manufacturer's instructions and the design specifications of the HVAC system(s);

(ii) The amount of outside air circulated through its HVAC system(s) and the number of air changes per hour are maximized to the extent appropriate;

(iii) All air filters are rated Minimum Efficiency Reporting Value (MERV) 13 or higher, if compatible with the HVAC system(s). If MERV–13 or higher filters are not compatible with the HVAC system(s), employers must use filters with the highest compatible filtering efficiency for the HVAC system(s);

(iv) All air filters are maintained and replaced as necessary to ensure the proper function and performance of the HVAC system(s); and

(v) All intake ports that provide outside air to the HVAC system(s) are cleaned, maintained, and cleared of any debris that may affect the function and performance of the HVAC system(s).

(2) Where the employer has an existing AIIR, the employer must maintain and operate it in accordance with its design and construction criteria.

Note 1 to paragraph (k). This section does not require installation of new HVAC systems or AIIRs to replace or augment functioning systems.

Note 2 to paragraph (k). In addition to the requirements for existing HVAC systems and AIIRs, all employers should also consider other measures to improve ventilation in accordance with ''CDC's Ventilation Guidance,'' (available at *www.cdc.gov/coronavirus/2019-ncov/community/ventilation.html*) (*e.g.,* opening windows and doors). This could include maximizing ventilation in buildings without HVAC systems or in vehicles.

(l) *Health screening and medical management*—(1) *Screening.* (i) The employer must screen each employee before each work day and each shift. Screening may be conducted by asking employees to self-monitor before reporting to work or may be conducted in-person by the employer.

(ii) If a COVID–19 test is required by the employer for screening purposes, the employer must provide the test to each employee at no cost to the employee.

(2) *Employee notification to employer of COVID–19 illness or symptoms.* The employer must require each employee to promptly notify the employer when the employee:

(i) Is COVID–19 positive (*i.e.,* confirmed positive test for, or has been diagnosed by a licensed healthcare provider with, COVID–19); or

(ii) Has been told by a licensed healthcare provider that they are suspected to have COVID–19; or

(iii) Is experiencing recent loss of taste and/or smell with no other explanation; or

(iv) Is experiencing both fever (≥100.4 °F) and new unexplained cough associated with shortness of breath.

(3) *Employer notification to employees of COVID–19 exposure in the workplace.*

(i) Except as provided for in paragraph (l)(3)(iii) of this section, when the employer is notified that a person who has been in the workplace(s) (including employees, clients, patients, residents, vendors, contractors, customers, delivery people and other visitors, or other non-employees) is COVID–19 positive, the employer must, within 24 hours:

(A) Notify each employee who was not wearing a respirator and any other required PPE and has been in close contact with that person in the workplace. The notification must state the fact that the employee was in close contact with someone with COVID–19 along with the date(s) that contact occurred.

(B) Notify all other employees who were not wearing a respirator and any other required PPE and worked in a well-defined portion of a workplace (*e.g.,* a particular floor) in which that person was present during the potential transmission period. The potential transmission period runs from 2 days before the person felt sick (or, for asymptomatic people, 2 days prior to test specimen collection) until the time the person is isolated. The notification must specify the date(s) the person with COVID–19 was in the workplace during the potential transmission period.

(C) Notify other employers whose employees were not wearing respirators and any other required PPE and have been in close contact with that person, or worked in a well-defined portion of a workplace (*e.g.,* a particular floor) in which that person was present, during the potential transmission period. The potential transmission period runs from 2 days before the person felt sick (or, for asymptomatic people, 2 days prior to test specimen collection) until the time the person is isolated. The notification must specify the date(s) the person with COVID–19 was in the workplace during the potential transmission period and the location(s) where the person with COVID–19 was in the workplace.

(ii) The notifications required by paragraph (l)(3)(i) of this section must not include any employee's name, contact information (*e.g.,* phone number, email address), or occupation.

(iii) The notification provisions are not triggered by the presence of a patient with confirmed COVID–19 in a workplace where services are normally provided to suspected or confirmed COVID–19 patients (*e.g.,* emergency rooms, urgent care facilities, COVID–19 testing sites, COVID–19 wards in hospitals).

(4) *Medical removal from the workplace.* (i) If the employer knows an employee meets the criteria listed in paragraph (l)(2)(i) of this section, then the employer must immediately remove that employee and keep the employee removed until they meet the return to work criteria in paragraph (l)(6) of this section.

(ii) If the employer knows an employee meets the criteria listed in paragraphs (l)(2)(ii) through (iv) of this section, then the employer must immediately remove that employee and either:

(A) Keep the employee removed until they meet the return to work criteria in paragraph (l)(6) of this section; or

(B) Keep the employee removed and provide a COVID–19 polymerase chain reaction (PCR) test at no cost to the employee.

(*1*) If the test results are negative, the employee may return to work immediately.

(*2*) If the test results are positive, the employer must comply with paragraph (l)(4)(i) of this section.

(*3*) If the employee refuses to take the test, the employer must continue to keep the employee removed from the workplace consistent with paragraph (l)(4)(ii)(A) of this section, but the employer is not obligated to provide medical removal protection benefits in accordance with paragraph (l)(5)(iii) of this section. Absent undue hardship, employers must make reasonable accommodations for employees who cannot take the test for religious or disability-related medical reasons.

Note to paragraph (l)(4)(ii). This partial symptom list in paragraphs (l)(2)(iii) and (l)(2)(iv) of this section informs the employer of the minimum requirements for compliance. The full list of COVID–19 symptoms provided by CDC includes additional symptoms not listed in paragraphs (l)(2)(iii) through (iv) of this section. Employers may choose to remove or test employees with additional symptoms from the CDC list, or refer the employees to a healthcare provider.

(iii)(A) If the employer is required to notify the employee of close contact in

the workplace to a person who is COVID–19 positive in accordance with paragraph (l)(3)(i)(A) of this section, then the employer must immediately remove that employee and either:

(*1*) Keep the employee removed for 14 days; or

(*2*) Keep the employee removed and provide a COVID–19 test at least five days after the exposure at no cost to the employee.

(*i*) If the test results are negative, the employee may return to work after seven days following exposure.

(*ii*) If the test results are positive, the employer must comply with paragraph (l)(4)(i) of this section.

(*iii*) If the employee refuses to take the test, the employer must continue to keep the employee removed from the workplace consistent with paragraph (l)(4)(iii)(A)(*1*) of this section, but the employer is not obligated to provide medical removal protection benefits in accordance with paragraph (l)(5)(iii) of this section. Absent undue hardship, employers must make reasonable accommodations for employees who cannot take the test for religious or disability-related medical reasons, consistent with applicable non-discrimination laws.

(B) Employers are not required to remove any employee who would otherwise be required to be removed under paragraph (i)(4)(iii)(A) of this section if the employee does not experience the symptoms in paragraph (l)(2)(iii) or (iv) of this section and has:

(*1*) Been fully vaccinated against COVID–19 (*i.e.,* 2 weeks or more following the final dose); or

(*2*) Had COVID–19 and recovered within the past 3 months.

(iv) Any time an employee is required to be removed from the workplace for any reason under paragraph (l)(4) of this section, the employer may require the employee to work remotely or in isolation if suitable work is available.

(5) *Medical removal protection benefits.* (i) Employers with 10 or fewer employees on the effective date of this section are not required to comply with paragraphs (l)(5)(iii) through (iv) of this section.

(ii) When an employer allows an employee to work remotely or in isolation in accordance with paragraph (l)(4)(iv) of this section, the employer must continue to pay the employee the same regular pay and benefits the employee would have received had the employee not been absent from work, until the employee meets the return to work criteria specified in paragraph (l)(4)(iii) or (l)(6) of this section.

(iii) When an employer removes an employee in accordance with paragraph (l)(4) of this section:

(A) The employer must continue to provide the benefits to which the employee is normally entitled and must also pay the employee the same regular pay the employee would have received had the employee not been absent from work, up to $1,400 per week, until the employee meets the return to work criteria specified in paragraph (l)(4)(iii) or (l)(6) of this section.

(B) For employers with fewer than 500 employees, the employer must pay the employee up to the $1,400 per week cap but, beginning in the third week of an employee's removal, the amount is reduced to only two-thirds of the same regular pay the employee would have received had the employee not been absent from work, up to $200 per day ($1,000 per week in most cases).

(iv) The employer's payment obligation under paragraph (l)(5)(iii) of this section is reduced by the amount of compensation that the employee receives from any other source, such as a publicly or employer-funded compensation program (*e.g.,* paid sick leave, administrative leave), for earnings lost during the period of removal or any additional source of income the employee receives that is made possible by virtue of the employee's removal.

(v) Whenever an employee returns to the workplace after a COVID–19-related workplace removal, that employee must not suffer any adverse action as a result of that removal from the workplace and must maintain all employee rights and benefits, including the employee's right to their former job status, as if the employee had not been removed.

(6) *Return to work.* The employer must make decisions regarding an employee's return to work after a COVID–19-related workplace removal in accordance with guidance from a licensed healthcare provider or CDC's ''Isolation Guidance'' (incorporated by reference, § 1910.509); and CDC's ''Return to Work Healthcare Guidance'' (incorporated by reference, § 1910.509).

Note to paragraph (l). OSHA recognizes that CDC's ''Strategies to Mitigate Healthcare Personnel Staffing Shortages'' (available at *www.cdc.gov/coronavirus/2019-ncov/hcp/mitigating-staff-shortages.html*) allows elimination of quarantine for certain healthcare workers, but only as a last resort, if the workers' absence would mean there are no longer enough staff to provide safe patient care, specific other amelioration strategies have already been tried, patients have been notified, and workers are utilizing additional PPE at all times.

(m) *Vaccination.* The employer must support COVID–19 vaccination for each employee by providing reasonable time and paid leave (*e.g.,* paid sick leave, administrative leave) to each employee for vaccination and any side effects experienced following vaccination.

(n) *Training.* (1) The employer must ensure that each employee receives training, in a language and at a literacy level the employee understands, and so that the employee comprehends at least the following:

(i) COVID–19, including how the disease is transmitted (including pre-symptomatic and asymptomatic transmission), the importance of hand hygiene to reduce the risk of spreading COVID–19 infections, ways to reduce the risk of spreading COVID–19 through the proper covering of the nose and mouth, the signs and symptoms of the disease, risk factors for severe illness, and when to seek medical attention;

(ii) Employer-specific policies and procedures on patient screening and management;

(iii) Tasks and situations in the workplace that could result in COVID–19 infection;

(iv) Workplace-specific policies and procedures to prevent the spread of COVID–19 that are applicable to the employee's duties (*e.g.,* policies on Standard and Transmission-Based Precautions, physical distancing, physical barriers, ventilation, aerosol-generating procedures);

(v) Employer-specific multi-employer workplace agreements related to infection control policies and procedures, the use of common areas, and the use of shared equipment that affect employees at the workplace;

(vi) Employer-specific policies and procedures for PPE worn to comply with this section, including:

(A) When PPE is required for protection against COVID–19;

(B) Limitations of PPE for protection against COVID–19;

(C) How to properly put on, wear, and take off PPE;

(D) How to properly care for, store, clean, maintain, and dispose of PPE; and

(E) Any modifications to donning, doffing, cleaning, storage, maintenance, and disposal procedures needed to address COVID–19 when PPE is worn to address workplace hazards other than COVID–19;

(vii) Workplace-specific policies and procedures for cleaning and disinfection;

(viii) Employer-specific policies and procedures on health screening and medical management;

(ix) Available sick leave policies, any COVID–19-related benefits to which the employee may be entitled under

applicable federal, state, or local laws, and other supportive policies and practices (*e.g.,* telework, flexible hours);

(x) The identity of the safety coordinator(s) specified in the COVID–19 plan;

(xi) The requirements of this section; and

(xii) How the employee can obtain copies of this section and any employer-specific policies and procedures developed under this section, including the employer's written COVID–19 plan, if required.

Note to paragraph (n)(1). Employers may rely on training completed prior to the effective date of this section to the extent that it meets the relevant training requirements under this paragraph.

(2) The employer must ensure that each employee receives additional training whenever:

(i) Changes occur that affect the employee's risk of contracting COVID–19 at work (*e.g.,* new job tasks);

(ii) Policies or procedures are changed; or

(iii) There is an indication that the employee has not retained the necessary understanding or skill.

(3) The employer must ensure that the training is overseen or conducted by a person knowledgeable in the covered subject matter as it relates to the employee's job duties.

(4) The employer must ensure that the training provides an opportunity for interactive questions and answers with a person knowledgeable in the covered subject matter as it relates to the employee's job duties.

(o) *Anti-Retaliation.* (1) The employer must inform each employee that:

(i) Employees have a right to the protections required by this section; and

(ii) Employers are prohibited from discharging or in any manner discriminating against any employee for exercising their right to the protections required by this section, or for engaging in actions that are required by this section.

(2) The employer must not discharge or in any manner discriminate against any employee for exercising their right to the protections required by this section, or for engaging in actions that are required by this section.

Note to paragraph (o). In addition, section 11(c) of the OSH Act also prohibits the employer from discriminating against an employee for exercising rights under, or as a result of actions that are required by, this section. That provision of the Act also protects the employee who files a safety and health complaint, or otherwise exercises any rights afforded by the OSH Act.

(p) *Requirements implemented at no cost to employees.* The implementation of all requirements of this section, with the exception of any employee self-monitoring conducted under paragraph (l)(1)(i) of this section, must be at no cost to employees.

(q) *Recordkeeping.* (1) *Small employer exclusion.* Employers with 10 or fewer employees on the effective date of this section are not required to comply with paragraph (q)(2) or (q)(3) of this section.

(2) *Required records.* Employers with more than 10 employees on the effective date of this section must:

(i) Retain all versions of the COVID–19 plan implemented to comply with this section while this section remains in effect.

(ii) Establish and maintain a COVID–19 log to record each instance identified by the employer in which an employee is COVID–19 positive, regardless of whether the instance is connected to exposure to COVID–19 at work.

(A) The COVID–19 log must contain, for each instance, the employee's name, one form of contact information, occupation, location where the employee worked, the date of the employee's last day at the workplace, the date of the positive test for, or diagnosis of, COVID–19, and the date the employee first had one or more COVID–19 symptoms, if any were experienced.

(B) The information in the COVID–19 log must be recorded within 24 hours of the employer learning that the employee is COVID–19 positive and must be maintained as though it is a confidential medical record and must not be disclosed except as required by this ETS or other federal law.

(C) The COVID–19 log must be maintained and preserved while this section remains in effect.

Note to paragraph (q)(2)(ii): The COVID–19 log is intended to assist employers with tracking and evaluating instances of employees who are COVID–19 positive without regard to whether those employees were infected at work. The tracking will help evaluate potential workplace exposure to other employees.

(3) *Availability of records.* By the end of the next business day after a request, the employer must provide, for examination and copying:

(i) All versions of the written COVID–19 plan to all of the following: Any employees, their personal representatives, and their authorized representatives.

(ii) The individual COVID–19 log entry for a particular employee to that employee and to anyone having written authorized consent of that employee.

(iii) A version of the COVID–19 log that removes the names of employees, contact information, and occupation, and only includes, for each employee in the COVID–19 log, the location where the employee worked, the last day that the employee was at the workplace before removal, the date of that employee's positive test for, or diagnosis of, COVID–19, and the date the employee first had one or more COVID–19 symptoms, if any were experienced, to all of the following: Any employees, their personal representatives, and their authorized representatives.

(iv) All records required to be maintained by this section to the Assistant Secretary.

Note to paragraph (q). Employers must continue to record all work-related confirmed cases of COVID–19 on their OSHA Forms 300, 300A, and 301, or the equivalent forms, if required to do so under 29 CFR part 1904.

(r) *Reporting COVID–19 fatalities and hospitalizations to OSHA.* (1) The employer must report to OSHA:

(i) Each work-related COVID–19 fatality within 8 hours of the employer learning about the fatality.

(ii) Each work-related COVID–19 in-patient hospitalization within 24 hours of the employer learning about the in-patient hospitalization.

(2) When reporting COVID–19 fatalities and in-patient hospitalizations to OSHA in accordance with paragraph (r)(1) of this section, the employer must follow the requirements in 29 CFR 1904.39, except for 29 CFR 1904.39(a)(1) and (2) and (b)(6).

(s) *Dates.* (1) *Effective date.* This section is effective as of June 21, 2021.

(2) *Compliance dates.* (i) Employers must comply with all requirements of this section, except for requirements in paragraphs (i), (k), and (n) of this section by July 6, 2021.

(ii) Employers must comply with the requirements of this section in paragraphs (i), (k), and (n) of this section by July 21, 2021.

§ 1910.504 Mini Respiratory Protection Program.

(a) *Scope and application.* This section applies only to respirator use in accordance with § 1910.502(f)(4).

(b) *Definitions.* The following definitions apply to this section:

COVID–19 (Coronavirus Disease 2019) means the respiratory disease caused by SARS–CoV–2 (severe acute respiratory syndrome coronavirus 2). For clarity and ease of reference, this section refers to ''COVID–19'' when describing exposures or potential exposures to SARS–CoV–2.

Elastomeric respirator means a tight-fitting respirator with a facepiece that is made of synthetic or rubber material that permits it to be disinfected, cleaned, and reused according to

manufacturer's instructions. It is equipped with a replaceable cartridge(s), canister(s), or filter(s).

Filtering facepiece respirator means a negative-pressure particulate respirator with a non-replaceable filter as an integral part of the facepiece or with the entire facepiece composed of the non-replaceable filtering medium.

Hand hygiene means the cleaning and/or disinfecting of one's hands by using standard handwashing methods with soap and running water or an alcohol-based hand rub that is at least 60% alcohol.

Respirator means a type of personal protective equipment (PPE) that is certified by the National Institute for Occupational Safety and Health (NIOSH) under 42 CFR part 84 or is authorized under an Emergency Use Authorization (EUA) by the US Food and Drug Administration. Respirators protect against airborne hazards by removing specific air contaminants from the ambient (surrounding) air or by supplying breathable air from a safe source. Common types of respirators include filtering facepiece respirators, elastomeric respirators, and PAPRs. Face coverings, facemasks, and face shields are not respirators.

Powered air-purifying respirator (PAPR) means an air-purifying respirator that uses a blower to force the ambient air through air-purifying elements to the inlet covering.

Tight-fitting respirator means a respirator in which the air pressure inside the facepiece is negative during inhalation with respect to the ambient air pressure outside the respirator (*e.g.,* filtering facepiece).

User seal check means an action conducted by the respirator user to determine if the respirator is properly seated to the face.

(c) *Respirators provided by employees.* Where employees provide and use their own respirators, the employer must provide each employee with the following notice: Respirators can be an effective method of protection against COVID–19 hazards when properly selected and worn. Respirator use is encouraged to provide an additional level of comfort and protection for workers even in circumstances that do not require a respirator to be used. However, if a respirator is used improperly or not kept clean, the respirator itself can become a hazard to the worker. If your employer allows you to provide and use your own respirator, you need to take certain precautions to be sure that the respirator itself does not present a hazard. You should do the following:

(1) Read and follow all instructions provided by the manufacturer on use, maintenance, cleaning and care, and warnings regarding the respirator's limitations.

(2) Keep track of your respirator so that you do not mistakenly use someone else's respirator.

(3) Do not wear your respirator where other workplace hazards (*e.g.,* chemical exposures) require use of a respirator. In such cases, your employer must provide you with a respirator that is used in accordance with OSHA's respiratory protection standard (29 CFR 1910.134). For more information about using a respirator, see OSHA's respiratory protection safety and health topics page (*https://www.osha.gov/respiratory-protection*).

(d) *Respirators provided by employers.* Where employers provide respirators to their employees, the employer must comply with the following requirements:

(1) *Training.* The employer must ensure that each employee wearing a respirator receives training prior to first use and if they change the type of respirator, in a language and at a literacy level the employee understands, and comprehends at least the following:

(i) How to inspect, put on and remove, and use a respirator;

(ii) The limitations and capabilities of the respirator, particularly when the respirator has not been fit tested;

(iii) Procedures and schedules for storing, maintaining, and inspecting respirators;

(iv) How to perform a user seal check as described in paragraph (d)(2) of this section; and

(v) How to recognize medical signs and symptoms that may limit or prevent the effective use of respirators and what to do if the employee experiences signs and symptoms.

(2) *User seal check.* (i) The employer must ensure that each employee who uses a tight-fitting respirator performs a user seal check to ensure that the respirator is properly seated to the face each time the respirator is put on. Acceptable methods of user seal checks include:

(A) Positive pressure user seal check (*i.e.,* blow air out). Once you have conducted proper hand hygiene and properly donned the respirator, place your hands over the facepiece, covering as much surface area as possible. Exhale gently into the facepiece. The face fit is considered satisfactory if a slight positive pressure is being built up inside the facepiece without any evidence of outward leakage of air at the seal. Examples of evidence that it is leaking could be the feeling of air movement on your face along the seal of the facepiece, fogging of your glasses, or a lack of pressure being built up inside the facepiece. If the particulate respirator has an exhalation valve, then performing a positive pressure check may not be possible unless the user can cover the exhalation valve. In such cases, a negative pressure check must be performed.

(B) Negative pressure user seal check (*i.e.,* suck air in). Once you have conducted proper hand hygiene and properly donned the respirator, cover the filter surface with your hands as much as possible and then inhale. The facepiece should collapse on your face and you should not feel air passing between your face and the facepiece.

(ii) The employer must ensure that each employee corrects any problems discovered during the user seal check. In the case of either type of user seal check (positive or negative), if air leaks around the nose, use both hands to readjust how the respirator sits on your face or adjust the nosepiece, if applicable. Readjust the straps along the sides of your head until a proper seal is achieved.

Note to paragraph (d)(2). When employees are required to wear a respirator and a problem with the seal check arises due to interference with the seal by an employee's facial hair, employers may provide a different type of respirator to accommodate employees who cannot trim or cut facial hair due to religious belief.

(3) *Reuse of respirators.* (i) The employer must ensure that a filtering facepiece respirator used by a particular employee is only reused by that employee, and only when:

(A) The respirator is not visibly soiled or damaged;

(B) The respirator has been stored in a breathable storage container (*e.g.,* paper bag) for at least five calendar days between use and has been kept away from water or moisture;

(C) The employee does a visual check in adequate lighting for damage to the respirator's fabric or seal;

(D) The employee successfully completes a user seal check as described in paragraph (d)(2) of this section;

(E) The employee uses proper hand hygiene before putting the respirator on and conducting the user seal check; and

(F) The respirator has not been worn more than five days total.

Note to paragraph (d)(3)(i). The reuse of single-use respirators (*e.g.,* filtering facepiece respirators) is discouraged.

(ii) The employer must ensure that an elastomeric respirator or PAPR is only reused when:

(A) The respirator is not damaged;

(B) The respirator is cleaned and disinfected as often as necessary to be maintained in a sanitary condition in accordance with § 1910.134, Appendix B–2; and

(C) A change schedule is implemented for cartridges, canisters, or filters.

(4) *Discontinuing use of respirators.* Employers must require employees to discontinue use of a respirator when either the employee or a supervisor reports medical signs or symptoms (*e.g.,* shortness of breath, coughing, wheezing, chest pain, any other symptoms related to lung problems, cardiovascular symptoms) that are related to ability to use a respirator. Any employee who previously had a medical evaluation and was determined to not be medically fit to wear a respirator must not be provided with a respirator under this standard unless they are re-evaluated and medically cleared to use a respirator.

(e) *Effective date.* This section is effective as of June 21, 2021.

§ 1910.505 Severability.

Each section of this subpart U, and each provision within those sections, is separate and severable from the other sections and provisions. If any provision of this subpart is held to be invalid or unenforceable on its face, or as applied to any person, entity, or circumstance, or is stayed or enjoined, that provision shall be construed so as to continue to give the maximum effect to the provision permitted by law, unless such holding shall be one of utter invalidity or unenforceability, in which event the provision shall be severable from this subpart and shall not affect the remainder of the subpart.

§ 1910.509 Incorporation by Reference.

(a)(1) The material listed in this section is incorporated by reference into this subpart with the approval of the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, OSHA must publish a document in the **Federal Register** and the material must be available to the public. All approved material is available for inspection at any Regional Office of the Occupational Safety and Health Administration (OSHA), or at the OSHA Docket Office, U.S. Department of Labor, 200 Constitution Avenue NW, Room N–3508, Washington, DC 20210; telephone: 202–693–2350 (TTY number: 877–889–5627). It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of these standards at NARA, email *fedreg.legal@nara.gov*, or go to *www.archives.gov/federal-register/cfr/ibr-locations.html*.

(2) The material is available from the sources listed in this section and as follows:

(i) The material listed in paragraphs (b) and (c) of this section (CDC and EPA) is available at this permanent weblink hosted by OSHA: *www.osha.gov/coronavirus/ets/ibr*.

(ii) The material listed in paragraph (d) of this section (ISEA) is available from the American National Standards Institute (ANSI), 25 West 43rd Street, 4th Floor, New York, NY 10036; telephone: 212–642–4900; fax: 212–398–0023; website: *http://www.ansi.org*.

(b) Centers for Disease Control and Prevention (CDC): 1600 Clifton Road, Atlanta, GA 30329; websites: *https://www.cdc.gov/, https://www.cdc.gov/coronavirus/2019-ncov/communication/guidance.html*, and *https://www.cdc.gov/infectioncontrol/guidelines/*.

(1) *Cleaning and Disinfecting Guidance.* COVID–19: Cleaning and Disinfecting Your Facility; Every Day and When Someone is Sick, updated April 5, 2021, IBR approved for § 1910.502(j).

(2) *COVID–19 Infection Prevention and Control Recommendations.* COVID–19: Interim Infection Prevention and Control Recommendations for Healthcare Personnel During the Coronavirus Disease 2019 (COVID–19) Pandemic, updated February 23, 2021, IBR approved for §§ 1910.502(d) and (j).

(3) *Guidelines for Isolation Precautions.* 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings, updated July 2019, IBR approved for §§ 1910.502(e) and (f).

(4) *Guidelines for Environmental Infection Control.* Guidelines for Environmental Infection Control in Health-Care Facilities, updated July 2019, IBR approved for § 1910.502(j).

(5) *Isolation Guidance.* COVID–19: Isolation If You Are Sick; Separate yourself from others if you have COVID–19, updated February 18, 2021, IBR approved for § 1910.502(l).

(6) *Return to Work Healthcare Guidance.* COVID–19: Return to Work Criteria for Healthcare Personnel with SARS–CoV–2 Infection (Interim Guidance), updated February 16, 2021, IBR approved for § 1910.502(l).

(c) U.S. Environmental Protection Agency (EPA): 1200 Pennsylvania Avenue NW, Washington, DC 20460; website: *https://www.epa.gov/*.

(1) List N. Pesticide Registration List N: Disinfectants for Coronavirus (COVID–19), updated April 9, 2021, IBR approved for § 1910.502(b).

(2) [Reserved]

(d) International Safety Equipment Association (ISEA): 1901 North Moore Street, Suite 808, Arlington, VA 22209; website: *www.safetyequipment.org*

(1) ANSI/ISEA Z87.1–2010, American National Standard for Occupational and Educational Personal Eye and Face Protection Devices, ANSI-approved April 13, 2010, IBR approved for § 1910.502(b).

(2) ANSI/ISEA Z87.1–2015, American National Standard for Occupational and Educational Personal Eye and Face Protection Devices, ANSI-approved May 28, 2015, IBR approved for § 1910.502(b).

(3) ANSI/ISEA Z87.1–2020, American National Standard for Occupational and Educational Personal Eye and Face Protection Devices, ANSI-approved March 11, 2020, IBR approved for § 1910.502(b).

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