VA'S ELECTRONIC HEALTH RECORD MODERNIZATION: AN UPDATE ON ROLLOUT, COST, AND SCHEDULE

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WEDNESDAY, SEPTEMBER 21, 2022

U.S. SENATE,
SUBCOMMITTEE OF THE COMMITTEE ON APPROPRIATIONS,
Washington, DC.

The subcommittee met at 10:01 a.m. in room SD–124, Dirksen Senate Office Building, Hon. Martin Heinrich (chairmain) presiding.

Present: Senators Heinrich, Tester, Boozman, and Hagerty.

DEPARTMENT OF VETERANS AFFAIRS

STATEMENT OF HON. DONALD M. REMY, DEPUTY SECRETARY, DEPARTMENT OF VETERANS AFFAIRS

OPENING STATEMENT OF SENATOR MARTIN HEINRICH

Senator HEINRICH. Good morning. This hearing of the Military Construction, Veterans Affairs, and Related Agencies Appropriations Subcommittee is now called to order.

Today, we will discuss VA's efforts around Electronic Health Record Modernization, or EHRM. This is a large but important initiative that was promised to result in a single health record for an individual, from service entry through a veteran's life, with seamless health data sharing.

Unfortunately, implementation efforts to date have been plagued by delays, provider complaints, patient safety concerns, and questions about the accuracy of reporting to Congress, particularly related to cost.

Our goal today is to address these issues over two panels. With that, I would like to welcome Donald Remy, Deputy Secretary of Veterans Affairs, and the accountable official for VA's Electronic Health Record Modernization Initiative. He is accompanied by Dr. Terry Adirim, the Program Executive Director of the EHRM Integration Office; Dr. Elnahal, VA's Under Secretary for Health; and Mr. Jon Rychalski—all right, three for four is not too bad—Assistant Secretary for Management and Chief Financial Officer.

I want to start just by reiterating the committee's support for VA's EHRM objective. This is an extremely important effort to solve a decade-long problem, decades-long problem, and is essential that VA get it right for the health and safety of veterans. In addition, this is a major investment, and VA has a responsibility to tax-

payers to ensure the system works, and its success can be measured.

In 2018 when VA announced it was signing a sole-source contract with Cerner Corporation, now known as Oracle Cerner, VA estimated the EHRM Initiative would cost $16 billion over 10 years. Congress was told that this amount incorporated the full cost of deploying and operating the new health record across VA's enterprise, including $10 billion for Cerner Corporation to provide the record itself.

Since that initial estimate we learned that VA did not include all of the costs required for a successful implementation, and did not report those omissions to Congress in a timely way. This lack of transparency was disappointing, and the committee is glad that VA has made the effort to be more forthright under new leadership.

Based on a recent independent cost estimate completed by the Institute for Defense Analyses, at VA's request, the cost to the Department could be significantly more than the initial estimate. The nearly $50 billion estimate assumes a longer deployment timeline, and 15 years of sustainment costs, as well as additional related and necessary costs that VA did not initially contemplate.

The components and elements raised by IDA are reasonable and appropriate to consider, which is why it is standard practice to have a third party complete a life-cycle cost estimate before contracts are awarded.

It is irresponsible that this step was skipped by VA when rushing through a sole-source contract in 2018, though I will acknowledge that none of today's witnesses, who are responsible for EHRM today, were part of that decision. We will discuss that estimate more in the second panel, and would appreciate VA's view of it as well.

To date Congress has appropriated $8.2 billion since fiscal year 2018 to VA's dedicated account for this effort, though more has been spent. Of this money VA has allotted about $4.1 billion, 40 percent of the contract ceiling, toward the Oracle Cerner contract, and the system has been deployed to five sites with 166 to go. I understand that there was a lot of upfront costs to the system, but would like a clear understanding of what that funding has bought us.

Closures related to COVID had a huge impact on rollout, but that is not the only challenge this effort is facing. Of significant concern is how the new system has been received by providers. This initiative will not succeed without provider buy-in. It is not surprising that productivity decreased following rollout, but it is not clear whether it has improved over time.

I understand that providers from the first rollout site, which deployed nearly 2 years ago, are still raising concerns. More alarming, are concerns that the new system is a risk to patient safety, and reports of repeated system degradations and outages. We know VA and Oracle Cerner have taken steps to address these issues, including training processes. And I look forward to hearing about how that collaboration is moving forward.

Finally, I would like to discuss VA's deployment schedule. Last year VA took a strategic pause to assess the program and lessons learned. The last deployments were in June, and VA has postponed

all planned rollouts until 2023 while still intending to meet the goal to be fully deployed by 2028. I am glad VA is not rushing deployments until there is more confidence in the likelihood of success, but the Department needs to be straightforward with Congress about what is reasonable and achievable. This effort is too important, and needs to succeed.

And with that, I would recognize Ranking Member Boozman for his opening comments as well.

STATEMENT OF SENATOR JOHN BOOZMAN

Senator BOOZMAN. Thank you Mr. Chairman. And Deputy Secretary Remy, thank you for you and your team being here today to discuss the VA's ongoing efforts to develop and deploy its new electronic medical record.

Over the last 5 years this subcommittee has appropriated nearly $8.5 billion towards this endeavor, and we are deliberating on the fiscal year 2023 request of another $1.75 billion. At the outset we were told that this program would cost no more than $16 billion, and would be complete in 10 years. In the years since VA has deployed the new system at only a small handful of sites; and those rollouts have been challenging, to say the least.

This is precisely why we are holding this hearing today. We want to get a sense of where the EHRM program is today, what the path forward is, and what the true cost is.

And thank you, Mr. Chairman, very much for facilitating this. And again, this is just a very, as so many things are that have to do with veterans, this is certainly a very bipartisan effort, just to see if we can get things moving in the right direction.

Certainly, the pandemic slowed the deployment and training, and we must not forget that, but the repeated system outages, persistent patient safety concerns, and lack of productivity at the deployment sites indicate problems much deeper than the challenge COVID posed. VA took an intentional pause to reevaluate the program, and has brought in new leadership, and now Cerner has been acquired by Oracle, meaning there is a completely new leadership team in place.

I look forward to hearing how the new team, on all sides, will work together to get this right, and get deployments back on track. Our second panel will have representatives from Oracle, the IG, and from the Institute for Defense Analyses who recently finished work on the first Independent Life Cycle Cost Estimate for the EHRM program. This estimate is very different than the numbers VA has promised, namely, that is based on the assumption that VA cannot deploy the system in the 10-year window it has promised. Beyond that, the estimate also shows the potential for costs significantly higher than the $16 billion VA number. I look forward to hearing this new perspective on the program, its timeline, and the associated costs.

It is always appreciated hearing from the Office of the Inspector General, and we value the work that you do; so Mr. Case, thank you for being here. Mr. Rieksts, welcome, and we look forward to learning more about your analysis. I also want to welcome Mr. Sicilia from Oracle. Oracle recently completed its acquisition of

Cerner, meaning you are now on the hook to see the rest of this deployment through successfully.

I look forward to hearing your plan to do so, and how you can leverage your work with other government entities to help accelerate the VA deployment.

And again, thank you very much, Mr. Chairman. And I yield back.

Senator HEINRICH. Thank you Senator.

Deputy Secretary Remy, you are recognized for your opening statement. And your full written testimony will be included in the record as well.

SUMMARY STATEMENT OF HON. DONALD M. REMY

Mr. REMY. Good morning, Senator. Good morning, Chairman Heinrich, Ranking Member Boozman, Senator Tester.

Chairman Heinrich, you have already introduced the expert team I have here with me today, so I won't go through those introductions again.

I simply want to say thank you for your consideration of the President's fiscal year 2023 Budget Request, and this opportunity to update you on VA's initiative to modernize our electronic health record, both so critical to veterans, their families, caregivers, and survivors.

The resources this committee has repeatedly secured for VA and the EHRM effort reflect our close partnership, and your continued focus on our shared commitment to improving Veteran's access, outcomes, and experiences.

In delivering world-class health care, VA adheres to the principles of high reliability organizations. Our fundamental goal, as an HRO, is achieving zero harm. Just one vet harmed is one vet too many.

And right now the bottom line is that the Cerner system is not delivering for veterans in the ways that it should, not even close. It needs major improvements, whether a system outage lasts for one minute, one hour, or one day, that outage is unacceptable. So on behalf of veterans we serve, and providers serving them, we couldn't be more frustrated, that is why we are holding Cerner and ourselves accountable. That is why we are applying lessons learned from every deployment to continue to improve. That is why we have paused on all future go-lives until 2023 to get this right. And make no mistake we will get this right. We have to, for veterans, for providers.

But these challenges cannot and will not stop us from modernizing the record system, because it is what veterans need. Our nearly 40-year-old Legacy system has served us well, but it has reached the end of its life cycle. Now now we need an EHR system where vets can access their health care records in one place, from the first day they put on their uniforms to the last day of their lives.

A system that empowers vets to receive care anywhere, whether it is from DOD, VA, or Community providers, without having to worry about cumbersome paperwork, or potentially harmful gaps in their records. A system that helps providers understand injuries

that veterans suffered 50 years ago, so that they can provide those vets with the best possible care, today.

In other words, getting this new system right is essential to delivering a lifetime of world-class health care and benefits to our veteran population. So we are continuing to drive toward these goals by making sure that future EHR deployments reflect what we learn, with each challenge informing and better positioning us for the next deployment.

During the remainder of this calendar year, and beyond, we are working with the contractor to ensure stability and resiliency of the system. We are using this interim period to make improvements like testing at our most complex sites, and adding capability enhancements to improve usability for our health care personnel. We are also fully engaged with past deployment sites, closely assessing their experiences, providing support, and applying lessons learned for future deployments, while also helping our hard-working, frontline users fix issues as they are identified.

We have added a new functional champion, Dr. David Massaro to help lead the EHRM effort, along with Dr. Adirim; and if any future sites fail to meet our integrated readiness criteria for any reason we will not go live, we simply will not subject our veterans to avoidable risk.

In short, we are continuously improving, continuously reviewing past deployments, and continuously holding ourselves, and Oracle, accountable to get this right before future deployments, not after. Whenever we make a decision at VA we ask ourselves one simple question: What does it mean for the veterans we serve, for their families, their caregivers, and survivors?

In the case of EHRM the answer is clear, veterans need a system supporting our high reliability organization, delivering them world-class health care for decades to come, the new system hasn't yet achieved those goals, and we won't rest until it does. Until it serves veterans as well as they have served all of us.

We look forward to your questions.

[The statement follows:]

PREPARED STATEMENT OF DONALD M. REMY

Good morning, Chairman Heinrich, Ranking Member Boozman and distinguished Members of the subcommittee. Thank you for the opportunity to testify today in support of VA's initiative to modernize its electronic health record (EHR) system. I am accompanied today by VA's experts on this initiative, Dr. Shereef Elnahal, Under Secretary for Health; Mr. Jon Rychalski, Assistant Secretary for Management and Chief Financial Officer; and Dr. Terry Adirim, Program Executive Director, Electronic Health Record Modernization Integration Office (EHRM–IO).

I want to begin by thanking Congress and this subcommittee for your continued support and shared commitment to Veterans. The resources you have invested in VA's EHRM effort will improve access, outcomes and experiences for Veterans. Successful deployment of a modern EHR is essential in the delivery of lifetime, world-class health care and benefits for Veterans, as well as to set the standard for U.S. health care writ large. We will get this right. With a unified, seamless, trusted information flow between VA and the Department of Defense (DoD), we can further empower Veterans and their families, caregivers and survivors to achieve and sustain health and wellness. In addition, we can enable care teams to deliver best-in-class access and outcomes while enhancing VA's ability to innovate and advance Veteran care and services.

I look forward to further engagement with you and your staffs to ensure that we are successful-and I assure you that we remain committed to full transparency regarding our deployment efforts. Veterans and patient safety are at the center of ev-

erything we do. In delivering world-class health care to Veterans, VA adheres to the principles of a High Reliability Organization and our fundamental goal is to achieve zero patient harm. To those important ends, I wanted to provide a program update, including what continues to be a sometimes challenging, but much more informed deployment and operational plan moving forward.

Our charge has been clear: create a single, seamless, integrated health record for Veterans, starting with their military service days. This complete record within a single system allows those who care for the Nation's Veterans to proactively prepare for the future and deliver the benefits, care and services those Veterans have earned.

This is one of the most complex clinical and business transformation endeavors in the Department's history. But the complexity and challenges associated with this effort should not deter us from modernizing our technology and processes. This is an opportunity for VA to fundamentally transform health care for Veterans through standardization of its operations to deliver consistent, high-quality care whenever, wherever Veterans seek it.

Our nearly 40-year-old legacy system has served us well, but it has reached the end of its life-cycle-and given its limitations, it needs replacing. As Secretary McDonough said, this is a leap forward we can and must get right.

We acknowledge that the first deployment at Mann-Grandstaff VA Medical Center (VAMC) in Spokane, Washington was problematic. The mistakes identified in the months following the Spokane deployment are unacceptable. We are holding ourselves and our vendor accountable to get these issues resolved at Mann-Grandstaff and our other deployment sites.

Since the deployment in Spokane nearly 2 years ago, VA has applied the lessons learned from that experience to improve future deployments. We conducted a Department-wide strategic review that identified patient safety and other areas for improvement and used these lessons to change our deployment strategies with a focus on reducing risk and improving adoption. VA is unequivocally committed to providing safe, effective care to Veterans.

This EHR modernization effort is led by the EHRM Integration Office with Dr. Terry Adirim, as the Program Executive Director, responsible for integrating efforts across the enterprise-wide, to include the Veterans Health Administration (VHA), the Office of Management, and other offices. We are excited to have on board as the first Senate-confirmed Under Secretary for Health since 2017—Dr. Shereef Elnahal, whose leadership of VHA will be critical to the success of this effort. In addition, Mr. Jon Rychalski has led VA's Office of Management for over 4 years and can address the updated independent cost estimate (ICE).

EHRM: THE PLAN GOING FORWARD

Any implementation of this scale and complexity comes with inherent challenges. While we are working diligently to address them, we also know change like this can be challenging and, as such, have always viewed this process iteratively. We are currently in the initial operating capability (IOC) phase. In this phase, we are learning what is working, what is not working-and applying the lessons learned moving forward.

DEPLOYMENT SCHEDULE

Following the 2020 Mann-Grandstaff VAMC deployment and strategic review in 2021, VA revised its EHR deployment schedule through the first quarter (Q) of fiscal year 2024. We understand, and VA has always made clear, that the deployment schedule is subject to change based on unforeseen events that may prevent a safe and successful deployment. This may include a determination that a site may not be ready for deployment due to implementation tasks not being completed on time or an assessment by EHRM–IO and Veterans Health Administration (VHA) leaders that a timeline adjustment is needed for a specific clinical site.

In preparation for deployments, EHRM–IO employs a detailed integrated readiness criteria checklist to assess risk at future sites. Additionally, we now use a continuous feedback loop with deployed sites to capture improvement opportunities and to drive future changes at sites not yet deployed. Pre-deployment activities are underway in Veterans Integrated Service Networks (VISN) 10 and 20, as well as preparation activities for site deployments in VISNs 12 and 23 scheduled later in fiscal Year 2023 and in early fiscal Year 2024.

Demonstrating the value of the new readiness process put in place, VA decided to postpone its planned go-live at Boise VAMC, originally scheduled for July 23, 2022. This decision was based on concerns that the site and Cerner had not completed all the tasks on the site deployment readiness checklist. A new launch date

for Boise VAMC has not been determined. We also shifted Puget Sound VA Health Care System (HCS), which includes the American Lake and Seattle VAMCs, from the original date of August 2022 to March 2023; and the VA Portland HCS, which includes the Portland and Portland-Vancouver VAMCs, from November 2022 to April 2023. These decisions were based on system stability concerns. Moving the deployment of these larger, more complex sites allows Oracle Cerner more time to deliver on its commitment to stabilize the system and implement our top priority capability enhancements.

We have paused going live at sites until 2023 to get this right. We are using our readiness checklist to determine their viability, and as always, we will adjust to ensure we are deploying a safe and effective EHR system. During the remainder of the calendar year, VA will be actively working on updates to the system, which includes testing at the Department's most complex facilities, as well as adding new capability enhancements. We are also still very much engaged with our past deployment sites, closely monitoring and assessing user experience, adoption of the new system and lessons learned.

The full EHR deployment schedule through 2028 is currently under development with VHA and VA's Office of Information and Technology (OIT) and will be ready in fall 2022.

<div align="center">CAPABILITY ENHANCEMENTS</div>

VA is committed and working diligently to resolve the challenges and issues identified in the strategic review, and by the Office of Inspector General (OIG) and the Government Accountability Office (GAO). We already have made progress on many of the issues identified. As of September 2022, we have closed 20 of the 68 OIG recommendations and are working with OIG to close an additional 12. However, some of the remaining recommendations are complex that cannot be closed out until the IOC phase is complete. Additionally, we are focused on ensuring technology stability and system enhancements, as well as on rigorous processes to manage budget and expenditures, aligning them with schedule, requirements and performance, among many other program improvements. Given the lessons learned from recent deployments, we also anticipate improving metrics, system stability, user adoption and training.

In terms of capability enhancements, VA currently is focused on four priority areas: pharmacy, suicide prevention, research and revenue cycle. Some of these enhancements are above the baseline requirements in the original contract but are necessary to ensure that our medical providers can deliver care safely according to VA policy and to meet the unique needs of Veterans. A notable example of progress is the task order modification for seven pharmacy capability enhancements, which was awarded to Cerner Government Services on July 6, 2022. The preliminary timeline for development of all 7 enhancements was 13–36 months. Oracle Cerner recently indicated that it would deliver the top three capability enhancements prioritized by the pharmacy community in 6–9 months. In the interim, VA has engaged MITRE experts to evaluate and provide recommendations to optimize the current pharmacy process to reduce burden on our medical personnel.

Another key concern among clinicians has been the visibility and prominence of patient behavioral health record flags. Flags are currently configured and available in PowerChart and FirstNet as part of core commercially available capabilities. However, these flags can be bypassed by clinicians, so we are working to enhance them—in all Cerner applications—to prompt clinicians to address them without the ability to move forward until appropriate action has been taken. In the meantime, staff have been trained on the workflow of accessing the alerts via an additional click from within those applications. We are in the process of adding additional mental health and patient record flags with task order modification award anticipated in the next 1–3 months. Once awarded, we anticipate having the ability to add three capabilities in 2–4 months, and an additional 2 capabilities in 18–24 months.

Like other EHR systems, the Cerner EHR system includes a queue to capture erroneous orders. The "unknown queue," is not a defect of the EHR, but rather how the system is designed. It functions to catch orders that cannot be delivered and completed so that they can be reviewed by staff for correction.

The problem with the unknown queue at Mann-Grandstaff VAMC was related to a failure of communication, training and processes. Unfortunately, responsible Mann- Grandstaff VAMC personnel initially were not aware of the unknown queue and how to work with this feature when the new Cerner EHR system was deployed. Subsequent actions have been taken to ensure that the queue is working optimally, including ensuring order locations are configured properly, adjusting workflows,

identifying staff to monitor the queue who are trained in its use, developing tip sheets and additional resources, among others. Almost all this work was completed prior to the 2022 deployments.

VA now has a process in place for facilities to track orders in the unknown queue daily and to assign facility staff to correct and resubmit the orders in a timely manner.

The issues discussed in the recent OIG report regarding the unknown queue were useful to further enhance its operation. VA has implemented corrective actions and reported them to OIG via a memorandum, dated July 6, 2022, requesting closure of the recommendations, and is diligently working to ensure that all facilities that have already deployed or are deploying in the future are adhering to the appropriate processes.

Proper training is an important element of a successful deployment. This means providing timely tailored, well-constructed coursework that requires active participation. VA has taken several actions to address identified training concerns, including:

—Engaging with independent consultants (McKinsey & Co) to review the contents and delivery of the training program, collecting end-user feedback and other related data and providing recommendations for improvements in the training program based on industry best practices;

—Conducting interviews on content areas of concern with super users and Clinical Councils;

—Working with EHRM–IO to incorporate feedback from listening sessions with super users at Puget Sound HCS regarding virtual super-user training;

—Piloting transition of 400-level courses including Sign-On Fair/Favorites Fair courses to local sites' super users and/or local sites' informatics teams (this is part of the strategy to transition ownership of appropriate activities from Cerner to VHA for long-term sustainment); and

—Implementing ongoing training content updates based on lessons learned, system changes and feedback from active EHR users.

SYSTEM RELIABILITY

VA continues to actively address concerns regarding system outages and degradations and is holding Cerner accountable. Not only are these episodes frustrating and disruptive to our medical personnel, but they potentially could put Veterans' safety at risk. We are also working collaboratively with DoD, the Federal Electronic Health Record Modernization Program Office, Cerner and Leidos to ensure stability of the Federal network. We are instituting prevention strategies and working to recognize problems earlier and improve notification procedures. Further, Cerner has committed to upgrading the current system and to the introduction of procedures for responding more quickly to service disruptions to ensure a better, more reliable user experience.

Cerner has failed to meet the 99.9 percent service uptime Service Level Agreement for 7 out of the last 13 months (June 2021 through July 2022) and the Department has received financial credits for Cerner's failure in meeting the contractual level of performance. To further hold them accountable, VA sent a second Letter of Concern to Cerner on August 5, 2022, reiterating our concerns and directing Cerner to provide their technical and operational roadmap to remedy the ongoing system instability issues within 30 calendar days.

These problems put our medical professionals' ability to deliver safe and effective care to Veterans at risk. Cerner's failure to resolve the system instability issues may result in the use of other contractual remedies within the Government's authority.

NEW FUNCTIONAL CHAMPION

VHA's involvement with the EHRM program is critical to the success of the EHR modernization initiative. The Office of the Functional Champion (OFC) is VHA's representative embedded within EHRM–IO and engaged across the Department. The OFC will lead functional initiatives to support VA's medical personnel, including collaborating daily across VA offices and across the health system to coordinate the development and implementation of EHRM-related activities. OFC works closely with VHA to ensure that our clinical community's interests are represented and integrated into each facet of the program, including leadership, staffing, governance and deployment.

We are pleased to have a new Functional Champion, Dr. David Massaro, as part of our leadership team. Dr. Massaro started on August 1, 2022. He is board certified in family medicine and health informatics and will lead EHRM–IO's clinical and

business functional efforts, including change management and training activities. Dr. Massaro formerly served within VHA in several executive roles, including Acting Chief of Clinical Informatics Operations for the Office of Health Informatics. He previously spent over a decade as a physician at VA.

More VHA personnel are being integrated fully into OFC, including informaticists, solution experts and informatics patient safety experts.

BUDGET OVERVIEW AND COST ESTIMATE

In support of this effort, the President's Budget includes $1.8 billion for fiscal Year 2023. This is in alignment with the new strategy, which adjusts the baseline requirements to align with VA's updated deployment plans. This funding is vital to support the 18 currently proposed EHR deployments scheduled for fiscal Year 2023, as well as the pre- deployment activities at future sites. These pre-deployment activities typically begin 13-15 months in advance of go-live dates to ensure sites are equipped to receive the new EHR system.

In fiscal Year 2023, VA currently plans to conduct EHR and infrastructure readiness activities at 68 sites across 7 VISNs. The funding will provide for:

—EHR: Contracts for site assessments, site transitions, enterprise integration and site implementation, including activities such as site activation, training and workflow development.
—Infrastructure: Information Technology (IT) and other infrastructure investments, such as IT upgrades, modifications to existing systems and interfaces.
—Program management support: Government staff (e.g., salaries and benefits), Government administrative expenses and contractor support.

Continuity of funding is integral to our ability to prepare sites for the deployment of the new EHR, and to execute VA's rollout schedule. By the end of fiscal Year 2022, EHRM–IO will have invested infrastructure readiness funding in 15 out of VHA's 18 VISNs. VA will also complete the vast majority of infrastructure modernization work in VISNs 10 and 20, and initial progress will be made in 13 additional VISNs. The FY 2023 budget also supports security, server stack and Local Area Network work at the final three VISNs, the initial set of infrastructure readiness items that the sites receive.

In addition to the funding requested for the EHRM account, VHA's Medical Facilities request includes $505 million in Non-Recurring Maintenance funding for facility infrastructure projects required to support EHRM. Some of the projects funded by this request include: $43 million at the Brockton VAMC, $45 million at the West Haven VAMC, and $45 million at the Dallas VAMC for required data cabling, electrical, heating/ventilation/air conditioning, and data center upgrades.

As planned, the fiscal Year 2023 President's budget provides the necessary funding to prepare for and meet the deployment requirements at sites that will go live in fiscal Year 2024 and early fiscal Year2025. Thanks to the support of Congress, funding already provided in FYs 2021 and 2022 supports the IT physical infrastructure requirements essential to the new EHR. EHRM program funding continues to support site preparation activities, including the IT infrastructure, distinct from predeployment activities described above,a that must be completed 12–32 months prior to go-live and deployment activities to prepare sites for the new EHR system.

In fiscal Year 2021, the VA OIG published two reports that each found deficiencies in the Department's Life Cycle Cost Estimate for EHRM and identified the need for an ICE for EHRM. In response to those reports, VA reviewed current and historical costs across the Department to ensure that, beginning in fiscal Year 2022, our quarterly financial reports to Congress provide a more complete picture.

To address OIG's concern regarding the lack of an independent cost estimate, VA procured the services of the Institute for Defense Analyses (IDA) to develop an independent cost estimate that includes EHRM-related costs attributable to EHRM–IO, VHA and OIT among other costs related to the new EHR throughout the life cycle of the system. This estimate provides VA leadership with a neutral, independent assessment of potential costs to implement and operate a new EHR. VA facilitated briefings with key Congressional staff on the preliminary cost estimate in July— now that VA has received the draft final report from IDA, we have provided a copy to the Committee as promised.

The four main drivers of differences between EHRM's estimates and IDA's are the deployment timeframe, sustainment, inclusion of productivity losses across the deployment and cost differences among existing elements of the deployment process.

For the specific difference between VA's and IDA's cost estimates for EHR deployment, VA's estimate spanned 10 years whereas IDA's estimate covers a timeframe of 13 years. VA's estimate was based on the current 10-year contract. IDA's estimate

of 13 years was derived from examining data on historical enterprise resource planning programs.

In its estimate, IDA also includes the cost for some sustainment during the implementation phase plus 15 years of sustainment operations once the system is fully deployed. The specific sustainment cost point estimates in IDA's life cycle cost are $3.5 billion during the implementation phase and $17.1 billion during the 15-year fully deployed phase. VA's estimate did not include some of the costs for operations and support during the implementation phase nor any sustainment costs during the fully deployed phase.

In total, IDA's estimate includes an estimated $25.9 billion in costs for elements not in scope of VA's estimate. These additional elements (i.e., acquisition, sustainment pre- and post-full deployment) account for about 75 percent of the cost difference between VA's estimate ($16.1 billion) and IDA's estimate ($49.8 billion).

The remaining approximately 25 percent difference between VA and IDA estimates is due to IDA independently producing higher cost estimates for some of the elements common to both VA and IDA estimates. These increased costs were derived from VA actual costs and the IDA-estimated 13-year implementation schedule. Cost increases are common for programs of this complexity, and prior enterprise resource planning programs have had similar cost increases in acquisition.

IDA's cost estimate excluded consideration of the effects of sustaining our current EHR, VistA. VistA must remain operable until all required functionality is replaced. The total cost to sustain VistA in fiscal Year 2021 was approximately $841 million. We expect this VistA cost to continue during the deployment of the Cerner system.

CONCLUSION

Our focus is keeping Veterans at the center of everything we do and our top priority remains and continues to be advancing a culture of safety and high reliability, with the goal of zero incidents of patient harm. Veterans deserve high-quality health care—that means health care that is timely, safe, Veteran-centric, equitable, evidence- based and efficient.

Thus, during the remainder of this year, we are working on ensuring the stability and resiliency of the EHR system and making improvements to the system, including usability improvements for our health care personnel. We are staying engaged with past deployment sites and providing support to our front-line personnel as well as fixing those issues they have identified. We are holding ourselves and Oracle Cerner accountable and continuing the work to deliver a more successful EHR, which will ensure delivery of world-class care to our Veterans.

While modernizing VA's EHR is a fundamental change in how business and health care work processes are performed within VA, it presents us with opportunities to transform the way we deliver health care, and to standardize that delivery across the enterprise to achieve improvements in patient safety and efficiency in health care deliver. Because this initiative is so transformative in terms of how Veteran care is provided, the success of the project depends on how well we prepare and support the people who use it. Be assured that the resources you have invested in VA's new EHR system, when fully implemented, will support VA in delivering world-class health care and will improve access, outcomes and the experience for Veterans for decades to come.

Finally, we want to acknowledge what may be top-of-mind for many of our stakeholders, including Members of the subcommittee. We understand the uncertainty this type of innovation can bring as meaningful, industry-shifting change often does. In a rollout of this scale and complexity, challenges are expected, they are inevitable, and we are prepared to address them. We learned much from our first deployment almost 2 years ago and have improved our deployment strategies. In fact, in the years ahead, a successful EHR deployment must reflect what we have learned, with each challenge helping to better inform and position the next deployment.

I again extend my gratitude to Congress for your continued support and shared commitment to serving Veterans with excellence. With your continued support, VA will realize the full promise of a modern integrated health record to cultivate the health and well-being of Veterans. We are happy to respond to any questions that you may have.

Senator HEINRICH. Thank you, Deputy Secretary. We will proceed with questions using the standard five-minute rounds, and senators will be recognized in the order that they arrive. I will start by recognizing myself for five minutes.

Deputy Secretary Remy, do you have any thoughts or impressions you can share with us about the life cycle cost analysis that was provided by IDA? Does it align with what you are seeing, or whether you have concerns with parts of their approach? Either way, just give us your honest impressions.

Mr. REMY. Mr. Chairman, thank you for the question. Indeed, it is important for us to have this Independent Life Cycle Cost Estimate, and we thank the Office of the Inspector General for pointing out the need for a VA to do that. Having this information is a data point that will help us build toward the future. There are differences and distinctions between our program office estimates and this life cycle cost estimate.

You mentioned them earlier that it goes for 3 years longer than our deployment schedule of 10 years currently does, that it allows for 15 years the same tail at the end, and it also covers other potential costs based on risk assessments that IDA did when they were performing the life cycle cost estimate. So we recognize that those are differences and distinctions, but we believe that the information in the estimate is valuable to us, as we look toward the future.

Senator HEINRICH. How much does it cost annually for the Department to maintain and update the VistA System? And am I correct in assuming that these costs will be eliminated once the Cerner record is fully deployed across the system?

Mr. REMY. Mr. Chairman, we estimate that amount to be around $800—$900 million on an annual basis to maintain the VistA System. Understand, however, that VistA is integrated with many other components of our IT systems, our financial management system, and other systems that rely upon VistA as a component of their operation. So as we modernize, we will be modernizing those other systems as well, but immediately we would not be able to draw down the usage of VistA because it is integrated with other things that we are using.

Senator HEINRICH. So tell me about how those costs will be impacted as the Cerner record is fully deployed? Do you see a transition there as opposed to a cliff? Talk to us about how you are going to integrate that.

Mr. REMY. Sir, I believe the way you have described it is accurate, that there will be a transition. I can't here say that we can identify, and quantify any specific cost savings that will result over time, because of the integration of the VistA System with other components of our technology.

Senator HEINRICH. This committee has requested, both in meetings and in our annual bills, metrics to measure whether this EHR implementation is good for individual veterans, or is a good use of taxpayer dollars. And while VA has shared really hundreds of technical metrics, we are still not entirely sure what constitutes success. So by what measures should we be able to tell whether the Department is succeeding?

Mr. REMY. Starting with what you have just described, is our veteran experience. We have engaged in this endeavor to enhance outcomes for our veteran population, and we want to make sure that our clinicians have the tools to achieve that. And so we have engaged in a process to gather information from our clinicians and

our veterans to understand what needs they have that aren't being met by the system, and how we can go about meeting those needs.

Now, that is a general statement not a specific KPI, if you will, to measure success. Success at the end of the day though, is measured by the performance of the system to achieve that outcome enhancement for our veterans, and that is what we are looking toward. When you look at the system's operations and you understand one of the things that is obligated in the contract for our contractors to provide, is that the system be operable 99.9 percent of the time.

I mentioned in my opening remarks some frustrations around outages and degradations; that is one of the measures that we look at to determine: Is the system reaching the people that it needs to, when it needs to?

Senator HEINRICH. VA always emphasized effective change management as key to really successful implementation, yet the provider feedback to the initial rollout has been quite negative. As the shift from VistA is happening, what is VA doing to support clinicians across that transition?

Mr. REMY. Mr. Chairman, we are arm in arm with those clinicians. We recognized that the initial rollout was not a rollout that had all of the components that it should have at the time, and presented a significant number of challenges. And so we have learned from that, and what we are doing now is to make sure that we have at-the-elbow support for our clinician community, our provider community, as they use this system at each site that is deployed.

I know we are almost out of time, but if you will, I would like to ask my colleagues to add to that response. Dr. Adirim.

Senator HEINRICH. Please, Dr. Adirim.

Dr. ADIRIM. Yeah. Now, and I think the Deputy Secretary pointed out a very important thing that we did in the subsequent four deployments, was ensuring ample at-the-elbow support with an adequate amount of time for our medical personnel to learn the system. But we have done a number of other things that I learned while at DOD, DOD being very successful, almost done with their CONUS deployment, that included ensuring that we have local leadership engagement, and we do this in multiple ways.

We do this several weeks before deployment engaging leadership to leadership, ensuring they have what they need, and that they are fully activated to help their people get through the deployments.

We have also started, and we have already done two, and we have four more planned, called VISN Director Workshops well in advance of deployment, so that site leadership and deployment leadership understand what is expected of them and what they need to do in order to prepare their medical personnel. So we have learned a lot, not only from VA's first experience, but also from other health systems, how we support our personnel.

And lastly, VHA did something really smart, they activated their VISN Clinical Resource Hubs to this effort, as well as, centrally, they have EHRM, they called the NESSU, which is the Supplemental Staffing Unit, to provide support to operations, whether it is virtual or onsite, for nursing, mental health, and so on, during

this post-go-live period to ensure that operations can be maintained and support our veterans as we are going through this.

Senator HEINRICH. Great. Thank you, Doctor.

Ranking Member Boozman has very graciously allowed Senator Tester to go next.

Senator TESTER. And I want to thank Senator Boozman. And I want to thank you, Mr. Chairman, also, for the opening statements. And I want to thank both of you for your leadership on these issues.

As you guys were giving your opening statements it occurred to me that not everybody is focused on what is going on with electronic health records in the VA. Not everybody in the Senate it is a top priority, but I can tell you for the two men in my left it is a top priority. And I would say the same thing for Senator Moran and myself.

Getting this right is really important. The contract was awarded in May of 2018, and we are, depending on what the numbers come in at the end of the fiscal year, somewhere between $7- and $9 billion into this outfit. And to be honest with you, from where I sit, I don't know that we have got a return on investment to speak of at all.

And so we have got long ways to go. And as I think I have told you, Mr. Remy, if I had all the money that was appropriated for computer programs for my time in the State Legislature and here, we would make a serious dent in the national debt, truthfully. We have got more work to do. And even though you guys, as Senator Heinrich has pointed out, weren't the people here when this contract was awarded, it is your responsibility now to either figure it out and move forward, or figure out a different way to go.

So look, the VA does not have any more installs planned for the rest of this year, and I think you have got a plan to restart in 2023, and then during that time you are working along with the folks from Oracle Cerner to fix any issues that are out there to make this thing work, so you can launch it somewhere else.

Deputy Secretary Remy, what data-driven set of metrics are you going to use to decide whether to take this system into more facilities? That is a little different question than Senator Heinrich just asked. But what are you going to be looking at to say, all right, we are ready to fly, we are going to move out?

Mr. REMY. Thank you, Senator. And you we have a Site Readiness Deployment Checklist that we have developed alongside, we being are VHA, an OEHR, or EHRM–IO, along with our contractor that spells out the types of things that will need to be done before we can go live.

And I can speak to some of those things. They include things like training, which is critically important for those people that are going to be using it, infrastructure, patient safety protections, and those types of things that we go through before we determine that a site is ready to go live. And this is an iterative process. It is not a static process.

As we are working with a site for potential deployment, we work through these issues to make sure that they have them covered. An example of the effectiveness of that checklist was Boise, recently,

where we determined we wouldn't go live as we were going through the checklist.

Senator TESTER. Okay. So as you are looking at this situation right now, and as we don't plan any installations until 2023, so I am going to ask you an unfair question: When do you anticipate, in 2023, that you are going to be able to implement and install?

Mr. REMY. Well, we have a schedule, but we are looking closely at this schedule, and we are realizing that there are issues that need to be resolved before we can go live. Right now our schedule would have us go to another installation in early-2023, January/ February. If we have to push that back, we will push that back.

Senator TESTER. So the question is, and I get it, and I don't want anything implemented before it is ready for prime time, on the same token we have got an investment in a program that needs to start delivering at sometime. And so are the problems with the program so intense that it is going to take months, and months, and months to solve them?

Mr. REMY. Some of the problems are challenging, and I mean we talk about people processes and technology, and making sure that we have each of those categories right as we move forward. We have learned things from prior deployments that will help us to enhance the system, so when we roll it out the next time we can roll it out in a way that can be more successful. We are learning things from our recent deployments, even, that that can help us move forward.

So I don't know that I would necessarily, sir, say that the problems are that intense, but the problems are real enough that we are not moving forward until we resolve some of them.

Senator TESTER. I got you. I just, I am concerned. We are into this damn near 5 years, it will be 5 years in May, and we are still, truthfully, I mean we are still, and we haven't done a damn thing. I mean we have implemented, and they have been a train wreck, in my opinion. And so the question really is here, and by the way, when Cerner comes up on the next panel it is the same thing, you guys have to be working really, really close with these folks, they have to be held accountable, they have to hold themselves accountable, you have to hold yourselves accountable. And we need to get this damn thing done. Because it is really hard for me to go back to the people anywhere and say, you are spending my money really well back there. Okay? You got the drift?

Mr. REMY. Yes.

Senator TESTER. All right. Thank you.

Senator HEINRICH. Thank you, Senator.

Ranking Member Boozman.

Senator BOOZMAN. So Senator Tester, I think the Secretary is playing in the football game tonight.

Senator TESTER. He is?

Senator BOOZMAN. I think that is tonight, isn't it?

Senator TESTER. It is

Senator BOOZMAN. Well tell him, from Senator Tester and I, that if he gets injured he still has to come and testify.

Mr. REMY. Well, his testimony is before the football game, sir.

Senator BOOZMAN. Oh, that is right. Very good; well, we will talk to him and wish him good luck. I don't know who talked him into that, but that is tough deal.

Secretary Remy, we all agree that the rollout as a rollout has fallen short, far short of expectations. Congress has appropriated $8.5 billion over the last 5 years. This year's request another $1.75 billion. We have talked about that at length.

I guess my question is, you know, we are in a situation now, as both Senators Heinrich and Tester alluded to, we have only deployed in five locations that still are struggling, and I guess the question is: How can we work together to get back on track? You know, what do we need to do to help you? And then again, you know, what do you all need to do, and the contractors, to get us in the situation that we need to be?

So I guess my question would be a couple things right away. Do you have the right balance of support staff necessary for the project to be successful? And what efforts is VA undertaking to identify lessons learned and ways to improve the deployment to other sites? How much of the change management work is done by VA employees? How much by contractors? What specific efforts are underway to enhance your change management initiatives, and to ensure your personnel embrace the new system? And what is VHA doing to underscore with clinicians the Department's full commitment to EHRM? In turn, how are VAMC directors and facility personnel held accountable for implementing Cerner?

That is a lot. But can you kind of chip away at that a little bit?

Mr. REMY. I can, Mr. Boozman. And let me start with the last point first. And if you will, I would like to ask Dr. Elnahal to speak to VHA's commitment. One of the important things about having a confirmed Under Secretary is to have the messaging delivered to his community, if it is acceptable.

Dr. ELNAHAL. Thank you, sir. And thank you, Senator, for the question.

So as the Deputy Secretary mentioned in his opening remarks, and as the Secretary has mentioned recently, I do have deep concerns about the system as it is functioning for frontline employees and service to veterans. I had a chance to see that, myself, in a visit to Columbus, Ohio, recently, a really great leadership team there who wants to get this right. And even more importantly, a great set of frontline folks who were in front of veterans trying to use the system, and I actually saw them in action using the system.

And what I will say is, my commitment, as again, the Deputy mentioned, is to actually get to a modern electronic health record that meets the clinical needs of our veterans, and right now I saw folks struggling with the system deeply.

Among the most concerning things that I saw was a phenomenon whereby our frontline clinicians when they put it in an order, or trying to interface with the system, they were not confident in many cases, and in many clinical settings, that those orders were actually getting where they needed to go on behalf of their veterans. And there was a lot of manual rework, recheck that had to be done to meet those veterans' needs.

What I took from that, was a need to come back, speak to my colleague, Dr. Adirim, Deputy Secretary, about ensuring that that is the case going forward by doing a deep investigation into that problem, but also to do a broader look at how these workflows can improve the configuration of the system against those clinical processes that we need to do for vets that also needs to improve.

I will say that there was a nucleus of folks at that facility as well, in some areas, who did find promise in the system. In the urgent care setting, some of the surgical, medical staff said that they appreciated it and found promise in it. So I think we can get there. But right now I did not see a system that was meeting most of the frontline clinician's needs. And that concerns me. And I know it also concerns the Deputy. And we are doing what we can to try and address those issues.

Senator BOOZMAN. So as a provider, you know, looking at the system you said that there was concern about the orders actually getting where they needed to go. What effect would that have on a patient, on patient care? Can you give an example?

Dr. ELNAHAL. Well, one thing I will say, Senator, is that this is not a new issue, per se, this is something that was discovered in the circumstances around the unknown queue, and some other issues. What I was surprised by was the frequency by which I was seeing that, and the number of staff who mentioned that to me.

And so what that meant was, that is a call to action for us to configure this system in a way where the workflows are intuitive, where clinicians, for example, don't necessarily have 10 to 20 choices for any given order or action in front of them. Looking at our training and ensuring that where the system can be configured better we can do that, but also that we have a confirmation that the broad swath of employees being trained know what to do in front of a veteran.

And so those issues we have to focus on, Senator. In full transparency, those things absolutely we need to improve.

Senator BOOZMAN. Okay.

Mr. REMY. Senator, I know you had a list of questions, and we are over time, I am happy to touch on the staffing and change management, if you would like.

Senator BOOZMAN. Yes sir, if you don't mind.

Mr. REMY. Absolutely. I mean, one of the things that flows from what Dr. Elnahal described is: How do you get a workforce to embrace change management in an environment where they see challenges? And the answer to that question is to provide them with the tools to overcome those challenges, to recognize that the outcome of the hard work that they put in to making sure that this system works is going to be improved outcomes for the veterans that they service.

And so what we have attempted to do is to provide them with those tools, to understand the challenges when they present, and to take swift affirmative action to resolve and remediate any problems that might arise. And we are doing that through our staff, through our governance process for the EHRM program, and through our work with the contractors, with Oracle and Cerner, to make sure that they have those tools to get past those challenges.

In terms of staffing, we are in the process of hiring; Dr. Adirim can speak to some of the staffing activities that are going on in the EHRM Integration Office. Similarly, I mentioned earlier that we have just brought on a new functional champion who is our linchpin with the VHA, and there is some hiring going on in VHA as well, to make sure that we have people that are available to do the work.

And then lastly, you ask about the role of contractors, whether that be the contract that we have with Cerner, or other contractors, and we utilize those contractors to assist us in delivering the system through training, and other activities that can help bolster our workforce. But the core of the work that is being done is being done by our team at VA.

Senator BOOZMAN. Thank you. So initially, we predicted 10 years. I don't think we can get that done. Do you have a somewhat concrete figure as to how long it is going to take us to actually get this thing?

Mr. REMY. Well, sir, the original plan was 10 years, as you mentioned, and we have been working feverishly to try to make that target. We have made some adjustments in the out years to the time for pre-deployment, deployment activities that might shorten that based on lessons learned to be able to meet the 10-year mark.

IDA, in their cost estimates, says they believe that initial deployment time period is 13 years. And we have been looking at, if we have to go beyond the 10 years, what does that look like? We don't have here today a specific time period beyond the 10 years because we are still looking at all the factors that might present, so that we have to go beyond the 10 years, if we do, nor do we have a dollar amount attributable to that, but I can assure you we are looking at what it would take to make sure that we deploy the system in a safe, effective manner for our clinicians, and our veterans, and if that needs to go beyond 10 years we are working through the process of determining what that time period might be.

Senator BOOZMAN. So let me ask you this. I will note that the VA has not yet allowed IDA to publicly release their independent cost estimate, we were told we can expect it to be released in mid-August, and now it is nearly October. It is challenging to hold an open hearing where a significant part of the discussion is about a document that you won't release. When can we expect this estimate to be released to the public?

Mr. REMY. Yeah, I understand your question. And we have provided the full document to the committee. It is a competition-sensitive document that we would have to pay attention to if we were to release it more broadly. But I can ask Mr. Rychalski to respond to that because he has had experience with this type of thing before. Jon?

Mr. RYCHALSKI. Okay. So it is. I guess it is, right now it is a legal procurement matter. One thing I will say is coming out of DOD, they would not release the cost estimates publicly, I think through FOIA requests, they would allow people to come in and look at pieces of it for that reason. So what I would say is, it is the legal and procurement communities are looking at it now to decide if it can be publicly released, or released kind of how DOD does it, which is a little bit more limited.

Senator BOOZMAN. Thank you, Mr. Chairman.

Senator HEINRICH. Senator Tester.

Senator TESTER. I have got a real quick question for you, Dr. Elnahal. And thanks for being here. It is good to have you on board. You talked about the Columbus visit. Health care people are under a lot of pressure just doing their job, period. This adds another level of stress. Are you concerned about VA burnout, employee burnout?

Dr. ELNAHAL. What I will say, Senator, is that is definitely in play, in the medical centers who have done this. And it was something I personally observed when I went to Columbus.

Senator TESTER. You personally observed burnout?

Dr. ELNAHAL. I personally folks telling me that the system was stressful to use, and leadership was telling me that folks were leaving, in part because of the difficulty of the workflows. Now, that said I will just put this into context. You know, EHR deployments, more generally, make things difficult in their initial phases. And we are in the IOC phase. But nonetheless that is a phenomenon that was communicated clearly to me when I was at Columbus.

Senator TESTER. Do you, okay so change is hard, and they are difficult to implement; is there any way that you can, or do you have plans for trying to deal with this upfront with the next rollout?

Dr. ELNAHAL. Well, I will mention that what Dr. Adirim mentioned around the clinical support teams, from our clinical resource hubs, the supplemental staffing units that we send are helping. What we have to do, ultimately, that will not only impact burnout, but more importantly what the veteran experience is, is configure the system in such a way that is intuitive to our frontline clinicians, and allows the system to get the job done for the clinical needs of veterans.

Senator TESTER. Do you think that is possible?

Dr. ELNAHAL. I do, Senator. I do think it is possible. I think it will require a significant amount of work, but we can get there.

Senator TESTER. All right. Thank you. Thank you, Mr. Chairman.

Senator HEINRICH. Thank you for your question, Senator. I think that will wrap up our first panel for now, and we will allow our second panel to get situated.

Thank you all very much, for testifying today.

Mr. REMY. Thank you, Mr. Chairman. Thank you, Senators.

PANEL II

Senator HEINRICH. Our second panel today is intended to provide the non-VA perspective.

And for that discussion I would welcome, Mike Sicilia, Executive Vice President of Industries for Oracle, who is overseeing Oracle Cerner's efforts; Brian Rieksts, of the Institute for Defense Analyses, or IDA, who oversaw the development of the Independent Life Cycle Cost Estimate; and David Case, VA's Deputy Inspector General who oversees work related to VA's EHRM effort, including inadequacies of VA's initial life cycle cost estimate and patient safety concerns.

We appreciate all of you being here today to discuss your roles in reviewing this initiative. I am going to recognize each witness for five minutes for your opening statements, and your full, written testimony will all be included in the record today.

We will begin with Mike Sicilia of Oracle. Mr. Sicilia.

STATEMENT OF MR. MIKE SICILIA, EXECUTIVE VICE PRESIDENT, INDUSTRIES, ORACLE

Mr. SICILIA. Chairman Heinrich, Ranking Member Boozman, and Members of the Committee; thank you for the opportunity to speak with you today.

As you probably know, approximately 4 months ago Oracle acquired Cerner, along with its VA EHRM program. As I stated in my written testimony, I hope you will agree, we believe our acquisition will reinvigorate this program and deliver on the promise of a single, longitudinal health record, from enlistment, and active-duty service at DOD, through retirement and elder care at VA.

We believe we can deliver a system that will leapfrog existing commercial EHRs and deliver for our service members and veterans the gold standard for modern health care technology. In the process, we are confident that delivering a modern EHR system will improve patient outcomes through analytics and machine learning, all while enabling advanced care delivery channels like telemedicine and mobility.

Importantly, for this committee, we believe we can deliver this system within the existing budget envelope envisioned for the current program scope without the need for any additional funds. To date Oracle Cerner, Millennium EHR is fully deployed for the Coast Guard, and is deployed at more than half of DOD medical facilities serving over 200,000 end users. I think a fair assessment is that the Coast Guard and DOD deployments are on track and proceeding successfully.

At the VA the story is a little different. Millennium is deployed at five medical centers and their associated facilities, and work is underway at over 40 medical centers for their upcoming deployments. Some of the delays are pandemic related, but it is also true that there have been technical, functional and training challenges at VA facilities. As we have examined the underlying causes for these delays and challenges, our conclusion is that we have found nothing that can't be addressed in reasonably short order to get us back on workable schedule, and within budget.

We know we have a lot to prove with deployments next year at larger more complex sites. We view the next year as a key window for building momentum and turning the corner just as we have done at DOD where initial adoption was also challenging and is now proceeding apace and with strong results.

We recognize that training must be improved, and have recently engaged a third-party firm to evaluate the current training program. We are announcing today that we will be engaging Accenture to work with us to make the training much more efficient, applicable, and useful for caregivers.

We are also committed to communicating timely and accurate information about our progress. This week we launched a dashboard that catalogs our to-do list and progress being made. We encourage you to view the dashboard frequently, and hope it will keep everyone, including us, focused on deliverables and dates.

I have already alluded to cost, but let me be clear about value. We intend to rewrite the Millennium EHR as a stateless cloud application which will deliver a modern user interface, ease of use, mobility, voice recognition, and self-service. It will have machine learning based clinical decision support, and analytics that are built in from the ground up. We intend to deliver a beta of this new system in 2023, and we commit to deliver it across VA as a cost-free upgrade under the current contract.

To be clear, this is a 10-year, $10 billion contract that already has had 700 million, or so, in additional funding due to additional scope. That is $10.7 billion. Even with delays, and perhaps an extended timeline for deployment. That is the number we intend to deliver the existing system for including rewriting the system for the cloud.

[Clerk's Note: The following Addendum was received for Mr. Mike Sicilia]

ADDENDUM TO TESTIMONY OF MIKE SICILIA, EVP-INDUSTRIES, ORACLE

Thank you for the opportunity to participate in the Senate Appropriations Committee, subcommittee on Military Construction, Veterans Affairs and Related Agencies hearing on "VA's Electronic Health Record Modernization: An Update on Rollout, Cost and Schedule" held on September 21, 2022. As VA's new EHRM partner, I appreciated the opportunity to update the subcommittee on Oracle's commitment to the program and plans to get it back on track and keep our costs in line.

In my testimony I committed that Oracle intends to deliver the EHR system across the entire VA for the amounts contemplated in the current contract under the current scope, barring big new requirements being added by VA. I reiterate that commitment today, but also wish to clarify that in my comments I did not mean to imply the contract ceiling had been raised or is being contemplated to be raised from $10 billion to $10.7 billion. It of course has not and remains unchanged from the original IDIQ contract award in 2018. We take seriously our responsibility to be good stewards of taxpayer dollars and will continue to look for opportunities to bring efficiencies and cost savings to this program.

Thank you.

The most important changes Oracle can bring to this program, in the short term, relate to improving the EHR system's performance and modernizing its technology.

On August 4th in Kansas City we hosted a Federal Leadership Summit to discuss performance and stability issues. Coming out of that meeting we have a two-fold plan. First, we are working on more than 40 different technical operational improvements that we expect to lead to improve performance and greater stability for the Federal enclave.

Second, at the end of July, I announced our intention to move the Cerner application at our own expense, and with of course Federal approval, to a modern hyperscale cloud data center, which will deliver a foundation for better performance and stability for end users.

And last, we are intently focused on improving functionality, fixing problems like the unknown queue, or other items listed on the dashboard, and working with VA National Councils where we believe changes can be made to improve clinical efficiency and productivity in the short term.

The changes Oracle is bringing to the EHRM program are significant, and 4 months into owning Cerner, we are confident that the problems are being, and will continue to be fixed, while at the same time we focus on delivering a far superior and modern Federal EHR on an aggressive time schedule.

We look forward to delivering for our Nation's veterans. Thank you.

[The statement follows:]

PREPARED STATEMENT OF MR. MIKE SICILIA

INTRODUCTION

Chairman Heinrich, Ranking Member Boozman and members of the Committee, thank you for the opportunity to speak with you today about the Dept. of Veterans Affairs' (VA) Electronic Health Record Modernization (EHRM) program and Oracle Cerner's Electronic Health Records (EHR) system (Millennium).

I am Mike Sicilia, Executive Vice President for Industries at Oracle. I am responsible for Oracle's Global Health Business Unit, including Oracle Cerner.

Today is my first appearance before your Committee, so I want to begin by committing to you to be completely candid and transparent about where we are, where we are going, and what changes Oracle can bring to the Federal EHR.

I also want to thank you for your past and current support of the EHRM program. We expect any program of this magnitude to receive intense scrutiny and oversight, and we understand concerns about delays and costs, which I will discuss further in my testimony. As VA's new partner in this effort, we have committed to getting the program on track and keeping our costs in line. In the coming months we hope to demonstrate to the Committee that we can deliver for the VA and our Nation's veterans so that we will continue to earn your support for the program.

Oracle is a leading enterprise software vendor with more than forty years of experience building and developing some of the most advanced, mission-critical, secure and performant technology around the world for governments, critical infrastructure, and commercial enterprises.

Oracle employs over 160,000 employees with more than 50,000 developers and engineers, and in the last 10 years we have spent more than $56 billion on research and development. Oracle holds more than 18,500 patents worldwide. Oracle is in both the infrastructure business with the world's leading autonomous database as well as the applications business with a full suite of high-performance enterprise applications across all industries.

Oracle is also a leading hyperscale cloud service provider with global reach across industries and governments. Of added importance here, Oracle operates fully certified government cloud regions under the Intelligence Community's Commercial Cloud Enterprise ("C2E") program and is fully qualified under the DoD's upcoming Joint Warfighter Cloud Capability Program ("JWCC").

Oracle is also a leading cloud applications company with Software as a Service ("SaaS") products across Enterprise Resource Planning, Human Capital Management, Supply Chain, and Customer Experience as well as industry specific cloud applications ranging from pharmaceuticals to banking and retail to utilities. Our systems are performant, scalable and secure, and there is nothing in the Federal EHR scope outside of our core capabilities.

Importantly, we have a demonstrated track record rewriting extremely complex applications from client-server technology to new, modern, stateless web applications which we plan to do here as well.

As you know, this past June Oracle completed its acquisition of Cerner. With this acquisition we brought together one of the world's most formidable and capable infrastructure and applications companies with one of the leading healthcare applications companies. Oracle's engineering expertise together with Cerner's clinical expertise is a very powerful combination that we believe will serve our Nation's veterans and their caregivers extremely well.

Our rationale for acquiring Cerner was straightforward. Healthcare IT in this country and around the world is significantly out-of-date and the associated health data is stove piped. Systems are aging without any hope of bringing modern technology innovations like analytics and machine learning to improve patient outcomes. Compared to banking, telecommunications, transportation, utilities, or any other mission critical sector, healthcare IT is furthest behind the modernization curve. Across the healthcare industry, EHR systems are often bespoke and running on-premises. The VA's current system—VistA—is certainly one example of extremely old technology incapable of bringing state of the art capabilities to our Nation's veterans.

Our intention is to lead the way with a new generation of modern, cloud-native, highly performant and secure EHR applications embracing mobility, self-service, analytics and ease of use, including virtual care, such as telemedicine, leading to better patient outcomes. Better patient outcomes inevitably lead to reduced health care costs. And modernization provides a rare chance to ensure caregivers are enabled by the tools they use, decreasing the administrative burden on caregivers. Unlike Cerner alone, Oracle brings an order of magnitude more engineering resources and scale to this formidable challenge and opportunity.

While Oracle is new to the EHR business, Oracle does have years of experience advancing medical research, powering clinical trials, reducing healthcare costs and providing public health authorities and policymakers with essential data to improve public health. During the COVID–19 pandemic, Oracle was honored to collaborate with the Centers for Disease Control (CDC) and the National Institutes of Health (NIH) to support COVID–19 related systems of record. We assisted in electronically pre-screening over six hundred thousand individuals willing to participate in COVID–19 vaccine clinical trials and then supported the CDC with the creation of the v-Safe After Vaccination Health Checker and the Health Partner Ordering Portal (HPOP) to support the distribution of vaccine, diagnostic and therapeutic supplies.

Finally, we worked with the CDC to build a national data repository for COVID–19 vaccination data in the U.S. We are accustomed to rising to the moment to handle large, complex tasks when our Nation needs it most.

I give you all this introduction so that you understand our acquisition of Cerner and assumption of its EHRM contract with the VA is well within our capabilities, given our size, expertise, and resources.

You should consider that in effect VA, the Department of Defense (DoD) and the Coast Guard obtained a new, vastly more resourced technology partner overnight to augment Cerner. We also strongly believe in this mission and consider it not only a contractual obligation but a moral one to improve healthcare for our Nation's veterans and their caregivers. We intend to exceed expectations.

The EHRM program is the largest health IT modernization project in history. The point of the program is three-fold: First, to offer a single interoperable longitudinal health record from a person's enlistment with DoD through lifelong care at VA. Second, to replace the current system conceived in the 1970s and deployed in the 1980s that is plainly and objectively past its prime. And third, to improve patient outcomes by deploying modern technologies across the entire data set of active duty and retired service members to ensure the highest quality of care. Doing so would literally leap-frog the commercial, private care systems and put DoD and VA at the leading edge of health care technical innovation.

When fully deployed across the VA healthcare system, 171 medical centers will go from using 130 different instances of the current VistA EHR to using a single enterprise-wide EHR that is shared between VA, DoD and Coast Guard. Problems currently experienced with VistA go away, such as: data silos creating gaps in patient data and care, veterans being tethered to specific medical centers, non-standardized workflows across the VA healthcare system, and a patchwork of VistA instances that inhibits the full potential of data analytics. These benefits of a modern EHR remain an extremely important goal worth protecting as they deliver significant improvements in healthcare services and outcomes for our Nation's service members and veterans.

To date, the Millennium EHR has been fully deployed for the Coast Guard and is deployed at more than half of DoD medical facilities serving over 200,000 end

users. I think a fair assessment is that the Coast Guard and DoD deployments are on track and proceeding successfully.

At VA the story is a little different. Millennium is deployed at five medical centers and their associated facilities, which is far slower than anticipated, and work is underway at over 40 medical centers for their upcoming deployments. Some of the delays were due to the COVID pandemic, but it is also true that there have been substantial technical and training challenges at VA facilities. As we have examined the underlying causes for these delays and technical and training challenges, our conclusion is that we have found nothing that can't be addressed in reasonably short order, in part because we have shifted Oracle's top talent to work on the DoD/VA EHR system as the company's number one priority.

We believe this moment is a unique opportunity to leapfrog VA into the future and make VA's EHR the gold standard for EHR modernization globally. But I also need to be clear that modernization requires change. There is no amount of money and no amount of work that can transform VistA into a modern system capable of delivering for our Nation's veterans.

We can and will do our part to deliver the most performant, feature-rich technology within the existing budget envelope for the current scope of work, but caregivers must also invest in training and learning a new system. Because a system is different does not make it unworkable. I am highly attuned to over-worked caregivers who are being asked to invest in learning a new technology without an immediate improvement in their day-to-day work. But I am also highly attuned to what a modern longitudinal health record with all health data in the same system can do to improve the care for our Nation's veterans.

Here is how we plan to address the current problems and get this system back on track:

Performance: On August 4, 2022, in Kansas City, we hosted a Federal Leadership Summit with VA, DoD, the Federal Electronic Health Record Modernization office (FEHRM) and Leidos to discuss the Federal EHR system's performance and recent stability issues. Coming out of that meeting, we have a two-fold plan.

First, we are working on more than 40 different technical operational improvement projects for the Federal Enclave that we expect to lead to improved performance and greater stability. We have made progress already, completing four projects and expecting seven, potentially eight, more to be complete by the end of the year. As we work on these projects, we will continue to analyze the system and make other fixes as needed. These plans are detailed in a letter we sent to VA on September 2, 2022, and which is attached for your reference.

Second, at the end of July I announced our intention to move the Cerner application—with, of course, the approval of VA, DoD and Coast Guard—to a modern, hyperscale cloud data center, which will deliver a foundation for better performance and stability for end-users.

Once achieved, this move will provide a scalable, modern platform for us to deliver the kind of modern technologies users have come to expect like mobility and predictive analytics. This is the same Generation 2 Cloud infrastructure that underpins Oracle's customers' most critical workloads in sectors like Financial Services, Telecommunications and Utilities.

Another advantage of moving the EHR system is that our cloud is a second-generation cloud with security built-in from the start. Infrastructure security patches are applied automatically with no downtime, removing the possibility of human error which is a major cause of security vulnerabilities. Oracle maintains all the highest government security classifications.

Moving to our cloud data center will be provided at no extra cost to the Coast Guard, DoD or VA, and as I will explain later we believe it will help substantially compress costs in the long- run.

We are cognizant of our Federal partners' concern raised at the August 4th summit that the entire Federal Enclave first be stabilized and are prioritizing that work in conjunction with the move to an Oracle cloud data center. We commit to maintaining the right balance of Oracle expertise, Oracle technology, and Oracle infrastructure to meet both goals.

Finally, we are working with VA to approve expanding our relationship with our current partners to assist with the work of making the Federal Enclave more stable and performant. We hope to announce this expansion soon, and believe that this expanded partnership will bring much-needed expertise and capabilities for a system as complex as this one.

Design: The second category of issues relates to system design. We have heard from providers about challenges with workflows and design that is not as easy or intuitive as it should be. While workflows are decided by the VA's National Councils

and in coordination with DoD we will be engaging with the councils where we believe design changes can be made to improve clinical efficiency and productivity.

And of course, one widely known design issue, the so-called "unknown queue," was recently reported on by the VA Inspector General. Despite its name, the unknown queue was not a bug, it was a backstop to account for patient scheduling tasks to facilities or providers that were not recognized by the system. These scheduling tasks were not lost, rather they were routed for manual review and processing, but the fact is the process initially resulted in far too many actions being routed to this queue and the manual review was not being completed in a timely manner.

While that has largely been corrected and current instances of orders entering the queue are minimal, we still committed to providing updates that would further reduce the chance of an order being entered incorrectly. On August 1, 2022, we delivered updates to VA to alert providers in their message center when an order is unable to be scheduled. A second update alerts providers when they go to close a patient's chart. VA has these updates for testing, and we will implement them when VA is ready. These updates were provided by us at no cost to VA. Screenshots of the updates are attached for your reference.

We also are working with VA related to the rescheduling of canceled appointments and the potential that some appointments were not properly rerouted. We will keep the Committee updated as we learn more.

Functionality and Millennium's Future: When it comes to functionality of the EHR, there are small things that become big things in practice and deserve rapid improvement. For example, we learned that in Columbus lab employees have not been printing in batches, which delays printing labels for vials of blood when multiple bloodwork tests are ordered. We have learned the check-in process for appointments has been slowed. These are two seemingly small examples in an overall EHR modernization, but they have a big impact on the amount of time a user spends in the EHR instead of with the veteran, and how much time the veteran spends in the facility. We are working to fix these and other similar issues that we are aware of to make the system more functional and efficient.

In previous testimony in July, I spoke to functionality concerns with the pharmacy module. Following VA's updated pharmacy requirements, we are currently working on seven important updates to pharmacy that will be delivered over the course of the next year and will make the pharmacy module function much better for users and veterans. The first three updates will be provided to VA by early next year.

At the same time, as I promised in July in testimony before the authorizing committees, we are developing new pharmacy functionalities from the ground-up. After starting this work, it quickly became apparent that we need to develop these pharmacy functionalities not as a separate module but as an integrated part of the new, modern EHR.

We are currently investing substantial resources to progressively rewrite the Oracle Cerner Millennium EHR as a modern, stateless web application, which will include pharmacy functionality. The system will have a modern web-based user interface. It will be mobile friendly, meaning users can bring their own device. It will include voice recognition, and ML- based clinical decision support and analytics that are built-in from the ground up. In short, it will be a fully modern cloud-based EHR system. Not only will this deliver the longitudinal record from enlistment through retirement and lifelong care at VA, but also includes the hierarchical view of the entire DoD/VA population against which analytics, AI, and machine learning can be deployed. We will keep VA, DoD and Coast Guard updated and engaged as we work on this modern EHR system, and of course will seek appropriate approvals for deployment as necessary. And while I don't want to over-promise here, our intent is to deliver a beta version of the new EHR, with pharmacy functionality included, in 2023.

Our plan—and our commitment to you—is to deliver all this functionality as an upgrade to the current system as part of our existing obligations under the current contract, at no extra cost to the government. Let me say that again—we plan to deliver a fully modern cloud-based EHR for the DoD, Coast Guard, and VA as part of our existing contract with the government.

Additionally, in the short-term we plan to show VA users and veterans a glimpse of what the future system will look like. As I mentioned before, during the pandemic Oracle created direct patient facing applications like v-Safe. We are expanding these patient facing applications so that patients can easily keep their providers informed—each day if they like—about their health status. It is a simple, intuitive application that patients will be able to use to connect with their providers, view appointments and keep up to date on new benefit announcements. These new fea-

tures will be added to Oracle Cerner EHR commercial products and therefore will be available to VA and DoD at no additional cost. We plan to meet with VA, DoD and Veterans Service Organizations to explain these features and assess applicability for focused areas like mental health or burn pit exposure awareness as two examples. It is the kind of addition to the system that will benefit veterans nationwide, all at once, while the longer hospital by hospital implementations progress. I have attached to this testimony sample screenshots of the new application. We look forward to working with VA and DoD to obtain their thoughts around rolling out some or all of these features in the coming months.

Nonetheless we will continue to invest in new technologies that we believe can assist our nation's veterans in short order, regardless of where their local VA center is on the system rollout schedule.

Training: Modern applications should require little to no training. Certainly, an EHR system has a level of complexity and medical specificity that will require some training, but our goal is to make this system as easy to use as anything else you do online. The best way to succeed is to win over users with user interfaces that are intuitive and functionality that exceeds practitioner's needs and expectations. When we do that, we believe we will create greater user satisfaction and combat inertia for acceptance of the new system.

Over time we will achieve that goal, especially when we eventually move Millennium to a modern stateless web application. But in the short-term, we recognize that training must be improved for users new to the Millennium system. Unless a VA provider recently joined VA from another healthcare system that used Millennium or another commercial product, VA providers are used to VistA and unfamiliar with Millennium. This is of course natural—VistA has been in use for several decades, so VA users know its tricks, shortcuts and workflows.

Similarly, it is important to understand that Oracle Cerner EHR's are deployed in tens of thousands of healthcare facilities across the country without incident.

We understand the challenge that change presents and the answer is two-fold. First, as I mentioned making the system more intuitive will help. Second, we are working with VA to revamp training. We recently engaged a third-party firm to evaluate the current training program. We have preliminary results and expect final recommendations in the coming two to 3 months. We will be engaging Accenture to implement the needed changes and work with us to make the training much more efficient, applicable and useful.

We know that nobody wants to sit through hours of training to learn a new system, so we will make it more targeted and impactful—and in so doing hopefully create better momentum and inertia for user adoption at rollout sites in 2023 than we have seen in the past.

Transparency: Another issue that has clearly been a problem is the dissemination of timely and accurate information, whether positive or negative. That has led to increased oversight by Congress and by the VA OIG, both of which we welcome. I of course commit to continue to come before this Committee and to work with you as often as is necessary, but to begin this work, we recently launched an electronic dashboard that we will make available to all of you which catalogues our "to do" list and progress being made. We hope this dashboard will supplement VA's monthly reporting, assist in the Committee's tracking and oversight, and keep everyone focused on deliverables and dates.

Timing: With new site deployments set for next year, we have the time to make fixes and updates to the system related to stability and performance as I discussed earlier. We expect to be ready to pick up with a full deployment schedule next year as set forth by VA and DoD, including at major facilities in Seattle, Portland, and other cities. By the end of next year DoD will be fully deployed, and we anticipate VA will have nearly 30 additional facilities live on the new EHR.

Under the original deployment schedule, more facilities would be using Millennium by the end of 2023, and we acknowledge that the rollout is behind. The pandemic obviously caused some of this delay and presented challenges with the initial rollout in Spokane that might otherwise have been avoided. But, as is often said, we are where we are—so from our perspective we look at how we can gain efficiencies in our deployment methodology to get back on a course to deploy more efficiently, and we look forward to working with VA on a full master schedule.

We believe that the combination of steps I have described—improved system performance and stability, design and workflow fixes, enhanced functionality, revamped training and more—will put us in a position to accelerate deployments in 2024 and beyond. The number one thing we can do is make a system that VA providers want—and are willing to learn and adopt. That happens with a modern system that makes work easier and where tangible benefits are seen for patients.

We know we have a lot to prove with deployments next year at larger more complex sites. We view the next year as a key window for building momentum and turning the corner, just as we have done at DoD where initial adoption was similarly challenging and is now proceeding apace and with strong results.

Cost: The Inspector General has written that it believes there will be cost overruns, and we have seen the Institute for Defense Analyses (IDA) preliminary cost estimates for the next 28 years of lifecycle of the EHRM system. While I am not able to critique the IDA report one way or another, I will make four points.

First, as for Oracle's part, we intend to deliver the EHR system across the entire VA for the amounts contemplated in the current contract under the current scope. This Committee rightfully focuses on the cost of the EHRM program. We recognize that our portion of the program is the lion's share of the budget, and we take seriously our responsibility to be good stewards of these taxpayer dollars.

As such, we intend to deliver even more than was ever originally contemplated as we upgrade Millennium to our data center and modernize it to a Stateless web application. Those upgrades will be done at our cost, not the government's.

Of course, if there are big new pieces of functionality not included in the current scope of the contract, that's a different discussion. However, if there are significant cost overruns related to the current contract, we are prepared to bear those costs and remain within the existing budget envelope. So let's talk dollars and cents, this is a 10-year, $10 billion contract that already has had $700 million or so in additional funding. That's $10.7 billion. Even with delays and perhaps an extended timeline for deployment, that's the number we intend to deliver for—again, barring some big new piece of functionality being added that is not currently contemplated in the contract.

Second, having been in this industry for almost 30 years, I am unaware of any point in history where the cost of technology has gone up, not down, nor am I sure I can predict the State or the cost of technology 28 years from now. I would anecdotally point out that 15 years ago mobile devices and cloud computing didn't even exist. Mobile computing and the cloud have turned the economics of technology upside down.

Third, and again we have not seen the full final IDA report, but from the preliminary slides it does not appear that a cost comparison was done against the cost of maintaining or upgrading VistA for 28 years. VistA has 130 different instances running using various VA- owned and maintained data centers. VistA is programmed in a language with a limited programmer-base where finding programmers in the coming decades will only become more difficult and expensive. As MITRE reported in 2015, VistA's ability to deliver new capabilities is stalled and is in danger of becoming obsolete. At the end of IDA's budget window, VistA would be 68 years old, would continue to fragment, and would have no viable path for modernization.

It seems intuitive that a system conceived and developed in the 1970s and 80s, by definition, would have a far greater lifecycle cost than a modern cloud EHR at scale developed in the 2020s. And once a modern cloud enterprise EHR is fully deployed, cost benefits from improved healthcare delivery will exist.

Fourth, with Millennium, VA is moving to an enterprise approach with one system instead of operating 130 instances, and eventually this system will move to the cloud. IDA of course couldn't have known our plans here as it conducted its analysis, but we believe the appropriate baseline for this program is not the current Millennium system but the next generation cloud product we are developing and that will be the system running for the lifecycle.

I can't contemplate a scenario where operating Millennium could cost more than VistA. In our experience, as technology improves, costs go down, and we believe we can compress costs in the coming years. Moving to a cloud-based system by definition will reduce the cost of maintenance dedicated to physical infrastructure for the Federal EHR. It also puts the onus—and staffing requirements—on Oracle as we will be responsible for running the data centers, providing updates and security patches and making upgrades for capacity needs freeing VA employees from many of those tasks in their own data centers.

CONCLUSIONS

In conclusion, 4 months into owning Cerner, we are confident that the problems with the VA rollout can be fixed in a relatively short amount of time, and additionally that we can deliver a far superior and modern Federal EHR on an aggressive time schedule as part of our existing contract with the government. We have committed to providing the Committee with full transparency as we move forward, including with the recent launch of our dashboard. And we are dedicated to providing

whatever resources are necessary to deliver to both DoD and VA a system that exceeds expectations without exceeding the contracted cost.

Oracle is excited to be VA and DoD's new partner in this one-of-kind, transformational EHR modernization effort. We are confident that our energy, commitment and resources will benefit this program greatly. With a little time, we can deliver for all the veterans who served our Nation and deserve nothing but the best, as well as for our current service members who will one day be a part of our veteran community.

We hope you will support us in this endeavor and look forward to working with the Committee as we move forward. I look forward to your questions. Thank you.

Attachments:

—September 2, 2022 letter from Oracle Cerner to VA

—Screenshots of Unknown Queue updates

—Screenshots of new patient facing application

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September 2, 2022

Mr. Joshua Hammill
Contracting Officer
Technology Acquisition Center
Office of Procurement, Acquisition and Logistics
U.S. Department of Veterans Affairs
Eatontown, NJ 07724

Re: Cerner Contract No. 36C10B18D5000, Response to Contracting Officer's Letter Dated August 5, 2022, Concerning Cerner Electronic Health Record Modernization (EHRM) Ongoing System Instability Issues

Dear Mr. Hammill,

Cerner Government Services, Inc. (herein after called "Oracle Cerner") is in receipt of your letter dated August 5, 2022, and we acknowledge your concerns regarding EHRM system stability and reliability. Oracle Cerner values its relationship with the U.S. Department of Veterans Affairs (VA), and we are grateful to be able to serve our nation's Veterans by working with you to modernize VA's electronic health record (EHR) system. We appreciated the opportunity to host the Federal Senior Leadership Summit with VA, the Department of Defense (DoD), the Federal Electronic Health Record Modernization office (FEHRM) and Leidos in early August to discuss the EHR rollout to date.

We have undertaken an extensive analysis of the EHRM system and attached to this letter we are providing current details on our technical and operational plan to address issues with system stability and reliability. These elements include proposed metrics as discussed with technical leadership from VA EHRM, DoD DHMSM and FEHRM and a prioritized project list from the Performance Excellence (Technical Review) begun in May. In addition, we will continue to execute to the previously agreed upon Scalability Roadmap, agreed with technical leadership from VA EHRM, DoD DHMSM and FEHRM, to be completed by November 25, 2022. We will also be taking additional actions based on further analysis by Oracle technical leaders, including architectural and operational assessments underway. As those efforts progress, we will share additional plans for improvement and stabilization of the system.

It is Oracle Cerner's expectation that our execution of the operational improvement projects and Scalability Roadmap, measured by improvement in the identified KPIs, will lead to improved performance of the EHR system, including achievement of defined SLAs. We are already making progress in that context. For example, July service availability was 100% for the first time in several

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months, and we have fixed the database bug causing the August 4th outage. In addition to these items, we will be providing ongoing updates regarding efforts to move to the cloud. As you know, we believe that moving to Oracle Cloud Infrastructure and eventually deploying a modern stateless web application will create a highly reliable and modern system for VA and DoD going forward.

Oracle Cerner also acknowledges VA's desire to incorporate additional metrics and performance requirements in the contract, and we look forward to further discussion in that regard, including potential incorporation of metrics identified in this letter.

Thank you for the opportunity to respond to these issues, and we look forward to continuing to serve our nation's veterans and VA caregivers.

Most Respectfully,

Pat Sargent

Pat Sargent
Senior Vice President and General Manager
Oracle Cerner Government Services

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Attachment

Proposed Technical Metrics

After performing an internal process maturity and operational health assessment of the federal enclave, Oracle Cerner has identified specific projects which we will execute to improve stability of the system. The impact of these projects will be measurable, evidenced by positive movement in the following Key Performance Indicators:

- Days since last incident, by severity
    - No baseline, metric for number of days without incident
- Days since last outage
    - No baseline, metric for number of days without an outage.
- Days since last performance degradation
    - No baseline, metric for number of days without a performance degradation
- Days since the last incomplete functionality
    - No baseline, metric for number of days without an incomplete functionality
- System Availability – Monthly availability
    - Baseline 12-month Average – 99.55
- Incident Free Time – calculated as time without an outage, performance degradation or incomplete functionality incident
    - Baseline 12-month Average – 91.13
- Mean time to repair (MTTR)
- Mean time between incidents
- Mean time between outages

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Projects

The following projects shall be undertaken by Oracle Cerner to improve system performance. This list of projects is introductory and not all-inclusive, as Oracle Cerner's roadmap for improvement will continually evolve as mentioned earlier in this letter.

Workstreams were established based on root causes of incidents, and how the incidents logically grouped. 41 of these projects across 8 workstreams have been identified as having a high or medium state of readiness and have been briefed to EHRM IO technical leadership. A high state of readiness is defined as teams having both clear delineation of steps that need to be taken to realize an opportunity fully, and appropriate resources to be able to fully execute realization of the opportunity. These projects have been initiated and assigned timelines. Projects indicated to be an a "medium" state of readiness indicate Oracle Cerner understands the path forward and what must be accomplished and is in the process of acquiring or identifying resources to carry out the work.

Workstream / Theme	Total Projects	High - Initiated	Medium	Completed
Certificate Management	7	1	5	1
Configuration	11	10		1
HIE	5	1	2	2
Infrastructure	1		1	
Interfaces	6	5	1	
Multi-Client Governance & Comms	2	1	1	
Testing	4	2	2	
WebSphere App Server	5		5	
TOTAL	41	20	17	4

The projects are shown below in order of estimated completion date. "High" readiness projects show estimated completion by month while "medium" readiness projects show estimated completion by quarter (using calendar quarters).

Theme: Project	Est. Complete	Description	Functional Value/Expected Outcome
Configuration: 3rd party vendor engagement to enhance system reviews - IBM	Complete July 2022	Acquire additional contracts with targeted vendors to support targeted system reviews	Ensure that actions taken to resolve previous incidents are adequate and seek additional input to harden the system.
Certificate Mgmt: FAS Service	Complete July 2022	Understand how to deploy Citrix FAS in the enclave to leverage multiple CA's	Reduce incidents where FAS cannot failover to another CA

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HIE: Improve HIE Product Information for Deployment, Configuration, and Optimization	Complete Aug. 2022	Define the HIE product technical information that will assist in the optimal deployment and configuration of the HIE application, and information that assists in optimally managing operation, including hardware capacity planning and sizing. Ensure that this information is created by the third-party development team and communicated to the appropriate Cerner technical teams, including the HIE DBA team and the HIE operations team.	We expect to reduce future HIE database issues by improving the management of the database. Providing the CernerWorks DBA and HIE Operations teams with more detailed technical information about the interaction of the HIE application with the HIE database will help the technical teams properly configure the database when deploying and managing the HIE database. Further, this information will be valuable when planning for additional function and capacity of the JHIE.
HIE: Standard naming convention for JHIE certificates	Complete Sept. 2022	Create a standardized naming convention for JHIE certificates to reduce the risk associated with installing certificates incorrectly and improve the ability to rapidly identify certificates during troubleshooting. Add the naming convention to existing certificate management process.	The myriad JHIE connections require a large number of certificates. Standardizing the nomenclature will reduce certificate management errors and decrease troubleshooting time for JHIE connections. Incident 434337108 would be addressed by this change.
Testing: Enhanced testing processes	Oct. 2022	Cerner and EHRM IO testing teams have worked together to identify process improvements as a result of recent production incidents (Examples include Rhapsody ICR 376 and EDIPI Identifier Corrections). These processes include improvements on Regression Testing, Test Plan Reviews and Interface Documentation updates to consider testing strategy.	Enhanced testing processes and test plan reviews ensure all stakeholders have opportunity to review testing plans and provide feedback. This review process also incorporates and ensures the correct levels of testing are performed for each change and include correct levels of regression testing. Finally, the improvement to interface documentation requirements will ensure special testing scenarios are captured.
Testing: Package validation testing services to be performed on behalf of EHRM program by Testing & Quality Assurance	Oct. 2022	Previously, the VA was responsible for testing in sustainment. With the recent TO47 award, Cerner will begin providing package validation services for EHRM IO beginning 7/1/2022. This strategy will expand on existing package testing strategies where focus previously was on only the Change Request. Cerner will now perform risk analysis, provide detailed testing approach recommendations and additional package regression testing	Improved package testing coverage, develop approach to include in Joint Master Test Plan on how to analyze risk, evaluate package criteria, establish risk level and put together recommendations on regression test strategy. Improved documentation on packages will allow for teams to remove the guess/art form of package validation so that IP and engineering provides clients with how to better approach testing a package

33

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		that is not performed at the time of this report.	
HIE: Standardize HIE Code Release Review & Testing	Oct. 2022	Standardize the end-to-end process for the release and deployment of Cerner HIE code releases for the JHIE, including reviewing the content (including commercial and federal enhancements) of Cerner HIE code upgrades, incorporating commercial testing in the release process, developing federal-specific deployment instructions, and defining and executing federal-specific test plans.	Incidents 436308946, 436447990, and 437416767 stemmed for the March 2021 JHIE code upgrade. After improvements to the release, testing, and deployment plan, the April 2022 JHIE code upgrade was completed with no downstream incidents. Standardizing this release and testing process will maintain the quality of future JHIE code upgrades.
Interfaces: Improve Rhapsody Code Reviews by implementing a Cross Functional process (IAM, EA, Integration and Rhapsody).	Nov. 2022	Rhapsody Stability: The Rhapsody Dev and Testing teams are working with Release Planning to move to Rhapsody releases for the VA aligned to Block Release schedule and Block Release testing. RECOMMENDING: Further discussions to combine VA and DoD Rhapsody Dev/Test/Release teams given the single shared Rhapsody environment	Rhapsody Contract with Leidos for single team providing improved support, dev, deployment. Block Release alignment and testing for improved stability, quality etc.
Interfaces: Perform regression and new feature/SR fix testing for each release	Nov. 2022	Perform regression and new feature/SR fix testing for each release, prior to requesting approval for production deployment	Rhapsody Contract with Leidos for single team providing improved support, dev, deployment. Block Release alignment and testing for improved stability, quality etc.
Configuration: 3rd party vendor engagement to enhance system reviews - Citrix Consulting	Dec. 2022	Acquire additional contracts with targeted vendors to support targeted system reviews	Ensure that actions taken to resolve previous incidents are adequate and seek additional input to harden the system.
Configuration: 3rd party vendor engagement to enhance system reviews - Citrix ADC	Dec. 2022	Acquire additional contracts with targeted vendors to support targeted system reviews	Ensure that actions taken to resolve previous incidents are adequate and seek additional input to harden the system.
Configuration: perform well-architected review for Oracle Exadata	Dec. 2022	Perform targeted system review	Ensure that actions taken to resolve previous incidents are adequate and seek additional input to harden the system.

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Certificate Mgmt: Service Delivery	Jan. 2023	Complete Key Factor Self-Service Implementation. Ensure Cerner is Registered with all necessary External Issuers and Document Process for Required Action when new External Certificates are Issued. Review and Enhance Methods of Notification.	Reduce time it takes to create and deliver a certificate. Reduce notification fatigue so that notifications are more actionable
Configuration: 3rd party vendor engagement to enhance system reviews - Brocade	Feb. 2023	Acquire additional contracts with targeted vendors to support targeted system reviews	Ensure that actions taken to resolve previous incidents are adequate and seek additional input to harden the system.
Interfaces: Combined VA/DoD Rhapsody releases should adhere to the EHRM Block Release Schedule for improved control of scope, timing, cross-team impact, and testing.	Mar. 2023	Rhapsody Stability: The Rhapsody Dev and Testing teams are working with Release Planning to move to Rhapsody releases for the VA aligned to Block Release schedule and Block Release testing. RECOMMENDING: Further discussions to combine VA and DoD Rhapsody Dev/Test/Release teams given the single shared Rhapsody environment	Rhapsody Contract with Leidos for single team providing improved support, dev, deployment. Block Release alignment and testing for improved stability, quality etc.
Interfaces: Review Rhapsody monitoring tools to determine if any modifications should be made to alert parameters	Mar. 2023	Rhapsody Stability: The Rhapsody Dev and Testing teams are working with Release Planning to move to Rhapsody releases for the VA aligned to Block Release schedule and Block Release testing. RECOMMENDING: Further discussions to combine VA and DoD Rhapsody Dev/Test/Release teams given the single shared Rhapsody environment	Rhapsody Contract with Leidos for single team providing improved support, dev, deployment. Block Release alignment and testing for improved stability, quality etc.
Interfaces: Review ESI monitoring parameters and thresholds to determine if any modifications are required.	May 2023	Analyze current state monitoring tools and thresholds related to ESI	Proactive monitoring of thresholds to identify issues before causing impact to client or system
Configuration: 3rd party vendor engagement to enhance system reviews - VMWARE	May 2023	Acquire additional contracts with targeted vendors to support targeted system reviews	Ensure that actions taken to resolve previous incidents are adequate and seek additional input to harden the system.
Configuration: 3rd party vendor engagement to	Sept. 2023	Acquire additional contracts with targeted vendors to support targeted system reviews	Ensure that actions taken to resolve previous incidents are adequate and seek additional input to harden the system.

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enhance system reviews - Palo Alto			
Configuration: 3rd party vendor engagement to enhance system reviews - Cisco	Oct. 2023	Acquire additional contracts with targeted vendors to support targeted system reviews	Ensure that actions taken to resolve previous incidents are adequate and seek additional input to harden the system.
Configuration: 3rd party vendor engagement to enhance system reviews - F5	Oct. 2023	Acquire additional contracts with targeted vendors to support targeted system reviews	Ensure that actions taken to resolve previous incidents are adequate and seek additional input to harden the system.
Multi-Client Governance & Comms: Define Communication Path for Major Incidents	*In Negotiation*	Determine a communication path for major incidents that provides clients clear communications and coordinated messaging during and pertaining to major incidents.	Upon successful completion of defining communications paths for major incidents, Cerner, Leidos and Accenture will clearly understand expectations for communications of major events and execute in accordance with SOP, and DoD/VA/FEHRM will understand how they will be notified, and how details will be received regarding communication of major incidents.
Certificate Mgmt: PKI SCOM Monitoring	2022 Q3	Test and Deploy PKI-SCOM Monitoring package to track heartbeat on Active Directory Certificate Services and reboot them if they have stopped. Test and Deploy PKI-SCOM Monitoring package to track and alert on Stale & Expired Certificate Revocation Lists.	Reduce incidents where a CRL expires. Reduce incidents where AD CS services are not functioning for an extended period of time.
HIE: Improve Knowledge Base used for Troubleshooting JHIE Incidents	2022 Q4	Create or update JHIE troubleshooting playbooks that include information such as: • HIE configuration details • Definitions of commonly encountered HIE errors • Checklists for confirming HIE functionality and connectivity • Overview of HIE integrations with Cerner and Federal systems • Description of Millennium capabilities that closely interact with the JHIE (FSI Java, Outside Records)	Troubleshooting in the complex JHIE ecosystem can result in long incident durations. We expect that by consolidating and documenting the experience of HIE subject matter experts, this information will guide incident response teams more efficiently and reduce JHIE incident durations.
HIE: JHIE System-level management	2022 Q4	Establish a team that monitors and analyzes JHIE performance, over time, at an end-to-end system level. The system level team will complement and leverage existing	We expect that JHIE trend monitoring will provide predictive information that allows the JHIE support and operations teams to prevent the occurrence of JHIE incidents. Specifically, multiple JHIE database issues could have been

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		event-driven monitoring and alerting to detect trends in JHIE behavior.	identified early and addressed before causing JHIE incidents.
WebSphere Application Server: ODR Monitoring	2022 Q4	Implement monitoring for both inbound and outbound ODR connections	Prevent thread pool exhaustion events and support future growth projections
WebSphere Application Server: Ensure all Federal ODR F5s are using Least Connections model	2022 Q4	Load balancing algorithm has been modified from round robin to least connections model as a response to previous incidents and on recommendation of IBM. Verify all of the F5 VIPs in the Federal enclave are configured to use this model	Distribute traffic evenly to all ODRs
Certificate Mgmt: Automated Certificate Rotation on Non-Windows Technologies	2023 Q1	Identify or Allocate Resources to Support Automation Needs, Prioritize and Roadmap Delivery of Certificate Rotation Automation, Automate Application Keystores for Various Millennium Solutions (WAS, Bridge, Clairvia, iBus, etc.), Initiate and Harden process of using Umpire to rotate Federal F5 certificates	Dedicated resources would allow for timely delivery of automation. Coupled with automation for application keystores, this would reduce manual work effort and potential for human error. Provide stakeholder visibility
Certificate Mgmt: Certificate Architecture Review	2023 Q1	Review Certificate Solutions against Federal Certificate Requirements, Key Factor Domain Consolidation, Certificate Authority Consolidation	Reduction of resource time spent on server maintenance; ability to report on certificates used across domains
Multi-Client Governance & Comms: Enhance Go-Live Readiness Communication SOP	2023 Q1	Increase process rigor for adding new capabilities to the environment, to match more built-up processes for going live at a new site. Leidos is standing up an engineering review board at the beginning of the process; recommendation is to leverage that pilot program to create a joint SOP and ensure VA is participating	More consistent approach and standardized questions across both agencies for adding new capabilities Identify risks around scalability or performance earlier in the project, reducing last-minute changes closer to go-live
Testing: Production findings accountability board	2023 Q1	A production findings accountability board shall be established or incorporated into existing Service Outage Analysis (SOA) processes to review each incident logged by an end user that results in a defect and/or correction. This board will	Testing strategy may be continuously updated and improved based on lessons learned to better prevent and identify issues prior to introduction in production.

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		trace how the finding was not observable by the multiple testing teams to ensure we are continuously improving.	
Testing: Test Automation capabilities	2023 Q1	With the award of TO43, Cerner is working on building the capability of Testing Automation using Eggplant automation software. Oracle Cerner will continue to prioritize standing up this capability so regression testing can be implemented and continuously performed in non-production environments.	Developing testing automation capability within the federal enclave will allow continuous regression testing to ensure general workflows are always functional and regression testing is always occurring
WebSphere Application Server: Optimize ODR tuning	2023 Q2	Implement vendor recommendations for improvements to the WAS ODR configuration	Improve resilience and support further scalability of the WAS technology stack
WebSphere Application Server: ODR Connection Projections	2023 Q2	Utilize ODR monitoring to identify connection growth trend on the WAS cells	Project future growth and plan capacity increases to projections
Certificate Mgmt: Data Quality and Reporting	2023 Q2	Socialize New PowerBI Reporting, Incorporate Planned/Scheduled Change Requests in Reporting, Perform Clean-up Activities for Certificates in Key Factor with unknown ownership, Perform Review and Clean-up Activities for Certificates in Key Factor by Executive, Create Documentation and Perform Clean-up Activities to support the process of new VA Solutions being developed and deployed in B1930 and Production by Cerner Consulting and IP.	Provide certificate subscribers with additional information and ability to plan for their certificate management activities. Tie planned change requests to outstanding certificate expirations to remove noise from reporting and highlight certificates at risk. Better positive control over certificate volume. Higher data quality in Key Factor. Better team understanding of certificate volume and exposure in order to plan for resourcing and change control activities. Reduce the number of not needed certificates that we maintain out of fear. Update documentation that can be used to prevent certificate incidents in the future.

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Certificate Mgmt: Scanning and Dependency Mapping	2023 Q4	Inventory digital certificates in use for all interfaces and produce comprehensive guides for management, updates and dependencies.	Deliver timely, relevant, actionable information including full visibility into current scan ranges and knowledge of existing certificates to reduce outages and impacts for all interested associates
Interfaces: Product enhancements for ESO Load Servers	2023 Q4	Product enhancements enabling ESO Load Servers to automatically scale in response to message queueing	Reduced message backlog for real time HL7 messages triggered outbound
WebSphere Application Server: Migrate Preferences Service	2023 Q4	Migrate the Millennium preferences service to dedicated WAS cell	Reduce total connections to main ODRs and minimize recurrence of thread pool exhaustion
Infrastructure: Federal architecture and design reviews with vendors	2024 Q1	Execute (Federal enclave specific) architecture and design reviews with key vendors	See specific outreach in Configuration recommendations
Configuration: Operationalize automation of tasks	2024 Q3	Create and operationalize automation for frequent, time-consuming, and/or error-prone tasks.	Reduce associate hours spent on high frequency, low value tasks and longer more time-consuming repetitive work
Configuration: Align to Oracle process for workplan and controlled document review	Ongoing	Per proposed technical change control policy respective organizations must establish a workplan review practice.	Reduction in unsuccessful changes.

Unknown Queue Update Example #1 – Message Center Notification:

Message Center

| General Messages | × | General Messages: | × |

Reply | Reply All | Forward | Delete | Print | Select Patient | Previous | Next | Mark Unread | Inbox View | Summary View | Launch

From:	SYSTEMOE, SYSTEMOE Cerner, Cerner Managed Acct		Caller:	
Sent:	08/09/22 21:01:16 CDT		Action:	
Subject:	Notice: Order Cannot be Scheduled: Return to Clinic - PM&R [Time in Queue: 8 days]		Due:	
To:	Buch,Ankur, Cerner Consulting		Provider:	
Cc:			Document:	Phone Messag

<Add Text>

The order Return to Clinic - PM&R can't be scheduled. Please cancel and reorder the order with the correct location or contact the appropriate site resource for assistance.

Order: Return to Clinic - PM&R
Details: *Est. 08/16/22 +/- 4 days, Future Order, 463 Audio, Test Same Conv, SCI/D ALS
Order Date Time: 08/01/2022 10:44
Ordered By: Buch, Ankur, Cerner Consulting

Time in Queue: 8 days
Date Time added to Unknown Queue: 08/01/2022 10:57
Order ID:[2729553951]

Unknown Queue Update Example #2 – Close Chart Notification:

Discern: Close Chart - ZZTEST, LEMON (1 of 1)

Cerner

Notice: Order(s) Cannot be Scheduled

The order(s) below cannot be scheduled. Please cancel and reorder the order(s) with the correct location or contact the appropriate site resource for assistance.

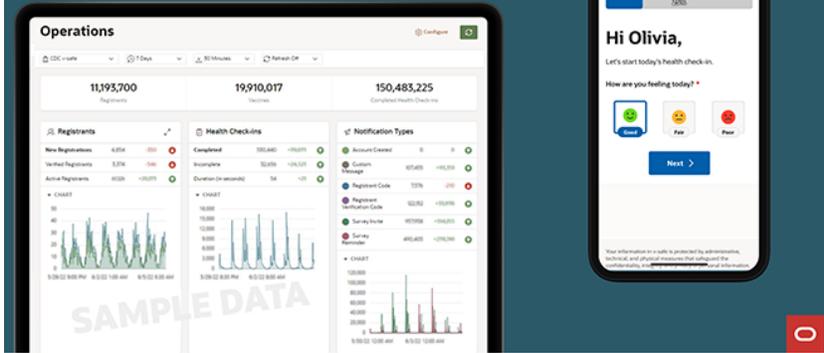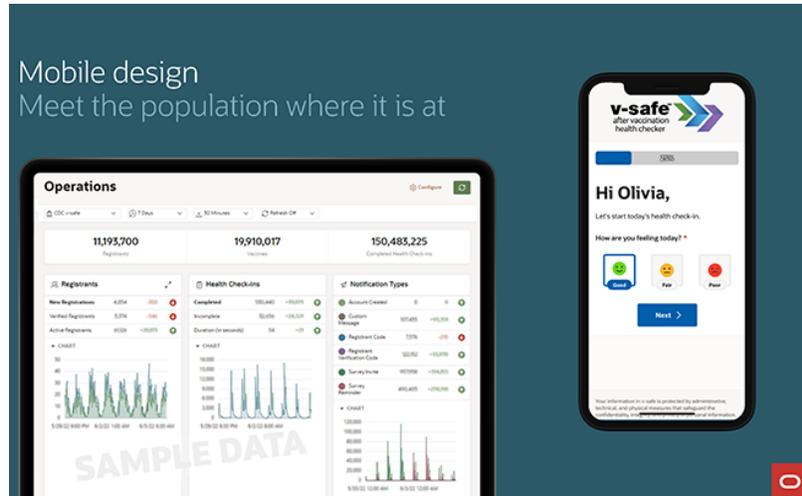| Order	Details
Return to Clinic - PM&R	*Est. 08/16/22 +/- 4 days, Future Order, 463 Audio, Test Same Conv, SCI/D ALS
Return to Clinic/Telehealth Group Visit Home (VVC)	*Est. 08/04/22 +/- 2 days, Future Order, Reason: Test Same Conv, 463GB Nutrition

Alert Action:
◉ Go Back to Chart
○ Close Chart

OK
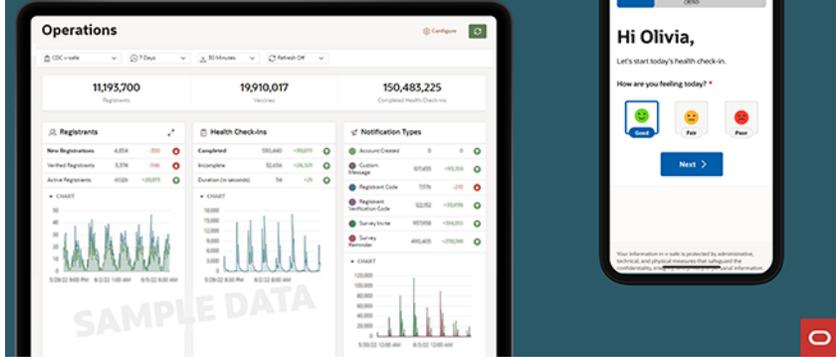
Senator HEINRICH. Dr. Rieksts.

**STATEMENT OF DR. BRIAN RIEKSTS, PH.D., RESEARCH STAFF MEM-
BER, COST ANALYSIS AND RESEARCH DIVISION, INSTITUTE FOR
DEFENSE ANALYSES**

Dr. RIEKSTS. Chairman Heinrich, Ranking Member Boozman,
and Senator Tester, thank you for the opportunity to testify today.

The Department of Veterans Affairs asked the Institute for De-
fense Analyses to provide an independent, life cycle cost estimate
for the Electronic Health Record Modernization program. Following
GAO and OIG guidance we included all program costs regardless
of funding source. IDA estimates the life-cycle cost of the EHRM
program to be about $50 billion in constant fiscal year 2022 dollars.

These costs would span about 28 years, which includes a 13-year
implementation period, and a 15-year period after the system is
fully deployed. IDA also conducted a risk analysis to quantify the
uncertainty of the cost estimate. We estimated a likely range of
$46- to $54 billion.

There are notable differences between the IDA cost estimate and
the 2019 VA estimate of $16 billion. IDA estimates cost for a 28-
year life cycle, whereas the VA estimate covers only the 10-year
time period of the current contract. The VA estimate does not in-
clude sustainment costs or the cost of productivity loss due to de-
ploying the system, both of which are included in the IDA estimate.

Our tasking was to produce this independent estimate of VA
EHRM life-cycle costs. Estimating potential benefits such as im-
proved health care delivery and possible legacy system cost reduc-
tions was beyond the scope of our study. Our analysis estimates
cost ranges for EHRM cost drivers, VA has an opportunity to man-
age cost drivers such as productivity loss associated with deploy-
ments.

As the system is rolled out to more facilities, emerging informa-
tion will provide additional insights regarding risk and uncertainty
in the cost estimate.

Thank you for the opportunity to discuss your cost estimate. And I look forward to your questions.

[The statement follows:]

PREPARED STATEMENT OF DR. BRIAN RIEKSTS

Chairman Heinrich, Ranking Member Boozman, and distinguished Members of the Committee: Thank you for the opportunity to testify today.

The Department of Veterans Affairs (VA) announced in 2017 that it would pursue an Electronic Health Record Modernization (EHRM) program to replace elements of its current aging system, the Veterans Health Information System and Technology Architecture (VistA). In 2022, VA asked the Institute for Defense Analyses (IDA) to develop an independent life-cycle cost estimate (LCCE) for the EHRM program.

IDA produced an independent life-cycle estimate for all of the costs attributable to the EHRM program-that is, costs that are incurred only due to the existence of the EHRM program. IDA's cost estimate includes all costs of the program over its full life cycle, from program inception through design, development, deployment, operations and maintenance, and disposal. Thus, all relevant acquisition and sustainment costs are included in the LCCE. The IDA LCCE covers the implementation phase and 15 years of operations after the system is fully deployed to all sites.

It is worth noting some items not in scope for the IDA independent cost estimate. One main item is benefits. The EHRM program has many potential benefits (e.g., improved healthcare delivery and reduced costs for legacy systems). The estimated benefits of the program, however, are out of scope for this study. Moreover, IDA's cost estimate is solely for the EHRM program. It does not include the cost of (or savings from) legacy electronic health record (EHR) systems.

RESULTS

IDA estimates the EHRM LCCE to be $49.8 billion (in constant Fiscal Year 2022 dollars). The conversion to constant dollars normalizes inflation to 2022 levels; actual future expenditures will be higher. Overall, this estimate consists of $32.7 billion during the implementation phase over 13 years and an additional $17.1 billion in sustainment costs over the following 15 years.

The following figure shows acquisition and sustainment costs for the LCCE during the implementation and fully deployed phases. We note that some sustainment costs are required during the implementation phase as sites start to use the new system.

We estimate an additional $5.2 billion of common infrastructure costs in addition to the LCCE. These costs would be needed without the EHRM program, but EHRM also requires these investments.

COST ESTIMATE BY PHASE

IDA provided a point estimate representing the 50 percent risk-adjusted cost. That is, the cost will be less than the point estimate with a likelihood of 50 percent. IDA also conducted a risk analysis to quantify the risk and uncertainty, estimating a range of $46-$54 billion for the 20–80 percent cost range.

COMPARISON

We compared the IDA estimate to the VA 2019 program office estimate of $16.1 billion (represented in constant Fiscal Year 2022 dollars). We note several differences in scope and comparable elements between the VA and IDA estimates. First, the VA estimate is for 10 years of implementation, whereas IDA's life-cycle estimate spans 28 years. Second, the IDA team includes sustainment and productivity loss during rollout as additional cost elements in its LCCE, in accordance with Government Accountability Office (GAO) and VA Office of Inspector General (OIG) guidance to include all costs, but these elements are not included in the VA estimate. The productivity loss cost corresponds to the supplemental staffing and additional community care for Veterans needed to mitigate the disruption in care when rolling out the system to facilities. The revenue loss from the disruption is also included. The following figure shows the costs for the VA estimate, the comparable costs for the IDA estimate, and the costs of additional elements in the IDA estimate. IDA's LCCE includes an additional $25.9 billion beyond the scope of the VA estimate. These additional elements account for about 75 percent of the cost difference from the VA's estimate ($16.1 billion) to IDA's estimate ($49.8 billion).

COMPARISON OF VA AND IDA ESTIMATES

The costs for comparable elements differ by $7.8 billion. About $5.1 billion of this difference is implied by actual costs from the first 4 years of the program. The factors contributing to the remaining difference are an IDA-estimated 3-year schedule adjustment based on experience in other programs and additional cost risks (e.g., additional development). We also note that the IDA LCCE includes $1.2 billion less in infrastructure than the VA's estimate because IDA defines some costs as common infrastructure.

Cost increases are common in programs of this complexity. Enterprise resource planning programs have typically had similar cost increases in acquisition.

PATH FORWARD

Our analysis estimates the cost ranges for risks associated with EHRM. VA has an opportunity to mitigate some of the risks associated with the cost drivers. For example, productivity loss associated with deployments is a cost element with substantial risk. VA can manage this risk and seek ways to improve the efficiency of deployments.

Going forward, information emerging from upcoming deployments will provide additional insights regarding risk and uncertainty in the cost estimate. Developing measures to assess progress in key risk areas will allow VA leadership to monitor uncertainty and understand the implication for the total life-cycle cost of this program.

Thank you for the opportunity to discuss our cost estimate, and I look forward to your questions.

Senator HEINRICH. Thank You. Mr. Case.

STATEMENT OF MR. DAVID CASE, DEPUTY INSPECTOR GENERAL, OFFICE OF INSPECTOR GENERAL, DEPARTMENT OF VETERANS AFFAIRS

Mr. CASE. Chairman Heinrich, Ranking Member Boozman, and Subcommittee Members, thank you for the opportunity to discuss the Office of Inspector General's Oversight of the VA's Electronic Health Record Modernization program.

First, we want to recognize the VA employees working so hard in Washington, Ohio, Oregon, and across the Nation to ensure veterans receive timely, high-quality health care during the EHR transition, especially in a pandemic.

Since April 2020, we have issued 14 EHRM reports primarily focused on planning, user training, and deployment activities at Mann-Grandstaff. They are meant to help VA leaders redress and avoid identified system failings in future rollouts. While VA has implemented 26 of our 68 total recommendations as of this week, considerable work remains.

This year, we published reports related to significant patient safety risks at Mann-Grandstaff, including issues with the unknown queue, medication management, patient care coordination, the troubled ticket process, and gaps in actionable quality of care metrics. We are also aware of continued issues with behavioral health services and the pharmacy management software. We remain concerned about the many workarounds and mitigations that VHA employees must use to address these issues. They can lead to delays, increased errors, and affect the quality of patient care.

Accordingly, our subject matter experts are continuously monitoring VA progress on OIG-recommended corrective actions meant to address many of these concerns.

I want to highlight two audits we published last year. Because VA needs to spend billions of dollars on fiscal and IT-related infrastructure upgrades to support the EHR, we audited VA's related

cost estimates following our determination that VA did not meet its own deadline for infrastructure upgrades at the pilot site.

The cost estimates were unreliable. In general, they were not comprehensive, well documented, accurate, or credible. Our audit teams also determined VA had not reported accurate and complete information to Congress in the Eight Congressional Reports submitted through January 2021. OEHRM personnel did not report the estimated $2.7 billion for physical infrastructure upgrades, and the estimated $2.5 billion for IT infrastructure upgrades.

They explained that because VHA and OIT were funding these upgrades, OEHRM did not need to report them. Despite VA and GAO guidance requiring life-cycle cost estimates to include all costs, regardless of funding source, these omissions significantly understate the program's true costs. Recommendations from the two audits include that VA obtain an independent cost estimate of the program's life cycle, and ensure transparency in reporting costs to Congress. These recommendations remain open.

We have been briefed by the Institute for Defense Analyses on their draft independent cost estimate and look forward to reviewing the final report's methodology, findings, and estimates before determining how they relate to our outstanding recommendations.

In April 2022, we also found VA had not executed a reliable and comprehensive integrated master schedule. They failed to meet the standards they adopted that called for a schedule that is comprehensive, credible, well-constructed, and controlled. Among the actions needed to meet the standards for an integrated master schedule, VA must complete a schedule risk analysis and develop a critical path for completion of the work.

Although not every task for a 10-year project can be accounted for early on, VA did not use accepted strategies to create a schedule that can be tailored over time. VA's failure to meet these standards increases the risk of further delays, dropped activities, and budget overruns. Without a reliable master schedule, the accuracy of any cost estimate is at risk because costs are inextricably linked to the schedule of activities VA needs to complete.

In closing, we remain concerned with the 15 recommendations open for longer than 1 year. The success of the EHR implementation is dependent on VA's transparency, careful planning, and the recognition and remediation of patient care and safety concerns. Not only those risks identified by our oversight work, but by VHA's own experts and end users who rely on the EHR for everyday clinical decisionmaking.

Chairman Heinrich, this concludes my statement. I would be happy to answer any questions you or other committee members may have.

[The statement follows:]

PREPARED STATEMENT OF MR. DAVID CASE

Chairman Heinrich, Ranking Member Boozman, and subcommittee members, thank you for the opportunity to discuss the Office of Inspector General's (OIG) oversight of the Department of Veterans Affairs' electronic health of record modernization (EHRM) program. The OIG recognizes the enormity and complexity of converting VA's electronic health record (EHR) system for millions of veterans receiving VA care and acknowledges the significant work and commitment of VA staff to accomplish this task. Over the more than 2 years that OIG staff have been engaging with employees at the first deployment site-the Mann-Grandstaff VA Medical

Center (VAMC) in Spokane, Washington-and other VA locations using the new EHR, oversight teams have observed VA employees' unwavering commitment to this transition while prioritizing the care of patients during the COVID–19 pandemic. Facility staff challenges have been exacerbated, however, by the lack of prompt remediation of problems that the OIG and others have identified in numerous oversight reports published since April 2020.

The OIG has published 14 reports addressing the EHRM program and system implementation between April 2020 and this hearing with a total of 68 recommendations. Though this statement does not detail all of these reports and their findings, a comprehensive list of recommendations has been included in the appendixes. Each oversight report is meant to help VA improve the new system's implementation and support the provision of prompt, quality health care for veterans. Failure to satisfactorily complete the corrective actions associated with these recommendations can increase risks to patient safety and the ability to provide high-caliber care as the new EHR system rolls out nationwide. Fully addressing oversight recommendations can help minimize considerable cost escalations and delays in future site deployments as well. The OIG is therefore concerned about the five recommendations that have been open (not implemented or fully addressed) for longer than 2 years-with 21 total recommendations open for more than 1 year. While the OIG follows up with VA on open recommendations every 90 days, VA program officials can submit evidence of sustained progress or satisfaction of corrective actions at any time to facilitate closing recommendations.

As detailed in this statement, OIG staff have found VA did not complete timely critical infrastructure upgrades for the initial rollout and provided unreliable and incomplete estimates on infrastructure upgrade costs, has not adequately prepared for the rollouts (including realistic scheduling and effective user training), failed to be fully transparent, and stove-piped governance with decision-making that has not appropriately engaged Veterans Health Administration (VHA) end users of the new EHR system. Many of these issues are still of concern to the OIG, as evidenced by the number of open recommendations.

This testimony highlights those OIG reports with findings that illustrate three broad categories of concern: (1) IT and physical infrastructure deficiencies and unreliable cost estimates for addressing them, (2) readiness concerns that include the lack of a comprehensive master schedule and ineffective training that was not transparently reported, and (3) implementation issues that affect patient care and safety as well as concerns with remediation and mitigation strategies.

INFRASTRUCTURE DEFICIENCIES AND UNRELIABLE COST ESTIMATES

The OIG's oversight in April 2020 focused on VA's preparation for the system's initial deployment at the Mann-Grandstaff VAMC and the condition of VA's physical and information technology (IT) infrastructure prior to system deployment. Two 2021 reports (published in May and July) resulted from audits that examined cost estimates for needed physical and IT-related infrastructure upgrades nationwide. For the new EHR system to operate as intended, VHA facilities need these infrastructure upgrades, but they are generally funded from different sources. Because the life-cycle cost estimates for infrastructure upgrades did not account for costs from all VA components' budgets, some estimated costs were not included in mandated reports to Congress. Transparent and reliable cost estimates are critical for Congress to make informed budgeting decisions. VA senior leaders also depend on these cost estimates to plan program budgets, approve acquisitions, and monitor program execution. The OIG determined the existing physical and IT infrastructure was inadequate for the new system at initial deployment sites, and pertinent life-cycle cost estimates for infrastructure upgrades were unreliable and likely underreported by approximately $5 billion. These two reports recommended that VA obtain an independent cost estimate for the EHR program's life-cycle costs, which the VA is obtaining from the Institute for Defense Analyses. The OIG has been briefed on the draft and will review the final report's methodology, findings, and estimates before determining how they relate to outstanding recommendations.

The 2020 OIG report focused on the gaps in VA's efforts to update the Mann-Grandstaff VAMC's physical and information technology (IT) infrastructure to support the new system.[1] The OIG found that VA did not meet its own timelines to complete critical physical and IT infrastructure upgrades at the facility. The prob-

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[1] "Physical infrastructure" refers to the underlying foundation that supports the system, such as electrical; cabling; and heating, ventilation, and air-conditioning. "IT infrastructure" includes network components such as wide and local area networks, end-user devices (e.g., desktop and laptop computers, and monitors), and medical devices.

lems with planning identified in this report were shown in greater detail in the 2021 OIG reports that found deficient and unreliable physical and IT infrastructure cost estimates. Many of the recommendations to resolve these issues remain open.

DEFICIENCIES IN INFRASTRUCTURE READINESS FOR DEPLOYING VA'S NEW ELECTRONIC HEALTH RECORD SYSTEM (APRIL 2020)

To deliver patient care using the new EHR system, significant upgrades are needed to VA's physical and IT infrastructure.[2] The OIG audited VA's infrastructure readiness activities at the Mann-Grandstaff VAMC in anticipation of the initial March 2020 go-live date. In 2019, then Office of Electronic Health Record Modernization (OEHRM) leaders testified before the House of Representatives that having infrastructure in place 6 months before deploying the Cerner system was a program goal to help ensure smooth deployment, but the OIG found they had not been completed at the facility even 5 months prior to the March 2020 go-live.[3] In fact, the OIG found some infrastructure upgrades intended to mitigate diminished system performance were not projected to be completed until months after going live. In sum, VA committed to an aggressive, but apparently unrealistic, deployment date of March 2020 without having the necessary information about the facility's infrastructure.

The OIG made seven recommendations for corrective action to the then executive director of OEHRM, and an eighth recommendation to the Mann-Grandstaff VAMC director. These recommendations, of which two remain open as not implemented, can be found in appendix A of this statement. Given the time elapsed since this report's publication, it is concerning that one of the open recommendations calls on OEHRM to evaluate physical infrastructure for consistency with its program's requirements and monitor those evaluations.

DEFICIENCIES IN REPORTING RELIABLE PHYSICAL INFRASTRUCTURE COST ESTIMATES FOR THE EHRM PROGRAM (MAY 2021)

This audit was conducted to determine if VA developed and reported reliable physical infrastructure upgrade cost estimates for the new EHR system.[4] As discussed previously, VHA medical facilities need significant physical infrastructure upgrades, such as electrical work, cabling, heating, ventilation, and cooling to successfully deploy the new EHR system. The audit examined whether VHA's cost estimates met VA standards and were comprehensive, well documented, accurate, and credible. It also reviewed whether OEHRM reported these cost estimates to Congress in accordance with statutory mandates.

VHA and OEHRM shared responsibilities for estimating and reporting physical infrastructure upgrade costs. VHA developed the physical infrastructure upgrade cost estimates, while OEHRM was responsible for reporting all program life-cycle cost estimates to Congress in accordance with the Veterans Benefits and Transition Act of 2018.[5] In May 2021, the act required quarterly reporting on the EHRM program's status, including annual and life-cycle cost estimates and defined the program as any activities to procure or implement the new EHR system. In early 2019, VA's Office of General Counsel determined that physical infrastructure upgrades must be funded from accounts specifically available for construction-type purposes, such as VHA's nonrecurring maintenance and minor construction funds.

VHA COST ESTIMATES FOR PHYSICAL INFRASTRUCTURE UPGRADES NEEDED IN SUPPORT OF THE EHRM PROGRAM WERE NOT RELIABLE

The OIG found VHA's cost estimates were not reliable under VA standards and Government Accountability Office (GAO) guidance.[6] These standards and guidance state that cost estimates should be comprehensive, well documented, accurate, and credible. However, neither of VHA's formal cost estimates for physical infrastructure, dated June 2019 ($2.7 billion) and November 2019 ($1.1 billion), fully met

these criteria, and thus could be significantly understated. In addition, VA lacked effective quality controls and procedures to evaluate the estimates and had conducted insufficient planning from the start.

1. Cost Estimates Were Not Comprehensive

Comprehensive cost estimates provide officials with reasonable assurance that all costs are included so they can make well-informed decisions. VHA's November 2019 estimate, totaling about $1.1 billion for physical infrastructure upgrades nationally, only reflected about 25 percent of nationwide cabling costs, understating the costs by at least $481 million. Also, the June and November 2019 estimates omitted estimated costs of upgrades paid with minor construction funds.

2. Cost Estimates Were Not Well Documented

Sufficient documentation supports an estimate's validity and provides an audit trail allowing the estimate to be easily recreated and updated. Both June and November estimates lacked evidence they were approved by senior leaders, and they did not have enough detail to allow an independent party to trace the costs or determine if costs were double-counted.

3. Cost Estimates Were Not Accurate

Neither cost estimate met the standard for accuracy-that is, free of mathematical errors and not overly conservative or optimistic. The June 2019 estimate had errors omitting about $90 million of fiscal year 2021 construction design costs. The November 2019 estimate omitted escalation costs for upgrades expected to take place in future years and did not include the cost of completely upgrading the cabling required at VHA facilities nationwide.

4. Cost Estimates Were Not Credible

Credible cost estimates identify limitations of the data and assumptions and are to be measured against independent or third-party cost estimates. Both estimates lacked a risk and uncertainty analysis, which is used to disclose the likelihood actual costs may differ from estimated costs. VHA did not conduct this type of analysis because VA did not have accurate assessments of what infrastructure upgrades were needed at its facilities. Both estimates also lacked a sensitivity analysis, which is used to explain how much impact each cost factor has on the overall estimate. Both cost estimates were also not compared to a third-party cost estimate, a best practice in validating the reliability and reasonableness of cost estimates. Using the planned and obligated costs at VA's three planned initial operating capability sites, the OIG team statistically projected program-wide physical infrastructure costs to be between approximately $3.1 and $3.7 billion.[7] Notably, VHA's June 2020 estimate projects physical infrastructure upgrade costs to be about $3.1 billion, consistent with the OIG team's low-end projection.

5. Lack of Effective Quality Controls and Procedures to Evaluate Estimates

Deficient quality controls contributed to the unreliability of both cost estimates. Independent cost estimates-a control used to validate the data and determine the reasonableness of a VA estimate-are required by VA policy to be performed on all major IT programs, but an independent cost estimate was not performed on either estimate.

6. Insufficient Planning at the Program's Start

Consistent with findings from the April 2020 OIG report, the audit team found neither OEHRM nor VHA knew the true state of infrastructure at facilities at the time the Cerner contract was signed, and, when this audit was completed in March 2021, VHA was still identifying necessary infrastructure upgrades. As of January 2021, infrastructure requirements continue to be defined, making it difficult for VHA to identify gaps in infrastructure and estimate related costs.

OEHRM DID NOT INCLUDE COST ESTIMATES FOR UPGRADING PHYSICAL INFRASTRUCTURE IN REPORTS TO CONGRESS

The OIG found that OEHRM did not include the cost of physical infrastructure upgrades in quarterly reports to Congress, which are intended to meet the program's requirements under the Veterans Benefits and Transition Act.[8] This is sig-

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[7] The three facilities were the Seattle, American Lake, and Mann-Grandstaff VAMCs, all located in Washington State.

[8] OEHRM produced its ninth report after the OIG report was drafted and did not include physical infrastructure upgrade costs in that document.

nificant, as it understated the program's cost in reports submitted to Congress. The reports gave the impression that these costs were included because seven of the eight reports said that infrastructure costs include "physical infrastructure at VA medical centers and other sites." To the contrary, these reports did not include the $2.7 billion for physical infrastructure upgrades as identified in the June 2019 estimate OEHRM received from VHA. OEHRM said it did not disclose these estimates because the upgrades were outside its funding responsibility, but this is contrary to the explicit requirements of statute and to VA and GAO guidance that a life-cycle cost estimate include all costs, regardless of source.[9] The VA Electronic Health Record Transparency Act of 2021 modified VA's reporting requirement to mandate the inclusion of costs expended by any VA element.[10]

The OIG made five recommendations to VA, which can be found in appendix B. Three of the recommendations, which pertain to the need for an independent cost estimate of the program's life cycle and ensuring transparency in reporting costs to Congress, remain open. As previously mentioned, the OIG has been briefed by the Institute for Defense Analyses on their draft independent cost estimate and looks forward to receiving the final report for review.

UNRELIABLE IT INFRASTRUCTURE COST ESTIMATES FOR THE EHRM PROGRAM (JULY 2021)

Of EHRM's estimated $16.1 billion total program cost from 2021, VA estimated about $4.3 billion would be directed for IT infrastructure upgrades.[11] This audit examined whether OEHRM-developed cost estimates were well-documented, comprehensive, credible, and accurate, and whether OEHRM reported to Congress all IT infrastructure upgrade costs, including future technology updates.[12]

IT Infrastructure Upgrade Cost Estimates Were Not Reliable but Improvements Have Been Made

As discussed previously, reliable estimates should be well-documented, comprehensive, credible, and accurate. The audit team evaluated two estimates OEHRM provided to Congress dated December 2018 and August 2020-each estimating about $4.3 billion for the IT infrastructure upgrades. Neither met the reliability criteria, and the OIG could not evaluate their accuracy because they lacked documentation to support many of the calculations. Like the physical infrastructure cost audit, VA did not complete an independent cost estimate, which could have revealed the OIG-identified issues sooner.

In January 2021, in part due to discussions with the audit team, OEHRM began developing procedures that align with cost-estimating guidance and include controls to help address the issues identified in the OIG report. During the audit, the team noted that VA also began making improvements to the cost model used to develop the estimate, facilitating more detailed support.

IT Infrastructure Costs Were Omitted and Not Updated for Accuracy

The OIG found OEHRM did not include costs for critical program-related IT infrastructure upgrades in the estimates reported to Congress, effectively underreporting program cost estimates by nearly $2.5 billion. The $2.5 billion is for IT infrastructure upgrades that VA's Office of Information and Technology (OIT) and VHA are expected to fund.[13] Like the physical infrastructure costs, OEHRM officials stated they felt the omitted costs were outside their scope of responsibility, but neither OIT nor VHA reported these costs to Congress, despite VA and GAO guidance requiring life-cycle cost estimates to include all costs, regardless of source. The costs should have been disclosed by OEHRM. VA did make changes to projected costs starting in the November 2021 report to Congress, but because VA was still developing the independent cost estimate, there was no certainty the updates were reliable.

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[9] The Veterans Benefits and Transition Act of 2018 defines the EHRM program as "any activities ... to procure or implement an electronic health or medical record system to replace" the existing electronic health record system and "any contracts or agreements entered into by [VA] to carry out, support, or analyze" these activities. Because physical infrastructure upgrades are necessary for system implementation, those costs should be included in life-cycle cost estimates under the statute's plain language.

[10] The law was signed on June 23, 2022 and became Public Law 117–154.

[11] VA OIG, Unreliable Information Technology Infrastructure Cost Estimates for the Electronic Health Record Modernization Program, July 7, 2021.

[12] Technology refreshment is the process of replacing certain infrastructure on a regular schedule, instead of using the systems or devices until they can no longer function. For example, devices like laptops are replaced every 4 years.

[13] OIT is expected to fund some upgrades for the local area network, end-user devices, phones, and Wi-Fi, while VHA is expected to fund upgrades mostly for medical devices.

Without all critical IT infrastructure upgrade costs accurately presented, Congress lacks the comprehensive picture of total program costs needed to make informed oversight and investment decisions. As mentioned previously, VA's reporting requirements have been updated by the VA Electronic Health Record Transparency Act of 2021.

All six recommendations to the executive director of OEHRM are listed in appendix C and remain open. The recommendations relate to obtaining independent cost estimates for IT infrastructure, ensuring the costs are estimated in line with VA policy, maintaining full and complete accounting for the costs, and ensuring complete and updated transparency of the costs with Congress.

LACK OF READINESS EXHIBITED BY NO INTEGRATED MASTER SCHEDULE AND INEFFECTIVE TRAINING

Exploring program costs and projections further, the OIG reported in April 2022 that VA had not executed a reliable, comprehensive schedule for system implementation. This could result in schedule delays and leave VA vulnerable to billions of dollars in cost overruns. Without that schedule, Congress and the public cannot rely on VA timeline projections for completing the work or be assured that the program will be completed within budget.

The OIG also examined the flawed implementation at Mann-Grandstaff VAMC that was brought on by inadequate planning. Deficiencies the OIG detected at Mann-Grandstaff VAMC in April 2020 revealed the need for prompt corrective measures as additional facilities were switching to the new EHR system. Yet many issues remained unresolved prior to deployment, particularly problems identified in the OIG's July 2021 report on the development, delivery, and assessment of staff training and proficiency.

THE EHRM PROGRAM DID NOT FULLY MEET THE STANDARDS FOR A HIGH-QUALITY, RELIABLESCHEDULE (APRIL 2022 REPORT)

To implement the program successfully and within budget, it is imperative that VA develop a reliable integrated master schedule (IMS).[14] GAO guidance, which OEHRM adopted, States that a high-quality, reliable schedule should be comprehensive, credible, well-constructed, and controlled. The IMS is designed to cover the entire required scope of work-of both government staff and contractors-needed to complete the program. VA should use it as a road map to monitor progress, complete the work, identify potential problems and track their resolution, and promote accountability. While not every task for a 10-year project can be accounted for early on, strategies exist to create a tailorable, comprehensive schedule to minimize the risk of delays, dropped activities (some of which are prerequisites for others), and budget overruns. While VA may have received a draft independent cost estimate for the program since the OIG's two audits, without a reliable IMS, the developed cost estimates' accuracy are at risk because they are inextricably linked to the schedule of activities VA that needs to complete.

VA Did Not Have a High-Quality, Reliable IMS

The OIG found that neither the overall IMS nor five of its underlying individual project schedules fully met GAO standards adopted by OEHRM for a high-quality, reliable schedule. VA failed to meet all aspects of the following scheduling standards:

—Comprehensive. The IMS should reflect the entire scope of program work in some level of detail. However, the OIG determined that the IMS did not capture all work for the program's duration and was missing VHA and OIT activities.

—Credible. A credible IMS should include a complete schedule risk analysis, which can give a level of confidence in meeting a program's completion date. However, OEHRM did not do this.

—Well-constructed. A "critical path" determines the earliest date a program can be completed to help managers examine the effects of activity slippages, but no overall IMS critical path was created.

—Controlled. A controlled IMS should include a baseline schedule, used for managing the program and conducting trend analyses over time to assess program performance. However, OEHRM's program baseline only covered events through April 2020.

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[14] VA OIG, The Electronic Health Record Modernization Program Did Not Fully Meet the Standards for a High-Quality, Reliable Schedule, April 25, 2022.

The OIG identified several root causes for OEHRM's failures:

—Did not adequately coordinate with various offices. VHA and OIT leaders said OEHRM did not collaborate with them, so the schedules did not include all work to be performed by these entities.

—Did not conduct a schedule risk analysis because it lacked procedures. Despite the importance of completing this analysis, OEHRM did not have procedures in place on when and how to conduct it.

—Focused on near-term deployment of the system at the initial operating sites. OEHRM only required development of site-specific schedules after task orders for those sites were awarded. Applying that strategy, VA would not have a high-quality, reliable IMS until it starts deploying the system at the last sites, which are planned to go live in fiscal Year 2028.

—Did not enforce its own scheduling standards or have tools in place to assess compliance. While OEHRM's schedule management plan stresses compliance with GAO guidance, task orders to Cerner do not require the IMS to align with them. Additionally, OEHRM's schedule management plan requires staff to use specific software to assess whether EHRM project schedules comply with GAO standards. However, a tool was not available from March 2020 to June 2021.

—Lacked consistent guidance on roles, resulting in confusion over the assignment of IMS development and documenting how work was broken down. Internal planning and contract documents inconsistently assigned responsibilities for developing and maintaining the program's work breakdown structure (WBS) and the IMS. The WBS defines all work needed to complete the program. Guidance inconsistently assigned these responsibilities to VA or one of its contractors-

—Booz Allen Hamilton, Inc., or Cerner, leading to confusion.[15] Cerner accepted responsibility for the WBS and, in July 2020, worked with VA to create it. While Cerner is responsible for developing the IMS, VA should ensure contract requirements are consistent with internal guidance.

—Did not clearly define IMS contract requirements. Cerner was contractually required to develop and maintain an IMS for the program under VA's task orders; however, the task orders did not clearly establish a timeline for when a complete IMS would be developed. Without a clear timeline, OEHRM required Cerner to develop site-specific project schedules as task orders were awarded. Following this process, future work not yet on task order would be unaccounted for in the IMS.

VA has a responsibility to ensure there is a complete IMS that meets scheduling standards. VA needs a high-quality, reliable IMS to strengthen the credibility of the program's timeline. Without one, VA can neither demonstrate how slippages will affect the overall timeline nor assure stakeholders that the reported timeline is realistic and achievable. Any schedule delays that extend the program beyond 10 years are also likely to result in billions of dollars in cost overruns. The OIG estimated the average cost per year of a schedule delay is potentially about $1.95 billion.

For this report, the OIG made six recommendations, found in appendix D, and all are open.

TRAINING DEFICIENCIES FOR VA'S NEW EHR SYSTEM AT THE MANN-GRANDSTAFF VAMC
(JULY 2021 REPORT)

The OIG reviewed the training given to Mann-Grandstaff VAMC staff.[16] Problems were identified similar to those found by Department of Defense (DoD) for training on the new EHR system. Even before deployment, the healthcare inspection team identified governance challenges as VHA did not have a defined role in decision-making or oversight related to training activities. In reviewing the training, the OIG found training content, delivery, and assessment failures.

The inspection team reviewed the training content on the software and the more than 900 new workflows. New workflows result in changes to how end users perform their jobs, such as scheduling consults (referrals) or how a provider performs an exam. The OIG found the classroom training and supplemental material were insufficient. Facility leaders and staff told the OIG that training did not prepare them for going live with the new system, teach them how to apply what they

learned to their work, or explain the meaning behind the process of which buttons to push ("buttonology").

The OIG identified four aspects of training delivery that may have negatively affected the new EHR system's use: (1) insufficient time for training, (2) limitations with the training domain (a close facsimile for users' practice), (3) challenges with user role assignments (these dictate the capabilities on which an employee is trained), and (4) gaps in training support. Facility leaders and staff raised concerns with Cerner classroom trainers, including their lack of clinical knowledge, EHR expertise, and an inability to address questions.

Finally, the OIG found OEHRM failed to effectively evaluate the training. The OIG conducted a follow- up administrative investigation into the inaccurate and incomplete data OEHRM provided about trainees' post-training tests after OIG staff requested "any and all data" from the training evaluation plan that OEHRM's Change Management leaders submitted.[17] While the investigation did not find that the two Change Management leaders intentionally sought to mislead OIG healthcare inspectors, their lack of due care and diligence resulted in inaccurate information being submitted to OIG staff. Most concerning, the Change Management's then executive director and the director for training strategy did not disclose they removed some data from consideration or that they questioned data reliability. They delayed production of underlying proficiency check data and instead provided one slide with three summary statistics containing significant errors that resulted in doubling the reported trainee proficiency check pass rate from 44 to 89 percent. In addition, officials admitted the evaluation plan was actually "immature" and "in its infancy" and was not implemented, contrary to the evaluation plan submitted to the OIG that showed training was being assessed immediately after it was completed by employees.

Had the OIG relied on the information provided, Congress and the public would have been misled as to how trainees had performed in the tests. The culture of accountability the Secretary and Deputy Secretary are promoting by mandating training on engaging with the OIG and other measures is critical; however, this investigation underscores the need for leaders overseeing the EHRM program to reinforce those values and the requirement for timeliness, completeness, and accuracy in all responses to OIG requests for information. The OIG made four recommendations, found in appendix E, and one remains open.[18]

The OIG made 11 recommendations in the July 2021 report to improve the training program, which can be found in appendix F, and seven are still open.

NEW PATIENT SCHEDULING SYSTEM NEEDS IMPROVEMENT AS VA EXPANDS ITS IMPLEMENTATION (NOVEMBER 2021 REPORT)

This report assessed the implementation of the EHR system's patient scheduling component at the Columbus clinic and Mann-Grandstaff VAMC.[19] The OIG found VHA and OEHRM did not fully resolve known significant limitations in the scheduling system, leading to reduced effectiveness and increased risk of patient care delays. The problems identified in this report have persisted through the OIG's 2022 reports, such as schedulers developing work-arounds for unresolved issues and problematic data migrated from legacy systems. OEHRM leaders did not provide scheduling staff with adequate chances to identify limitations in the new scheduling system before implementation, nor did leaders assess Cerner's compliance with contract terms for handling trouble tickets submitted by users. OEHRM leaders were aware of the system's issues before and after Columbus's implementation, but the issues were not resolved even in late 2021. That said, VHA staff told the OIG that the new system should help greatly, and schedulers reported positive experiences. For example, schedulers said the new system was more user-friendly than the legacy system, making video visits easier to schedule, among other upgrades. The OIG made eight recommendations, found in appendix G, and all remain open.

IMPLEMENTATION DEFICIENCIES AND THE LACK OF REMEDIATION

The OIG has sustained a strong focus on the patient safety aspects of the EHRM program, starting with its April 2020 report that reviewed VA's readiness to "go

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[17] VA OIG, Senior Staff Gave Inaccurate Information to OIG Reviewers of Electronic Health Record Training, July 14, 2022.

[18] Two of the recommendations ask VA to examine if administrative action should be taken concerning the conduct or performance of the senior leaders. As an independent oversight authority, the OIG cannot mandate administrative action or dictate a specific outcome.

[19] VA OIG, New Patient Scheduling System Needs Improvement as VA Expands Its Implementation, November 10, 2021.

live" at the initial site and the potential impact of the transition on patients' access to high-quality care. The findings include that the Mann-Grandstaff VAMC lacked adequate staffing and formal, written guidance to navigate the transition's strains. The OIG also found that the risk mitigations facility leaders would employ during the planned go-live period were inadequate to address the gaps in the new EHR system capabilities and presented a potential yet significant risk to patient safety.

In 2022, the OIG published a series of reports that examined a range of user and veteran concerns with inadequate planning and implementation, which if left unremedied could pose patient safety risks and additional instances of harm in future rollouts. Three OIG reports released in March 2022 identified EHRM issues connected to medication management, care coordination, and the ticketing process used by Mann-Grandstaff VAMC providers to request help and resolve problems.

Finally, in July 2022, the OIG determined that the new EHR system directed thousands of medical orders to an "unknown queue" that were not evident to the clinical and administrative staff required to address them. The OIG also found that VHA determined the unknown queue created significant risk and caused harm to multiple patients. As recently as June 2022, hundreds of orders remained in the unknown queue across VA sites implementing the new system.

REVIEW OF ACCESS TO CARE AND CAPABILITIES DURING VA'S TRANSITION TO A NEW ELECTRONIC HEALTH RECORD AT THE MANN-GRANDSTAFF VA MEDICAL CENTER (APRIL 2020)

VA expected a productivity drop associated with the facility's preparations for going live with the new EHR system.[20] Mann-Grandstaff VAMC leaders consulted with DoD staff, who transitioned to the Cerner system in 2017 and experienced a 30-percent decrease in productivity for the subsequent months. VA had plans to mitigate the impact on facility personnel for the March 2020 go-live event, including adding facility staff, enhancing clinical space, changing clinic processes, and a greater use of community care. At publication, however, the OIG did not find evidence of VA providing final guidance to Mann-Grandstaff VAMC leaders on carrying out these plans.

Some of the problems that emerged were foreseeable. OEHRM and Cerner determined in July 2019 that not all anticipated capabilities of the new EHR would be available for the March 2020 go-live date. Mann-Grandstaff VAMC leaders and staff told the OIG of concerns related to the deployment of limited capability sets that led to significant gaps in functionality. For example, the MyHealtheVet portal was the most frequently used method for patients to request prescription refills, but it would not be connected to the new EHR.[21] Facility leaders and staff told the OIG of safety concerns related to losing access to the MyHealtheVet electronic refill portal. The OIG was unable to determine all potential patient safety risks associated with the new EHR, but the work-around for the electronic prescription refill process alone presented significant concerns as it could have impacted a patient's ability to fill a life-sustaining medication after go-live. Follow-on work, discussed later in this statement, conducted by the OIG after Mann-Grandstaff VAMC began using the new EHR system, validated numerous of these medication management and prescription delivery services.

The OIG made eight recommendations, of which three remain open. The three that remain open call for VA to evaluate the impact of the new EHR implementation on productivity and provide operational guidance to facilities on mitigating the impact of the transition and any undeveloped aspects of the software on users and patients. The recommendations' text and status can be found in appendix H.

A trilogy of reports released in March 2022 responded to many complaints submitted to the OIG hotline and requests from congressional offices following the new EHR's deployment at the Mann-Grandstaff VAMC. OIG healthcare inspections staff began work on two efforts to address several priority concerns-medication management and patient care coordination. During this work, the OIG team identified further challenges with the trouble ticketing process for system users to submit concerns or requests for help, and the OIG team determined that some previously identified deficiencies were still unresolved. Consequently, the healthcare oversight team

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[20] VA OIG, Review of Access to Care and Capabilities during VA's Transition to a New Electronic Health Record System at the Mann-Grandstaff VA Medical Center Spokane Washington, April 27, 2020.

[21] My HealtheVet, Get to Know Rx Refill Options, https://www.myhealth.va.gov/mhv-portal-web/ss20180423-prescription- refill-options-for-veterans. (The website was accessed on July 6, 2021.) MyHealtheVet is an online personal health portal patients can access to schedule appointments, view medical records, refill prescriptions, and send secure messages to their care providers.

started a third effort to examine why problems were not addressed and to highlight the underlying causal factors. When VA responded to the three reports in early March 2022-nearly 18 months after going live in October 2020–VA actions to resolve issues were limited. The OIG identified 46 issues that were unresolved after the OIG completed its inspection in June 2021, but only seven were resolved as of March 2022. [22]

MEDICATION MANAGEMENT DEFICIENCIES AFTER THE NEW EHR GO-LIVE AT THE MANN-GRANDSTAFF VAMC (MARCH 2022 REPORT)

EHRs can improve clinical decision-making and minimize human error, but the risk of patient harm increases when systems have poor usability, workflows, or data inputs. The first in the trilogy of healthcare inspections focused on medication management for patients subject to the new EHR at Mann- Grandstaff VAMC.[23] This included tracking and managing lists of medication, ordering, and promptly getting them to patients. Ensuring patients receive the correct medication in a timely manner is critical, given many patients are older with numerous medical conditions treated with multiple medications.

The OIG grouped the various complaints regarding medication management into three categories: data migration, medication orders, and medication reconciliation.

Data Migration

For this report, data migration focused on the transfer of patient information from VA's legacy EHR to the new system. Deficiencies were found with patient contact information, patient medication lists, and formulary lists that included medications and supplies unavailable at the facility.

—Patient Contact Information: Prior to going live, VA migrated contact information and clinical data for approximately 88,000 veterans to the new EHR. The OIG found that outdated DoD data overwrote VHA's patient contact information, such as name, address, telephone number, and email address when data were migrated to the new EHR. Consequently, VA patients were delayed in receiving medications through the mail order pharmacy system.

—Medication Lists: The OIG substantiated that medication lists, migrated as "free text" per VHA's request, contained inaccuracies. Because medication lists did not import properly, care providers used work-arounds, including manual reentry to generate accurate medication lists. Staff described this process as "overwhelming" and time-consuming.

—Medication Formulary: The new EHR's formulary included many medications not available at Mann-Grandstaff or on VA's national formulary. Consequently, care providers unknowingly selected nonformulary or unavailable supplies. These selections increased risks for errors, potentially raised costs for VA, and added work for care providers and pharmacy staff.

Medication Orders

The OIG substantiated 10 of 12 allegations related to the mismanagement of medication orders. The identified problems affect every aspect of the process from orders failing to process to patients' recurring future medication orders being automatically discontinued without notice to providers.

Summary of Medication Order Allegations and Findings

Medication Orders	Allegations	OIG Determination	Status
Future Order Discontinuance	The new EHR discontinued future medication orders written by providers.	Substantiated	Unresolved
	Discontinued future medication orders required providers to write "stat" or place immediate orders, causing medication delays for patients.	Substantiated	Unresolved

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[22] The allegations substantiated but unresolved in the trilogy of reports date from March 2022. VA requested an extension until September 16, 2022 on providing its first update as to the status of its work to resolve these issues, so at this time, the OIG does not have an update on VA's progress.

[23] VA OIG, Medication Management Deficiencies after the New Electronic Health Record Go-Live at the Mann-Grandstaff VA Medical Center in Spokane, Washington, March 17, 2022.

Summary of Medication Order Allegations and Findings—Continued

Medication Orders	Allegations	OIG Determination	Status
	Discontinued future medication orders led absent providers to arrange for colleagues to write orders for recurring medications, creating inefficiencies and increasing risks for orders being missed and possible patient safety issues.	Substantiated	Unresolved
Unauthorized Orders Placed	Registered nurses could order medications without provider approval.	Substantiated	Unresolved
Outpatient Orders Not Processed	Pharmacy staff did not process outpatient orders.	Not Substantiated	Not Applicable
	Some outpatient orders failed to process and appeared missing to nonpharmacy staff.	Substantiated	Unresolved
Lack of Notification	Notifications were not sent to prescribing providers and pharmacists about future recurring injectable medication orders that were discontinued or outpatient medication orders that did not process.	Substantiated	Unresolved
Confusing Alerts	Medication alerts were confusing, and providers did not receive training on interpreting them.	Substantiated	Unresolved
Prescription Status Unclear	Providers were unable to assess the status of a filled prescription order.	Substantiated	Unresolved
Lack of Tracking for Mailed Controlled Substances	Pharmacy staff were unable to consistently track mailed controlled substance prescriptions.	Not Substantiated	Not Applicable
	Nonpharmacy staff could not consistently track mailed controlled substance prescriptions.	Substantiated	Unresolved
Prescription Drug Monitoring Program	After completing a PDMP query, providers' notes were not automatically populated in alignment with VHA policy, requiring additional work for providers.	Substantiated	Unresolved

Medication Reconciliation

The OIG substantiated that inaccurate medication lists in the new EHR challenged staff conducting reconciliations. This critical process identifies and resolves any medication discrepancies found in an EHR with the information supplied by the patient or caregiver. Accurate medication lists guide providers' treatment decisions, and inaccuracies could have significant health consequences for a patient. The OIG observed that poor training led to a knowledge gap that contributed to errors and helped explain varying user experiences.

Summary of Medication Reconciliation Allegations and Findings

Medication Reconciliation	Allegations	OIG Determination	Status
Medication List Discontinuity	Staff had to update medication lists at every visit because prior medication information revisions did not carry over.	Substantiated	Unresolved
	Medications disappeared from reconciled medication lists, and lists were inaccurate after reconciliation.	Substantiated	Unresolved

Summary of Medication Reconciliation Allegations and Findings—Continued

Medication Reconciliation	Allegations	OIG Determination	Status
Medication List Inaccuracies	Staff manually entered medication lists post-reconciliation, which increased risk for error and safety concerns.	Substantiated	Unresolved
	Medication reconciliation required a significant amount of time to complete per patient.	Substantiated	Unresolved
	Discontinued and expired medications were not viewable during reconciliation, creating a patient safety issue.	Substantiated	Unresolved
	Medications administered in a clinic did not appear on medication lists, creating a patient safety issue.	Substantiated	Unresolved
Medication Lists Unsuited for Patient Use	Medication lists were not patient-friendly.	Substantiated	Unresolved

The two report recommendations can be found in appendix I. VA concurred with the first recommendation, which requires extensive software updates that VA indicated may take over a year from publication to implement. The second recommendation called for VA to ensure medication management issues related to the new EHR identified after the inspection be reported to the OIG. VA did not concur with this recommendation, citing the difficulty of a continuous, open reporting requirement to the OIG. This is not an open-ended recommendation, however, and could be closed after VA demonstrates an effective and sustainable process to identify and address patient safety issues. VA already must provide this information to the OIG regardless of whether VA concurs with the recommendation, and the OIG will continue this oversight work.

CARE COORDINATION DEFICIENCIES AFTER THE NEW EHR GO-LIVE AT THE MANN-GRANDSTAFF VAMC (MARCH 2022 REPORT)

The second report in the trilogy addressed an expansive list of allegations categorized as care coordination concerns.[24] Care coordination involves numerous EHR functions that facilitate how care is synchronized both among healthcare providers and directly with the patient. As an example of these challenges, the VAMC's coordinator for the new EHR's patient portal reported a backlog after the go-live of over 300 voicemail messages from patients unable to access the portal. During the pandemic, the portal was a central means for patients to communicate with providers.

The OIG further sorted the allegations into eight categories. Each had multiple deficiencies:

1. Patient Record Flags: Patient record flags denoting patients at high risk for suicide and disruptive behavior in the legacy EHR failed to activate for some Mann-Grandstaff VAMC patients. Some identified concerns about patient record flag functionality in the new EHR stemmed from system design, while others related to deficits in training on the new EHR's workflow. The flags are not as obvious in the new system as they were in the legacy EHR. In some new EHR views, staff had to navigate multiple steps to find information about the flag and relevant precautions. Of the six substantiated allegations, only two remained unresolved: the visibility of the flag and national-level data sharing of active record flags for patients at high risk for suicide.

2. Data Migration: As previously discussed, deficiencies were found in the migration of patient information, such as incorrect patient names, genders, and contact information. Discussions continued between VA and DoD regarding business rule updates needed to improve interoperability and ensure accurate data migration in the face of policy differences between VA and DoD.

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[24] VA OIG, Care Coordination Deficiencies after the New Electronic Health Record Go-Live at the Mann-Grandstaff VA Medical Center in Spokane, Washington, March 17, 2022.

3. Scheduling Process: Initial allegations received by the OIG cited delays in scheduling and inadequate appointment information and reminders in the new EHR. Reminders to veterans and caregivers did not always specify if appointments were by telephone rather than in-person, resulting in some patients traveling to the facility for telephone appointments. The OIG was also alerted to problems with the new self-scheduling tool that resulted in Washington State patients inadvertently self-scheduling appointments at the Columbus clinic. Of the five related substantiated allegations, four remained unresolved, particularly related to delays in scheduling primary care appointments, the type of appointment, and the information contained on appointment reminders.

4. VA Video Connect: This VHA telehealth service technology enables veterans to meet virtually with VA healthcare providers from anywhere, using encrypted video. The OIG substantiated some allegations that appointments failed due to broken links, incorrect time zones, and links being sent to outdated email addresses. VA needed to completely resolve only the last allegation, as some veterans were still having to contact DoD to have their contact information updated.

5. Referral Management: Deficiencies in implementing the Ambulatory Referral Management function decreased care providers' ability to manage patients' referrals in the provider's own clinical service, particularly in the behavioral health department, and with other outpatient services in VHA. These breakdowns could lead to delays and affect patient experiences at VHA more generally. For example, providers had no easy way to determine if a referral had been acted on. Certain aspects of system configuration, workflow errors, interoperability deficits, and insufficient training contributed to staffs' difficulties with handling referrals. The three substantiated issues remained unresolved.

6. Laboratory Orders: The OIG was alerted to "disappearing" laboratory orders that never reached lab personnel. The system configurations and training deficits were factors in these failures. Ordering providers were shown a confusing array of options. Additionally, staff were challenged in tracking the orders, and many results were delayed in being returned. These issues created more opportunities for human error as staff used work-arounds to get results that informed care delivery. These three substantiated issues were unresolved.

7. Patient Portal and Secure Messaging: As mentioned above, when the new EHR went live, many patients could not access the portal, affecting access to tools that supported coordination of care, such as secure messaging and online prescription refills. VA staff reported that system changes completed by OIT resolved some causes of this disruption, while other resolutions were in progress.

8. Documentation Processes: While the OIG did not substantiate all allegations received related to documentation process problems, facility staff reported experiencing challenges in effectively navigating and using some of the new EHR capabilities. Insufficient end-user training and misperceptions about certain new EHR functionalities appeared to be the sources of the difficulties. VA started using a new method, the financial identification number (FIN), to document workload associated with between-visit care, which VHA did not historically record. This required numerous steps for providers, creating additional work and confusion. Another example is a configuration issue in which not all International Classification of Disease 10 diagnostic codes were available in the new EHR, affecting providers' ability to correctly code patient diagnoses. Of the three substantiated allegations, the FIN and diagnostic codes were unresolved at the time of publication.

For this report, the OIG made one recommendation, located in appendix J, and it remains open.

TICKET PROCESS CONCERNS AND UNDERLYING FACTORS CONTRIBUTING TO MEDICATION MANAGEMENT AND CARE COORDINATION DEFICIENCIES (MARCH 2022 REPORT)

The OIG issued this third report to provide an analysis of the persistent issues with the ticket process used for reporting problems and requesting assistance at Mann-Grandstaff VAMC, including identifying the underlying causal factors.[25] From the October 2020 go-live date through March 31, 2021, new EHR end users placed over 38,700 tickets. OIG staff analyzed the help ticket system for key terms for each allegation and checked 4,094 tickets related to the issues discussed in the two prior reports.

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[25] VA OIG, Ticket Process Concerns and Underlying Factors Contributing to Deficiencies after the New Electronic Health Record Go-Live at the Mann-Grandstaff VA Medical Center in Spokane, Washington, March 17, 2022.

Ticket Process Challenges

The OIG team reviewed ticket comments to understand facility staffs' frustration with getting fixes and changes. Although VA initiated a strategic review to address these concerns, there were limited process changes. The ticket process challenges the OIG found include the following:

—Cerner's service desk support staff were not able to view and replicate reported issues. While Cerner had a mirror version of the DoD EHR, a mirror version of the Mann-Grandstaff VAMC's EHR was not built.[26] OEHRM staff were frustrated that when Cerner support staff could not reproduce a reported issue they closed the ticket, potentially delaying the problem's resolution.

—The same Cerner staff closed tickets before resolving the issues. Closing tickets without resolving the concerns could result in patient safety issues as well as the propagation of similar issues at future implementation sites. Facility staff also reported feeling a lack of support.

—Ticket status was not communicated to end users. As part of VA's agreement with Cerner, end users were to be notified and given the opportunity to review whether the proposed or implemented resolution addressed the reported issue before Cerner closed the ticket. Mann-Grandstaff VAMC staff reported during 2021 that Cerner's service desk staff were unhelpful or rude.

—Mann-Grandstaff VAMC staff sometimes created work-arounds instead of placing tickets. Due to the challenges, Mann-Grandstaff VAMC users began creating work-arounds to accomplish tasks, which can increase patient safety risks, create inefficiencies, and bypass safeguards.

This report validated deficient ticket processes identified earlier in VA's "Electronic Health Record Comprehensive Lessons Learned" report released in July 2021.[27] While VA had identified proposed measures to monitor these process changes, their July 2021 report said the measures had not been finalized and were under review.

Underlying Factors of Substantiated Allegations in Companion Inspections

To probe into the causes of the allegations in the two companion inspections regarding medication management and care coordination issues, the inspection team identified five underlying factors:

1. EHR Usability Problems. Poor usability has been linked to increased patient safety risks, inefficiencies, and care provider frustration and stress. Among other issues, the OIG found that the user interface was not optimized for workflows; inefficient navigation hampered staff; patient data were in different sections of the EHR; and restrictive definitions of user roles assignments, which defined employees' capabilities in the system, limited the information staff could see.

2. Training Deficits. The OIG found insufficient training content, support, and an approach to training that did not provide staff with the underlying reasons for the actions they should take.

3. Interoperability Challenges. Staff must have access to information needed to perform their work from within and across VHA. This was hampered by the data migration issues previously discussed, the failure of information to transfer to the Consolidated Mail Outpatient Pharmacy, and information not properly transferring to national-level VHA databases.

4. Fixes and Refinement Needs. The OIG identified that some substantiated allegations were unresolved and required fixes after going live, as well as refinements to address errors in system workflows and changes to components of the new EHR. For example, staff were initially unable to view patients' service-connected conditions noted by the Veterans Benefits Administration from the new EHR, which led to an inability to document these conditions for healthcare delivery purposes.

5. Problem Resolution Process Challenges. Successful EHR implementation requires effective pathways for resolving identified problems, and as discussed in this trilogy of reports, the ticket process for resolving questions and concerns had several deficiencies.

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[26] In the response VA gave to the OIG before publication, VA said Cerner service desk support staff had given access to the EHR's production version. The OIG will review VA's evidence during the follow-up process to determine if that is the case.

[27] VA, Electronic Health Record Comprehensive Lessons Learned Report, November 2021. The report was initially released in July 2021 and updated in November 2021.

For this report, the OIG made three recommendations, found in appendix K, and all are open.

THE NEW EHR'S UNKNOWN QUEUE CAUSED MULTIPLE PATIENT HARM EVENTS (JULY 2022 REPORT)

This review looked at one aspect of the question of whether the new EHR resulted in any patient harm.[28] In May 2021, after VHA identified several patient safety concerns, a VHA National Center for Patient Safety team went to Mann-Grandstaff VAMC with their work continuing through the year. In late 2021, the team drafted a report and held a Safety Summit where they ranked dozens of safety concerns based on severity, identifying the "unknown queue" as one of the most severe.

Information about patient harm due to the new EHR was presented to the VA Deputy Secretary in November 2021. In December 2021, the Deputy Secretary forwarded information about harms due to the unknown queue to the executive director of EHRM IO. From October 24, 2020, through May 8, 2022, VHA identified 1,134 patient safety events related to the new EHR. VHA's analysis identified one catastrophic patient harm (death or major permanent loss of function) and two major patient harm cases (permanent lessening of bodily functioning), one of which was related to the unknown queue.[29]

The intent of the unknown queue was to capture orders entered by providers that the new EHR cannot deliver to the intended location. The new EHR's design allowed providers to select locations from a drop-down menu that, depending on the specific order, the system would not be recognize as a "match." This "mismatch" would send orders to the unknown queue and not to the requested service location to initiate the ordered care. Notably, the new EHR did not alert the healthcare providers that the order was not delivered to the intended location.

Orders from care providers began populating the unknown queue immediately after the facility went live. Staff had to re-input the orders after discovering the issue, expending many hours of labor then and during the clinical reviews that assessed the harm patients may have suffered. Cerner did take steps with VA to mitigate the problem at Mann-Grandstaff VAMC by removing unmapped locations in September 2021. As of February 2022, an alert was being sent if a provider created an order with an unmapped location. However, prior to March 2022, VHA could not generate a report of unknown queue orders itself. Cerner acknowledged that the unknown queue's ongoing risk would require mitigation at future go-live sites, noting the need to continuously reinforce the guidance on managing the queue.

The OIG found that Cerner did not inform VA end users of the unknown queue or provide guidance to address the unknown queue in advance of going live with the new EHR. A Cerner vice president, identified by the company's general counsel as an unknown queue subject matter expert, also reported having no knowledge that VA was told about it before going live. Following the OIG's transmittal of the draft report to VA in June 2022, Cerner provided EHRM IO with documentation that asserted a VA leader approved the use of the unknown queue in January 2020. However, that VA leader and their supervisor told OIG staff they had no awareness of the unknown queue prior to going live.

VHA itself assessed the risk as major severity, frequently occurring, and very difficult to detect and initiated a clinical review in June 2021 to ensure orders were acted on and to assess patients for harm. VHA's clinical reviewers conducted 1,286 assessments and identified 148 adverse events (with an additional one later found by VHA to be a major harm, bringing the total to 149) for patients:

—Major harm: 2
—Moderate harm: 52
—Minor harm: 95

As an example of major harm, a provider entered a psychiatric care order for a patient experiencing homelessness and identified as at-risk for suicide. The new EHR sent the order to the unknown queue. The patient was not scheduled for fol-

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[28] VA OIG, The New Electronic Health Record's Unknown Queue Caused Multiple Events of Patient Harm, July 14, 2022.

[29] VA defines "catastrophic harm" as "death or major permanent loss of function (sensory, motor, physiologic, or intellectual) not related to the natural course of the patient's illness or underlying condition (i.e., acts of commission or omission)." VA defines "major harm as "permanent lessening of bodily functioning (sensory, motor, physiologic, or intellectual) not related to the natural course of the patient's illness or underlying condition (i.e., acts of commission or omission)." [bolding not added by the OIG]

low-up care and later contacted the Veterans Crisis Line reporting a razor in hand and a plan to take their own life. The patient was hospitalized for psychiatric care.

The OIG has concerns with the effectiveness of the plan to mitigate the unknown queue's safety risk. Facility leaders reported using the mitigation process to monitor and manage the queue but shared that steps in the process could still lead to orders remaining in the queue. In June 2022, when the OIG met with VA leaders to discuss this report, VA said that work to address the unknown queue was considered complete and that, on average, there were 28 orders in the unknown queue report. However, on that day, the OIG generated a report showing 522 total orders across the six VA facilities using the new EHR. The OIG made two recommendations, found in appendix L, and both are open.[30]

CONCLUSION

This subcommittee and VA have focused tremendous resources on the successful transition to the new EHR system. The OIG's work on the topic reveals there are still considerable challenges, particularly regarding the true costs and scope-especially given the lack of a reliable and comprehensive integrated master schedule. Additionally, physical and IT infrastructure upgrades at all VHA facilities remain, as does the need for effective training and practice before VA staff can properly use the new EHR.

The OIG is committed to providing impactful and practical recommendations that flow from its oversight work to help VA deploy the new EHR efficiently and in a manner that improves veterans' experiences. While each report has specific recommendations intended to improve the EHRM program, there are broader concerns that many of the recommendations reflect. A primary concern is governance: Are the right structures in place to identify potential issues to prevent their occurrence, to prioritize those issues that may affect prompt quality care to patients, and to resolve those issues before additional deployments? Another key concern is transparency: Is there transparency among EHRM IO, the facilities, VHA, OIT, and Oracle Cerner? Full and candid information sharing will help build confidence that issues are being identified, prioritized, and adequately addressed. As VA moves toward deployment in more complex facilities, proper governance and transparency will be necessary to get it right. Failures in these areas risk cascading problems that put the entire program in jeopardy. The OIG will continue to monitor EHRM efforts to help recommend improvements needed to fulfill its promise to the veteran community and make the most effective use of taxpayer dollars. Chairman Heinrich, this concludes my statement. I would be happy to answer any questions you or other members may have.

APPENDIX A. VA RESPONSES TO RECOMMENDATIONS: DEFICIENCIES IN INFRA-STRUCTURE READINESS FOR DEPLOYING VA'S NEW EHR SYSTEM, APRIL 27, 2020

1. The executive director of OEHRM should establish an infrastructure-readiness schedule for future deployment sites that incorporates lessons learned from the DoD. Status: Closed October 1, 2020.

2. The executive director of OEHRM should reassess the enterprise-wide deployment schedule to ensure projected milestones are realistic and achievable, considering the time needed for facilities to complete infrastructure upgrades. Status: Closed October 1, 2020.

3. The executive director of OEHRM should implement tools to comprehensively monitor the status and progress of medical devices at the enterprise level. Status: Closed September 21, 2021.

4. The executive director of OEHRM should standardize infrastructure requirements in conjunction with the VHA and the OIT and ensure those requirements are disseminated to all necessary staff. Status: Closed July 16, 2021.

5. The executive director of OEHRM should evaluate physical infrastructure for consistency with OEHRM requirements and monitor completion of those evaluations. Status: Open. VA's targeted completion date: March 2021.

6. The executive director of OEHRM should fill infrastructure-readiness team vacancies until optimal staffing levels are attained. Status: Closed September 12, 2022.

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[30] Appendices M and N are the recommendations flowing from two additional OIG reports on EHR implementation. The first relates to the availability and use of data in the new EHR, and the second is a joint report with the DoD Office of Inspector General on the progress of VA and DoD in their interoperability efforts.

7. The executive director of OEHRM should ensure physical security assessments are completed and addressed at future EHR deployment sites. Status: Open. VA's targeted completion date: None initially provided.

8. The Mann-Grandstaff VAMC director should ensure all access points to physical infrastructure are secured and inaccessible to unauthorized individuals. Status: Closed October 1, 2020.

APPENDIX B. VA RESPONSES TO RECOMMENDATIONS: DEFICIENCIES IN REPORTING RELIABLE PHYSICAL INFRASTRUCTURE COST ESTIMATES FOR THE EHRM PROGRAM, MAY 25, 2021

1. The executive director for OEHRM should ensure an independent cost estimate is performed for program life cycle cost estimates including related physical infrastructure costs funded by VHA. Status: Open. VA's targeted completion date: 9—12 months from contract start.

2. The VA assistant secretary for management and chief financial officer should ensure the Office of Programming, Analysis and Evaluation, or another office performing its duties, conducts independent cost estimates as required by VA financial policy, and performs an independent estimate of EHRM program life cycle cost estimates including physical infrastructure. Status: Open. VA's targeted completion date: 9—12 months from contract start.

3. The director of special engineering projects for VHA's Office of Healthcare Environment and Facilities Programs should develop a reliable cost estimate for EHRM program-related physical infrastructure in accordance with VA cost-estimating standards and incorporate costs for upgrade needs identified in facility self-assessments and scoping sessions. Status: Closed July 26, 2022.

4. The director of special engineering projects should also continuously update physical infrastructure cost estimates based on emerging requirements and identified project needs. Status: Closed January 20, 2022.

5. The executive director for OEHRM should ensure costs for physical infrastructure upgrades funded by VHA or other sources needed to support the EHRM program are disclosed in program life cycle cost estimates presented to Congress. Status: Open. VA's targeted completion date: July 31, 2021.

APPENDIX C. VA RESPONSES TO RECOMMENDATIONS: UNRELIABLE INFORMATION TECHNOLOGY INFRASTRUCTURE COST ESTIMATES FOR THE EHRM PROGRAM, JULY 7, 2021

1. The executive director of OEHRM should ensure an independent cost estimate is performed for program life-cycle cost estimates related to IT infrastructure costs. Status: Open. VA's targeted completion date: This is part of the strategic review and will be provided as soon as information is available.

2. The executive director of OEHRM should reassess the cost estimate for EHRM program-related IT infrastructure and refine as needed to comply with VA's cost-estimating standards. Status: Open. VA's targeted completion date: Under active revision as part of the strategic review and will be provided as soon as information is available.

3. The executive director of OEHRM should develop procedures for cost-estimating staff that align with VA cost-estimating guidance. Status: Open.VA's targeted completion date: Under active revision as part of the strategic review and will be provided as soon as information is available.

4. The executive director of OEHRM should ensure costs for all IT infrastructure upgrades funded by OIT and VHA or other sources needed to support the EHRM program are disclosed in program life- cycle cost estimates presented to Congress. Status: Open. VA's targeted completion date: This is part of the strategic review and will be provided as soon as information is available.

5. The executive director of OEHRM should formalize agreements with OIT and VHA identifying the expected contributions from each entity toward IT infrastructure upgrades in support of the EHRM program. Status: Open. VA's targeted completion date: This is part of the strategic review and will be provided as soon as information is available.

6. The executive director of OEHRM should establish procedures that identify when life-cycle cost estimates should be updated and ensure those updated estimates are disclosed in the program's congressionally mandated reports. Status: Open. VA's targeted completion date: This is part of the strategic review and will be provided as soon as information is available.

APPENDIX D. VA RESPONSES TO RECOMMENDATIONS: THE EHRM PROGRAM DID NOT FULLY MEET THE STANDARDS FOR A HIGH QUALITY, RELIABLE SCHEDULE, APRIL 25, 2022

1. The EHRM program management office executive director should comply with internal guidance and ensure the development of an IMS that complies with standards adopted from GAO for scheduling, Status: Open. VA's targeted completion date: December 2022.

2. The EHRM program management office executive director should take action to improve stakeholder coordination in the development of the program schedules to ensure activities from all relevant VA entities are included. Status: Open. VA's targeted completion date: August 2022.

3. The EHRM program management office executive director should develop procedures for when and how staff should perform an initial schedule risk analysis and conduct periodic updates as needed. Status: Open. VA's targeted completion date: December 2022.

4. The EHRM program management office executive director should ensure consistency between contract language and program office plans or other guidance identifying the entity or individuals responsible for developing and maintaining the program's WBS and IMS. Status: Open. VA's targeted completion date: November 2022.

5. The EHRM program management office executive director should evaluate the contract requirements for schedule management and modify as needed to ensure clear roles and expectations for further development and maintenance of the IMS. Status: Open. VA's targeted completion date: December 2022.

6. The EHRM program management office executive director should comply with the Federal Acquisition Regulation and issue guidance to accept deliverables not separately priced before invoice payment. Status: Open. VA's targeted completion date: May 2022.

APPENDIX E. VA RESPONSES TO RECOMMENDATIONS: SENIOR STAFF GAVE INACCURATE INFORMATION TO OIG REVIEWERS OF EHR TRAINING, JULY 14, 2022

1. Issue a clarifying communication to the office's personnel that all staff have a right to speak directly and openly with OIG staff without fear of retaliation, and that, irrespective of any processes established to facilitate the flow of information, EHRM IO personnel are encouraged to communicate directly with OIG staff when needed to proactively clarify requests and avoid confusion. Status: Closed September 7, 2022.

2. Provide clear guidance that the office's personnel must provide timely, complete, and accurate responses to requests for all data or information without alteration, unless other formats are requested, with full disclosure of the methodology, any data limitations, or other relevant context. This includes prompt OIG access to entire datasets consistent with the Inspector General Act of 1978, as amended. Status: Closed September 7, 2022.

3. Determine whether any administrative action should be taken with respect to the conduct or performance of the executive director of Change Management. Status: Open. VA's targeted completion date: July 2022.

4. Determine whether any administrative action should be taken with respect to the conduct or performance of Change Management's director for training strategy. Status: Closed August 15, 2022.

APPENDIX F. VA RESPONSES TO RECOMMENDATIONS: TRAINING DEFICIENCIES WITH VA'S NEW EHR SYSTEM AT THE MANN–GRANDSTAFF VAMC IN SPOKANE, WASHINGTON, JULY 8, 2021

1. The USH explores the establishment of a group of VHA staff composed of core user roles with expertise in VHA operations and Cerner EHR use with data architect level knowledge to lead the effort of generating optimized VHA clinical and administrative workflows. Status: Open. VA's targeted completion date: September 2021.

2. The deputy secretary establishes an EHR training domain that ensures close proximation to the production environment and is readily available to all end users during and following training. Status: Open. VA's targeted completion date: January 2022.

3. The deputy secretary ensures end users receive training time sufficient to impart the skills necessary to use the new EHR prior to implementation. Status: Open. VA's targeted completion date: January 2022.

4. The deputy secretary ensures the user role assignment process addresses identified facility leaders and staff concerns. Status: Open. VA's targeted completion date: January 2022.

5. The deputy secretary ensures Cerner trainers and adoption coaches have the capability to deliver end user training on Cerner and VHA EHR software workflows. Status: Open. VA's targeted completion date: January 2022.

6. The deputy secretary evaluates the process of super user selection and takes action as indicated. Status: Closed February 1, 2022.

7. The deputy secretary reviews OEHRM's performance-based service assessments for Cerner's execution of training to determine whether multiple, recurrent concerns are being accurately captured and addressed. Status: Open. VA's targeted completion date: January 2022.

8. The deputy secretary oversees the revision of an OEHRM training evaluation plan and ensures implementation of stated objectives. Status: Open. VA's targeted completion date: January 2022.

9. The deputy secretary reviews the EHRM governance structure and takes action as indicated to ensure the under secretary for health (USH) role in directing and prioritizing EHRM efforts is commensurate with VHA's role in providing safe patient care. Status: Closed February 1, 2022.

10. The USH establishes guidelines and training to capture new EHR-related patient complaints, including patient advocacy. Status: Closed August 5, 2022.

11. The USH ensures an assessment of employee morale following implementation of a new EHR and takes action as indicated. Status: Closed February 1, 2022.

APPENDIX G. VA RESPONSES TO RECOMMENDATIONS: NEW PATIENT SCHEDULING SYSTEM NEEDS IMPROVEMENT AS VA EXPANDS ITS IMPLEMENTATION, NOVEMBER 10, 2021

1. The USH coordinates with the OEHRM executive director to continue to make improvements to the scheduling training as needed to address feedback from schedulers. Status: Open. VA's targeted completion date: January 2022.

2. The USH coordinates with the OEHRM executive director to require that some schedulers from each clinic fully test the scheduling capabilities of their clinics, solicit feedback from the schedulers to identify system or process issues, and make improvements as needed. Status: Open. VA's targeted completion date: November 2021.

3. The USH coordinates with the OEHRM executive director to issue guidance to facility staff on which date fields in the new system schedulers should use to measure patient wait times. Status: Open. VA's targeted completion date: February 2022.

4. The USH coordinates with the OEHRM executive director to develop a mechanism to track and then monitor all tickets related to the new scheduling system, and then ensure OEHRM evaluates whether Cerner effectively resolved the tickets within the timeliness metrics established in the contract. Status: Open. VA's targeted completion date: December 2021.

5. The USH coordinates with the OEHRM executive director to develop a strategy to identify and resolve additional scheduling issues in a timely manner as OEHRM deploys the new EHR at future facilities. Status: Open. VA's targeted completion date: December 2021.

6. The USH coordinates with the OEHRM executive director to develop a mechanism to assess whether facility employees accurately scheduled patient appointments in the new scheduling system, and then ensure facility leaders conduct routine scheduling audits. Status: Open. VA's targeted completion date: July 2022.

7. The USH coordinates with the OEHRM executive director to evaluate whether patients received care within the time frames directed by VHA policy when scheduled through the new system. Status: Open. VA's targeted completion date: July 2022.

8. The OIG recommends that the VA OEHRM executive director provide guidance to schedulers to consistently address system limitations until problems are resolved. Status: Open. VA's targeted completion date: December 2021.

APPENDIX H. VA RESPONSES TO RECOMMENDATIONS: REVIEW OF ACCESS TO CARE AND CAPABILITIES DURING VA'S TRANSITION TO A NEW EHR SYSTEM AT THE MANN– GRANDSTAFF VAMC, APRIL 27, 2020

1. The USH, in conjunction with OEHRM evaluates the impact of the new EHR implementation on productivity and provides operational guidance and required resources to facilities prior to go-live. Status: Open. VA's targeted completion date: Ini-

tial response at Initial Operating Capability go-live; revised versions at subsequent go-live dates.

2. The USH, in conjunction with OEHRM, identifies the impact of the mitigation strategies on user and patient experience at go-live and takes action, as needed. Status: Open. VA's targeted completion date: Initial response at IOC go-live; revised versions at subsequent go-live dates.

3. The executive director, OEHRM, in conjunction with the USH, ensures that clear guidance is given to facility staff on what EHR capabilities will be available at go-live. Status: Closed January 13, 2021.

4. The USH, in conjunction with OEHRM, reevaluates the EHRM deployment timeline to minimize the number of required mitigation strategies at go-live. Status: Open. VA's targeted completion date: May 2020.

5. The veterans integrated service network (VISN) director collaborates with facility leaders to implement VA-provided operational guidance and supports required resources needed throughout the transition to the new EHR system. Status: Closed July 31, 2021.

6. The VISN director ensures that positions required for the transition to the new EHR system are staffed and trained prior to go-live. Status: Closed October 16, 2020.

7. The Mann-Grandstaff VAMC director ensures that community care consults are managed through go- live to ensure accuracy and completeness, and to avoid the need for manual reentry after go-live. Status: Closed September 22, 2021.

8. The Mann-Grandstaff VAMC director ensures that patients receive medication refills in a timely manner throughout the transition to the new EHR system. Status: Closed September 22, 2021.

APPENDIX I. VA RESPONSES TO RECOMMENDATIONS: MEDICATION MANAGEMENT DEFICIENCIES AFTER THE NEW EHR GO–LIVE AT THE MANN–GRANDSTAFF VAMC, MARCH 17, 2022

1. The deputy secretary ensures that substantiated and unresolved allegations discussed in this report are reviewed and addressed. Status: Open. VA's targeted completion date: May 2022.

2. The deputy secretary ensures medication management issues related to the new EHR that are identified subsequent to this inspection be reported to the OIG for further analysis. Status: Open. VA's targeted completion date: None as VA did not concur with the recommendation.

APPENDIX J. VA RESPONSES TO RECOMMENDATIONS: CARE COORDINATION DEFICIENCIES AFTER THE NEW EHR GO–LIVE AT THE MANN–GRANDSTAFF VAMC, MARCH 17, 2022

1. The deputy secretary ensures that substantiated and unresolved allegations noted in this report are reviewed and addressed. Status: Open. VA's targeted completion date: May 2022.

APPENDIX K. VA RESPONSES TO RECOMMENDATIONS: TICKET PROCESS CONCERNS AND UNDERLYING FACTORS CONTRIBUTING TO DEFICIENCIES AFTER THE NEW EHR GO–LIVE AT THE MANN–GRANDSTAFF VAMC, MARCH 17, 2022

1. The deputy secretary completes an evaluation of the new EHR problem resolution processes and takes action as warranted. Status: Open. VA's targeted completion date: March 2022.

2. The deputy secretary completes an evaluation of the underlying factors of substantiated allegations identified in this report and takes action as warranted. Status: Open. VA's targeted completion date: May 2022.

3. The deputy secretary ensures the EHRM deployment schedule reflects resolution of the allegations and concerns discussed in this report. Status: Open. VA's targeted completion date: March 2022.

APPENDIX L. VA RESPONSES TO RECOMMENDATIONS: THE NEW EHR'S UNKNOWN QUEUE CAUSED MULTIPLE EVENTS OF PATIENT HARM, JULY 14, 2022

1. The deputy secretary reviews the process that led to Cerner's failure to provide VA substantive information of the unknown queue and takes action as indicated. Status: Open. VA's targeted completion date: October 2022.

2. The deputy secretary evaluates the unknown queue technology and mitigation process and takes action as indicated. Status: Open. VA's targeted completion date: October 2022.

APPENDIX M. VA RESPONSES TO RECOMMENDATIONS: DEFICITS WITH METRICS FOL-LOWING IMPLEMENTATION OF THE NEW EHR AT THE MANN–GRANDSTAFF VAMC, JUNE 1, 2022

1. The deputy secretary completes an evaluation of gaps in new EHR metrics and takes action as warranted. Status: Open. VA's targeted completion date: October 2022.

2. The deputy secretary completes an evaluation of factors affecting the availability of metrics and takes action as warranted. Status: Open. VA's targeted completion date: October 2022.

APPENDIX N. VA, DOD, AND FEHRM RESPONSES TO RECOMMENDATIONS: JOINT AUDIT OF THE DOD AND THE VA EFFORTS TO ACHIEVE EHR SYSTEM INTEROPERABILITY, MAY 5, 2022

1. We recommend that the deputy secretary of defense and deputy secretary of veterans affairs review the actions of the Federal Electronic Health Record Modernization Program Office (FEHRM) and direct the FEHRM to develop processes and procedures in accordance with the FEHRM charter and the National Defense Authorization Acts. Status: Open.

VA's targeted completion date: September 30, 2022. DoD's targeted completion date: None specified.

2. We recommend that the director of the FEHRM, in coordination with the director of the Defense Health Agency; program executive director for EHRMI; and program manager for DoD Healthcare Management System Modernization:

a. Determine the type of patient health care information that constitutes a complete patient EHR. Status: Open. FEHRM's targeted completion date: August 31, 2022.

b. Develop and implement a plan for migrating legacy patient health care information needed for a patient's complete EHR once the FEHRM determines the health care data domains of patient health care information that constitutes a complete patient EHR. Status: Open. FEHRM's targeted completion date: August 31, 2022.

c. Develop and implement a plan for creating interfaces that would allow medical devices to connect and transfer patient health care information to Cerner Millennium. Status: Open. FEHRM's targeted completion date: One year after resources have been approved and allocated, the FEHRM will develop a plan to create interfaces between medical devices and the Federal EHR.

Senator HEINRICH. Thank you. Senator Tester has another commitment, so I am going to let him go first.

Senator TESTER. Thank you very much, Mr. Chairman. I appreciate this.

Mr. Sicilia, are you the point person for Oracle's efforts here with EHR?

Mr. SICILIA. Yes, I am. I am ultimately responsible for the business.

Senator TESTER. Perfect. You are you the right person then to have in front of us. How is the communication, how would you rate the communication between yourself and VA leadership? Would you say it is good, poor, superior?

Mr. SICILIA. I would say it is very good. I have regular meetings with Deputy Secretary Remy, with Dr. Adirim, and I certainly look forward to working with Dr. Elnahal.

Senator TESTER. And how often do you meet?

Mr. SICILIA. We meet twice a month with Deputy Secretary Remy, and Dr. Adirim as part of our regularly scheduled leadership calls; and sometimes I have one-on-one calls with her as needed as

well. I would say there are no barriers to communication between Oracle and the VA.

Senator TESTER. And as and it is made clear during these meetings, what you guys need and what their expectations are?

Mr. SICILIA. Yes. I think we are in pretty good hands, and as I mentioned in my testimony, I think having a dashboard that all of us can see.

Senator TESTER. Yes.

Mr. SICILIA. You can see where the ball and court is for every effort is very valuable.

Senator TESTER. So one of the advantages that happened when Oracle acquired this, as you are a much bigger company than Cerner was, you have much more capacity, you have much more ability to solve problems, big problems. But Oracle is a big company. Where does this EHR land on the list of what needs to be done in priorities for Oracle?

Mr. SICILIA. This is the most important effort we have going on at the company. We have recast over 2,000 people, existing Oracle employees, to now work specifically on the VA–EHRM program, in addition to the existing Cerner team.

Senator TESTER. So your opening statement was—I mean who could argue with what you said—I mean, it was pretty good stuff. The only thing you didn't talk about is timeline. What is Oracle's timeline for getting this thing going?

Mr. SICILIA. We will be ready, from a technical infrastructure perspective, whenever the VA wishes to resume go lives, and if they wish to add more parallelism down the road to compress, what now looks like it could be 13, backed into 10 years. We are ready——

Senator TESTER. Okay. So I am holding VA accountable, but what I am not holding VA accountable for is the computer program that works, that make sure we don't burn out employees, and make sure veterans get the health care they need. They can't go live until it meets those measures that we have talked about before, and we can talk about more now. What is the timeline to making sure that program is going to work so they feel comfortable?

Mr. SICILIA. I think we have a pretty good visibility into changes that are needed. For example, the unknown queues, talked about many times.

Senator TESTER. I got you.

Mr. SICILIA. We delivered that fix on August 1st, as promised, to the VA. As Dr. Elnahal reported, there are provider frustrations, caregiver frustrations with the system. What we need is the VHA Councils to provide the content for how they want the system reconfigured, if so, because that is not necessarily a programming change, we don't have to change the code of the system, these are switches that need to be flipped. And frankly that is collaboration between Oracle, and the VHA Councils, and the VA.

Senator TESTER. And so that takes me back to my first question. This thing doesn't get done without good communication.

Mr. SICILIA. That is correct.

Senator TESTER. And so very good, but yet I heard you just say that you need more input from VHA.

Mr. SICILIA. I think with Dr. Elnahal's leadership, I think that will increase rapidly. And again, I believe the best way to hold us all accountable is to put everything that we need on the dashboard so we can all see at the same time, and we don't have to wait for the next hearing to have an update. We should be able to have very good telemetry into everything that is going on with a public-facing dashboard, and as we intend to do.

Senator TESTER. Thank you. And thank you for your statement, and thank you for the commitment to deliver it with the agreed amount. I think that timeliness is something that is important here, as on one hand I say don't roll this thing out until you are ready for prime time, and on the other hand, we can't wait forever either. Okay?

Mr. SICILIA. Agreed.

Senator TESTER. All right. Thank you.

This question is for Mc. Case. And it is my last question. The work that you do I very much appreciate, as Inspector General. I sent a letter to the VA after our last hearing, asking them to speed up the closing on their EHR recommendations as Chairman of the Senate Veterans Affairs' Committee. Mr. Case, can you give us an update on whether you have seen a speeding up of the VA side, giving you the information that you need to be able to close out these recommendations?

Mr. CASE. Yes, we have. We have seen some reasonable progress over the last couple of weeks, especially, and we have been able to close out six recommendations over the last few days, which include some of the recommendations addressing training. There is another piece of information we got that may allow us to close out another recommendation.

So, we have seen some good effort, but there is much more to do, particularly with recommendations dealing with the medication management, care coordination, and even some early recommendations, and particularly those pertinent to budget and our recommendations concerning having an integrated master schedule in place. We are told that will be coming this year. But, we will see.

Senator TESTER. Okay. Thank you. And I want to thank everybody who testified. I would get to you too, but we are having too much fun.

Thank you, thank you to both of you for having this hearing.

Senator HEINRICH. No. Thanks for coming.

Ranking Member Boozman.

Senator BOOZMAN. Thank you, Mr. Chairman.

Dr. Rieksts, the IDA cost estimate looks out over 28 years. I would like to focus more on the immediate future; your estimate is the VA will take 13, not 10 years to complete. Can you explain the discrepancy, why the extra 3 years? And then also, you estimate the implementation phase will cost us roughly $33 billion, primarily from the acquisition bucket. Will you expand on that number and explain how your estimate differs from the VA's?

Dr. RIEKSTS. Sure. Thank you for the question. First, on the 13-year implementation period, we based an extra 3 years in our estimate based on a risk analysis. So we estimated a range of one to five additional years over the 10-year period that will be required. And that is based on both looking at historical programs and the

challenges that they have had, and then events that have happened with the current program that have led to the delays that don't indicate that this program would behave differently than historical programs.

And the second point in your question is the implementation period and what that includes that is not in the VA cost estimate. So one of the big elements is the productivity loss that we estimate, that is not in scope and included in the VA estimate, and that is the cost of sending veterans out to the community, to private caregivers to get care while there is a disruption at the facility, and clinicians are busy in training, and learning where to click on the new system. And that also would include additional staffing that is needed at a facility at the go-lives to help those physicians and clinicians at a facility. That is one element.

Another element is, there are some sustainment costs after you turn on the initial sites. You need to host and sustain the system, and that is also included in our cost estimate. And then there are some differences between the IDA estimate and the VA estimate of about $8 billion in comparable elements.

And that is due to both learning from the actual costs that have been incurred today. Our estimate has come after their estimate, so we leverage at the costs that have been incurred to date, and also doing risk analysis of, for example, some of the development activities that are needed to make sure the system is suitable for veterans, and performs the way that it is intended to meet the functions that are required.

Senator BOOZMAN. Very good. Thank you. The VA OIG has issued numerous reports critical of EHRM programs execution and transparency. Among these criticisms VA has moved forward with deployments without the necessary IT infrastructure in place, VA's EHRM and infrastructure cost estimates were not comprehensive, well-documented, accurate, or credible. VA's reports to Congress did not include cost estimates for physical infrastructure, leaving out $2.7 billion in cost, and the program is marred by ineffective training, and no integrated master schedule.

Mr. Case, given those criticisms and what you know of the IDA independent cost estimate, what should this subcommittee make of the testimony today? What will be the true cost of the program? And how long do you think it is going to take? Who is more correct, VA or IDA? Is the answer somewhere in the middle? I know that is difficult, but tell us what you are thinking.

Mr. CASE. Looking at the cost and what IDA has produced, I think it is a serious document, is how I would characterize it. And as noted, even from the $16 billion that was estimated by VA, there is an additional $8 billion that IDA sees there, comparing apples to apples.

One critical aspect of IDA's approach is they include a risk analysis. It is good to be optimistic, but we have to understand that there is risk to all this, particularly in a complicated system like this.

How long it will take? I think we can only reach an informed answer on that once we see an integrated master schedule. They have nothing at VA that tells us how they are going to get from start to finish, site by site, and what is included in that effort. They have

promised one this year, and we hope to see it, and it is particularly important at this juncture, given that they are moving into complex facilities next year, and it is a very short time fuse between complex facilities.

As I recall, the current schedule has Ann Arbor going live, which is a complex facility, on January 28th. And then the next complex facility, which is Seattle, just 1 month later on March 5th, and the next set of complex facilities even shorter, at the end of March, which is both Cincinnati and Dayton.

Can they get lessons learned implemented in time to go complex facility by facility in that period of time? And, will issues appear during that short window that they can correct between facilities? It took a long time for the unknown queue to appear, for remediations to be put in place, and to be addressed to where it is now.

All that is so uncertain that we really can't say how long it is going to take. Or, at least, the IG has no confidence to be able to say that.

Senator BOOZMAN. Good. Thank you. Can I ask one more? Thank you, Mr. Chairman.

Mr. Sicilia, we have heard reports of inadequate IT and physical infrastructure at VA facilities. What is your assessment of VA's IT infrastructure and some of the challenges you anticipate that will need to be resolved to successfully deploy the system across the Nation? What changes need to be made to the program to expedite employment, and ensure the VA clinicians accept, and embrace the new system? And what will require additional effort? And what will require additional investment?

Mr. SICILIA. Well, hopefully over time, Senator, there will be less of that infrastructure needed. As we move to a modern, stateless web application you need less infrastructure and not more infrastructure. And that is, I think, one of the issues that is a challenge with stability and configurations today, is also with the cost estimates a long time, because there is an assumption that the technology stands still. And obviously as it changes you need less of it because the new computers are, frankly, far more powerful.

As far as the view into internal IT needs at the VA, sometimes it is just things like printers, and routers, and things like that. I think that will continue as a matter of course, and it is not uncommon. In any technology, in any technology rollout at the local IT landscape sometimes needs to change, because it is quite old, and quite attuned to the new systems.

But my hope is that as we get more systems live, that becomes a far more repeatable process, and a repeatable cost because we have plenty of lessons learned. And if I can share with you why I am optimistic of the changes, we are pretty well through here, the DOD implementations. In fact, we have two more go lives this week, the same system, same computers, same code, and we are on budget for the entire program at the DOD and the Coast Guard from the original contract scope.

So that is what gives me hope that all the costs that are under our control are certainly achievable with the current scope.

Senator BOOZMAN. Good. Thank you, Mr. Chair.

Senator HEINRICH. Thank you. Mr. Sicilia, drill down a little bit more on that last point. What do you see as the nature of the dif-

ferences in the rollout between, for example, the Coast Guard and the VA? Is it the complexity of the population within the VA? What are the other contributing factors to why those rollouts have gone differently?

Mr. SICILIA. You know, certainly, I think there are several factors. The first is, as I mentioned in my testimony, I think, frankly, the training and that is on us, the training at the VA sites was not as strong as it was at some of the DOD sites. It is also not lost on me that the complexity of the population in the VA is different than the complexity of the population among active service personnel. And therefore, more intense workflows, more configurations to the system may be needed.

I think one of the things that has worked well at DOD is, if you will, snapping a chalk line with some of the configurations, and it is, which I think is complicating situation at the VA, is that you have 171 facilities with 133 unique versions of a system. And sometimes it is difficult, from a change management perspective, to snap that chalk line because everybody wants everything they have today to work exactly the way it does today in the brand new system. And that is difficult when you have so many different custom versions, and so many different custom systems.

And I think where we have seen success, and where we have been able to increase our velocity at the DOD, is to snap that, you know, that line and have that configuration fixed. And I was very encouraged to hear Dr. Elnahal, who I think I agreed with everything that he said, about understanding these configurations of workflows and making them simpler to use for physicians.

And that is something that we can do today. This doesn't require any big investment, or any big change out of infrastructure, technical infrastructure, all that will happen over time too. But we can certainly reconfigure these workflows today. There is no barrier to doing that.

Senator HEINRICH. Talk about that, you know, much of what has been done early on with the system and the fixes were specific to individual locations. And now we are we are talking about moving to the cloud, and having a more ubiquitous system. What are the challenges in just making sure that that is a seamless transition as well?

Mr. SICILIA. I would say that some of the fixes were specific to individual locations. But things like the unknown queue were, you know, a design feature or flaw depending on how you want to look at it.

Senator HEINRICH. Right.

Mr. SICILIA. Of the system from day one. And certainly, everybody benefits from that fix, everybody who is live today, and who will go live next year. So that is, I think that those, both of those things will happen.

As far as moving to a modern, stateless web application, you know, eliminating some of the technology stack as a result, our plan is to do that incrementally. I think it would be a mistake to just replace everything all at once, and say here is the brand new system flip the switch and here you go.

Now, the benefit that we have is that the Cerner Millennium system is written on top of the Oracle database, so there is no data

migration that has to happen, and that is one of the things that is a huge problem that is what is happening today, it has got to migrate all the data from the old system to the new system. We don't want to repeat that process. That is not a good idea. So what we will do is deliver new modern modules on top of the existing system that will run in parallel to the Cerner Millennium system, and over time councils, and certainly practitioners, can decide when they wish to update those things. I think that is the most risk-free way to move forward.

Senator HEINRICH. Given your last 4 months of experience, as well as the experience that DOD and Coast Guard, knowing full well what you are generally in for at this point, what do you think is a realistic timeline for safe deployment at the entirety of the Department's facilities?

Mr. SICILIA. I still think we can do it 10 years that was originally contemplated. I don't really—comparing this to other large commercial programs that we roll out, like electricity grid management and, you know, things like this which are at the national infrastructure level, it is not uncommon that in the beginning, is where you have the most bumps in the road, if you will, and you pick up, you pick up over time.

Senator HEINRICH. Sure.

Mr. SICILIA. Yeah, I think agreement on those workflows, and making sure they are as simple as we possibly can, eases impediment. I am very confident in our new training program, and bringing Accenture in to take that. So I don't see a reason why I could tell you today that it is not possible to deliver on time.

Senator HEINRICH. And you have mentioned several times the necessity of getting a dashboard that everybody agrees has the metrics that are necessary to get this where it needs to go. Do you feel like that that is something everyone agrees on now, and is communicating adequately around?

Mr. SICILIA. I do. And the first version of the dashboard is now live, and accessible for all the members of the committee. And we will certainly work with VA to add content as they say fit to that as well. But everything that we are responsible before is now listed on that dashboard.

Senator HEINRICH. I want to get to Senator Hagerty. I appreciate him being here for this hearing. But I have one more question before we transition to him.

And that is simply the issue, Mr. Sicilia, around outages and stability at the system. Give us some transparency into that, and how we get to what is a very high standard, and not unlike the standard you would apply to a power utility, 99.9 system uptime. Talk to us about that and what your plans are.

Mr. SICILIA. Yeah. Our early view of this, 4 months into the system, was a bit under-resourced technically, so we have added computer capacity to the system at our expense, and we will continue to do that over time, to make sure that all future go-lives are adequately staffed.

We also have over 40 different programs going on, seven of which we completed already for system, shall we say, internal audits, where we are auditing the system and looking at all of the technical functionality of the system, I am confident that we can ad-

dress the stability, and we have made great progress towards getting to the 99.9 over the last few months.

We are actually in the process, where we plan to do to put those numbers out publicly, as we do for our business in general at Oracle. We are just in the process of working with VA right now on the exact—to make sure that we agree on the exact calculation of uptime, because we don't want to put a number out there that they may disagree with.

Senator HEINRICH. Great.

Mr. SICILIA. So that will also be a public metric as well.

Senator HEINRICH. And we look forward to that.

Senator Hagerty.

Senator HAGERTY. Thank you, Chairman Heinrich, and Ranking Member Boozman. I appreciate your chairing this. And to our witnesses, thank you for being here.

You know, one of the most important missions of the Federal government is fulfilling the promise that we have made to our bravest men and women and their families for the sacrifices that they have made, sacrifices that we will never be able to fully repay. And I know that this subcommittee is committed to ensuring that our 17 million veterans, 430,000 of them living in my Home State of Tennessee, get the health care that they deserve.

The Electronic Health Record Modernization program is one of the key programs in the VA Department that has undertaken to provide the best possible care to our veterans. This subcommittee has provided nearly $8.5 billion to this program over the past 5 years. As my colleagues have covered, unfortunately this program has been plagued by delays, by problems, and by safety concerns.

So I would like to turn to you, Mr. Sicilia. You mentioned in your opening remarks that Oracle has recently acquired Cerner, and that Oracle brings world-leading expertise in software, and cloud infrastructure, and health IT. I am certain that there is significant value added that was contemplated when the acquisition was undertaken.

So Mr. Sicilia, can you go through the process of describing the resources, and the capabilities and the expertise that Oracle is going to bring to bear above and beyond what Cerner was able to provide on its own?

Mr. SICILIA. Yeah. As I stated, we have already repurposed thousands of engineers, software engineers to move into a central organization, wherein their sole focus is the health mission and the mission of this program, and to provide additional engineering capacity to the program.

In my view, and owning this now for 4 months, that is where I think the single biggest lack was on the Cerner side. I think engineering horsepower in terms of people who have built very large scale systems for a living, both at the infrastructure level, and the application level, for very large mission-critical systems, like the world's clinical trials networks, the world's power grids and utilities, that same caliber of folks who are used to building very high, of highly available systems, are now working on the Cerner system. So I am confident.

I do believe that the Cerner team brought us tremendous clinical expertise. I mean obviously there are over 1,500 people who work

at Cerner, have some medical degree, are either a doctor, or a nurse, or a radiologist, or something. So I think putting those two things together is a marriage well made. And I am confident that we at Oracle have the engineering capacity that is needed to add significance, and make significant velocity changes to the program.

Senator HAGERTY. Beyond the thousands of engineers that you have added, are there other areas of actions or specific improvements that you have undertaken since June to make this more effective?

Mr. SICILIA. We have sponsored—well as you know, this implementation is the VA, plus the DOD, plus the Coast Guard, so it is all three, so the Federal enclave. You know, I think bringing together all of our Federal partners in this has been very valuable. So we have sponsored the meetings at the Cerner Headquarters in Kansas City.

We continue to meet, so on a very regular basis, and now have a joint leadership meeting among the Oracle team, the Oracle Cerner team which is a holding a subsidiary at this point; the VA, the DOD, Leidos, et cetera, and everybody who is involved in this. And I think that that leadership meeting has led to, or the regular leadership meeting has led to great improvements, and actually the sharing of successes.

Senator HAGERTY. I am glad to hear that. I am sure you are looking at best observed practices across this and trying to make certain that would benefit from the Federal government's broader experience here, particularly as you try to bring the VA up to par.

Would you mind to discuss, Mr. Sicilia, the impact, or what you anticipate the impact to be by having a centralized interoperable modern health record system, and how will that impact the quality of care for our veterans?

Mr. SICILIA. Well, the premise is the longitudinal health record, which means that, you know, as either an active-duty service member or a veteran you don't have to go fish around to a bunch of different websites, or fax machines, or all the things that plague people from getting their health information today, into an aggregate stack, an electronic stack.

And you can imagine that from a quality care perspective, every time you see a new provider not having to start over, and saying, you know, here is all the things that I have been treated for in the past, the medications, all of that is readily available, there is a tremendous time saving, and a tremendous, you know, lack of fatigue factor.

I think sometimes people just get so fatigued of going through the process, of trying to get all their records together, to go to a new appointment that they give up.

Senator HAGERTY. Yeah. And the frustration too, I mean, and people can go to the VA—go to the VA in Memphis, and then go to the one in Nashville, and they can't get their records transferred.

Mr. SICILIA. Right, and so if you are the VA, and you are traveling seeing family out of state, you ought to be able to have an application that tells you exactly where you can go and make an appointment right away, and have your records follow you, so you don't have to go, you don't have to go start over.

And then, obviously, from the provider standpoint, providers suffer too from not having longitudinal records. I mean, they don't know enough about the patient that they are treating, and they would love to be able to know a lot of things ahead of time, before they walk into the room and have to spend the first 15 minutes of an appointment starting over. So I think that those benefits will be tremendous for both patients and providers, and will be.

Senator HAGERTY. Well, given the magnitude of investment that this committee has put in place, I am glad to hear you are kicking it into overdrive with the acquisition, putting new resources in place. We are looking forward to seeing this getting done.

Mr. SICILIA. Thank you.

Senator HAGERTY. Thank you. Thank you, Mr. Chairman.

Senator HEINRICH. Ranking Member Boozman, do you have any follow-up questions?

Senator BOOZMAN. No. Thank you.

Senator HEINRICH. I want to thank all of our panelists and the senators who participated in today's hearing. This is an incredibly important endeavor. We certainly appreciate everyone's efforts to make sure it is done correctly for the benefit of all of our veterans.

ADDITIONAL COMMITTEE QUESTIONS

And finally, I will keep the hearing record open for one week. Committee members who would like to submit written questions for the record should try to do so by 5:00. Should actually do so by 5:00 p.m. Wednesday, September the 28th.

QUESTIONS SUBMITTED TO MR. MIKE SICILIA

QUESTIONS SUBMITTED BY SENATOR HEINRICH

Question. Since the contract was signed, issues have arisen that require shifts in what was originally planned. Oracle's commitment to doing much of this new work within the scope of the initial contract is appreciated. Your testimony indicated that on top of the $10.0 billion contract there already has been an additional $700 million in additional requirements identified, for a total of $10.7 billion. The clarification provided subsequent to the hearing that the contract ceiling is not contemplated to be raised is appreciated. What specific changes, by issue and amount, comprise the additional $700 million Oracle referenced?

Answer. With any contract of this size and duration, there will always be a need for prudent, new programmatic requirements to account for emerging realities to be able to adjust course and implement lessons learned. As such, additional requirements have been identified that were not previously contemplated in the original Indefinite Delivery Indefinite Quantity (IDIQ) ceiling price. These additional requirements include but are not limited to the work related the VA side of interfaces, new requirements including Pharmacy enhancements, the standalone scheduling deployment in Columbus and additional solutions such as ones for clinicians to chart vitals data directly into the EHR.

Oracle Cerner expects to be able to identify and leverage cost efficiencies to achieve taxpayer's savings over the ten-year term. Accordingly, Oracle continues to be committed to continuously evaluating opportunities to bring efficiencies and will continue to work with VA now, and over the life of the contract to deliver on those efficiencies through modern, enterprise-based technologies. Our commitment to efficiencies gained through the evolution of technology over time is expected to balance and offset many of the new requirements.

Question. How close are Oracle Cerner and VA from having a rollout that is "replicable" and a better sense of what it will cost, on average, to deploy at a facility?

Answer. As the number of facilities with different types of care and clinical complexity go-live, we will be able to better standardize deployment processes and solutions. Specifically, facilities with varying types of care and complexity may require

new workflows, order sets, and capabilities that may not already be live and thus would be standardized over time as they are introduced to sites and accessed by end users. The new deployment schedule should help accelerate that process by pulling in capabilities earlier, such as the pharmacy enhancements. While difficult to eliminate all the variance between sites, having a holistic, replicable process will be key to better predict costs and scope of the work.

This is intrinsic to our deployment methodology; however, it is dependent on a framework of a refinement of the system with a steady and clear baseline of scope and requirements. For this reason, as deployments resume, it will be critical to have a clear, detailed checklist of both requirements to resume go-lives uninterrupted and an ongoing set of standardized readiness criteria for site deployments going forward.

Question. According to Oracle Cerner and VA, one of the significant differences between the first deployment of the Cerner EHR at Mann-Grandstaff and the subsequent deployments was the commitment to training. What are Oracle's plans to make the training more useful, effective and efficient?

Answer. VA and Oracle Cerner remain committed to providing training that prepares end users to use their new EHR in the delivery of health care to Veterans through ongoing improvements reflective of experience gained and lessons learned.

Actions taken following deployment at Mann-Grandstaff include 4,000+ content improvements, enhancement of all courses for virtual delivery, conversion of some foundational content to self-paced computer-based courses to provide flexibility, creation of training to support hands-on practice, and development of more targeted training in specialty areas. The initial impact of these efforts is reflected in improved training satisfaction survey results, a return to productivity baseline in many areas, and productivity levels as illustrated by key performance indicators (e.g., decreased time in the EHR, specifically at urgent care centers and in labs).

While progress has been made, there remains work to be done. The EHRM training program, one of significant size and complexity, is executed in accordance with government-defined requirements and government-determined priorities. While VA has contracted with Oracle Cerner to provide technical training on the new EHR, end user feedback reflects more expansive expectations. To better understand these needs and associated opportunities, Oracle Cerner engaged a third-party to conduct an independent assessment of the EHRM training program and recommendations offered to VA by Oracle Cerner thus far at our own expense. The result of this effort was the identification of 10 (10) root cause issues, six (6) high-level recommendations and more than 25 initiatives.

As I mentioned in my testimony, we will be engaging Accenture to assist in implementing the changes needed to make the training much more efficient, applicable, and useful. The scope of Accenture's support of this aspect of the EHRM program is currently under consideration and we will keep the committee apprised of progress as that process moves forward.

Question. Oracle announced plans to implement a cloud-based solution to improve stability and enhance the EHR system. Given this shift, what adjustments to current site assessment findings will need to be factored in to adjust the estimates for this shift from data centers?

Answer. The current state reviews (CSR) incorporate both technology and infrastructure site reviews and are capturing the site-specific infrastructure and workflows needed to understand the scope and requirements for deployments. I don't anticipate any changes needed to the CSR requirements to account for the future cloud-based solution.

Question. In recent months there have been many instances of system instability—either degradations or outages. The contract includes a 99.9 percent standard for system uptime, with a required "credit" to be provided by Oracle Cerner when the standard is not met. Is the 99.9 percent standard an appropriate expectation to meet?

Answer. Yes, the service-level commitment (SLC) is industry standard and an appropriate expectation. Delivering a single common health record between VA, DoD and the U.S. Coast Guard is the first of its kind and is technically challenging, but the benefits are enormous. Veterans and Service members will have greater flexibility in where and how they seek care by no longer having to carry their own paper records or being tethered to their data siloed in specific medical centers.

However, the benefits of this system can only be realized if it is reliable and completely trusted by the people using it. We are working on more than 40 different technical operational improvement projects for the Federal Enclave that we continue to lead to improved performance and greater stability. We have made progress already, completing 12 projects and expecting 4 more to be completed by the end of the year.

We are seeing benefits from our architecture and operation reviews, including July and September without a major incident and decreased frequency of incidents related to change. Specifically, we had a 60 percent month over month reduction in incidents related to change after Oracle introduced more rigorous methodology and oversight.

Question. At one point in March 2022, the system was down for over 20 hours, which resulted in a credit of a little over $100,000. Given the scope and scale of the overall contract, do you see the credits required when Oracle does not meet this target as appropriately incentivizing?

Answer. We will leave it to our client to determine the appropriate levels consistent with the contractual requirements. With that said, our incentive goes well beyond this single component. With our acquisition of Cerner, we see our work with the VA and DoD as the opportunity to be a show piece for what Oracle will bring broadly to the entire health IT industry. We are driven by delivering what has been promised and exceeding expectations with the VA EHR setting the gold standard with a new generation of modern, cloud-native, highly performant and secure EHR applications embracing mobility, self-service, analytics and ease of use to solve some of the biggest challenges facing our veterans and VA clinicians.

QUESTIONS SUBMITTED BY SENATOR JOHN HOEVEN

Question. The safekeeping of our Nation's servicemembers and veterans' medical records is essential not only for an individual's privacy, but for our National security. What systems does Oracle Cerner have in place so that medical records are secure?

Answer. Oracle is a leading enterprise software vendor with more than forty years of experience building and developing some of the most advanced, mission-critical, secure and performan technology around the world for governments, critical infrastructure, and commercial enterprises. As an example, Oracle operates fully certified government cloud regions under the Intelligence Community's Commercial Cloud Enterprise ("C2E") program and is fully qualified under the DoD's upcoming Joint Warfighter Cloud Capability Program ("JWCC").

Oracle's cyber security expertise together with Cerner's expertise in securing sensitive patient data is a very powerful combination that we believe will enhance security and data protection for our Nation's servicemember and veterans.

The on-going modernization of the Federal electronic health record system across VA and DoD enhances health record protections in three main areas. First, incorporating regulatory best practices in support of HIPAA and NIST requirements. Second, the transformation from disparate systems running across multiple data centers to an enterprise system decreases system dependencies and surface area susceptible to security issues while enhancing system agility to be able keep pace with the ever-evolving cyber security threats. Third, the additional protections in moving the Cerner application, with the approval of VA, DoD and Coast Guard, to a modern, hyperscale cloud data center. This is the same Generation 2 Cloud Infrastructure that underpins Oracle's customers' most critical workloads.

QUESTIONS SUBMITTED TO DR. BRIAN RIEKSTS

QUESTIONS SUBMITTED BY SENATOR MARTIN HEINRICH

Question. VA has not provided a revised schedule for the remainder of deployments, but the IDA analysis suggests it could take 3 years longer than originally planned. Understanding there are a lot of unknowns with future deployments, what is the basis for that assessment?

Answer. The current program has already experienced schedule slips. For example, Seattle Veterans Affairs Medical Center (VAMC) was originally projected to go live in March 2020. The current projection is that this site is not likely to deploy until at least June 2023.[1]

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[1] Veterans Affairs Office of Public and Intergovernmental Affairs, "VA extends delay of upcoming electronic health record deployments to June 2023 to address technical and other system performance issues," October 13, 2022. https://www.va.gov/opa/pressrel/pressrelease.cfm?id=5833, accessed October 18, 2022.

The Institute for Defense Analyses (IDA) estimated the overall deployment schedule using historical data on enterprise resource planning (ERP) systems.[2] Those data show that the average schedule slip was 31 percent, which translates into a mean expected schedule adjustment of 3 years when applied to the Electronic Health Record Modernization (EHRM) initial 10-year deployment schedule. The historical data also have a standard deviation of 32 percent. Using this historical schedule variation, IDA estimates a 20 percent chance the deployments will be completed within 11 years and an 80 percent chance the deployments will be completed within 15 years.

Question. Oracle Cerner indicated plans to shift to a cloud model, rather than data center requirements at each facility. Would this result in savings compared to the IDA estimate? If so, what would the potential magnitude of the savings be and where would they be realized?

Answer. The planned requirements to shift to the Oracle cloud were not available for our cost estimate, so we do not have an estimate of this change. Costs for hosting and infrastructure could decrease; however, additional cybersecurity costs may be required to shift from current operations to the Oracle cloud. The net effect of these changes depends, in part, on the specific changes in requirements.

A shift to the Oracle cloud would have an effect on some of the EHRM cost elements. We identified hosting ($5B) as the largest cost element in the IDA estimate affected by the shift. Oracle Cerner cloud services would still require some hosting costs; however, savings may be achieved if hosting costs decrease.

Question. The IDA estimate treats the costs of "common infrastructure" as being on top of the EHR estimate. What criteria did IDA use in identifying and estimating this category?

Answer. IDA defines common infrastructure as costs that would still be incurred without the EHRM program. We engaged with VA staff and reviewed documentation to identify common physical or information technology (IT) infrastructure costs that would be incurred regardless of EHRM. For example, common infrastructure includes shared services that are required by other programs, such as the Financial Management Business Transformation (FMBT) or Veterans Affairs Logistics Redesign (VALOR). Another example of common infrastructure is maintenance (e.g., cabling, climate control) that is planned regardless of EHRM. These costs are reported separately from the life-cycle cost estimate (LCCE) because they are not required exclusively by EHRM.

Some cost elements are not exclusively common or EHRM-specific infrastructure. For example, WiFi is common infrastructure, but the increase in WiFi density required by EHRM is EHRM-specific. In these cases, we estimated the share of the overall costs that are EHRM-specific infrastructure. To address the uncertainty in the categorization of EHRM-specific and common infrastructure, we estimated high and low values for the percent of common infrastructure and included this estimate in our risk analysis.

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QUESTIONS SUBMITTED TO MR. DAVID CASE

QUESTIONS SUBMITTED BY SENATOR MARTIN HEINRICH

Question. VA Office of Inspector General reports related to EHRM implementation often flag areas where VA may not have followed standard, acceptable procedures in moving forward, such as with the previous cost estimate report to Congress and the development of a master schedule. What does OIG perceive as the greatest risk to the initiative going forward?

Answer. The OIG is concerned about any risk that could impact patient safety. In our three March 2022 reports about the implementation at Mann-Grandstaff VA Medical Center, Medication Management Deficiencies after the New Electronic Health Record Go-Live at the Mann-Grandstaff VA Medical Center in Spokane, Washington, Care Coordination Deficiencies after the New Electronic Health Record Go-Live at the Mann-Grandstaff VA Medical Center in Spokane, Washington, and Ticket Process Concerns and Underlying Factors Contributing to Deficiencies after the New Electronic Health Record Go-Live at the Mann-Grandstaff VA Medical Center in Spokane, Washington, we discussed issues related to patient safety, medication management, and care coordination. In our July 2022 report on the unknown queue, The New Electronic Health Record's Unknown Queue Caused Multiple

[2] H. Gebre-Mariam et al., "Assessing Enterprise Resource Planning (ERP) Cost, Schedule and Size Growth," June 2017, 2017 ICEAA Professional Development & Training Workshop.

Events of Patient Harm, we focused on the importance of resolving the queue because it requires human activity to identify what is in the queue, remove the order, and reroute the order. Those mitigations can lead to delays in care, which could impact patient safety. We have also recommended that VA ensure that the employee training program is conducted in an efficient and effective manner and improvements to the new EHR system are implemented speedily so that VA providers can return to predeployment productivity levels as quickly and safely as possible.

We identified issues with VA's costs estimates and master schedule. Our 2021 reports Unreliable Information Technology Infrastructure Cost Estimates for the Electronic Health Record Modernization Program and Deficiencies in Reporting Reliable Physical Infrastructure Cost Estimates for the EHRM Program indicated that existing physical and IT infrastructure at VA medical facilities was inadequate for the new system and pertinent life cycle cost estimates were unreliable and underestimated possibly by about $5 billion. We note that the Department is finalizing the life cycle cost estimate prepared by the Institute for Defense Analyses. Once that is done, we will review the report and supporting materials to determine which, if any, of our recommendations from our two reviews of VA's physical and information technology cost estimates could be closed.

However, as we noted in our report, The Electronic Health Record Modernization Program Did Not Fully Meet the Standards for a High-Quality, Reliable Schedule, VA must also develop a reliable, comprehensive schedule for full system implementation. Identified deficiencies could result in schedule delays and leave VA vulnerable to billions of dollars in cost overruns. Without that schedule, Congress cannot rely on VA's timelines for completing the work or be assured that the program will be completed within budget or in line with the independent cost estimate.

Question. Given the number of recommendations that remain open after more than a year, has VA been collaborative in working on the issues that have been raised?

Answer. We saw some reasonable progress recently in September 2022, and we were able to close out six recommendations shortly before the subcommittee's hearing. This included some of the recommendations addressing training deficiencies from our July 2021 report, Training Deficiencies with VA's New Electronic Health Record System at the Mann-Grandstaff VA Medical Center in Spokane, Washington. While we have seen some improved efforts, there is much more to do with recommendations addressing medication management and care coordination, and recommendations pertinent to costs and having an integrated master schedule in place.

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QUESTIONS SUBMITTED BY SENATOR JOHN HOEVEN

Question. The VA Office of Inspector General has a number of recommendations that remain open with regard to the VA's electronic health record (EHR) modernization.

Of the open recommendations, which are of the greatest concern in terms of patient safety, privacy, and cost?

Answer. The OIG is concerned about any risk that could impact patient safety. In our three March 2022 reports about the implementation at Mann-Grandstaff VA Medical Center, Medication Management Deficiencies after the New Electronic Health Record Go-Live at the Mann-Grandstaff VA Medical Center in Spokane, Washington, Care Coordination Deficiencies after the New Electronic Health Record Go-Live at the Mann-Grandstaff VA Medical Center in Spokane, Washington, and Ticket Process Concerns and Underlying Factors Contributing to Deficiencies after the New Electronic Health Record Go-Live at the Mann-Grandstaff VA Medical Center in Spokane, Washington, we made recommendations related to patient safety, medication management, and care coordination. From our July 2022 report on the unknown queue, The New Electronic Health Record's Unknown Queue Caused Multiple Events of Patient Harm, there is an open recommendation related to evaluating the mitigation process because it requires human activity to identify what is in the queue, remove the order, and reroute the order. Those mitigations can lead to delays in care, which could impact patient safety. We have also recommended that VA ensure that the employee training program is conducted in an efficient and effective manner and improvements to the new EHR system are implemented speedily so that VA providers can return to predeployment productivity levels as quickly and safely as possible.

Our 2021 reports Unreliable Information Technology Infrastructure Cost Estimates for the Electronic Health Record Modernization Program and Deficiencies in Reporting Reliable Physical Infrastructure Cost Estimates for the EHRM Program

indicated that existing physical and IT infrastructure at VA medical facilities was inadequate for the new system and pertinent life cycle cost estimates were unreliable and underestimated possibly by about $5 billion. We note that the Department is finalizing the life cycle cost estimate prepared by the Institute for Defense Analyses. This estimate was done by VA in response to our recommendations. Once that is done, we will review the report and supporting materials to determine which, if any, of our recommendations from our two reviews of VA's physical and information technology cost estimates could be closed.

However, as we noted in our report, The Electronic Health Record Modernization Program Did Not Fully Meet the Standards for a High-Quality, Reliable Schedule, VA must also develop a reliable, comprehensive schedule for full system implementation. Identified deficiencies could result in schedule delays and leave VA vulnerable to billions of dollars in cost overruns. Without that schedule, Congress cannot rely on VA's timelines for completing the work or be assured that the program will be completed within budget or in line with the independent cost estimate.

SUBCOMMITTEE RECESS

Senator HEINRICH. And with that we stand adjourned. Thank you all.

[Whereupon, at 11:22 a.m., Wednesday, Septemeber 21, the hearing was adjourned, and the subcommittee was recessed, to reconvene at a time subject to the call of the Chair.]