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UNITED STATES COURT OF APPEALS

FOR THE SIXTH CIRCUIT

DAVID L. BEST,
Plaintiff-Appellant,

v.

LOWE'S HOME CENTERS, INC.,
Defendant-Appellee.

No. 08-5924

Appeal from the United States District Court
for the Eastern District of Tennessee at Knoxville.
No. 04-00294—C. Clifford Shirley, Jr., Magistrate Judge.

Argued: March 12, 2009

Decided and Filed: April 16, 2009

Before: MARTIN and GILMAN, Circuit Judges; ZOUHARY, District Judge.*

COUNSEL

ARGUED: Robert E. Pryor, Jr., PRYOR, FLYNN, PRIEST & HARBER, Knoxville, Tennessee, for Appellant. Clinton J. Woodfin, SPICER, FLYNN & RUDSTROM, Knoxville, Tennessee, for Appellee. **ON BRIEF:** Robert E. Pryor, Jr., PRYOR, FLYNN, PRIEST & HARBER, Knoxville, Tennessee, for Appellant. Clinton J. Woodfin, SPICER, FLYNN & RUDSTROM, Knoxville, Tennessee, for Appellee.

OPINION

RONALD LEE GILMAN, Circuit Judge. David L. Best claims to suffer from permanent anosmia—the loss of his sense of smell—as a result of a pool chemical spilling onto his face and clothing at a Lowe's Home Center store. After filing suit

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* The Honorable Jack Zouhary, United States District Judge for the Northern District of Ohio, sitting by designation.

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against Lowe's, Best planned to introduce the expert testimony of Dr. Francisco Moreno, a board-certified otolaryngologist (an ear, nose, and throat doctor) and a former chemical engineer, in order to establish the causal link between the chemical spill and his injuries. The district court excluded Dr. Moreno's testimony, holding that the method employed by the doctor in drawing his conclusions regarding causation was "unscientific speculation." This resulted in summary judgment being granted in favor of Lowe's. For the reasons set forth below, we **REVERSE** the judgment of the district court and **REMAND** the case for further proceedings consistent with this opinion.

I. BACKGROUND

A. Factual background

Best visited a Lowe's store in Knoxville, Tennessee in June 2003. Intending to purchase chemicals for his swimming pool, he located a product called Aqua EZ Super Clear Clarifier (Aqua EZ). When Best lifted the plastic container from the shelf, an unknown quantity of the contents splashed onto his face and clothing. The container had allegedly been accidentally punctured with a knife by the Lowe's employee who had opened the shipping box. Best went to the emergency room of a hospital for treatment on the day that the spill occurred. Four months later, Best sought care and treatment from Dr. Moreno for the injuries associated with the incident. Dr. Moreno has practiced medicine as an otolaryngologist since 1982. Before attending medical school, Dr. Moreno earned a Bachelor of Science degree in chemical engineering. He was employed as a chemical engineer from 1968 until 1972.

At the time of his initial visit to Dr. Moreno, Best described the incident at Lowe's. He said that the spilled product had a strong odor, and that immediately thereafter he had suffered from irritation and burning of his skin, irritation to his nasal passages and mouth, dizziness, and shortness of breath. Best also reported that he experienced clear drainage from his nose following the spill and that he eventually lost his sense of smell completely. Dr. Moreno was unable to inspect Best's mucous

membranes for physical damage because they are located too far inside the nasal passages to permit visual examination.

Best was seen for a second time by Dr. Moreno in January 2007. Dr. Moreno took a new medical history and again performed a physical examination to the extent possible in light of the position of the mucous membranes in the nose. At that time, Best was experiencing rhinitis—otherwise known as a runny or stuffy nose—with swelling and decreased airflow. Best reported that, during the three-and-a-half year period since the spill incident, he had struggled with rhinitis, anosmia, and dizzy spells.

In April 2008, Dr. Moreno administered to Best the University of Pennsylvania Smell Identification Test (UPSIT), a standardized test of olfactory function. The test involves various sample chemicals, requiring the test subject to choose one of four descriptions of each sample's scent. Best scored a six on the test, a score consistent with complete anosmia.

Dr. Moreno testified in his deposition that "[l]oss of smell is caused by either a virus, an accident, tumors to the brain, surgery into the brain, or exposure to chemicals." He also conceded that sometimes anosmia is idiopathic, meaning that it occurs for unknown reasons, and that some medications can cause a loss of the sense of smell. Dr. Moreno proceeded to list the following medications that Best reported taking at the time of his chemical exposure: aspirin, Atenolol, Effexor, hydrochlorithiazide, Lescol, Letensin, moxamorphin, OxyContin, Protonix, and Remeron. Dr. Moreno stated that Atenolol and Lotensin are for blood pressure; aspirin, moxamorphin, and OxyContin are for pain; Effexor is for depression; hydrochlorothiazide is a fluid pill; and Protonex is for the stomach. He was unfamiliar with the drug Lescol. Referring to all of the medications, he stated that "[i]n my practice, with the patients that I have seen . . . over the years . . . , I have never seen an anosmia caused from the use of these medications." He also said that he had looked up all of the medications except Lescol in the course of his practice. Dr. Moreno was unable to list the general types of medications that can cause a loss of the sense of smell.

Lowe's provided Best's attorney with a one-page document identifying the pool chemical as Aqua EZ. The document describes the product as a "thick blue liquid" containing cationic polymers that attract foreign particles in the pool water so that they can be more efficiently removed by the filtration system. After receiving this document, Best's attorney obtained a Material Safety Data Sheet (MSDS) prepared by Ciba Specialty Chemicals Corporation, the supplier of the active ingredient in Aqua EZ. Dr. Moreno reviewed the MSDS, which describes the characteristics of the active ingredient.

The relevant ingredient is an organic cationic polyelectrolyte. Specifically, the compound is a homopolymer with the name 2-Propen-1-aminium, N, N-dimethyl-N-2-propenyl-chloride. The MSDS identifies the chemical as "hazardous" and states that "[p]rolonged or repeated contact may cause eye and skin irritation." Primary routes of entry for the compound are listed as "Ingestion, Skin, Inhalation, Eyes." According to the MSDS, if the chemical is inhaled, the person should be "[r]emove[d] to fresh air, if not breathing give artificial respiration. If breathing is difficult, give oxygen and get immediate medical attention." The Handling Instructions state: "Do not inhale . . . . Use only with adequate ventilation." Under the heading "Engineering Controls," the MSDS instructs: "Work in well ventilated areas. Do not breathe vapors or mist." The MSDS also notes that "Acute Inhalation Toxicity" for the compound has not been determined. Dr. Moreno later reviewed a second MSDS, published by Sigma-Aldrich, another supplier of the relevant compound. That MSDS confirmed that the compound is "irritating to the mucous membrane and upper respiratory tract" and that it "[m]ay be harmful if inhaled."

Dr. Moreno concluded, based on the MSDS information, that the inhalation of Aqua EZ has the potential to cause damage to the nasal and sinus mucosa and the nerve endings of the olfactory bulb. According to Dr. Moreno, the culprit components of the polymer in question include a chlorine derivative and an ammonium derivative. He offered his opinion that "a chemical burn can cause a loss of smell on a time basis" due to "scarring of the tissue," and reported that he has treated other chemical exposures with anosmic side effects following exposure to chlorine derivatives. But Dr. Moreno did not

know the precise amount of the offending chemical that Best had been exposed to, nor was he able to determine the threshold level of exposure that could cause harm. Dr. Moreno summarized his diagnosis regarding causation this way:

> The patient had an accident, chemical was spilled, the patient cannot smell. If we have any trust in the patient at all, all I can say is he cannot smell. I did test him, his test was positive in the fact that he was anosmic. All I can tell you is that exposure to the—the only exposure that he had at the time that I talked to him was exposure to this chemical. There was nothing else in his history that dictated the fact that he was anosmic otherwise.

In short, because of the temporal relationship between Best's exposure to the chemical and the onset of his symptoms, in conjunction with a principled effort to eliminate other possible causes of anosmia, Dr. Moreno formed the opinion that the inhalation of Aqua EZ caused Best to lose his sense of smell.

B. Procedural history

Best originally filed suit against Lowe's in a Tennessee trial court. Lowe's timely removed the case to the federal district court based upon diversity of citizenship under 28 U.S.C. § 1332. After Best identified Dr. Moreno as an expert witness, counsel for Lowe's took the doctor's deposition. Lowe's then moved for the exclusion of Dr. Moreno's testimony regarding the cause of Best's injury and also moved for summary judgment. The district court excluded Dr. Moreno's proposed testimony after concluding that the doctor's opinion was too speculative. *Best v. Lowe's Home Centers, Inc.*, No. 3:04-CV-294, 2008 WL 2359986 at *9 (E.D. Tenn. June 5, 2008). Because Best presented no other evidence to carry his burden of proof on the element of causation, the district court granted partial summary judgment in favor of Lowe's on Best's anosmia claim. *Id.* Best later withdrew his claims for the less serious injuries and losses that he allegedly suffered as a result of the chemical spill. The court accordingly granted summary judgment in full to Lowe's. Best now appeals the district court's decision to exclude Dr. Moreno's testimony.

II. ANALYSIS

A. Standard of review

We apply the abuse-of-discretion standard in reviewing a district court's decision regarding the admissibility of expert testimony. *Hardyman v. Norfolk & W. Ry. Co.*, 243 F.3d 255, 258 (6th Cir. 2001). "A district court abuses its discretion if it bases its ruling on an erroneous view of the law or a clearly erroneous assessment of the evidence." *Brown v. Raymond Corp.*, 432 F.3d 640, 647 (6th Cir. 2005) (internal quotation marks omitted).

B. Admissibility of expert testimony on medical causation

Rule 702 of the Federal Rules of Evidence controls the admissibility of all types of expert testimony. The rule provides as follows:

> If scientific, technical, or other specialized knowledge will assist the trier of fact to understand the evidence or to determine a fact in issue, a witness qualified as an expert by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise, if (1) the testimony is based upon sufficient facts or data, (2) the testimony is the product of reliable principles and methods, and (3) the witness has applied the principles and methods reliably to the facts of the case.

According to *Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579 (1993), a district court's task in assessing evidence proffered under Rule 702 is to determine whether the evidence "both rests on a reliable foundation and is relevant to the task at hand." *Id.* at 597. The district court must consider "whether the reasoning or methodology underlying the testimony is scientifically valid." *Id.* at 592-93.

Daubert attempts to strike a balance between a liberal admissibility standard for relevant evidence on the one hand and the need to exclude misleading "junk science" on the other. *See Amorgianos v. Nat'l R.R. Passenger Corp.*, 303 F.3d 256, 267 (2d Cir. 2002). There is no "definitive checklist or test" for striking this balance, but the Supreme Court in *Daubert* set forth a number of factors that typically "bear on the inquiry." 509 U.S. at 593. These include whether the theory or technique in question

"can be (and has been) tested," whether it "has been subjected to peer review and publication," whether it has a "known or potential rate of error," and finally, whether the theory or technique enjoys general acceptance in the relevant scientific community. *Id.* at 594. The Rule 702 inquiry is "a flexible one," and "[t]he focus . . . must be solely on principles and methodology, not on the conclusions they generate." *Id.* at 594-95. An expert who presents testimony must "employ[] in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field." *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 152 (1999).

C. The district court's analysis

In applying *Daubert* to Dr. Moreno's opinion, the district court focused on the analysis found in the case of *Downs v. Perstorp Components, Inc.*, 126 F. Supp. 2d 1090 (E.D. Tenn. 1999). The district court in *Downs* excluded the testimony of a physician who concluded that an incident involving skin contact and inhalation exposure to a polyurethane polymer caused the plaintiff to suffer "severe facial pain, sensory abnormalities, visual field losses, impaired balance, slowed reaction time, and recall-memory impairment." *Id.* at 1093. That opinion in turn relied heavily on *Moore v. Ashland Chemical Inc.*, 151 F.3d 269 (5th Cir. 1997) (en banc) (affirming a district court's exclusion of a physician's medical-causation opinion). *Downs*, 126 F. Supp. 2d at 1120-22. *Downs* also identified and considered a list of "red flags" provided by a treatise on evidence, and the district court in the present case followed suit. *Id.* at 1125-28 (citing 2 Saltzburg, Martin & Kapra, Federal Rules of Evidence Manual, 1229-37 (7th ed. 1998)).

The "red flags" that were employed by both the *Downs* court and the district court in the present case to purportedly demonstrate a lack of reliability were the following: (1) improper extrapolation, (2) reliance on anecdotal evidence, (3) reliance on temporal proximity, (4) insufficient information about the case, (5) failure to consider other possible causes, (6) lack of testing, and (7) subjectivity. *Downs*, 126 F. Supp. 2d at 1125-28; *Best*, 2008 WL 2359986 at *5-7. According to the district court below, Dr.

Moreno's opinion regarding the cause of Best's alleged loss of his sense of smell raised every red flag except number 6 (lack of testing). *Id.* at *8-9.

Specific faults perceived by the district court included Dr. Moreno's extrapolation from the chemical's ability to irritate mucous membranes to a conclusion that such irritation could lead to scarring and anosmia. *Id.* at *8. The court also faulted Dr. Moreno for relying on past experiences with patients who had been exposed to different chlorine derivatives and the "temporal proximity between the incident and the reported injury." *Id.* It next criticized Dr. Moreno for having "insufficient information about the case" because he "reli[ed] on [Best]'s general and subjective report of the accident, an examination of [Best], and the MSDS sheet." *Id.* The court then noted that Dr. Moreno was unfamiliar with Lescol, one of Best's medications, and concluded that his opinion was faulty for "failure to consider other possible causes." *Id.* In light of Dr. Moreno's testimony that testing the effects of hazardous chemicals on humans is not appropriate, the district court decided not to hold the lack of such testing against him. *Id.* Having concluded that the six other red flags were raised, however, the court held that Dr. Moreno's opinion was inadmissible "unscientific speculation." *Id.*

D. Differential diagnosis

Dr. Moreno employed a methodology known as "differential diagnosis" in forming his opinion. Differential diagnosis is "[t]he method by which a physician determines what disease process caused a patient's symptoms. The physician considers all relevant potential causes of the symptoms and then eliminates alternative causes based on a physical examination, clinical tests, and a thorough case history." *Hardyman v. Norfolk & W. Ry. Co.*, 243 F.3d 255, 260 (6th Cir. 2001) (quoting Federal Judicial Center, Reference Manual on Scientific Evidence 214 (1994)).

As described above, Dr. Moreno formed his opinion regarding Best's alleged loss of his sense of smell by considering a list of the possible causes of such an injury—"a virus, an accident, tumors to the brain, surgery into the brain, or exposure to chemicals"—as well as Best's use of medications and the possibility of another, unknown (idiopathic) cause. He took note of the temporal proximity between Best's

exposure to Aqua EZ and discovered that the pool clarifier contained a chemical that, according to the MSDS, is "irritating to the mucous membrane and upper respiratory tract" and "[m]ay be harmful if inhaled." Although Dr. Moreno was unable to quantify the level of Best's exposure, he noted that the chemical was quite concentrated—a "little bottle" is poured into a "whole swimming pool"—and relied on Best's report that the material splashed onto his face and clothing. Dr. Moreno ruled out medications as the cause, based on his knowledge of the side effects of nine out of Best's ten medications (he had no information about the tenth), and also because he had never known of a patient who had used any of the medications and developed anosmia. Finally, Dr. Moreno ruled out idiopathic anosmia because of the remote likelihood that some unknown cause would bring about anosmia "all of a sudden" around the same time as an exposure to a chemical that is known to irritate the nasal mucous membranes.

This court recognizes differential diagnosis as "an appropriate method for making a determination of causation for an individual instance of disease." *Hardyman*, 243 F.3d at 260. An "overwhelming majority of the courts of appeals" agree, and have held "that a medical opinion on causation based upon a reliable differential diagnosis is sufficiently valid to satisfy the first prong [reliability] of the Rule 702 inquiry." *Westberry v. Gislaved Gummi AB*, 178 F.3d 257, 263 (4th Cir. 1999) (collecting cases from the First, Second, Third, Ninth, and D.C. Circuits). Differential diagnosis is considered to be "a standard scientific technique of identifying the cause of a medical problem by eliminating the likely causes until the most probable one is isolated." *Hardyman*, 243 F.3d at 260 (quoting *Westberry*, 178 F.3d at 262).

The district court below did not cite *Hardyman* or any other cases that discuss the admissibility of causation opinions based on the method of differential diagnosis. Because the court did not recognize that differential diagnosis is a valid technique that often underlies reliable medical-causation testimony, its conclusions are not entitled to the deference that they would otherwise receive under the abuse-of-discretion standard of review. *See United States v. 2903 Bent Oak Highway*, 204 F.3d 658, 665 (6th Cir. 2000) (explaining that we will "extend[] a high degree of deference to the district court's

decision" under the abuse-of-discretion standard "only if the district court properly understood the pertinent law"). We will accordingly analyze Dr. Moreno's differential-diagnosis method de novo to determine whether his methodology led to a reliable, admissible opinion under Rule 702.

Not every opinion that is reached via a differential-diagnosis method will meet the standard of reliability required by *Daubert*. *See, e.g.*, *Rolen v. Hansen Beverage Co.*, 193 F. App'x 468, 474 n.4 (6th Cir. 2006) (holding that a doctor's opinion did not meet "the kind of methodological rigor that characterizes acceptable differential diagnosis"). The problem is that no case in this circuit has previously provided detailed guidance for the district courts in separating reliable differential diagnoses from unreliable ones. We find the Third Circuit's opinion in the case of *In re Paoli Railroad Yard PCB Litigation*, 35 F.3d 717 (3d Cir. 1994), instructive in this regard.

In *Paoli Railroad Yard*, the court evaluated the differential-diagnosis-based causation testimony of two physicians regarding the various ailments of a large number of plaintiffs who lived near a facility where polychlorinated biphenyls (PCBs) were used for an extended period of time. *Id.* at 732. The Third Circuit noted that "differential diagnosis generally is a technique that has widespread acceptance in the medical community, has been subject to peer review, and does not frequently lead to incorrect results." *Id.* at 758. It also emphasized the individual nature of each differential diagnosis. *Id.* ("[T]he steps a doctor has to take to make [a] (differential) diagnosis reliable are likely to vary from case to case."). As a result, the court stated that, "to the extent that a doctor utilizes standard diagnostic techniques in gathering . . . information," a finding that "the doctor's methodology is reliable" is "more likely." *Id.* Another observation by the court was that "performance of physical examinations, taking of medical histories, and employment of reliable laboratory tests all provide significant evidence of a reliable differential diagnosis," and that "their absence makes it much less likely that a differential diagnosis is reliable." *Id.* "The core of differential diagnosis is a requirement that experts at least consider alternative causes." *Id.* at 759.

We hereby adopt the following differential-diagnosis test, adapted from the Third Circuit's well-reasoned opinion: A medical-causation opinion in the form of a doctor's differential diagnosis is reliable and admissible where the doctor (1) objectively ascertains, to the extent possible, the nature of the patient's injury, *see id.* at 762 ("A physician who evaluates a patient in preparation for litigation should seek more than a patient's self-report of symptoms or illness and . . . should . . . determine that a patient is ill and what illness the patient has contracted."), (2) "rules in" one or more causes of the injury using a valid methodology, and (3) engages in "standard diagnostic techniques by which doctors normally rule out alternative causes" to reach a conclusion as to which cause is most likely. *Id.* at 760.

In connection with the third "rules out" prong, if the doctor "engage[s] in very few standard diagnostic techniques by which doctors normally rule out alternative causes," the doctor must offer a "good explanation as to why his or her conclusion remain[s] reliable." *Id.* Similarly, the doctor must provide a reasonable explanation as to why "he or she has concluded that [any alternative cause suggested by the defense] was not the sole cause." *Id.* at 758 n.27.

Our approach is similar to those employed in other circuits that recognize differential diagnosis as a valid basis for medical-causation opinions. *See, e.g.*, *Ruggiero v. Warner-Lambert Co.*, 424 F.3d 249, 254 (2d Cir. 2005) ("Where an expert employs differential diagnosis to 'rule out' other potential causes for the injury at issue, he must also 'rule in' the suspected cause, and do so using scientifically valid methodology." (internal quotation marks omitted)); *Glastetter v. Novartis Pharm. Corp.*, 252 F.3d 986, 989 (8th Cir. 2001) ("In performing a differential diagnosis, a physician begins by 'ruling in' all scientifically plausible causes of the plaintiff's injury. The physician then 'rules out' the least plausible causes of injury until the most likely cause remains.").

E. Dr. Moreno's opinion was sufficiently reliable to warrant admissibility

Applying our newly formulated test to Dr. Moreno's opinion, we conclude that his methodology meets the minimum threshold for admissibility. We consider each element of the differential-diagnosis test in turn.

1. Dr. Moreno ascertained, to the extent possible, that Best is anosmic

Dr. Moreno employed a well-recognized test—the UPSIT—to confirm Best's complaint that he could not smell. Based on the research that Dr. Moreno had done regarding tests for anosmia, he concluded that the UPSIT is "as objective as you're ever going to get." Lowe's has made no attempt to discredit that test.

Instead, Lowe's argues that Dr. Moreno had never before administered the UPSIT and that Best's score was only one point outside the range for malingering, suggesting that Best purposely manipulated the result. Lowe's also points out that when Best took the UPSIT, Dr. Moreno possessed conflicting information about Best's smoking habits—a factor that the doctor knew could affect the test results. In addition, Lowe's complains that Dr. Moreno did not examine the record of Best's visit to the hospital's emergency room, during which Best allegedly stated that he did not inhale the Aqua EZ. But Best also reported at that time that the chemical spilled on his face and clothing, and he described its strong odor. Dr. Moreno accordingly observed that he "would have to assume that regardless of the statements made that [Best] had to have had some exposure."

All of Lowe's attacks on Dr. Moreno's efforts to ascertain whether Best is anosmic amount to factual disputes suitable for cross-examination. *See Daubert*, 509 U.S. at 596 ("Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence."). Where, as here, a doctor has used a reliable method to conclude that the plaintiff has suffered an injury, potential problems such as those pointed out by Lowe's do not warrant the total exclusion of plainly relevant testimony.

2. Dr. Moreno employed a valid methodology to "rule in" Aqua EZ as a potential cause

Based on his medical knowledge, Dr. Moreno compiled a list of possible causes for the injury, including virus, accident, brain tumor, brain surgery, exposure to chemicals, medications, or an ideopathic (unknown) cause. Lowe's strongest argument is that no published material confirms that inhalation of the chemical in Aqua EZ can cause anosmia. But "there is no requirement that a medical expert must always cite published studies on general causation in order to reliably conclude that a particular object caused a particular illness." *Kudabeck v. Kroger Co.*, 338 F.3d 856, 862 (8th Cir. 2003) (internal quotation marks omitted). Dr. Moreno did not arbitrarily "rule in" Aqua EZ as a potential cause, but instead concluded from the MSDS sheet and his own knowledge of medicine and chemistry that the chemical it contains can cause damage to the nasal and sinus mucosa upon inhalation.

In addition, Dr. Moreno has treated other patients who developed anosmic symptoms after inhaling chlorine derivatives. The opinion presented by Dr. Moreno thus differs markedly from those in cases like *Ruggiero v. Warner-Lambert Co.*, 424 F.3d 249, 254 (2d Cir. 2005), where the Second Circuit excluded a doctor's opinion that a particular diabetes medication could cause liver cirrhosis and death because the expert could not point to *anything* suggesting such a possibility. *Id.* at 251-52.

Another Second Circuit case, *McCullock v. H.B. Fuller Co.*, 61 F.3d 1038 (2d Cir. 1995), comes much closer to the circumstances in the present case. In *McCullock*, the plaintiff developed throat polyps after being exposed to hot-glue fumes. *Id.* at 1040-41. Her treating physician, "an experienced medical doctor . . . certified by the American Board of Otolaryngology," opined that the plaintiff's polyps resulted from "inhalation of the fumes from the hot-glue pot." *Id.* at 1042-43. The MSDS sheet for the hot glue at issue in *McCullock* contained similar warnings to those in this case, including: "Avoid breathing vapors/fumes," and "Vapors and fumes may cause irritation of the nose, throat and respiratory tract." *Id.* at 1040. Despite the defendant's insistence that the expert "could not point to a single piece of medical literature that says glue fumes cause throat polyps," *id.* at 1043, the court admitted the doctor's testimony, citing

in support the doctor's "review of [the] MSDS" and his "training and experience," among other things. *Id.* at 1044. Dr. Moreno's testimony should likewise be admitted here.

3. Dr. Moreno engaged in standard techniques to "rule out" alternate causes

Having no evidence that virus, accident, brain tumor, or brain surgery were applicable in Best's case, Dr. Moreno focused on chemicals, medications, or ideopathic causes. Dr. Moreno concluded, based on his own experience, that an ideopathic anosmia would not appear over such a short period of time. He also eliminated nine of Best's ten medications as potential causes of anosmia.

Lowe's makes much of Dr. Moreno's failure to eliminate Lescol as a possible cause. But doctors need not rule out every conceivable cause in order for their differential-diagnosis-based opinions to be admissible. *E.g.*, *Westberry v. Gislaved Gummi AB*, 178 F.3d 257, 266 (4th Cir. 1999) (citing *In re Paoli R.R. Yard PCB Litig.*, 35 F.3d 717, 764-65 (3d Cir. 1994)). Lowe's presented no evidence that Lescol might cause anosmia. If such evidence exists, or if Dr. Moreno failed to consider some other likely cause, Lowe's is free to attack Dr. Moreno's opinion on that basis at trial.

Admissibility under Rule 702 does not require perfect methodology. Rather, the expert must "employ[] in the courtroom the same level of intellectual rigor that characterizes the practice of an expert in the relevant field." *Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 152 (1999). Dr. Moreno's diagnosis might not stand up to exacting scrutiny if he were testifying as a research scientist or a chemist, but he is neither of those. He performed as a competent, intellectually rigorous treating physician in identifying the most likely cause of Best's injury. Any weaknesses in his methodology will affect the weight that his opinion is given at trial, but not its threshold admissibility. *See, e.g.*, *Kudabeck v. Kroger Co.*, 338 F.3d 856, 861-62 (8th Cir. 2003) ("[A]ttacks regarding the completeness of [a doctor's] methodology go to the weight and not the admissibility of his testimony."); *Heller v. Shaw Indus., Inc.*, 167 F.3d 146, 157 (3d Cir. 1999) (describing a case in which the "district court erred in excluding expert

medical testimony because a defendant's suggested alternative causes (once adequately addressed by plaintiff's expert) affect the weight that the jury should give the expert's testimony and not the admissibility of that testimony").

F. Dr. Moreno's opinion is distinguishable from differential-diagnosis opinions that have been excluded in other cases

A review of several cases in which differential-diagnosis testimony has been excluded further solidifies our conclusion that Dr. Moreno's opinion falls on the admissible side of the elusive line separating reliable opinions from "junk science." In particular, we believe that the case of *Downs v. Perstorp Components, Inc.*, 126 F. Supp. 2d 1090 (E.D. Tenn. 1999), upon which the district court heavily relied, is materially distinguishable. For starters, the court in *Downs* gave great weight to *Moore v. Ashland Chemical Inc.*, 151 F.3d 269 (5th Cir. 1997) (en banc), a case that takes a minority position by implicitly rejecting the validity of differential diagnosis in the formulation of medical-causation opinions. *See Westberry*, 178 F.3d at 263 (contrasting the exclusion of a causation opinion in *Moore* with opinions from several other circuits that recognize differential diagnosis as a reliable methodology). Reliance on *Moore* by the district court in *Downs* was thus misplaced in light of *Glaser v. Thompson Medical Co.*, 32 F.3d 969, 977 (6th Cir. 1994), which explicitly recognized the admissibility of properly developed differential-diagnosis opinions in this circuit.

Moreover, under a proper differential-diagnosis analysis, the opinion offered by the expert in *Downs* differs from Dr. Moreno's opinion in several key ways. In *Downs*, Dr. Kilburn was the plaintiff's expert who concluded that the plaintiff had suffered severe brain damage as a result of a single exposure to a polyurethane polymer. 126 F. Supp. 2d at 1093. The defense presented voluminous testimony from other experts that Dr. Kilburn's methods of testing the plaintiff for injury were novel and not generally accepted in the neuropsychological community. *Id.* at 1108-15. These competing experts concluded, based on their own tests, that the plaintiff had no neurological impairment that could have resulted from the chemical exposure. *Id.*

Dr. Kilburn therefore did not follow a reliable method to ascertain the nature of the plaintiff's injury, and he had no reliable information with which to "rule in" chemical exposure as a potential cause. He was not able to say which component of the chemical product might have caused the injury, or point to any objective source suggesting that such an injury might result from exposure to any component of the chemical mixture at issue. *Id.* at 1098. Dr. Kilburn had access to MSDS sheets describing the components of the chemical, but he did not read them. *Id.* at 1108. And testimony from Dr. Kilburn had previously been excluded in at least six other toxic-tort cases. *Id.* at 1093.

Dr. Moreno's testimony here is far stronger than the testimony of Dr. Kilburn in *Downs*. His analysis also materially contrasts with that of experts whose differential-diagnosis testimony has been excluded in earlier Sixth Circuit cases. In *Conde v. Velsicol Chemical Corp.*, 24 F.3d 809 (6th Cir. 1994), for example, Dr. James Conde was a general practitioner and the lead plaintiff in the case. *Id.* at 813. He testified that chlordane, a termiticide that was applied to the basement of his home, caused various ailments in himself and his family members. *Id.* Dr. Conde's opinion was discredited because "[n]ineteen epidemiologic studies in humans ha[d] found little evidence of long-term adverse health effects from chlordane doses hundreds of times higher than those the Condes were subjected to under a worst-case scenario." *Id.* at 813-14.

The three remaining causation experts offered by the plaintiffs in *Conde* were "non-medical doctors unqualified to render differential diagnoses of medical conditions." *Id.* at 813. Their opinions were not admitted because they were "unable to exclude other potential causes for [the plantiffs'] symptoms, and their theories [were] inconsistent with the negative chlordane test results on the Condes' tissue and the vast majority of the relevant, peer-reviewed scientific literature." *Id.* at 814. Although Dr. Moreno did not provide any study concluding that Aqua EZ can cause anosmia, he did discover that it could damage nasal and sinus mucosa. The record reveals no studies comparable to those in *Conde* that discredit Dr. Moreno's reasonable conclusion that a chemical insult to the sinuses can lead to anosmia.

Two unpublished Sixth Circuit cases that excluded medical-causation testimony founded upon differential diagnoses are also distinguishable. One of these is *Rolen v. Hansen Beverage Co.*, 193 F. App'x 468 (6th Cir. 2006), where a doctor opined that a juice drink manufactured by the defendant had caused the plaintiff's stomach problems. The doctor employed a differential diagnosis, but presented no evidence that the juice drink was harmful in any way other than the fact that the plaintiff fell ill shortly after consuming it. *Id.* at 470-71. This conclusion was extremely dubious in light of the fact that, despite ample opportunity to do so, the plaintiff had not tested the drink in question for bacteria. The defendant had a juice box from the same batch (provided by the plaintiffs) tested by an independent laboratory, which concluded that it contained "no organisms of public health concern." *Id.* at 469-70.

Kolesar v. United Agriproducts, Inc., 246 F. App'x 977 (6th Cir. 2007), is the other unpublished case involving a differential-diagnosis opinion that fell short of the one developed by Dr. Moreno. In that case, the testifying physician opined that a chemical spill caused the plaintiff's Reactive Airways Dysfunction Syndrome (RADS). *Id.* at 979. But the plaintiff suffered from asthma and a serious preexisting "smoker's cough"—possible causes of RADS that the doctor did not consider. *Id.* at 981. No such unconsidered alternative causes of Best's alleged anosmia have been identified in the case before us.

Lowe's has pointed to several potential problems with Dr. Moreno's expert opinion. But our function is not to determine whether the opinion is airtight and conclusively proves the cause of Best's anosmia. Rather, the court's role as gatekeeper is to decide whether Dr. Moreno performed his duties as a diagnosing physician to the professional level expected in his field. *See Kumho Tire Co. v. Carmichael*, 526 U.S. 137, 152 (1999). In light of this standard, we conclude that Dr. Moreno's differential-diagnosis testimony meets the threshold level of admissibility under *Daubert*.

G. Need for medical expert testimony

We further note that, even without Dr. Moreno's expert testimony, summary judgment might be inappropriate in this case in light of this court's recent decision in *Gass v. Marriott Hotel Services*, 558 F.3d 419, 434 (6th Cir. 2009) (holding that expert testimony was not required to prove the causation element of a negligence case where the plaintiffs were allegedly exposed to pesticides and immediately developed respiratory injuries). Because we conclude that Dr. Moreno's opinion is admissible, however, we have no need to decide whether the holding in *Gass* is applicable to the present case.

III. CONCLUSION

For all of the reasons set forth above, we **REVERSE** the judgment of the district court and **REMAND** the case for further proceedings consistent with this opinion.