Filed: June 8, 1999

UNITED STATES COURT OF APPEALS

FOR THE FOURTH CIRCUIT

Nos. 98-1540(L)
(CA-97-562-8-13)

James Curtis Westberry,

Plaintiff - Appellee,

versus

Gislaved Gummi AB,

Defendant - Appellant.

O R D E R

The court amends its opinion filed May 20, 1999, as follows:

On page 2, section 4, line 8 -- counsel's name is corrected to read "Joseph M. Pracht."

For the Court - By Direction

/s/ Patricia S. Connor
Clerk

PUBLISHED

UNITED STATES COURT OF APPEALS

FOR THE FOURTH CIRCUIT

JAMES CURTIS WESTBERRY,
Plaintiff-Appellee,

and

CONNIE RENA WESTBERRY,
Plaintiff,

v. No. 98-1540

GISLAVED GUMMI AB,
Defendant-Appellant,

and

MATAKI KEMI AB,
Defendant.

CONNIE RENA WESTBERRY,
Plaintiff-Appellant,

and

JAMES CURTIS WESTBERRY,
Plaintiff,

v. No. 98-1587

GISLAVED GUMMI AB,
Defendant-Appellee,

and

MATAKI KEMI AB,
Defendant.

Appeals from the United States District Court
for the District of South Carolina, at Anderson.
G. Ross Anderson, Jr., District Judge.
(CA-97-562-8-13)

Argued: March 3, 1999

Decided: May 20, 1999

Before WILKINS and WILLIAMS, Circuit Judges, and
LEE, United States District Judge for the
Eastern District of Virginia, sitting by designation.

Affirmed by published opinion. Judge Wilkins wrote the opinion, in which Judge Williams and Judge Lee joined.

COUNSEL

ARGUED: Russell Thomas Burke, NEXSEN, PRUET, JACOBS & POLLARD, Columbia, South Carolina, for Appellant. James William Logan, Jr., LOGAN, JOLLY & SMITH, L.L.P., Anderson, South Carolina, for Appellee. **ON BRIEF:** Edward Raymond Moore, III, NEXSEN, PRUET, JACOBS & POLLARD, Columbia, South Carolina, for Appellant. James D. Jolly, Jr., LOGAN, JOLLY & SMITH, L.L.P., Anderson, South Carolina; John R. McCravy, III, MCCRAVY LAW FIRM, Greenwood, South Carolina; Joseph M. Pracht, PRACHT & WYNDHAM, Greenwood, South Carolina, for Appellee.

OPINION

WILKINS, Circuit Judge:

James Curtis and Connie Rena Westberry brought this action against Gislaved Gummi AB (GGAB), claiming that GGAB was liable under South Carolina law for damages the Westberrys suffered as a result of the company's failure to warn of the danger of the talcum powder (talc) lubricant GGAB placed on rubber gaskets it manufactured. GGAB presently appeals the judgment against it following a jury verdict in favor of the Westberrys, and Mrs. Westberry cross

appeals the refusal of the district court to grant an additur or a new trial on the issue of her damages. We affirm.

I.

GGAB manufactured rubber products, including rubber gaskets used in window frames. Westberry's employer purchased gaskets produced by GGAB for use in manufacturing skylights and windows in the Greenwood, South Carolina plant where Westberry was employed. Because the rubber gaskets were difficult to handle without a protective lubricant, GGAB applied a coating of talc to the gaskets prior to shipping.

Westberry's first duties in the plant involved working on a production line adjacent to the area where the GGAB gaskets were cut. In January 1994, he changed to the position of gasket cutter, which required him to remove the gaskets from their boxes and to place them in the cutting machine. Although the evidence was conflicting, Westberry testified that these duties brought him into contact with high concentrations of airborne talc. Westberry received no warning that talc could be dangerous, and he wore no protective gear when performing his duties as a gasket cutter.

Following his change to the position of gasket cutter, Westberry began to experience unrelenting sinus problems. He was hospitalized for four days in July 1994 with a severe sinus infection and was treated with antibiotics by his physician, Dr. W. David Isenhower, Jr. Beginning in September 1994, Westberry underwent several sinus surgeries in an attempt to alleviate his sinus pain, including a procedure in which his frontal sinuses were obliterated.

Westberry brought the present action against GGAB, claiming that its failure to warn him of the dangers of breathing airborne talc proximately caused the aggravation of his pre-existing sinus condition. He alleged causes of action sounding in strict liability, breach of warranty, and negligence. Following a trial at which Westberry's treating physician, Dr. Isenhower, provided the principal evidence of causation, the jury returned a verdict in favor of Westberry. Although GGAB challenges the judgment on a number of grounds, the only one warranting extended discussion is its contention that the district court

abused its discretion in admitting the opinion testimony of Dr. Isenhower concerning the cause of Westberry's sinus problems.

II.

The introduction of expert opinion testimony is governed by Federal Rule of Evidence 702, which provides:

> 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 ... may testify thereto in the form of an opinion or otherwise.

Expert testimony is admissible under Rule 702, then, if it concerns (1) scientific, technical, or other specialized knowledge that (2) will aid the jury or other trier of fact to understand or resolve a fact at issue. See Daubert v. Merrell Dow Pharms., Inc., 509 U.S. 579, 592 (1993). The first prong of this inquiry necessitates an examination of whether the reasoning or methodology underlying the expert's proffered opinion is reliable--that is, whether it is supported by adequate validation to render it trustworthy. See id. at 590 & n.9. The second prong of the inquiry requires an analysis of whether the opinion is relevant to the facts at issue. See id. at 591-92. Thus, an expert's testimony is admissible under Rule 702 if it "rests on a reliable foundation and is relevant." Kumho Tire Co. v. Carmichael, 119 S. Ct. 1167, 1171 (1999) (internal quotation marks omitted).

A district court considering the admissibility of expert testimony exercises a gatekeeping function to assess whether the proffered evidence is sufficiently reliable and relevant. See id. at 1174. The inquiry to be undertaken by the district court is "a flexible one" focusing on the "principles and methodology" employed by the expert, not on the conclusions reached. Daubert, 509 U.S. at 594-95. In making its initial determination of whether proffered testimony is sufficiently reliable, the court has broad latitude to consider whatever factors bearing on validity that the court finds to be useful; the particular factors will depend upon the unique circumstances of the expert testimony involved. See Kumho Tire Co., 119 S. Ct. at 1175-76.**1** The court,

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1 Some factors that may be valuable tools in assessing the reliability of an expert's opinion are whether the reasoning or methodology underly-

however, should be conscious of two guiding, and sometimes competing, principles. On the one hand, the court should be mindful that Rule 702 was intended to liberalize the introduction of relevant expert evidence. See Cavallo v. Star Enter., 100 F.3d 1150, 1158-59 (4th Cir. 1996). And, the court need not determine that the expert testimony a litigant seeks to offer into evidence is irrefutable or certainly correct. See id. As with all other admissible evidence, expert testimony is subject to being tested by "[v]igorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof." Daubert, 509 U.S. at 596. On the other hand, the court must recognize that due to the difficulty of evaluating their testimony, expert witnesses have the potential to "be both powerful and quite misleading." Id. at 595 (internal quotation marks omitted). And, given the potential persuasiveness of expert testimony, proffered evidence that has a greater potential to mislead than to enlighten should be excluded. See United States v. Dorsey, 45 F.3d 809, 815-16 (4th Cir. 1995).

This court reviews the decision of a district court to admit or exclude evidence for an abuse of discretion. See General Elec. Co. v. Joiner, 522 U.S. 136, 139 (1997). A district court abuses its discretion if its conclusion is guided by erroneous legal principles, see Koon v. United States, 518 U.S. 81, 100 (1996), or rests upon a clearly erroneous factual finding, see United States v. Barber, 119 F.3d 276, 283 (4th Cir.) (en banc), cert. denied, 118 S. Ct. 457 (1997). Further, even if a district court applies the correct legal principles to adequately supported facts, the discretion of the trial court is not boundless and subject to automatic affirmance. See Wilson v. Volkswagen of Am., Inc., 561 F.2d 494, 506 (4th Cir. 1977) (noting "that an appellate court would be remiss in [its] duties if [it] chose only to rubber stamp ... orders of lower courts" (internal quotation marks omitted) (first & second alterations in original)). This court is obligated to review the record and reasons offered by the district court and to reverse if the

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ing the expert's opinion has been or could be tested; whether the reasoning or methodology has been subject to peer review and publication; the known or potential rate of error; and the level of acceptance of the reasoning or methodology by the relevant professional community. See Kumho Tire Co., 119 S. Ct. at 1175-76; Daubert, 509 U.S. at 593-94.

"court has a definite and firm conviction that the court below committed a clear error of judgment in the conclusion it reached upon a weighing of the relevant factors." Id. With these principles in mind, we turn to a consideration of the decision of the district court to permit Dr. Isenhower to testify that in his opinion the sinus problems experienced by Westberry were caused by the inhalation of airborne talc in the workplace.

A.

GGAB argues that the district court erred in failing to undertake a determination of the reliability and relevance of the evidence as required by Rule 702 because it believed such an analysis was applicable only to novel scientific opinions. We agree. As the Supreme Court recently made clear, the obligation of a district court to determine whether expert testimony is reliable and relevant prior to admission applies to all expert testimony. See Kumho Tire Co., 119 S. Ct. at 1174. Nevertheless, because we can affirm the evidentiary ruling of the district court on a ground different from that employed below, we consider whether Dr. Isenhower's testimony was sufficiently reliable and relevant to warrant admission. See Dorsey, 45 F.3d at 814 (concluding that decision of district court to exclude expert testimony was proper despite failure of district court to conduct analysis of reliability and relevance required by Rule 702).

B.

GGAB contends that Dr. Isenhower's testimony was inadmissible because it was not based on reliable scientific methodology. This is so, it argues, because Dr. Isenhower had no epidemiological studies, no peer-reviewed published studies, no animal studies, and no laboratory data to support a conclusion that the inhalation of talc caused Westberry's sinus disease. Further, GGAB continues, Dr. Isenhower did not have any tissue samples indicating that talc was found in Westberry's sinuses, nor did he have studies showing that talc, at any threshold level, causes sinus disease. Instead, Dr. Isenhower merely relied on a differential diagnosis--supported in part by the temporal relationship between Westberry's exposure to talc and the problems he experienced with his sinuses--in reaching the conclusion that Westberry's sinus problems were caused by his exposure to talc from

GGAB's gaskets. GGAB maintains that neither a differential diagnosis nor a temporal relationship between exposure and onset or worsening of symptoms is sufficient to establish the reliability of Dr. Isenhower's opinion. We disagree.

Differential diagnosis, or differential etiology, is a standard scientific technique of identifying the cause of a medical problem by eliminating the likely causes until the most probable one is isolated. See Baker v. Dalkon Shield Claimants Trust, 156 F.3d 248, 252-53 (1st Cir. 1998). A reliable differential diagnosis typically, though not invariably, is performed after "physical examinations, the taking of medical histories, and the review of clinical tests, including laboratory tests," and generally is accomplished by determining the possible causes for the patient's symptoms and then eliminating each of these potential causes until reaching one that cannot be ruled out or determining which of those that cannot be excluded is the most likely. Kannankeril v. Terminix Int'l, Inc., 128 F.3d 802, 807 (3d Cir. 1997) (explaining that "[d]ifferential diagnosis is defined for physicians as `the determination of which of two or more diseases with similar symptoms is the one from which the patient is suffering, by a systematic comparison and contrasting of the clinical findings'" (quoting Stedman's Medical Dictionary 428 (25th ed. 1990)); see McCullock v. H.B. Fuller Co., 61 F.3d 1038, 1044 (2d Cir. 1995) (describing differential etiology as an analysis "which requires listing possible causes, then eliminating all causes but one"); Glaser v. Thompson Med. Co., 32 F.3d 969, 978 (6th Cir. 1994) (recognizing that differential diagnosis is "a standard diagnostic tool used by medical professionals to diagnose the most likely cause or causes of illness, injury and disease"). This technique "has widespread acceptance in the medical community, has been subject to peer review, and does not frequently lead to incorrect results." Brown v. Southeastern Penn. Transp. Auth. (In re Paoli R.R. Yard PCB Litig.), 35 F.3d 717, 758 (3d Cir. 1994); see Heller v. Shaw Indus., Inc., 167 F.3d 146, 154-55 (3d Cir. 1999) (noting "that differential diagnosis consists of a testable hypothesis, has been peer reviewed, contains standards for controlling its operation, is generally accepted, and is used outside of the judicial context" (internal quotation marks omitted)). We previously have upheld the admission of an expert opinion on causation based upon a differential diagnosis. See Benedi v. McNeil-P.P.C., Inc., 66 F.3d 1378, 1383-85 (4th Cir. 1995) (holding that expert testimony by

treating physician concerning cause of plaintiff's liver failure--acetaminophen combined with alcohol--was admissible despite the lack of epidemiological data). And, the overwhelming majority of the courts of appeals that have addressed the issue have held that a medical opinion on causation based upon a reliable differential diagnosis is sufficiently valid to satisfy the first prong of the Rule 702 inquiry. Compare Heller, 167 F.3d at 154, 156-57 (concluding that a proper differential diagnosis is adequate to support expert medical opinion on causation), Kennedy v. Collagen Corp., 161 F.3d 1226, 1228-30 (9th Cir. 1998) (holding district court abused its discretion in excluding an expert opinion on causation based upon a reliable differential diagnosis), cert. denied, 67 U.S.L.W. 3570 (U.S. May 3, 1999) (No. 98-1424), Baker, 156 F.3d at 252-53 (determining that a differential diagnosis rendered expert opinion on causation sufficiently reliable for admission), Zuchowicz v. United States, 140 F.3d 381, 385-87 (2d Cir. 1998) (upholding determination that expert opinion was reliable in part based on differential diagnosis), and Ambrosini v. Labarraque, 101 F.3d 129, 140-41 (D.C. Cir. 1996) (holding that because expert opinion was based on differential diagnosis, district court abused its discretion in refusing to admit it), with Moore v. Ashland Chem., Inc., 151 F.3d 269, 277-79 (5th Cir. 1998) (en banc) (concluding that district court did not abuse its discretion in rejecting expert opinion on causation without discussing why differential diagnosis was insufficient to support admission of opinion into evidence), cert. denied, 67 U.S.L.W. 3443 (U.S. Apr. 19, 1999) (No. 98-992). Thus, we hold that a reliable differential diagnosis provides a valid foundation for an expert opinion.

C.

GGAB next maintains that, assuming a differential diagnosis may provide a trustworthy foundation for an opinion on causation, Dr. Isenhower's differential diagnosis did not. According to GGAB, Dr. Isenhower's differential diagnosis was unreliable because he could not "rule in" talc as a possible cause of sinus disease. See Raynor v. Merrell Pharms., Inc., 104 F.3d 1371, 1374-76 (D.C. Cir. 1997) (holding that expert opinion that exposure to Bendectin caused birth defects based in part on differential diagnosis was not admissible in light of "overwhelming body of contradictory epidemiological evidence" (internal quotation marks omitted)). Further, GGAB contends

that Dr. Isenhower's differential diagnosis was not reliable because he failed to "rule out" all other possible causes.

GGAB asserts that Dr. Isenhower could not "rule in" talc because he had no means of accurately assessing what level of exposure was adequate to produce the sinus irritation Westberry experienced. In order to carry the burden of proving a plaintiff's injury was caused by exposure to a specified substance, the "plaintiff must demonstrate `the levels of exposure that are hazardous to human beings generally as well as the plaintiff's actual level of exposure.'" Mitchell v. Gencorp Inc., 165 F.3d 778, 781 (10th Cir. 1999) (quoting Wright v. Willamette Indus., Inc., 91 F.3d 1105, 1106 (8th Cir. 1996)); see Allen v. Pennsylvania Eng'g Corp., 102 F.3d 194, 199 (5th Cir. 1996) (concluding that "[s]cientific knowledge of the harmful level of exposure to a chemical, plus knowledge that the plaintiff was exposed to such quantities, are minimal facts necessary to sustain the plaintiffs' burden in a toxic tort case"); cf. Black v. Food Lion, Inc., 171 F.3d 308, 314 (5th Cir. 1999) (explaining that "[t]he underlying predicates of any cause-and-effect medical testimony are that medical science understands the physiological process by which a particular disease or syndrome develops and knows what factors cause the process to occur"). But, it must also be recognized that

> [o]nly rarely are humans exposed to chemicals in a manner that permits a quantitative determination of adverse outcomes.... Human exposure occurs most frequently in occupational settings where workers are exposed to industrial chemicals like lead or asbestos; however, even under these circumstances, it is usually difficult, if not impossible, to quantify the amount of exposure.

Federal Judicial Center, Reference Manual on Scientific Evidence 187 (1994). Consequently, while precise information concerning the exposure necessary to cause specific harm to humans and exact details pertaining to the plaintiff's exposure are beneficial, such evidence is not always available, or necessary, to demonstrate that a substance is toxic to humans given substantial exposure and need not invariably provide the basis for an expert's opinion on causation. See Heller, 167 F.3d at 157 (noting "that even absent hard evidence of the level of

exposure to the chemical in question, a medical expert could offer an opinion that the chemical caused plaintiff's illness").

Although GGAB is correct that Dr. Isenhower had no scientific literature on which to rely to "rule in" talc as a possible basis for Westberry's sinus condition, it was undisputed that inhalation of high levels of talc irritates mucous membranes.**2** The Material Safety Data Sheet (MSDS) for talc provided by GGAB for Dr. Isenhower's examination provided that "[i]nhalation of dust in high concentrations irritates mucous membranes," J.A. 659, and it is undisputed that sinuses are mucous membranes. Further, although Dr. Isenhower did not point to Westberry's exposure to a specific level of airborne talc, there was evidence of a substantial exposure. Westberry testified that he was exposed to very high levels of airborne talc throughout his workday. According to his testimony, when he removed the gaskets from the box in which they had been shipped, the gaskets, which were black, had so much talc on them that they appeared to be white or gray. And, talc was released into the air as the gaskets went through the cutting machines. Westberry testified that the talc that settled from the air around his work area was so thick that one could see footprints in it on the floor. He further stated that he worked in clouds of talc and that it covered him and his clothes. Moreover, at the close of his workday Westberry was required to blow off his work area and machinery with a blower, stirring up all of the talc that had fallen. This testimony concerning the level of airborne talc was adequate to permit a factfinder to conclude that Westberry was exposed to high concentrations of airborne talc, and there was no dispute that exposure to high concentrations of airborne talc could cause irritation to mucous membranes. Indeed, GGAB's expert conceded on cross-examination that if the levels of airborne talc were those testified to by Westberry (and relied upon by Dr. Isenhower), his own opinion that talc did not cause Westberry's sinus problems would change. Thus, this clearly is not a case in which the plaintiff was unable to

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2 Indeed, during opening argument counsel for GGAB, in stressing to the jury that the principal issue for it to decide was the amount of airborne talc to which Westberry was exposed, stated, "The question is, how much talc got in the air? If there was a lot of talc, then yeah, it could cause some kind of problem with mucous membranes. But there wasn't a whole lot of talc." J.A. 69.

establish any substantial exposure to the allegedly defective product. Cf. Wintz v. Northrop Corp., 110 F.3d 508, 512-14 (7th Cir. 1997) (holding that expert opinion was not reliable when expert formed opinion that in utero exposure to bromide caused birth defects, but expert had no information concerning the mother's work environment or her exposure to bromide); Allen, 102 F.3d at 199 (concluding that expert opinion that plaintiff's brain cancer was caused by exposure to ethylene oxide in his hospital workplace was not sufficiently reliable to support admissibility when "experts' background information concerning [plaintiff's] exposure to [chemical was] so sadly lacking as to be mere guesswork").

Additionally, Dr. Isenhower testified that he relied in part on the temporal proximity of Westberry's exposure to talc in his workplace to the onset and worsening of Westberry's sinus problems to conclude that talc was the cause. GGAB makes no serious argument that a strong temporal relationship between Westberry's exposure to talc and his sinus disease did not exist, but contends that the temporal relationship between Westberry's exposure to talc and his sinus problems was not a proper basis for an expert opinion on causation. Again, we disagree.

Of course, the mere fact that two events correspond in time does not mean that the two necessarily are related in any causative fashion. See Heller, 167 F.3d at 154. But, depending on the circumstances, a temporal relationship between exposure to a substance and the onset of a disease or a worsening of symptoms can provide compelling evidence of causation. See id.; Zuchowicz, 140 F.3d at 385, 390; Cavallo v. Star Enter., 892 F. Supp. 756, 774 (E.D. Va. 1995) (explaining that "there may be instances where the temporal connection between exposure to a given chemical and subsequent injury is so compelling as to dispense with the need for reliance on standard methods of toxicology," for example, if one were exposed to a substantial amount of "chemical X and immediately thereafter developed symptom Y"); see also 2 Stephen A. Saltzburg et al., Federal Rules of Evidence Manual 1233-34 (7th ed. 1998). But see Moore, 151 F.3d at 278 (holding that "[i]n the absence of an established scientific connection between exposure and illness, or compelling circumstances such as those discussed in Cavallo, the temporal connection between exposure to

chemicals and an onset of symptoms, standing alone, is entitled to little weight").

Here, Dr. Isenhower testified that Westberry's sinus disease began shortly after Westberry began working as a gasket cutter. Furthermore, during the time he was treating Westberry, Dr. Isenhower experimented with keeping Westberry out of work and noticed that his sinus condition improved when he was not working but worsened when he returned. Under these circumstances, we conclude that the temporal relationship between Westberry's exposure and the onset and worsening of his sinus disease provided support for Dr. Isenhower's opinion that talc was the source of the problem.

GGAB also argues that Dr. Isenhower's differential diagnosis was unreliable because he failed to "rule out" all potential causes other than talc because he did not explain why a cold Westberry developed in May 1994 and water skiing he did over the summer of 1994 could not have accounted for his sinus problems. A differential diagnosis that fails to take serious account of other potential causes may be so lacking that it cannot provide a reliable basis for an opinion on causation. See In re Paoli R.R. Yard PCB Litig., 35 F.3d at 758-61. However, "[a] medical expert's causation conclusion should not be excluded because he or she has failed to rule out every possible alternative cause of a plaintiff's illness." Heller, 167 F.3d at 156. The alternative causes suggested by a defendant "affect the weight that the jury should give the expert's testimony and not the admissibility of that testimony," id. at 157, unless the expert can offer "no explanation for why she has concluded [an alternative cause offered by the opposing party] was not the sole cause," id. at 156. See also Kannankeril, 128 F.3d at 808 (explaining that "[i]n attacking the differential diagnosis performed by the plaintiff's expert, the defendant may point to a plausible cause of the plaintiff's illness other than the defendant's actions" and "[i]t then becomes necessary for the plaintiff's experts to offer a good explanation as to why his or her conclusion remains reliable"); McCullock, 61 F.3d at 1044 (recognizing that perceived faults in doctor's differential diagnosis are matters for cross-examination that do not affect admissibility); In re Paoli R.R. Yard PCB Litig., 35 F.3d at 764-65 (recognizing that failure to account for all possible causes does not render expert opinion based on differential diagnosis inadmissible; only if expert utterly fails to consider

alternative causes or fails to explain why the opinion remains sound in light of alternative causes suggested by the opposing party is expert's opinion unreliable for failure to account for all potential causes).

Dr. Isenhower's testimony made clear that he considered and excluded other potential causes for Westberry's sinus disease. Furthermore, on cross-examination Dr. Isenhower explained why he did not believe that the cold Westberry developed in 1994 or the water skiing he did over that summer accounted for his sinus problems. Accordingly, Dr. Isenhower's alleged failure to account for all possible alternative causes for Westberry's sinus problems did not prohibit the admissibility of his opinion as to causation.

III.

In sum, we reject GGAB's contention that Dr. Isenhower's testimony was invalid and untrustworthy. A reliable differential diagnosis provides a valid basis for an expert opinion on causation. And, Dr. Isenhower's differential diagnosis was sufficiently reliable. Because Dr. Isenhower's testimony satisfied the reliability and relevance standards of Rule 702, the district court properly admitted this testimony.**3**

AFFIRMED

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3 Having carefully considered the remaining issues advanced by GGAB and Mrs. Westberry, we find them to be without merit.