REVISED, September 8, 1998

UNITED STATES COURT OF APPEALS
for the Fifth Circuit

No. 95-20492

BOB T. MOORE; SUSAN MOORE,

Plaintiffs-Appellants
Cross-Appellees,

VERSUS

ASHLAND CHEMICAL INC.; ASHLAND OIL INC.,

Defendants-Appellees
Cross-Appellees,

AND

DOW CORNING CORPORATION; CDC SERVICES, INC.,

Defendants.

Appeals from the United States District Court
for the Southern District of Texas

August 14, 1998

Before KING, JOLLY, HIGGINBOTHAM, DAVIS, JONES, SMITH, DUHÉ, WIENER, BARKSDALE, EMILIO M. GARZA, DeMOSS, BENAVIDES, STEWART, PARKER, and DENNIS, Circuit Judges.*

W. EUGENE DAVIS, Circuit Judge:

In this toxic tort case, we consider whether the district court abused its discretion in excluding the opinion of a physician

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* POLITZ, Chief Judge, is recused.

on the causal relationship between Plaintiff's exposure to industrial chemicals and his pulmonary illness. We find no abuse of discretion and affirm.

I.

Bob T. Moore was employed as a delivery truck driver for Consolidated Freightways, Inc. ("Consolidated"), a motor freight company. On the morning of April 23, 1990, Moore delivered several drums of chemicals manufactured by Dow Corning Corp. ("Dow") to Ashland Chemical Inc.'s ("Ashland") terminal in Houston. When Moore opened the back door of his trailer, he smelled a chemical odor that caused him to suspect that a drum was leaking. Moore and the Ashland plant manager, Bart Graves, identified two leaking drums and removed them from the trailer. Mr. Graves contacted Dow and requested cleanup instructions and a copy of the material safety data sheet ("MSDS") for the spilled chemicals. The MSDS identified the contents of the leaking drum and health hazards associated with the contents.[1] **The MSDS stated that the chemical**

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[1] **The MSDS provided, in part, as follows:**
MATL NAME: DOW CORNING(R) 1-2531 RELEASE COATING

. . . .

SECTION II - HAZARDOUS INGREDIENTS AS DEFINED IN 29 CFR 1910.1200 . . .

TOLUENE . . .
SOLVENT NAPHTHA, PETROLEUM, LIGHT ALIPHATIC . . .
ISOBUTYLISOBUTYRATE
PROPYLENE GLYCOL METHYL ETHER . . .

SECTION III - EFFECTS OF OVEREXPOSURE
. . .
INHALATION: SHORT VAPOR EXPOSURE MAY CAUSE DROWSINESS AND IRRITATE NOSE AND THROAT. VAPORS MAY INJURE BLOOD,

solution included hazardous ingredients, most notably Toluene. It warned that depending upon the level and duration of the exposure to fumes from the chemicals, irritation or injury to various organs, including the lungs, could result.

After Moore and Graves obtained cleanup instructions, they put the leaking drums into larger salvage drums. Moore and another Consolidated employee then proceeded to place absorbent material on the spilled chemicals, sweep them up, and dispose of them. The men were engaged in this cleanup for forty-five minutes to an hour. After the cleanup, Moore returned to the Consolidated terminal. At trial, he testified that about an hour after finishing the cleanup, he began experiencing symptoms, including dizziness, watery eyes, and difficulty in breathing. However, Moore was able to drop off another Consolidated trailer as requested by his supervisor.

When he completed this delivery, Moore returned to Consolidated's terminal and told his supervisor that he was sick. The supervisor sent Moore to the company doctor. The next day, Moore saw his family physician. After two to three weeks of treatment by the family physician, Moore placed himself under the care of a Dr. Simi, a pulmonary specialist. Dr. Simi released Moore to return to work on the 11th day of June, 1990. After working several days, Moore terminated his employment due to

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LIVER, LUNGS, KIDNEYS, AND NERVOUS SYSTEM. DEGREE OF EFFECTS DEPENDS ON CONCENTRATION AND LENGTH OF EXPOSURE.

. . .

COMMENTS: PROLONGED TOLUENE OVEREXPOSURE MAY INJURE BLOOD, LIVER, LUNGS, KIDNEYS, AND NERVOUS SYSTEM AND MAY AGGRAVATE EXISTING EYE, SKIN, AND RESPIRATORY DISORDERS.

difficulty breathing. On three occasions in the summer of 1990, Moore also consulted Dr. Daniel E. Jenkins, a pulmonary specialist. Dr. Jenkins diagnosed Moore's condition as reactive airways dysfunction syndrome ("RADS"), an asthmatic-type condition. In November of 1990, Moore consulted another pulmonary specialist, Dr. B. Antonio Alvarez, who became his primary treating physician. Dr. Alvarez confirmed Dr. Jenkins's diagnosis and treated Moore for RADS.

Moore reported to his physicians that he had smoked approximately a pack of cigarettes a day for approximately twenty years, and he continued to smoke at the time of trial. He also reported that on April 23, 1990, when he was exposed to the Dow chemical, he had just returned to work following a bout with pneumonia. Moore also related a history of childhood asthma to his treating physician.

Moore and his wife filed suit against Ashland Chemical, Inc., Ashland Oil, Inc., and others, primarily on grounds that Ashland was negligent in insisting that Moore expose himself to vapors created by the chemical spill. More specifically, Moore complained that Ashland's employee, Bart Graves, should have permitted Moore to return to Consolidated's terminal where other employees could have cleaned up the spill. He also complained that Graves did not permit him to use a respirator during the cleanup. Ashland removed the suit to federal court on the basis of diversity jurisdiction.

After extensive discovery and motion practice dealing particularly with whether Moore's expert physicians, Dr. Jenkins

and Dr. Alvarez, would be permitted to testify, the case proceeded to trial before a jury. At the conclusion of the trial, the jury answered the following interrogatory in the negative: "Do you find, from a preponderance of the evidence, that the negligence, if any, of the person named below proximately caused the injury in question: . . . (b) Ashland Chemical, Inc. and/or Ashland Oil, Inc." Thereafter, the district court entered a take nothing judgment against Moore. On appeal, a divided panel of this Court concluded that the district court had erred in refusing to allow Dr. Jenkins, one of Moore's experts, to give an opinion on the cause of Moore's illness, and reversed the district court's judgment and remanded the case for a new trial. Moore v. Ashland Chem., Inc., 126 F.3d 679 (5th Cir. 1997). We granted rehearing to consider this case en banc and to clarify the standards district courts should apply in determining whether to admit expert testimony.

II.

In this appeal we focus on the trial court's refusal to permit one of Moore's medical witnesses, Dr. Daniel E. Jenkins, to give an opinion on the cause of Moore's illness. Some factual and procedural background is necessary to understand the arguments of the parties.

Moore sought to call two medical witnesses, Dr. Jenkins and Dr. Antonio Alvarez. Dr. Jenkins, a well-qualified medical specialist, was certified by the American Board of Internal Medicine in 1947. He also had special training and taught in the

fields of pulmonary disease, allergy, and environmental medicine.[2] **Dr. Jenkins saw Moore on three occasions. He examined Moore, performed a series of tests, and reviewed Moore's medical records. He concluded that Moore was suffering from RADS. Based upon his examination and tests, Dr. Jenkins expressed the opinion that Moore's RADS had been caused by Moore's exposure to vapors from the chemical spill at Ashland's facility in April of 1990. We will discuss later in more detail the reasons Dr. Jenkins assigned for his opinion. Generally, he relied upon the MSDS, which warned that exposure to the Toluene solution could be harmful to the lungs, his examination and test results, and the close, temporal connection between Moore's exposure to the Toluene solution and the onset of symptoms.**

Dr. Alvarez, who was a former student of Dr. Jenkins, agreed with Dr. Jenkins about the cause of Moore's RADS. Dr. Alvarez was Moore's primary treating physician. In addition to the reasons relied on by Dr. Jenkins, Dr. Alvarez supported his theory of causation with a report of a study on RADS co-authored by Dr. Stuart Brooks that he found in a medical magazine.[3] One case study

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[2] **The Defendants agree that Dr. Jenkins's qualifications are outstanding. He served residencies in internal medicine, tuberculosis, and chest disease and allergy, and was certified by the American Board of Internal Medicine in 1947. After serving as Chief Resident in Medicine and Assistant Professor of Medicine and Physician in Charge of the Tuberculosis and Chest Unit at the University of Michigan Medical School from 1943 to 1947, he spent forty-four years on the faculty at Baylor Medical School. In 1991, he went into practice in Houston with a group of physicians specializing in respiratory ailments.**

[3] **Stuart M. Brooks, M.D. et al., Reactive Airways Dysfunction Syndrome (RADS), 88 CHEST 376 (1985).**

in the report involved a clerk who was exposed to a Toluene mixture in a small, enclosed room for two and one-half hours. Dr. Jenkins initially stated in his deposition that he knew of no reported literature that supported his causation opinion. During his *in limine* testimony outside the presence of the jury at trial, Dr. Jenkins, for the first time, pointed to the Brooks study relied on by Dr. Alvarez.

Dr. Jenkins admitted that Moore was his first RADS patient with a history of exposure to Toluene. He had conducted no research on this subject. Dr. Jenkins had previously treated other patients whose RADS he attributed to exposure to chemicals that were known to irritate the airways. However, he conceded that the chemicals involved with these previous patients were stronger and more irritating than the Toluene solution to which Moore was exposed. Dr. Jenkins made no attempt to explain how any of the other chemicals that he believed caused RADS in his earlier patients had properties similar to the Dow Toluene solution.

The district court, after reviewing Dr. Jenkins's deposition and listening to his *in limine* testimony, decided to exclude his causation opinion. The court did permit Dr. Jenkins to testify about his examination of Moore, the tests he conducted, and the diagnosis he reached. The only feature of Dr. Jenkins's testimony the court excluded was his opinion that the Toluene solution caused Moore's RADS. The district court concluded that Dr. Jenkins had no scientific basis for this opinion, that it was not sufficiently reliable under Fed. R. Evid. 702, and that it would be inconsistent

with the court's gatekeeper role under Daubert to admit this opinion.

The district court decided to admit Dr. Alvarez's causation opinion even though it was essentially identical to Dr. Jenkins's proffered opinion. The district court was apparently convinced that Dr. Alvarez's opinion linking the RADS to Moore's exposure to the Toluene solution was more reliable than Dr. Jenkins's opinion because Dr. Alvarez had been the treating physician, and also because he had relied from the outset on the Brooks study and therefore had some support from the scientific literature for his conclusion. In view of the verdict, the Defendants do not challenge the district court's decision to admit Dr. Alvarez's opinion. Thus, the propriety of this ruling is not presented to us for review.

The single defense expert, Dr. Robert Jones, was the third medical witness to testify. Based upon his review of the medical records, Dr. Jones concluded that Moore did not have RADS; rather, according to Dr. Jones, Moore suffered from a form of bronchial asthma. Dr. Jones further testified that the evidence in the case was insufficient to allow him to conclude that Moore's exposure to Toluene caused his pulmonary problems. Dr. Jones's conclusion was reinforced by Moore's medical history, which included conditions that Dr. Jones thought were much more likely triggering agents for RADS. These conditions included Moore's history as a heavy smoker for approximately twenty years, his history of asthma, and his recent bout with pneumonia. Dr. Jones also testified that the

scientific literature revealed that Toluene and similar substances have a low potential for causing lung injury except when encountered in such high dosages that the person is overcome and passes out.

With this background, we now turn to the issue presented by this appeal: whether the district court erred in excluding Dr. Jenkins's causation testimony.

III.

A.

Fortunately, the Supreme Court recently resolved a disagreement among the circuits about the standard for reviewing a district court's admission or exclusion of expert testimony. In General Electric Co. v. Joiner, 118 S. Ct. 512 (1997), the Court held that we should review such decisions for an abuse of discretion. In evaluating whether the district court abused its discretion in excluding Dr. Jenkins's testimony on causation, the Supreme Court's decisions in Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579, 113 S. Ct. 2786 (1993), and Joiner control our analysis.

In Daubert, the lower courts considered the admissibility of expert testimony on medical causation. The expert witnesses sought to testify that ingestion of Bendectin, a prescription anti-nausea drug, by several mothers caused birth defects in their children. The lower courts excluded the evidence on the basis that the experts' methodology was not generally accepted in the scientific community and had not been subjected to peer review. The Supreme

Court, speaking through Justice Blackmun, first concluded that the "Frye doctrine,"[4] **requiring that a theory be generally accepted in the scientific community before it can be the basis of an expert's opinion, was not a controlling principle in federal trials. Daubert, 509 U.S. at 589, 113 S. Ct. at 2794. Justice Blackmun then turned to Rule 702 of the Federal Rules of Evidence[5] and the proper test for admissibility of scientific evidence.**

> **That the Frye test was displaced by the Rules of Evidence does not mean, however, that the Rules themselves place no limits on the admissibility of purportedly scientific evidence. Nor is the trial judge disabled from screening such evidence. To the contrary, under the Rules the trial judge must ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable.**
>
> **The primary locus of this obligation is Rule 702, which clearly contemplates some degree of regulation of the subjects and theories about which an expert may testify. "*If scientific*, technical, or other specialized *knowledge will assist the trier of fact* to understand the evidence or to determine a fact in issue" an expert "may testify *thereto*." The subject of an expert's testimony must be "scientific . . . knowledge." The adjective "scientific" implies a grounding in the methods and procedures of science. Similarly, the word "knowledge" connotes more than subjective belief or unsupported speculation. The term "applies to any body of known facts or to any body of ideas inferred from such facts or accepted as truths on good grounds." Webster's Third New International Dictionary 1252 (1986). Of course, it would be unreasonable to conclude that the subject of scientific testimony must be "known" to a certainty;**

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[4] **Frye v. United States, 293 F. 1013 (D.C. Cir. 1923).**

[5] **Fed. R. Evid. 702 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 by knowledge, skill, experience, training, or education, may testify thereto in the form of an opinion or otherwise.**

> **arguably, there are no certainties in science. But, in order to qualify as "scientific knowledge," an inference or assertion must be derived by the scientific method. Proposed testimony must be supported by appropriate validation--i.e., "good grounds," based on what is known. In short, the requirement that an expert's testimony pertain to "scientific knowledge" establishes a standard of evidentiary reliability.**

Daubert, 509 U.S. at 589-90, 113 S. Ct. at 2794-95 (emphasis in original) (internal citations omitted).

The Court stated further that:

> **Rule 702 further requires that the evidence or testimony "assist the trier of fact to understand the evidence or to determine a fact in issue." This condition goes primarily to relevance. "Expert testimony which does not relate to any issue in the case is not relevant and, ergo, non-helpful."**

Id. at 591, 113 S. Ct. at 2795 (citation omitted). The Court then proceeded to enumerate a five-factor, non-exclusive, flexible test for district courts to consider when assessing whether the methodology is scientifically valid or reliable. These factors include: (1) whether the expert's theory can be or has been tested; (2) whether the theory has been subject to peer review and publication; (3) the known or potential rate of error of a technique or theory when applied; (4) the existence and maintenance of standards and controls; and (5) the degree to which the technique or theory has been generally accepted in the scientific community. Id. at 593-95, 113 S. Ct. at 2796-97.[6]

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[6] **The panel majority took the position that because Dr. Jenkins's causation opinion was not predicated on "hard science," it was therefore not subject to Daubert's standards for admissibility. We disagree. Daubert and Joiner both involved questions of medical causation. As one of the scientists who filed an amicus brief, Professor Alvan R. Feinstein, stated: "In other words, determining the etiology of a disease--its cause--involves**

The Supreme Court concluded by pointing out that important differences exist between truthseeking in the courtroom and in the laboratory:

> **Scientific conclusions are subject to perpetual revision. Law, on the other hand, must resolve disputes finally and quickly. The scientific project is advanced by broad and wide-ranging consideration of a multitude of hypotheses, for those that are incorrect will eventually be shown to be so, and that in itself is an advance. Conjectures that are probably wrong are of little use, however, in the project of reaching a quick, final and binding legal judgment--often of great consequence--about a particular set of events in the past. We recognize that, in practice, a gatekeeping role for the judge, no matter how flexible, inevitably on occasion will prevent the jury from learning of authentic insights and innovations.**

Daubert, 509 U.S. at 597, 113 S. Ct. at 2798-99. The Court remanded the case to permit the lower courts to evaluate their rulings in light of the multi-factor, flexible test it had just announced.

Procedurally, Daubert instructs us that the district court must determine admissibility under Rule 702 by following the directions provided in Rule 104(a).[7] Rule 104(a) requires the

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the same scientific exercise, whether the decision is made by a clinician, an epidemiologist, or other scientist." Brief of Dr. Feinstein,
Sterling Professor of Medicine and Epidemiology at the Yale University School of Medicine and author and co-author of more than 375 peer-reviewed articles and five scientific texts, including Clinical Judgment.

In any event, in this Circuit an opinion is governed by Fed. R. Evid. 702 and Daubert, even though the opinion is not grounded in "hard science," assuming such a distinction exists. In Watkins v. Telsmith, Inc., 121 F.3d 984 (5th Cir. 1997), we rejected the position that application of the Daubert factors is unwarranted in cases where expert testimony is based solely on experience or training. Id. at 988-90.

[7] **Fed. R. Evid. 104(a) provides:**

judge to conduct preliminary fact-finding and to make a "preliminary assessment of whether the reasoning or methodology underlying the testimony is scientifically valid and of whether that reasoning or methodology properly can be applied to the facts in issue." Daubert, 509 U.S. at 592-93, 113 S. Ct. at 2796.

Thus, the party seeking to have the district court admit expert testimony must demonstrate that the expert's findings and conclusions are based on the scientific method, and, therefore, are reliable. This requires some objective, independent validation of the expert's methodology. The expert's assurances that he has utilized generally accepted scientific methodology is insufficient. See Daubert v. Merrell-Dow Pharmaceuticals, Inc., 43 F.3d 1311, 1316 (9th Cir. 1995) (on remand). The proponent need not prove to the judge that the expert's testimony is correct, but she must prove by a preponderance of the evidence that the testimony is reliable. See In re Paoli R.R. Yard PCB Litigation, 35 F.3d 717 (3d Cir. 1994); see also 2 STEPHEN A. SALTZBURG ET AL., FEDERAL RULES OF EVIDENCE MANUAL 1229-40 (7th ed. 1998).

In sum, the law cannot wait for future scientific investigation and research. We must resolve cases in our courts on the basis of scientific knowledge that is currently available. The inquiry authorized by Rule 702 is a flexible one; however, a scientific opinion, to have evidentiary relevance and reliability,

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Preliminary questions concerning the qualification of a person to be a witness, the existence of a privilege, or the admissibility of evidence shall be determined by the court, subject to the provisions of subdivision (b).

must be based on scientifically valid principles.

Last term, in General Electric Co. v. Joiner, 118 S. Ct. 512 (1997), the Supreme Court gave us helpful insight into the application of the Daubert principles. In Joiner, the plaintiff sued, claiming that his small-cell lung cancer was caused by his exposure to polychlorinated biphenyls ("PCBs") in the workplace. The plaintiff offered expert testimony to establish his causation theory. The district court ruled that the testimony was scientifically unreliable and refused to admit the proffered evidence. The Eleventh Circuit Court of Appeals reversed and held that the simple abuse of discretion standard of review did not apply to the ruling; rather, "a particularly stringent standard of review" applied "to the trial judge's exclusion of expert testimony" that resulted in the dismissal of the suit. Joiner v. General Elec. Co., 78 F.3d 524, 529 (11th Cir. 1996). The Supreme Court reversed, holding that the usual abuse of discretion standard generally applied to evidentiary rulings also applied to the admission or exclusion of expert testimony. General Elec. Co. v. Joiner, 118 S. Ct. 512 (1997). The Supreme Court's treatment of several of Joiner's arguments is instructive to both trial courts and courts of appeals in the area of admissibility of expert testimony.

The Court emphasized that a district court, while acting as a gatekeeper for expert evidence, must evaluate whether there is an adequate "fit" between the data and the opinion proffered. Joiner, 118 S. Ct. at 519. One of the bases for the experts' causation

opinion in Joiner was animal studies on the effects on rats injected with large doses of PCBs. In analyzing Joiner's argument, the Court observed that

> **[r]ather than explaining how and why the experts could have extrapolated their opinions from these seemingly far-removed animal studies, respondent chose to proceed as if the only issue [was] whether animal studies can ever be a proper foundation for an expert's opinion. Of course, whether animal studies can ever be a proper foundation for an expert's opinion was not the issue. The issue was whether these experts' opinions were sufficiently supported by the animal studies on which they purported to rely. The studies were so dissimilar to the facts presented in this litigation that it was not an abuse of discretion for the District Court [sic] to have rejected the experts' reliance on them.**

Id. at 518 (internal quotation and citation omitted).

The Court next considered four published epidemiological studies on which the proffered experts relied to determine whether they provided a sufficient basis for the experts' opinion. The Court observed that the authors of the first two studies, while finding that the rate of cancer deaths among former employees at plants where workers were exposed to PCBs was higher than might have been expected, nevertheless concluded that "there were apparently no grounds for associating lung cancer deaths (although increased above expectations) and exposure in the plant." Joiner, 118 S. Ct. at 518 (citation omitted). The Court concluded that given that the authors of the article were "unwilling to say that PCB exposure had caused cancer among the workers they examined, their study did not support the experts' conclusion that Joiner's

exposure to PCBs caused his cancer." Id. at 518.[8] The Court next referred to the two remaining studies, one of which made no mention of PCBs and the other in which the PCB-exposed group had also been subjected to additional potential carcinogens. The Court observed that the district court was entitled to conclude that these studies were likewise no help to the experts in supporting their opinions. Id. at 519.

The Court concluded its discussion of Joiner's arguments as follows:

> **Respondent points to Daubert's language that the "focus, of course, must be solely on principles and methodology, not on the conclusions that they generate." He claims that because the District Court's disagreement was with the conclusion that the experts drew from the studies, the District Court committed legal error and was properly reversed by the Court of Appeals. But conclusions and methodology are not entirely distinct from one another. Trained experts commonly extrapolate from existing data. But nothing in either Daubert or the Federal Rules of Evidence requires a district court to admit opinion evidence which is connected to existing data only by the *ipse dixit* of the expert. A court may conclude that there is simply too great an analytical gap between the data and the opinion proffered. That is what the District Court did here, and we hold that it did not abuse its discretion in so doing.**

Joiner, 118 S. Ct. at 519 (internal citations omitted).

B.

With this background, we turn to the record evidence in this case to apply the Supreme Court's directives in Daubert and Joiner, and to determine whether the district court abused its discretion

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[8] **This analysis by the Supreme Court is particularly relevant to our case. The Brooks study relied upon by Dr. Jenkins suffered from the same self-doubts as the studies in Joiner. Dr. Brooks was unable to reach any conclusions based on his isolated studies.**

in excluding Dr. Jenkins's testimony.

Dr. Jenkins pointed to the following support for his causation conclusion: (1) the MSDS from Dow warned that exposure to fumes from the Toluene solution could cause injury to the lungs; (2) Moore had an onset of symptoms shortly after his exposure to the Toluene solution; (3) although Dr. Jenkins did not initially rely on the Brooks article, when it was called to his attention at trial by counsel, he did claim to have knowledge of the article and stated that he had relied on it; (4) his training and experience; and (5) his examination and test results.

The district court was entitled to conclude that the above bases for Dr. Jenkins's opinion were individually and collectively inadequate under Daubert. First, Dr. Jenkins's training and experience and his examination and tests, items 4 and 5 above, were obviously important to his diagnosis. However, Dr. Jenkins gave no reason why these items were helpful in reaching his conclusion on causation. He admitted that he had never previously treated a patient who had been exposed to a similar Toluene solution. Dr. Jenkins was a highly qualified pulmonary specialist, but, as the Seventh Circuit observed in Rosen v. Ciba-Geigy Corp., 78 F.3d 316 (7th Cir. 1996), "[u]nder the regime of Daubert a district judge asked to admit scientific evidence must determine whether the evidence is genuinely scientific, as distinct from being unscientific speculation offered by a genuine scientist." Id. at 318 (internal citation omitted).

With respect to the Brooks article, item 3 above, the authors

made it clear that their conclusions were speculative because of the limitations of the study. Also, in the single study involving exposure to Toluene fumes, the level and duration of the exposure was several times greater than Moore's exposure.

The bases for Dr. Jenkins's causation opinion are therefore reduced to the following: (1) the Dow MSDS from which Dr. Jenkins could have gleaned that the contents of the drum were irritating to the lungs at some level of exposure; and (2) the relatively short time between Moore's exposure to the chemicals and the onset of his breathing difficulty.

The district court was entitled to find that the Dow MSDS had limited value to Dr. Jenkins. First, Dr. Jenkins admitted that he did not know what tests Dow had conducted in generating the MSDS. Second, and perhaps more importantly, Dr. Jenkins had no information on the level of exposure necessary for a person to sustain the injuries about which the MSDS warned. The MSDS made it clear that the effects of exposure to Toluene depended on the concentration and length of exposure.

The district court was also correct in viewing with skepticism Dr. Jenkins's reliance on the temporal proximity between the exposure and injury. Cavallo v. Star Enter., 892 F. Supp. 756 (E.D. Va. 1995), *aff'd. in part*, 100 F.3d 1150 (4th Cir. 1996), contains a helpful discussion of this issue. In that case, the plaintiff alleged that she suffered respiratory illness as a result of exposure to aviation jet fuel vapors. The proffered expert relied substantially on the temporal proximity between exposure and

symptoms. The court concluded that this reliance was "not supported by appropriate validation" as required by Daubert, and was "ultimately unreliable." 892 F.Supp. at 773. The court observed that although "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," this was not such a case. Id. at 773-74. The court pointed out that the plaintiff in Cavallo was not doused with jet fuel and that there was no mass exposure of jet fuel to many people who in turn suffered similar symptoms. In 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 in determining causation.[9]

Dr. Jenkins offered no scientific support for his general theory that exposure to Toluene solution at any level would cause RADS. Because he had no accurate information on the level of Moore's exposure to the fumes, Dr. Jenkins necessarily had no support for the theory that the level of chemicals to which Moore was exposed caused RADS.[10] Dr. Jenkins made no attempt to explain

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[9] See also Porter v. Whitehall Labs., Inc., 9 F.3d 607 (7th Cir. 1993); 2 STEPHEN A. SALTZBURG ET AL., FEDERAL RULES OF EVIDENCE MANUAL 1233-34 (7th ed. 1998).

[10] Given the paucity of facts Dr. Jenkins had available about the level of Moore's exposure to the Toluene solution, his causation opinion would have been suspect even if he had scientific support for the position that the Toluene solution could cause RADS in a worker exposed to some minor level of the solution. Under

his conclusion by asserting that the Toluene solution had properties similar to another chemical exposure to which RADS had been scientifically linked. Several post-Daubert cases have cautioned about leaping from an accepted scientific premise to an unsupported one. See Wheat v. Pfizer, Inc., 31 F.3d 340, 343 (5th Cir. 1994); see also Braun v. Lorillard Inc., 84 F.3d 230, 235 (7th Cir. 1996); Daubert, 43 F.3d at 1319; Cavallo, 892 F. Supp. at 769. To support a conclusion based on such reasoning, the extrapolation or leap from one chemical to another must be reasonable and scientifically valid. See Daubert, 43 F.3d at 1319-20; Cavallo, 892 F. Supp. at 769.

In the end, Dr. Jenkins was relegated to his fall-back position that *any* irritant to the lungs could cause RADS in a susceptible patient. Dr. Jenkins cited no scientific support for this theory. None of Daubert's factors to assess whether the opinion was based on sound scientific principles was met. Dr. Jenkins's theory had not been tested; the theory had not been subjected to peer review or publication; the potential rate of error had not been determined or applied; and the theory had not been generally accepted in the scientific community. In sum, Dr. Jenkins could cite no scientific support for his conclusion that exposure to any irritant at unknown levels triggers this asthmatic-type condition. Under the Daubert regime, trial courts are

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Daubert, "*any* step that renders the analysis unreliable . . . *renders the expert's testimony inadmissible. This is true whether the step completely changes a reliable methodology or merely misapplies that methodology*." In re Paoli R.R. Yard PCB Litigation, 35 F.3d 717, 745 (3d Cir. 1994) (emphasis in original).

encouraged to exclude such speculative testimony as lacking any scientific validity.

The district court was also entitled to conclude that Moore's personal habits and medical history made Dr. Jenkins's theory even more unreliable. Moore had been a moderate to heavy smoker for twenty years. In addition, he had just recovered from pneumonia shortly before his contact with the chemicals. Finally, Moore had suffered from asthma (a condition very similar to RADS) in his youth.

In sum, the district court did not abuse its discretion in finding that the "analytical gap" between Dr. Jenkins's causation opinion and the scientific knowledge and available data advanced to support that opinion was too wide. The district court was entitled to conclude that Dr. Jenkins's causation opinion was not based on scientific knowledge that would assist the trier of fact as required by Rule 702 of the Federal Rules of Evidence.

CONCLUSION

Daubert and its progeny give the district court discretion to "keep the gate" for the purpose of admitting or excluding opinion testimony. In this case, the district court did not abuse that discretion in concluding that the causation evidence proffered by Dr. Jenkins should be excluded. It was within the judge's discretion to conclude that Dr. Jenkins's testimony was not grounded in science as required by Daubert and its progeny, and, therefore, was not sufficiently reliable for the jury to consider. We therefore affirm the judgment of the district court.

AFFIRMED.

KING, Circuit Judge, concurs in the result reached by the majority.

ENDRECORD

BENAVIDES, Circuit Judge, specially concurring:

Although I join both the reasoning and result of the majority opinion, I write separately to reiterate that, under *General Electric Co. v. Joiner*, ___ U.S. ___, 118 S. Ct. 512 (1997), the issue before us is whether the magistrate judge abused her discretion in excluding the testimony of Dr. Jenkins. While I believe this case to be a close one, I must agree that the magistrate judge acted within her discretion in excluding Dr. Jenkins's proffered testimony. It does not follow from this, however, that she would have abused her discretion by admitting the proffered testimony. On the contrary, had she admitted the testimony, I would likewise be of the opinion that she acted within her discretion. I do not read the majority opinion to require otherwise.

ENDRECORD

DENNIS, Circuit Judge, with whom PARKER and STEWART, Circuit Judges, join, dissenting:

I respectfully dissent.

The majority *en banc* opinion (1) conflicts with the view of other circuits, a state court of last resort, and scholarly commentary, in holding that (a) a clinical medical expert cannot express an opinion as to a causal relationship between a chemical compound and a plaintiff's disease, although the opinion is based on the sound application of generally accepted clinical medical methodology, unless the causal link is confirmed by hard scientific methodology as per the *Daubert* factors[11], ***see Daubert v. Merrell Dow Pharmaceuticals, Inc.*, 509 U.S. 579, 593-94 (1993); (b) the temporal relationship between chemical exposure and symptoms of disease are to be accorded little weight by courts in assessing an expert's determination of causation with either clinical medical or hard science methodology; (c) even when an expert has hard scientific support for a general causal relationship between a chemical compound and a particular disease, his opinion of a specific causal relationship between**

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[11] Evidently, the majority interprets the final *Daubert* factor, "general acceptance," to mean acceptance within a relevant "hard scientific" community. For it is undisputed that the methods and techniques used by Dr. Daniel Jenkins to determine that Mr. Moore's RADS had been caused by his exposure to the chemical compound, i.e. history taking, physical examinations, differential etiology (conducting tests to eliminate other diagnoses and causes of the patient's disease), and review of other physicians' reports were generally accepted within the doctor's own clinical medical disciplines of pulmonary and environmental medicine.

the compound and an individual's disease is "suspect" unless the expert also has scientifically accurate data as to the level of that person's exposure to the chemical compound; (2) conflicts with Supreme Court decisions by conducting a de novo trial of the preliminary assessment hearing on the record, substituting its own erroneous ruling and reasons for those of the district court, and disregards the district court's errors of law, clearly erroneous factual findings, and abuse of discretion.

1.

After *Daubert*, federal courts have become balkanized on important questions that confront federal trial judges daily, e.g., whether *Daubert* applies outside the field of hard science; if so, whether *Daubert*'s gatekeeping function applies to the admission of any or all of the other types of expert testimony; if so, whether application of the *Daubert* "factors" is required in the admission of any or all testimony based on knowledge not derived by hard scientific methodology. Even before the present *en banc* circuit opinion there was a clear and present need for the Supreme Court to clarify whether and, if so, how, *Daubert* applies to expert testimony based on knowledge derived by disciplines or sources other than the hard sciences. *E.g.*, 29 Charles A. Wright and Victor J. Gold, FEDERAL PRACTICE AND PROCEDURE §6266 (1997); 2 Michael H. Graham, HANDBOOK OF FEDERAL EVIDENCE §702.5, pp.22-26 (Supp. 1998).

(a)

The majority opinion represents an eccentric additional fragmentation of the *Daubert* picture that underscores the need for Supreme Court guidance. This circuit now takes the position that a clinical medical expert, correctly using and applying generally accepted clinical medical methodology, may not express an opinion as to whether a particular chemical compound caused, aggravated, or contributed to a person's disease or disorder unless that opinion is corroborated by hard scientific methodology that passes muster under a rigid application of the *Daubert* factors.

The majority's rule applies even to single plaintiff negligence actions that do not involve substances alleged to cause diseases in large numbers of persons or diseases having long latency periods. The *en banc* majority opinion emanates from a case in which a single plaintiff claims to have developed a reactive airways disorder as a result of a defendant's negligence in causing him to clean up a spillage of a chemical compound without taking any safety precautions. The defendant refused to provide the plaintiff with a respirator or to measure the air contamination with a safety meter although the defendant had both devices ready at hand. The plaintiff was required to work in and around an enclosed 28-foot trailer for about an hour in cleaning up the spilled chemical compound.

Unlike many toxic torts situations, in Mr. Moore's case there was not a long latency period between the onset of symptoms

and the chemical compound gases that were alleged to have caused his illness. The onset of the plaintiff's respiratory disease occurred less than an hour after his exposure during his clean up of the chemical compound. He immediately sought emergency medical treatment, which included being given oxygen, and he has been under treatment for his respiratory disease ever since. The particular circumstances of the plaintiff's inhalation injury, combined with the fact that so few humans have ever been subjected to a similar exposure to the chemical compound involved, obviously impacted on the manner in which the plaintiff could prove causation. The quantity of persons who sustain this type of exposure was simply too small for a plaintiff to be able to provide epidemiological, animal testing or other hard scientific evidence linking the particular chemical compound to reactive airways disease. *See Zuchowicz v. United States*, 140 F.3d 381, 385-86 (2nd Cir. 1998)(described *infra.*).

Although the *en banc* majority recognizes that cases involving chemical compounds which have not been subjected to hard scientific testing must be timely resolved and cannot await the fortuity of relevant scientific experimentation, the majority nevertheless insists that every admissible medical causation opinion in a chemical injury case must have a hard science, *Daubert* factor related basis. If such hard scientific data is not available, the majority decrees, a plaintiff must face trial or the defendant's summary judgment motion without a medical

causation expert witness.[12]

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[12] **In *Daubert*, the Court stated:**

> **Scientific conclusions are subject to perpetual revision. Law, on the other hand, must resolve disputes finally and quickly. The scientific project is advanced by broad and wide-ranging consideration of a multitude of hypotheses, for those that are correct will eventually be shown to be so, and that in itself is an advance. Conjectures that are probably wrong are of little use, however, in the project of reaching a quick, final and binding legal judgment--often of great consequence--about a particular set of events in the past. We recognize that, in practice, a gatekeeping role for the judge, no matter how flexible, inevitably on occasion will prevent the jury from learning of authentic insights and innovations. *Daubert,* 509 U.S. at 597.**

The majority *en banc* opinion quotes this passage at page 12 and proceeds to stand it on its head on page 13, interpreting the Supreme Court's words as supporting the majority's proposition that although hard scientific proof of medical causation will not always be available in chemical injury cases, the cases must be quickly resolved; therefore, in chemical injury cases, if the plaintiff can produce only clinical medical experts whose opinions are based solely on well accepted clinical medicine methodology, they must face trial without a medical causation expert witness.

The *Daubert* Court neither expressed nor implied such a draconian rule. Being confronted with a case involving the admissibility of hard science epidemiological expert opinions, not generally accepted in that field, proffered to prove that Bendectin could have caused birth defects in children whose mothers used the drug, the Court concluded that the evidence could not be excluded under the *Frye* rule which was superseded by the Federal Rules of Evidence, but that the trial judge as gatekeeper must determine that the hard science evidence proffered is not only relevant but also reliable as based on a sound application of the methodology of the expert's discipline and suggested several ways, based on basic elements of hard science methodology, that a party who proffers an expert who proposes to testify to a hard scientific opinion can show that the opinion is reliable or, reciprocally, that a court can use to test the opinion's reliability.

These ways of testing or showing reliability of hard scientific opinions have become known as the "*Daubert* factors." But the Court did not intend to require that these gauges of reliability be applied monolithically to all expert testimony.

The majority opinion creates a schism between this court and other circuits and a state court of last resort and disregards the teachings of federal evidence law scholars.

The Second, Fourth, and Third Circuits have held that a clinical physician may, consistently with *Daubert*, express an opinion, based on clinical medical methodology generally accepted within that discipline, that a particular toxic substance caused the patient's disease or death, without hard scientific corroboration under an inflexible application of the *Daubert* factors.

The Second Circuit in *McCullock v. H.B. Fuller Co.*, 61 F.3d 1038 (2nd Cir. 1995), rejected the defendant's argument for exclusion of a clinical physician's opinion, as scientifically unfounded, that glue fumes caused the plaintiff's respiratory symptoms and throat polyps. The doctor's opinion was based

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When the expert does not propose to testify to an opinion based on hard scientific methodology, the Court indicated that the reliability of his opinion should be assessed according to the methodology of the expert's own discipline. The *Daubert* court did not indicate, and this court is not called upon to decide, what a trial court should do if it is confronted by proffers of experts who propose to testify to directly conflicting opinions as to medical causation, one based on hard scientific methodology and the other based on clinical medical methodology. In such a case, it is likely that the trial court should find the clinical medical expert's opinion unreliable if it fails to take into account and distinguish the hard scientific expert's opinion and its basis in hard scientific data, if the court finds the latter to be reliable. The *Daubert* Court did no suggest, however, that the Federal Rules of Evidence authorize a federal court to formulate a rule, as the *en banc* majority has done, that, in effect, bars a clinical physician from expressing an opinion as to the probable chemical causation of a disease in a specific individual until the existence of a general causal relationship has been confirmed by the use of hard scientific methodology.

entirely upon his use of clinical medical methodology, without any hard science or strict *Daubert* factor related basis. The doctor could not point to a single piece of medical literature that said that glue fumes cause throat polyps. In describing the doctor's use of clinical medical methodology as vouching for the reliability of his opinion, the court stated:

> **[Dr.] Fagelson based his opinion on a range of factors, including his care and treatment of McCullock; her medical history (as she related it to him and as derived from a review of her medical and surgical reports); pathological studies; review of Fuller's MSDS; his training and experience; use of a scientific analysis known as differential etiology (which requires listing possible causes, then eliminating all causes but one); and reference to various scientific and medical treatises. Disputes as to the strength of his credentials, faults in his use of differential etiology as a methodology, or lack of textual authority for his opinion, go to the weight, not the admissibility, of his testimony. *Id.* at 1044.**

In *Zuchowicz v. United States*, 140 F.3d 381 (2nd Cir. 1998), the Second Circuit reaffirmed its holding in *McCullock*. The *Zuchowicz* court approved the admission of a pulmonary medical expert's opinion that a negligent overdose of Danocrine had been responsible for the pulmonary disease related death of the plaintiff's wife. The doctor based his opinion on the temporal relationship between the overdose and the start of the disease, the deceased's apparent good health prior to the overdose, and the differential etiology method of excluding other possible

causes. *Id.* at 385. He also testified that Mrs. Zuchowicz's illness was similar in onset, timing and course of development to other cases of pulmonary diseases known to have been caused by other classes of drugs. *Id.* at 385-86. There had been no scientific tests to determine the effects of dosages at the level received by Mrs. Zuchowicz, and the doctor's opinion as to medical causation, based solely on clinical medical methodology, was not confirmed by any hard science or strict *Daubert* factor evidence. *See also Ambrosini v. Labarraque,* 101 F.3d 129, 138 (D.C. Cir. 1996)(stating that the fact that a case may be the first of its type should not prevent a plaintiff's doctor from testifying as to causation).

Similarly, the Fourth Circuit in *Benedi v. McNeil-P.P.C., Inc*., 66 F.3d 1378, 1384 (4th Cir. 1995), upheld the plaintiff's recovery for severe liver damage resulting from his use of Extra-Strength Tylenol contemporaneously with alcohol due to the manufacturer's negligent failure to warn. The Court of Appeals rejected McNeil's argument that the medical causation testimony of the plaintiff's clinical physicians based on the methodology of their discipline, such as the microscopic appearance of his liver, the Tylenol found in his blood, the history of several days of using Tylenol and alcohol, the liver enzyme blood level, and the lack of evidence of a viral or other cause of liver failure, was unreliable because they did not have or rely on epidemiological data. The *Benedi* court stated: "We will not declare [the clinical medicine] methodologies invalid and

unreliable in light of the medical community's daily use of the same methodologies in diagnosing patients." *Id.; see also, Maryland Casualty Co. v. Therm-O-Disc, Inc*., 137 F.3d 780, 785 (4th Cir. 1998)("[T]his circuit has taken the position that the *Daubert* court 'was not formulating a rigid test or checklist,' and was 'relying instead on the ability of federal judges to properly determine admissibility.'")(citing and quoting *Benedi,* 66 F.3d at 1384)).

The Third Circuit in *In Re Paoli R.R. Yard PCB Litigation*, 35 F.3d 717 (3rd Cir. 1994) held that a clinical physician's methodology of differential diagnosis was sufficiently reliable to support the admissibility of that expert's opinion that polychlorinated biphenyls (PCBs) caused specific plaintiffs' illnesses. The *Paoli* court, heeding *Daubert*'s admonition that the inquiry as to whether a particular technique or method is reliable is a flexible one, *id*. at 742, reasoned that "differential diagnosis can be considered to involve the testing of a falsifiable hypothesis (e.g. that PCBs caused a plaintiff's cancer) through an attempt to rule out alternative causes," and although it "involves assessing causation with respect to a particular individual[,][t]his merely makes it a different type of science than science designed to produce general theories; it does not make it unreliable science." *Id.* at 758. Moreover, the *Paoli* court concluded that a clinical physician's performance of standard diagnostic techniques provides prima facie evidence that a doctor has considered alternative causes and has attempted to

test his or her initial hypothesis as to cause. *Id*.

The Court of Criminal Appeals of Texas, a state court of last resort, in *Nenno v. State*, 1998 WL 331283 (Tex. Crim. App. June 24, 1998)("This opinion has not been released for publication in the permanent law reports. Until released, it is subject to revision or withdrawal."), in reviewing the defendant's capital murder conviction and death sentence, held that the trial court did not err in finding reliable and admitting the state's future dangerousness expert's opinion that the defendant would be a threat to society. The expert, an FBI agent who specialized in studying the sexual victimization of children, based his opinion on his study of over 1,000 cases, personal interviews with inmates convicted of child sex offenses, examination of inmates' psychological records, and study of the facts of the offenses involved. The *Nenno* court rejected the defendant's argument that the expert's opinion was not reliable because it did not rely on criteria substantially identical to the *Daubert* factors. Instead, the *Nenno* court concluded that "the four factors listed in *Daubert* do not necessarily apply outside of the hard science context; instead methods of proving reliability will vary, depending upon the field of expertise." *Id*. at *11 (citing the panel opinion in the present case, *Moore v. Ashland Chemical, Inc.*, 126 F.3d 679, 685-689 (5th Cir. 1997)).

Although the *Nenno* decision did not involve the testimony of a clinical physician as to cause of disease in a specific person,

the court relied directly upon the *Moore* panel decision and its underlying principle that the reliability of an expert witness's opinion ordinarily should be judged by whether it is soundly grounded in the methodology of the expert's discipline. Thus, *Nenno*, which permits experts to predict the future causation of criminal harm by a specific person without the support of any hard scientific, strict *Daubert* factor type methodology, is at odds with the premise of the present *en banc* majority opinion.

In similar manner, additional federal circuit decisions conflict in principle with the *en banc* majority opinion's insistence on an inflexible, unthinking application of the *Daubert* factors to expert opinions based on knowledge and methodology outside the realm of hard science. *E.g., Tyus v. Urban Search Management*, 102 F.3d 256, 263 (7th Cir. 1997)("Social science testimony, like other expert testimony . . . must be tested to be sure that the person possesses genuine expertise in a field and that her testimony adheres to the same standards of intellectual rigor that are demanded in her professional work." (internal quotation marks and brackets omitted); *Hose v. Chicago Northwestern Transp. Co*., 70 F.3d 968, 974 (8th Cir. 1995)(clinical physician's opinion that patient's inhalation of manganese caused patient's manganese encephalopathy was reliable although based only on patient history, laboratory studies of manganese levels in patient's body and work clothes, clinical examinations, a series of MRIs, and other doctors' reports); *United States v. Jones*, 107 F.3d 1147 (6th Cir.

1997)(although *Daubert*'s gatekeeper function is applicable to all expert testimony, the *Daubert* factors do not extend outside the hard scientific orbit to handwriting experts); *see also Tassin v. Sears, Roebuck and Co.,* 946 F.Supp. 1241, 1247-48 (M.D. La. 1996)(holding that for an expert's opinion to be considered reliable he must use the methodology of experts in his particular field).

The majority's opinion requiring a rigid, mechanical application of the *Daubert* factors beyond the ambit of the hard sciences also conflicts with the views of leading scholars, jurists and practitioners.[13] For example, the report of the

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[13]**In addition to the views expressed by commentators and practitioners, Stephen A. Saltzburg, et al. 2 FEDERAL RULES OF EVIDENCE MANUAL at 1250-1251 (7th ed. 1998) reports that:**

> **The Advisory Committee on Evidence Rules has made a determination that Rule 702 should be amended in light of Daubert and its progeny. The Advisory Committee has prepared a working draft for an amended 702, which, at this writing, has yet to receive final approval from the Committee. The working draft, which is adapted from a proposal by Professor Michael Graham, reads as follows:**
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> **Testimony providing scientific, technical or other specialized information, in the form of an opinion, or otherwise, may be permitted if:**
>
> **(1)the information is based upon adequate underlying facts, data or opinions;**
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> **(2)the information is based upon a methodology either (a) established to have gained widespread acceptance in the particular field to which the explanative theory belongs, or (b) shown to possess indicia of trustworthiness;**
>
> **(3)the methodology has been applied reliably to the facts of the case;**
>
> **(4) the witness is qualified as an expert by knowledge, skill, experience, training or education to provide such information; and**
>
> **(5) the information will assist the trier of fact to understand the evidence or to determine a fact in issue.**
>
> **While the language set forth above is still in**

American College of Trial Lawyers on Standards and Procedures For Determining the Admissibility of Expert Evidence After Daubert, 157 F.R.D. 571 (1994) recognizes that the basic *Daubert* requirement that a trial judge determine whether a proffer of expert testimony is reliable or valid applies to all forms of expert testimony and that the particular expert at issue should have her methodology, i.e. the validity of her opinion, judged by the principles applicable to "that particular field." *Id*. at 577. In regard to the specific *Daubert* factors which the majority so rigidly applies, the American College of Trial Lawyers' report concludes that:

> **. . . Justice Blackmun's "general observations" about the factors that a federal judge ought to consider in evaluating the soundness of scientific methodology, set forth in part II-C of his opinion, are specifically aimed at the evaluation of scientific testimony. Of course, some of these factors may be highly relevant to an evaluation of certain types of non-scientific expert evidence. For example, whether the proffered**

> **development, the Advisory Committee has agreed upon some general substantive points. First, the gatekeeper standards of Rule 702 must apply to all expert testimony..... Second, the reliability standards must apply not only to the theory or methodology used by the expert, but also to the application of that theory or methodology in the specific case.... Third, it does not pay to get too detailed about the factors that a Trial Judge should use in assessing reliability.... The risk of leaving out important reliability factors is especially great because experts in different fields will necessarily use different methodologies, and it would be very difficult to describe an all-inclusive list of reliability factors that would cover the testimony of all experts.**

> **methodology can be and has been tested may very well be pertinent to an examination of non-scientific but "technical" expert evidence. Peer review and publication may be an important factor with respect to testimony involving social sciences. And the "general acceptance" of a methodology within a particular discipline will be crucial in many cases. *The point is that any one of Justice Blackman's four factors may or may not have applicability to proffers of non-scientific expert evidence. The inquiry to be made concerns the fundamental principles by which the validity of a methodology is to be judged in the particular field of knowledge*. *Id.* (footnotes omitted)(emphasis added)**

Leading federal evidence commentators have noted that the *Daubert* opinion is ambiguous and has given rise to a number of interpretations. *E.g.* 29 Charles A. Wright and Victor J. Gold, FEDERAL PRACTICE AND PROCEDURE §6266 (1997). They observe that at its narrowest *Daubert* can be read to allow judges to exercise a signifigant gatekeeping function only in the case of expert testimony in the hard sciences based on novel theories and methodologies. *Id.* at 289. They further state that the broadest reading of *Daubert* is that it applies to all reliability issues presented by all expert testimony. *Id.* at 290. In rejecting the broadest view, Wright and Gold state:

> **This broadest interpretation of Daubert should be rejected. As noted above, it is inconsistent with both policy and precedent to make the admissibility of all expert testimony depend upon a showing that the**

> **expert's testimony is completely reliable in every respect. Since Daubert does not explicitly take such a position, and nothing in the Evidence Rules compels it, it seems unlikely that the Court intended such a departure from past practice. In overturning Frye, it is unlikely that the Court in Daubert sought to make the admission of scientific evidence harder. *Id.* at 290-91 (footnotes omitted).**

Professor Michael Graham contends that *Daubert* boxes the courts into working within a structure that has not functioned as anticipated by the Supreme Court and can fairly be said to not have functioned well at all. 2 Michael H. Graham, HANDBOOK OF FEDERAL EVIDENCE, §702.5, pp.22-26 (Supp. 1998). Graham strongly advises against a rigid application of the *Daubert* factors and suggests that:

> **Until the *Daubert* box is removed, on balance, it is suggested that *Daubert*'s gatekeeping language should be held by lower courts to apply to "scientific" evidence only. This interpretation is most consistent with the plain meaning of the opinion and the clear choice for liberalization if liberal admissibility is in fact the goal. Most importantly, nonapplication of judicial gatekeeping to "technical or other specialized knowledge" would prevent the hardship incurred by many plaintiffs in product liability litigation. Such an interpretation also avoids unthinking application of the four *Daubert* factors as well as the alternative trying process of developing a list of factors for determining whether a construction worker with 30 years of reinforced concrete experience is testifying to an explanative theory that is sufficiently trustworthy.**

Id. **at 25-26.**

In *Daubert*, the Supreme Court stated: "The inquiry envisioned by Rule 702 is, we emphasize, a flexible one." *Daubert,* 509 U.S. at 594. The *en banc* majority opinion, however, heedless of *Daubert*'s precept, and unmindful of the other circuits' unanimous adoption of a flexible approach in applying the *Daubert* factors, holds that district courts in this circuit must unthinkingly and rigidly apply the *Daubert* factors in assessing the reliability of a clinical physician's opinion as to the causal relationship between an individual's exposure to a chemical or substance and that person's disease or medical disorder.[14] This means, of course, that in cases such as the

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[14] The panel opinion in the present case, *Moore v. Ashland Chemical Co., Inc.*, 126 F.3d 679 (5th Cir. 1997), consistently with the foregoing authorities, concluded that: (1) the basic principles of the Federal Rules of Evidence recognized in *Daubert* apply to the admission or exclusion of every type of expert testimony; (2) a trial judge, therefore, must assess every proffer of expert testimony to determine whether it is relevant to the case and a reliable application of the principles and methodology of that expert's discipline; (3) the Supreme Court in *Daubert* interpreted "scientific knowledge" under Federal Rule of Evidence 702, for purposes of that case, to mean knowledge obtained and tested by the scientific method, i.e., "hard" scientific knowledge; (4) accordingly, the *Daubert* court indicated that a trial court should assess the reliability of expert testimony professedly based on "hard" scientific knowledge using several factors, the "*Daubert* factors," which are "hard" science methods or techniques; (5) clinical medicine (as opposed to research and laboratory medical science) is not, strictly speaking, a "hard" scientific discipline; its goals, subject matter, conditions of study, and well developed, sui generis methodology are quite different from that of purely "hard" science and its methodology; (6) Consequently, a trial judge assessing the reliability of the proffer of a clinical physician's expert testimony based on clinical medical knowledge, without purporting to be based on hard scientific methodology, should determine whether it is a sound application of the knowledge, principles and methodology of clinical medicine; (7) In the present

present one, in which the association between a specific chemical compound and a particular disease has not yet been, and perhaps never will be, subjected to hard science investigation, that the plaintiff will be unable to present any expert testimony that his or her exposure to the chemical compound was the probable medical cause of his or her disease.

The *en banc* majority adopts a mechanistic interpretation of the *Daubert* factors that threatens to require the exclusion from evidence of vast numbers of clinical medical opinions, although they are generally accepted as trustworthy by physicians practicing in their fields, and, until the majority's decision today, were routinely accepted as reliable by our courts both before and after *Daubert*. *See Carroll v. Morgan*, 17 F.3d 787, 789-90 (5th Cir. 1994). Disturbingly, the majority does not explain the reasons for its deviation from the other circuits or its departure from the prior precedent and practice in our courts. Ironically, the majority's divergence occurs in a rather run-of-the-mill setting, a case involving a clinical physician's opinion, based on generally accepted clinical methodology, as to the cause of a non-catastrophic disease following a person's episodic and traumatic occupational exposure to a chemical compound. Unlike *Daubert*, and other highly publicized toxic torts cases, the present case does not involve "junk science," or

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case, the district court committed an error of law by rigidly applying the "*Daubert* factors" and excluding the expert clinical physician's opinion because the doctor did not have any "hard" scientific data to support his clinical medical opinion.

purportedly hard scientific opinions, based on epidemiological and animal studies not generally accepted in their discipline, as to the surreptitious causal relationship between drugs or other substances and catastrophic systemic diseases or disorders such as cancer and birth defects.

(b)

Having depleted the ranks of medical causation experts available to plaintiffs suffering non-catastrophic chemical exposure injuries, the majority adds insult to injury by casting doubt on the importance of a principal element used by both hard scientific and clinical medical experts in determining whether there is a causal relationship between an individual's exposure to a substance and his or her disease viz., the temporal relationship between the person's exposure and the development of symptoms or signs of disease. The majority asserts that in the absence of an established scientific connection between exposure and illness or compelling circumstances, the temporal connection between exposure to chemicals and an onset of symptoms is entitled to little weight in determining causation. Maj. Op. at p. 19. This dictum conflicts with the great weight of scientific and judicial authority.

In the sphere of hard science, the opinion of an expert who opines that exposure to a compound caused a person's disease is "based on an assessment of the individual's exposure, including the amount, *the temporal relationship between the exposure and*

disease, and exposure to other disease-causing factors." Federal Judicial Center, REFERENCE MANUAL ON SCIENTIFIC EVIDENCE, p. 205 (1994)(emphasis added). The temporal relationship may either support or contradict causation. "In most ***acute*** injuries, there is a short time period between cause and effect. However, in some situations, the length of basic biological processes necessitates a longer period of time between initial exposure and the onset of observable disease." ***Id.*** at 207. Moreover, temporal relationship is one of the seven factors that an epidemiologist considers in determining whether the association between an agent and a disease is causal. ***Id***. at 161.

Courts and commentators have also recognized that the fact that an individual's symptoms followed an appropriate time after exposure is an important consideration in determining causation. ***E.g., Kannankeril v. Terminix Int'l., Inc***., 128 F.3d 802, 805, 809 (3rd Cir. 1997); ***Zuchowicz,*** 140 F.3d at 385 (affirming the admissibility of an expert whose "conclusion was based on the temporal relationship between the overdose and the start of disease and the differential etiology method of excluding other possible causes."); 1 Margie Searcy-Alford, A GUIDE TO TOXIC TORTS §10.03[2], p.10-69 (1998)("The fact that the symptoms follow an appropriate time after exposure does not prove causation, but it is an important consideration."); Stephen A. Saltzburg et al., FEDERAL RULES OF EVIDENCE MANUAL at 1233-1234 (7th ed. 1998); ***see Benedi v. McNeil-P.P.C., Inc.***, 66 F.3d 1378, 1384 (4th Cir. 1995); 3 Stuart M. Speiser et al., THE AMERICAN LAW OF TORTS §11.27,

at 465 (1986).

The district court case relied on by the majority, *Cavallo v. Star Enter.*, 892 F.Supp. 756 (E.D. Va. 1995), is distinguishable in numerous respects and does not support the majority's assertion that temporal relationship is entitled to "little weight" in the absence of compelling circumstances. In *Cavallo*, the plaintiff's exposure occurred in the open parking lot of a shopping mall during a five minute period at a distance of 500 feet from the source of the jet fuel fumes, the chemical substance at issue; she did not seek medical assistance until nine days later for her symptoms that resulted in an initial diagnosis of "conjunctivitis, or eye redness;" her experts did not have even a rough idea of the amount of her exposure; and there was no showing that the fumes the plaintiff inhaled from the defendant's alleged negligent spillage were actually more dense than the ordinary daily atmosphere in the shopping mall near defendant's petroleum distribution, mixing and transfer terminal. Significantly, Cavallo's experts did not have a material safety data sheet (MSDS) or full knowledge of some of the chemicals inhaled and, more importantly, they did not reliably use or apply the methodology of their own disciplines.

In sum, the *Cavallo* court ruled the experts' opinions inadmissible because their opinions were based almost exclusively on a very tenuous temporal and spatial connection between exposure and symptoms and because they significantly departed from the accepted toxicology methodology, while the defendant's

toxicology expert followed the generally accepted methodology of that discipline. *Id*. at 763, 773. Moreover, the *Cavallo* court never said that, in the absence of compelling circumstances, a temporal relationship is "entitled to little weight." Instead, that court merely observed that there may be instances where the temporal connection is so compelling as to dispense with the need for toxicologists to rely on the standard methodology of their discipline. *Id*. at 773.

(c)

As a coup de grace to inhalation injury claimants, the majority indicates that, if a plaintiff's expert does not have scientifically accurate measurements of the level of the plaintiff's exposure, "his causation opinion [will be] suspect even if he ha[s] scientific support for the position that the [chemical compound] could cause [the plaintiff's disease]." Maj. Op. p.19 n.9. The majority downplays the lethal swath of its new rule by suggesting that it applies here because of "the paucity of the facts Dr. Jenkins had available about the level of Mr. Moore's exposure." But the truth is that Dr. Jenkins had better information about the nature of the substances, the level of exposure, and its duration than experts in most inhalation accident cases.[15] "Only rarely are humans exposed to chemicals

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[15]As explained by the panel opinion:

> **From Moore's history that Dr. Jenkins had taken, he had information that before the exposure Moore was in good health, that two 400 pound drums of the chemicals had begun leaking in the back of Moore's truck at some**

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, p. 187 (1994). Consequently, the majority's rule will apply in virtually all inhalation cases to exclude the opinions of plaintiffs' experts as to specific medical causation even if they are fortunate enough to have hard science data supporting a general causal relationship or association between the chemical compound and the disease involved. The majority does not have even a paucity of authority to support this extra, gratuitous ratcheting down of inhalation

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> **time before his arrival at Ashland, that Moore's rig consisted of a diesel tractor and a 28 foot enclosed trailer, that after the discovery of the leakage upon arrival at Ashland the drums were allowed to continue to leak inside the trailer with the doors shut for another 45 minutes until the Ashland supervisor told Moore to remove them, that at this point the 400 pound drums had become light enough to allow Moore and others to roll them manually out onto the dock, that Moore and a co-employee worked in and around the trailer for about 45 to 60 minutes sprinkling "Absorbo" over the contaminated areas sweeping the saturated material into shovels, removing the materials from the trailer, and shoving the leaking drums into salvage drums, that Moore finished the cleanup at Ashland about 11:00 a.m., that Moore began to experience tightness of chest at about 11:45 a.m., that as his symptoms were continuing to worsen Moore consulted the company doctor who put him on oxygen and inhalants." *Moore,* 126 F.3d at 702.**
>
> **From this information, Dr. Jenkins was able to roughly estimate that Mr. Moore had been exposed to possibly "200 parts per million or higher" of the chemical compound. *Id.* at 695.**

accident victims' chances of recovery.

2.

The majority has conducted a trial de novo of the district court's preliminary assessment of whether the reasoning and methodology underlying Dr. Jenkins' testimony was reliable, substituting its own erroneous judgment and reasoning for that of the trial judge, rather than reviewing the district court's rulings and reasoning for abuse of discretion, *General Electric Co. v. Joiner,* 118 S.Ct. 512, 517 (1997), clearly erroneous factual findings, *Bourjaily v. United States*, 483 U.S. 171, 181 (1987), and errors of law, *Koon v. United States,* 518 U.S. 81, 100 (1996)("A district court by definition abuses its discretion when it makes an error of law").

In the district court proceedings, the defendants objected to the introduction of Dr. Jenkins' opinion as to the diagnosis and cause of Mr. Moore's disease on the grounds that the doctor lacked hard scientific support that the chemical compound involved could cause reactive airways disease. The district court admitted Dr. Jenkins' opinion that Mr. Moore had reactive airways disease but excluded Dr. Jenkins' opinion that the disease had been specifically caused by exposure to the chemical compound involved because Dr. Jenkins had not presented any hard scientific support for a general causal link or association

between that particular compound and that particular disease.[16]

The majority opinion retries the preliminary assessment of Dr. Jenkins' proffer de novo and concludes that (1) the district court was "entitled to conclude" that (a) Dr. Jenkins had not explained in sufficient detail how his differential diagnosis or etiology and his training and experience were helpful in reaching his conclusion on causation; (b) the MSDS had limited value in supporting Dr. Jenkins' opinion because he did not know what tests Dow had conducted in preparing the MSDS or what level of exposure was necessary for a person to sustain the injuries warned of in the MSDS; (c) Mr. Moore's asthma in his youth, history of smoking and recovery from pneumonia shortly before his exposure made Dr. Jenkins' opinion even more unreliable; and (d) the "analytical gap" between Dr. Jenkins's causation opinion and the scientific knowledge and available data advanced to support that opinion was too wide; and (2) Dr. Jenkins did not explain precisely how the irritating properties in the compound described by the MSDS were similar to those in other chemicals or compounds

[16]Dr. Jenkins performed a physical examination, took a detailed medical history, observed Moore on three occasions, reviewed the MSDS prepared by Dow Corning, and performed a series of tests on Moore including pulmonary function tests, a bronchodilator test, a spirometry test, a plethysmographic test, a lung volume determination, an intrapial gas distribution test, a diffusion test, an arterial bloods test, a mechanics test, X-rays, and laboratory tests. Dr. Jenkins reviewed the medical records and reports of a bronchodilator test performed by Dr. Simi two to three weeks after the accident that showed severe airways obstruction. Additionally, Dr. Jenkins reviewed a report of an allergy test performed by Dr. Alvarez, which ruled out allergic or immunologic disease and confirmed RADS. Finally, Dr. Jenkins also relied upon the temporal proximity between the exposure to the chemicals at the Ashland facility and the onset of symptoms.

that had been linked with reactive airways disease.

Dr. Jenkins testified that he did not know what tests Dow had performed in preparing the MSDS warnings of the hazards of the chemical compound. The district court commented on this fact but based its ruling on the lack of hard scientific support for the doctor's clinical medical opinion, not on his lack of knowledge of Dow's testing. The MSDS was introduced without objection and referred to in testimony by the experts on both sides, none of whom professed to have any knowledge of Dow's MSDS-related testing. The record clearly demonstrates that Dr. Jenkins used the MSDS only for the same purpose as did the other experts, merely as a source of information as to the kinds of chemicals in the compound to which Mr. Moore had been exposed. Thus, the district court evidently gave no weight to the experts' lack of knowledge of Dow's testing, and if it did find any relevance in this fact, it would have been clearly erroneous in doing so. *See Moore*, 126 F.3d. at 701.

The district court, moreover, did not base its decision on many of the findings and reasons that the majority now attributes to it. Neither the defendant nor the district court found any fault with Dr. Jenkins' qualifications[17], experience, testimony

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[17]The majority opinion fails to point out that Dr. Jenkins' qualifications were never an issue at any point in these proceedings. In fact, Dr. Jenkins was more than eminently qualified to render an opinion in this matter as a brief summary of his education, training and experience reveals. Dr. Jenkins received his medical degree from the University of Texas in 1940, received training at the University of Michigan Hospital as an intern, resident in Tuberculosis and Chest Disease and resident in Allergy in 1940-45, served as Instructor and Chief Resident in

regarding the similarity of irritating chemical properties, or his proper performance of differential etiology to eliminate alternative causes of Mr. Moore's disease. Because the defendant did not object to Dr. Jenkins' opinion on these grounds or question him on these points and the district court did not base its ruling on them, these issues should not be raised *sua sponte* by this court. The performance of physical examinations, taking of medical histories, and employment of reliable laboratory tests provide significant evidence of a reliable differential diagnosis and prima facie evidence that a doctor has considered alternative causes and has attempted to test his or her initial hypothesis as to cause. *See Paoli*, 35 F.3d at 759. The failure of the defendant or the district court to ask for, or the doctor's failure to volunteer, further elaboration on how each differential diagnosis test is designed to eliminate each alternative cause of disease or a chemistry professor's exegesis on the structure and composition of each chemical identified as having similar irritating properties, does not afford a proper basis for an appellate trial de novo on the record of the district court's preliminary assessment hearing.

Medicine and Assistant of Medicine and Physician in charge of the Tuberculosis and Chest Unit, University of Michigan Medical School, 1943 to 1947, was certified by the American Board of Internal Medicine in 1947, served in various capacities as a professor at Baylor College of Medicine from 1947-91 where from 1947-74 he was chief of the Pulmonary Disease Section and from 1975-91 chief of environmental medicine. Additionally, in the course of over fifty years of practicing medicine, Dr. Jenkins has examined and evaluated over 100 persons for injuries occurring from exposure to various chemical compounds in an occupational setting.

Likewise, the defendants did not contend, and the trial judge did not rule, that Dr. Jenkins' opinion was inadmissible because of Mr. Moore's childhood asthma, smoking or pneumonia. Dr. Jenkins concluded that the exposure to the chemical compound triggered Mr. Moore's reactive airways disease after taking these and all other relevant factors into consideration. The plaintiff is not required to prove that the exposure was the exclusive cause of the disease. It is well settled in Texas and elsewhere that a defendant takes the plaintiff as he finds him. *Coates v. Whittington,* 758 S.W.2d 749, 752 (Tex. 1988)(citing *Driess v. Friederick,* 11 S.W. 493, 494 (Tex. 1889)); *Mondragon v. Austin*, 954 S.W.2d 191, 194 (Tex. Ct. App. 1997); *see Maurer v. United States,* 668 F.2d 98, 99-100 (2nd Cir. 1981)("It is a settled principle of tort law that when a defendant's wrongful act causes injury, he is fully liable for the resulting damage even though the injured plaintiff had a preexisting condition that made the consequences of the wrongful act more severe than they would have been for a normal victim. The defendant takes the plaintiff as he finds him."); W. Page Keeton, et al., PROSSER AND KEETON ON TORTS §43 at 291-92 (5th ed. 1984).

The majority's most blatant addition of its own ex post facto finding and rationale in an effort to bolster the district court's ruling, however, is its erroneous claim that the district court found "that the 'analytical gap' between Dr. Jenkins's causation opinion and the scientific knowledge and available data advanced to support that opinion was too wide." Maj. Op. p. 21.

The district court made no such finding. The term "analytical gap," comes from the Supreme Court's *Joiner* opinion of 1997, *see* 118 S.Ct. at 519, and does not appear in the district court's 1995 ruling in the present case.[18] Moreover, as explained above,

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[18] In *General Electric Co. v. Joiner*, 118 S.Ct. 512 (1997), the Supreme Court held that abuse of discretion, rather than the particularly stringent standard of review applied by the court of appeals in that case, is the proper standard by which to review a district court's decision to admit or exclude scientific evidence. The plaintiff Joiner proffered expert testimony based on hard science methodology, animal and epidemiological studies, to prove that the defendants' PCBs and related products had caused his lung cancer. "Joiner's experts used a 'weight of the evidence' methodology to assess whether Joiner's exposure to transformer fluids promoted his lung cancer. They did not suggest that any one study provided adequate support for their conclusions, but instead relied on all the studies taken together (along with their interviews of Joiner and their review of his medical records)." *Id*. at 521 (Stevens, J. concurring in part and dissenting in part) (footnote omitted). The district court examined the studies and excluded the experts' opinions on the ground that none of the studies was sufficient alone to show a link between PCBs and lung cancer.

The Supreme Court held that the district court did not abuse its discretion in excluding the experts' testimony on grounds that the studies upon which the experts relied were not sufficient, whether individually or in combination, to support their conclusions. The Supreme Court remarked that "[a] court may conclude that there is simply too great an analytical gap between the data and the opinion proffered." *Id*. at 519.

In the present case, there was no "analytical gap" between Dr. Jenkins' data and his opinion that Mr. Moore's exposure caused his disease. In fact, the district court allowed Dr. Alvarez to use the identical data to express the same opinion. It is easy to see that the district court's decision in *Joiner* was reasonable and not an abuse of discretion because the plaintiff himself conceded that there was an analytical gap between each one of his expert's studies and the conclusion that PCBs caused his cancer. He argued, although unsuccessfully, however, that every analytical gap could be bridged if all of the experts' studies were considered in combination. In the present case, the district court excluded Dr. Jenkins' opinion simply because he did not have any hard scientific support for his clinical medical opinion, not because of a gap in reasoning. Dr. Jenkins' clinical medical opinion was, in fact, snugly based on the sound application of the well accepted methodology of his discipline. Thus, *en banc* the majority itself is simply attempting to bridge too great an analytical gap by

the district court based its decision on the same erroneous theory as the majority's primary rationale, i.e., that a clinical medical physician cannot express an admissible opinion, regardless of how soundly he or she relies on and applies well settled clinical medical methodology, unless the opinion is further supported by hard science, rigid *Daubert* factor type data.

Conclusion

In the final analysis, this case presents the legal question of the proper interpretation of Federal Rule of Evidence 702 and *Daubert* in cases involving expert witness proffers based on knowledge beyond the realm of hard scientific knowledge. Indeed, the majority *en banc* opinion is far too "rulefied" for anyone to seriously contend that it does not set broad, eccentric precedents that will profoundly affect the trials and outcomes in substantial numbers of future cases involving injuries and diseases alleged to have been caused by exposure to chemical compounds. The *en banc* majority, in my opinion, makes several errors of law, the most serious of which is its holding that a clinical medical expert, whose opinion is based on a sound application of the principles and methodology of his or her discipline, cannot reliably testify as to the causal relationship between and individual's exposure to a chemical compound and his

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trying to stretch *Joiner* to cover the present case.

or her subsequent onset of symptoms and disease. As a result of this error of law and others, the *en banc* opinion subverts the liberal thrust of the Federal Rules of Evidence and the principles enunciated in *Daubert* by locking the gate on causation evidence derived through the principles and methodology of clinical medicine.