MOORE v. ASHLAND CHEMICAL INC (1997)

United States Court of Appeals,Fifth Circuit.

Bob T. MOORE and Susan Moore, Plaintiffs-Appellants Cross-Appellees, v. ASHLAND CHEMICAL, INC. and Ashland Oil, Inc., Defendants-Appellees Cross-Appellants.

No. 95-20492.

Decided: October 20, 1997

Before DAVIS and DENNIS, Circuit Judges, and FALLON, District Judge 1:Before KING, JOLLY, HIGGINBOTHAM, DAVIS, JONES, SMITH, DUHÉ, WIENER, BARKSDALE, EMILIO M. GARZA, DeMOSS, BENAVIDES, STEWART, PARKER and DENNIS, Circuit Judges.*

Robert Dale Green, Michael L. Davis, Green, Davis & Barton, Houston, TX, for Bob and Susan Moore. Debora M. Alsup, Julie Caruthers Parsley, Thompson & Knight, Austin, TX, William Lowell Banowsky, Thompson & Knight, Dallas, TX, William Kyle Carpenter, Woolf, McClane, Bright, Allen & Carpenter, Knoxville, TN, for Ashland Chemical, Inc. and Ashland Oil, Inc. Terry Lynn Jacobson, Dawson, Sodd, Moe and Means, Corsicana, TX, for Dow Corning Corp. and CDC Services, Inc. David G. Matthiesen, Houston, TX, for CDC Services, Inc.

In this negligence case, we are called upon to determine the standards for assessing the reliability of the proffer of a clinical physician's expert opinion as to the cause of a plaintiff's disease in the light of Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993). We conclude that: (1) the basic principles of the Federal Rules of Evidence recognized by 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 reliable under the principles and methodology of the discipline involved; (3) the Supreme Court in Daubert interpreted "scientific knowledge" under Federal Rule of Evidence 702 to mean knowledge obtained and tested by the scientific method, i.e. "hard" or "Newtonian" 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 a hard science discipline; its goals, subject matter, conditions of study and well developed methodology are sui generis and quite different from that of 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 should determine whether it is soundly grounded in the knowledge, principles and methodology of clinical medicine; the "Daubert factors," which are techniques derived from hard science methodology, are, as a general rule, inappropriate for use in making the reliability assessment of expert clinical medical testimony.

The foregoing conclusions are the results of our conscientious efforts to determine the standard for admitting clinical medical testimony under the Federal Rules of Evidence as interpreted by the Supreme Court in Daubert and by this court in Watkins v. Telsmith, Inc., 121 F.3d 984 (5th Cir.1997) and other authorities cited herein. They represent neither a "let it all in" nor a "keep it all out" view. Instead, they reflect the interplay of the basic principles of the Federal Rules of Evidence, viz., the liberal standards of admissibility and relevance of Rules 401 and 402 and the assumption underlying Rules 702 and 703 "that the expert's opinion will have a reliable basis in the knowledge and experience of his discipline." Daubert, 509 U.S. at 587, 592, 113 S.Ct. at 2793, 2796.

I. Introduction

Plaintiffs-appellants, Bob T. Moore and his wife, Susan Moore, filed this suit against the defendants-appellees in Texas state court, alleging that Moore had contracted reactive airways disease as the result of the defendants-appellees' negligence in causing Moore to be exposed to a mixture of chemical gases on their premises. Defendants-appellees removed the suit to federal court on diversity grounds.

Before trial the plaintiffs proffered the testimony of two well credentialed clinical physician experts, Dr. Daniel Jenkins and Dr. Antonio Alvarez, who expressed identical opinions based on clinical medical methodology that Bob T. Moore suffered from reactive airways disease that had been caused by his inhalation of the mixture of chemical gases on defendants-appellees' premises. Dr. Jenkins based his opinion on his firsthand observations in examining and taking a history from Bob T. Moore,

on the results of tests he performed or had performed on Moore, and on facts and data he obtained from other physicians who had previously examined, tested and treated Moore. Dr. Alvarez essentially adopted the facts, data and conclusions developed and compiled by Dr. Jenkins. To confirm his opinion before the proffer, Dr. Jenkins reviewed and considered reports he received of Dr. Alvarez's subsequent treatment and allergy testing of Bob T. Moore. In response, the defendants-appellees moved to exclude the testimony of Dr. Jenkins and Dr. Alvarez on the grounds that the proffers failed to demonstrate reliable bases for their opinions.

The trial court concluded that the proffer of Dr. Jenkins' testimony demonstrated a reliable basis for his diagnosis of Moore's reactive airways disease. However, the court excluded Dr. Jenkins' opinion that Moore's exposure to the chemicals caused the disease on dual grounds, viz., (1) that under Federal Rule of Evidence 702 the opinion did not have a reliable basis, and (2) that under Federal Rule of Evidence 403 the probative value of the opinion was outweighed by the prejudice that would be caused by Dr. Jenkins' highly impressive qualifications. The trial court admitted Dr. Alvarez's opinions as to both diagnosis and cause of disease as evidentiarily reliable, despite the fact that Dr. Alvarez relied heavily on Dr. Jenkins' opinion and based his own opinion essentially on the same data that had been developed and used by Dr. Jenkins.

At the jury trial, Dr. Jenkins' testimony was limited to his diagnosis of Moore's disease and did not touch on causation. Dr. Alvarez testified as to both the diagnosis and the cause of the disease. Dr. Alvarez, however, was forced to admit that in forming his opinions he relied heavily on the work and opinions of Dr. Jenkins. Dr. Alvarez was unable to explain possible discrepancies in the data he used that had been compiled by Dr. Jenkins. Counsel for the defendants-appellees in closing argument pointed out that Dr. Alvarez was not as highly qualified as their medical causation expert who testified that Moore's disease had not been caused by exposure to the mixture of chemicals.

The jury answered “No” to an interrogatory asking whether the negligence, if any, of the defendants-appellees had proximately caused the injury in question. The district court entered a take nothing judgment against the plaintiffs. The plaintiffs appealed, assigning as error the trial court's ruling that excluded Dr. Jenkins' testimony as to his opinion or inference that Moore's disease had been caused by his exposure to the chemicals he encountered at the defendant-appellees' facility.

II. Daubert's Illumination and Impact

The trial court's oral ruling excluded Dr. Jenkins' opinion as to cause of disease under Rules 702 and 403, apparently based on the court's understanding of the Rules as interpreted and impacted by the Supreme Court's decision in Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993). Therefore, before analyzing the trial court's interpretation and

application of the law to the particular proffer of expert testimony, we will set forth our reading of the essential elements of the pertinent Federal Rules of Evidence that have been illumined and impacted by Daubert.

A. Rule 702

Rule 702 provides that:

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.

In admitting expert testimony, Rule 702 requires that two preliminary determinations be made by the trial court. First, the proffered witness must be qualified as an expert by knowledge, skill, experience, training, or education. Second, the proffered expert's opinion, inference or other testimony must be based on scientific, technical or other specialized knowledge that will assist the trier of fact to understand the evidence or determine a fact in issue. To facilitate discussion, we refer to these as the "qualifications" and "knowledge" components of Rule 702.

1. Qualifications

An expert must have scientific, technical or other specialized knowledge, and a witness may be qualified as an expert by reason of knowledge, skill, experience, training or education. Fed.R.Evid. 702; Christophersen v. Allied-Signal Corp., 939 F.2d 1106, 1110 (5th Cir.1991)(en banc). Rule 702, according to the Advisory Committee Note, permits expert testimony not only by experts carrying formal credentials such as university degrees and professional memberships but also by so-called skilled witnesses, whose experiences permit them to testify with authority on a given topic. Id. The areas of inquiry that expert testimony may address are similarly broad, including scientific and technical questions as well as any other areas of specialized knowledge. Id. The question of whether the witness is sufficiently qualified as an expert is a matter to be decided by the court pursuant to Rule 104(a). United States v. Normile, 587 F.2d 784 (5th Cir.1978); Loftin & Woodard, Inc. v. United States, 577 F.2d 1206 (5th Cir.1978). In making this inquiry, the trial court has wide discretion in determining the qualifications of a witness as an expert with respect to a particular subject. Hamling v. United States, 418 U.S. 87, 108, 94 S.Ct. 2887, 2902, 41 L.Ed.2d 590 (1974), reh'g denied, 419 U.S. 885, 95 S.Ct. 157, 42 L.Ed.2d 129 (1974); Robert v. Conti Carriers & Terminals, Inc. 692 F.2d 22 (5th Cir.1982).

In Daubert, the question of an expert's qualification under Rule 702 was not raised. The court stated that the experts were well or impressively credentialed. Daubert, 509 U.S. at 582-583, 113 S.Ct. at

2791-92. Accordingly, Daubert does not affect the foregoing principles pertaining to qualifications.

2. Knowledge

In Daubert v. Merrell Dow Pharmaceuticals, Inc., 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993), the Supreme Court was called upon to determine the standard for admitting expert scientific testimony in a federal trial. Id. at 582, 113 S.Ct. at 2791. The court had granted certiorari in light of sharp divisions among courts applying and rejecting the test of Frye v. United States, 54 App.D.C. 46, 47, 293 F. 1013, 1014 (D.C.Cir.1923) that expert opinion based on a scientific technique is inadmissible unless the technique is "generally accepted" as reliable in the relevant scientific community. Daubert, 509 U.S. at 585, 113 S.Ct. at 2792.

The court held that the Frye "general acceptance" test had been displaced by the Federal Rules of Evidence, observing that: Rule 702 specifically governing expert testimony does not establish "general acceptance" as an absolute prerequisite to admissibility; the drafting history of the rule does not indicate an intention to incorporate such a standard; and a rigid "general acceptance" standard would be at odds with the liberal thrust of the Federal Rules and their general approach of relaxing the traditional barriers to opinion testimony. Id. at 588-589, 113 S.Ct. at 2794-2795.

The Supreme Court also held that the Federal Rules require the trial judge to ensure that any and all scientific testimony or evidence admitted is not only relevant, but reliable. Id. at 589, 113 S.Ct. at 2794. Citing Rule 702 as the primary locus of this obligation, the court decided that the trial judge, when faced with a proffer of expert scientific testimony, must determine pursuant to Rule 104(a) whether the expert is proposing to testify to (1) scientific knowledge that (2) will assist the trier of fact to understand or determine a fact in issue. The court explained that this entails a preliminary assessment of whether the underlying reasoning of the scientific testimony is soundly grounded in scientific knowledge and methodology and can be relevantly applied to the facts in issue. Id. at 592, 113 S.Ct. at 2796.

a. Hard Scientific Knowledge

Speaking specifically of "scientific knowledge," the Court stated that the adjective " 'scientific' implies a grounding in the methods and procedures of science." Id. The Court elaborated:

" 'Science is not an encyclopedic body of knowledge about the universe. Instead, it represents a process for proposing and refining theoretical explanations about the world that are subject to further testing and refinement.' 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." Id. quoting from Brief for American Association for the Advancement of Science et al. as Amici Curiae 7-8. (Parentheses omitted; emphasis in original).

Thus, the Daubert Court defined "scientific knowledge" in terms of "hard science" or "Newtonian science" i.e., knowledge obtained and tested through "the scientific method," of which Sir Issac Newton was the leading exponent. See Edward J. Imwinkelried, The Next Step After Daubert, Developing A Similarly Epistemological Approach To Ensuring The Reliability of Nonscientific Expert Testimony, 15 Cardozo L.Rev. 2271, 2276-2277 (1994)(citing 5 The Encyclopedia of Philosophy 490-491 (Paul Edwards ed., 1967)); Jennifer Laser, Comment, Inconsistent Gatekeeping in Federal Courts: Application of Daubert v. Merrell Dow Pharmaceuticals, Inc. to Nonscientific Expert Testimony, 30 Loy. L.A.L.Rev. 1379, 1404 (1997); United States v. Hall, ---F.Supp. ----, ---- (C.D.Ill.1997); United States v. Starzecpyzel, 880 F.Supp. 1027, 1039 (S.D.N.Y.1995).

The methodology of hard or Newtonian science is what distinguishes it from other fields of human inquiry. See Michael D. Green, Expert Witnesses and Sufficiency of Evidence in Toxic Substances Litigation: The Legacy of Agent Orange and Bendectin Litigation, 86 Nw.U.L.Rev. 643, 645 (1992). "Scientific methodology today is based on generating hypotheses and testing them to see if they can be falsified.Theoretically, therefore, hypotheses are not affirmatively proved, only falsified. Of course, if a hypothesis repeatedly withstands falsification, one may tend to accept it even if conditionally true." Id. at 645-646 (citing Karl R. Popper, The Logic of Scientific Discovery (1965); David L. Faigman, To Have and Have Not: Assessing the Value of Social Science to the Law as Science and Policy, 38 Emory L.J. 1005, 1015-17(1989); Interdisciplinary Panel on Carcinogenicity, Criteria for Evidence of Chemical Carcinogenicity, 225 Sci. 682, 683 (1984)).

b. Knowledge Outside the Realm of Hard Science

In Daubert the Supreme Court noted that, although Rule 702 also applies to "technical, or other specialized knowledge," its discussion was "limited to the scientific context because that is the nature of the expertise offered here." Id. at 590 n. 8, 113 S.Ct. at 2795 n. 8. Nevertheless, we conclude that, except where it is self-evident that the court's remarks specifically apply only to "scientific knowledge," that the general principles of Rule 702 recognized by the decision are applicable to other species of expert testimony. Moreover, in Watkins v. Telsmith, 121 F.3d 984, 991 (5th Cir.1997), another panel of this court recently concluded that "whether an expert's testimony is based on 'scientific, technical or other specialized knowledge,' Daubert and Rule 702 demand that the district court evaluate the methods, analysis, and principles relied upon in reaching the opinion."

The Daubert court began by stating that "[w]e interpret the legislatively-enacted Federal Rules of

Evidence as we would any statute." Id. at 587, 113 S.Ct. at 2793(citing Beech Aircraft Corp. v. Rainey, 488 U.S. 153, 163, 109 S.Ct. 439, 446, 102 L.Ed.2d 445 (1988)) ("Because the Federal Rules of Evidence are a legislative enactment, courts turn to the 'traditional tools of statutory construction in order to construe their provisions.' ") Accordingly, a court must not be guided by a single sentence or member of a sentence, but look to the provisions of the whole law, and to its object and policy. United States Nat. Bank of Or. v. Independent Ins. Agents of America, 508 U.S. 439, 455, 113 S.Ct. 2173, 2182, 124 L.Ed.2d 402 (1993)(citing United States v. Heirs of Boisdore, 49 U.S. (8 How.) 113, 122, 12 L.Ed. 1009 (1849)). A statutory text consists of words living a communal existence, the meaning of each word informing the others and all taking their purport from their context. Id. at 454, 113 S.Ct. at 2182 (citing NLRB v. Federbush, Co., 121 F.2d 954, 957 (2nd Cir.1941)(L.Hand, J.)). The maxim noscitur a sociis, that a word is known by the company it keeps, is often used to avoid giving one word a scope inconsistent with its companions and thus giving " 'unintended breadth to the Acts of Congress.' " Gustafson v. Alloyd Co., 513 U.S. 561, 575, 115 S.Ct. 1061, 1069, 131 L.Ed.2d 1 (1995)(citing and quoting Jarecki v. G.D. Searle & Co., 367 U.S. 303, 307, 81 S.Ct. 1579, 1582, 6 L.Ed.2d 859 (1961)).

Consequently, the requirements that Daubert found to be inherent in Rule 702, viz., that the trial judge must ensure that the expert's evidence is not only relevant, but reliable, must be applicable to "technical, or other specialized knowledge," as well as to scientific testimony. Otherwise, Rule 702 would not place limits on the admissibility of non-scientific expert testimony comparable to those it imposes on purportedly scientific evidence.

Moreover, the Daubert opinion at several points clearly implies that it is drawing on principles of the Federal Rules that are generally applicable to all types of expert testimony. The court stated that "Rule 702 . clearly contemplates some degree of regulation of the subjects and theories about which an expert may testify." Daubert, 509 U.S. at 589, 113 S.Ct. at 2794. Further, the court observed that the premise for the relaxation of the usual requirement of first-hand knowledge when any type of qualified expert testifies is "an assumption that the expert's opinion will have a reliable basis in the knowledge and experience of his discipline." Id. at 592, 113 S.Ct. at 2796 Thus, Daubert plainly indicates that the trial judge, when faced with the proffer of expert testimony in any field of study, must determine whether the reasoning or methodology underlying the testimony is valid under the principles of the discipline involved. Id.; See American College of Trial Lawyers, Standards And Procedures For Determining The Admissibility Of Expert Evidence After Daubert, 157 F.R.D. 571, 578 (1994).

c. Reliability: The expert's opinion or inference must be grounded in the methodology of his discipline.

The Daubert court read Rule 702 to provide that " '[i]f 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.' " Daubert, 509 U.S. at 589, 113 S.Ct. at 2794 (emphasis by Court deleted). "Knowledge" in this context " 'applies to any body of known facts or to any body of ideas inferred from such facts or accepted as truths on good grounds.' " Id. at 590, 113 S.Ct. at 2795(quoting Webster's Third New International Dictionary 1252 (1986)).

In Daubert, the Court indicated that, (1) "scientific knowledge" within Rule 702 means principles, theories, techniques or inferences derived by the scientific method or by a body of sound scientific methods; and (2) that the proffered expert's opinion, inference, or testimony based on scientific knowledge, in order to have evidentiary reliability or trustworthiness, must be derived or inferred by the same methods. Id. at 590 n. 9, 113 S.Ct. at 2795; See also the court's "general observations" on principal scientific methods. Id. at 593-594, 113 S.Ct. at 2796-2797.

By the same token, we conclude that, under Rule 702, an opinion based on other technical or specialized knowledge, must be grounded in the principles, methods and procedures of the particular field of knowledge involved. Every discipline employs a body of methods, rules, and postulates, i.e., methodology, both in its ordinary functions and in developing and adopting new concepts, techniques, and analogues. Therefore, the "knowledge" of each discipline, under Rule 702, is both its principles and methodology and the theories, techniques or inferences produced through its methodology. Thus, the proffered opinion of any expert in a field of knowledge, in order to be evidentiarily reliable, must either be based soundly on the current knowledge, principles and methodology of the expert's discipline or be soundly inferred or derived therefrom.

As the American College of Trial Lawyers' report concludes, "[W]hether the testimony concerns economic principles, accounting standards, property valuation or other non-scientific subjects, it should be evaluated by reference to the 'knowledge and experience' of that particular field. To that extent, Daubert ought to be regarded as universally applicable to expert evidence." American College of Trial Lawyers, Standards and Procedures for Determining the Admissibility of Expert Evidence after Daubert, 157 F.R.D. 571, 579 (1994).

For the same reasons, this court recently held in Watkins v. Telsmith, Inc., 121 F.3d 984 (5th Cir.1997) that the application of Daubert in determining the admissibility of expert testimony is not limited to "scientific knowledge" or "novel" scientific evidence. Id. at 989-991. Moreover, in Watkins, this court concluded that:

[W]hether an expert's testimony is based on "scientific, technical or other specialized knowledge," Daubert and Rule 702 demand that the district court evaluate the methods, analysis, and principles

relied upon in reaching the opinion. The court should ensure that the opinion comports with applicable professional standards outside the courtroom and that it "will have a reliable basis in the knowledge and experience of [the] discipline."

Id. at 991(quoting Daubert, 509 U.S. at 592, 113 S.Ct. at 2796.) (also citing and quoting Cummins v. Lyle Indus., 93 F.3d 362, 366-371 (7th Cir.1996)(Rule 702 demands that experts "adhere to the same standards of intellectual rigor that are demanded in their professional work." Id. at 369)(citing Rosen v. Ciba-Geigy Corp., 78 F.3d 316, 318 (7th Cir.1996))); See also Tyus v. Urban Search Management, 102 F.3d 256, 263 (7th Cir.1996)("Social science testimony . must be tested to be sure that the person possesses genuine expertise in a field and that her court testimony 'adheres to the same standards of intellectual rigor that are demanded in [her] professional work.' ")(quoting Braun v. Lorillard Inc., 84 F.3d 230, 234 (7th Cir.1996)).

d. Relevance: The opinion or inference must be relevant to the case.

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. Daubert, 509 U.S. at 590, 113 S.Ct. at 2795. " 'Expert testimony which does not relate to any issue in the case is not relevant and, ergo, non-helpful.' 3 Weinstein & Berger ¶ 702[02], p. 702-18. See also United States v. Downing, 753 F.2d 1224, 1242 (3d Cir.1985)('An additional consideration under Rule 702-and another aspect of relevancy-is whether expert testimony proffered in the case is sufficiently tied to the facts of the case that it will aid the jury in resolving a factual dispute'). " Id. at 591, 113 S.Ct. at 2795. "The study of the phases of the moon, for example, may provide valid scientific 'knowledge' about whether a certain night was dark, and if darkness is a fact in issue, the knowledge will assist the trier of fact. However (absent creditable grounds supporting such a link), evidence that the moon was full on a certain night will not assist the trier of fact in determining whether an individual was unusually likely to have behaved irrationally on that night." Id.

e. The trial judge is the gatekeeper.

Accordingly, when faced with a proffer of a qualified expert's testimony to scientific, technical or other specialized knowledge, the trial judge must determine at the outset, pursuant to Rule 104(a), whether the proffered opinion or inference is soundly grounded in the methodology of the expert's discipline and whether that opinion or inference is relevant to a fact in issue or to an understanding of the evidence. Cf. Daubert, 509 U.S. at 589-592, 113 S.Ct. at 2794-2796.

The Court emphasized that the trial judge's inquiry under Rule 702 is a flexible one. Different approaches may be permissible, but the focus must be on the principles and methodology upon

which the expert's opinion is based, not on the merits of the expert's conclusion. Id. at 594-595 n. 12, 113 S.Ct. at 2797-2798. "Vigorous cross-examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence." Id. at 596, 113 S.Ct. at 2798 (citing Rock v. Arkansas, 483 U.S. 44, 61, 107 S.Ct. 2704, 2714, 97 L.Ed.2d 37 (1987)). "Additionally, in the event the trial court concludes that the scintilla of evidence presented supporting a position is insufficient to allow a reasonable juror to conclude that the position more likely than not is true, the court remains free to direct a judgment, Fed. Rule Civ. Proc. 50(a), and likewise to grant summary judgment, Fed. Rule Civ. Proc. 56." Id. (citing cf., e.g., Turpin v. Merrell Dow Pharmaceuticals, Inc., 959 F.2d 1349 (6th Cir.), cert. denied, 506 U.S. 826, 113 S.Ct. 84, 121 L.Ed.2d 47 (1992); Brock v. Merrell Dow Pharmaceuticals, Inc., 874 F.2d 307 (5th Cir.1989), modified, 884 F.2d 166 (5th Cir.1989), cert. denied, 494 U.S. 1046, 110 S.Ct. 1511, 108 L.Ed.2d 646 (1990)).

f. The Daubert "factors" are hard scientific methods that generally are inappropriate for the reliability assessment of clinical medical testimony.

After declaring that evidentiary reliability of an expert's scientific opinion depends on whether it is soundly grounded in the the scientific method, the Daubert Court identified several individual methods or techniques within the body of hard or Newtonian scientific methodology as appropriate for trial judges' use in testing the methodology-relatedness of particular hard scientific opinion proffers. Daubert, 509 U.S. at 593, 113 S.Ct. at 2796. These hard scientific methods, now sometimes called "Daubert factors," are empirical testing, peer review and publication, known or potential rate of error, the existence and maintenance of operational standards, and acceptance within a relevant scientific community. Id. at 593-94, 113 S.Ct. at 2796-2797.

Because the objectives, functions, subject matter and methodology of hard science vary significantly from those of the discipline of clinical medicine, as distinguished from research or laboratory medicine, the hard science techniques or methods that became the "Daubert factors" generally are not appropriate for assessing the evidentiary reliability of a proffer of expert clinical medical testimony.

First, the goals of the disciplines of clinical medicine and hard or Newtonian science are different. In hard science, the usual motive is inquiring: to gain a new understanding of some mechanism of nature. Alvan R. Feinstein, Clinical Judgment 22 (1967)[hereinafter Feinstein]. In contrast, the care and treatment of the individual patient is the ultimate, specific act that characterizes a clinical physician. Id. at 27; Pellegrino and Thomasma, For The Patient's Good 71 (1988); Pellegrino and Thomasma, A Philosophical Basis of Medical Practice 120 (1981)("[T]he whole process is ordained to a specific practical end-a right action for a particular patient-and . this end must modulate each step

leading to it in important ways."). The clinical physician, therefore, must take account of the immediacy of the problem confronting her for she bears an essential relationship to each patient. Additionally, she has many human values to consider-ethics, compassion, and must have a willingness to take responsibility in the face of the unknown. Edmond A. Murphy, The Logic of Medicine 6 (1976)[hereinafter Murphy]. The pursuit of these different goals of hard science and clinical medicine serves to shape the distinct objectives of the scientific experiment and the clinical treatment of a patient:

In clinical treatment, the main motives are remedial, or prophylactic: to change what nature has done or to prevent what it may do. In laboratory work, the premise is innovative: the goal is to test a new hypothesis or a new procedure. In ordinary clinical treatment, the premise is repetitive: the goal is to reproduce (or surpass) the best results of experiments conducted before in similar circumstances. A clinician chooses treatment in a new situation by reviewing what was done and what happened in previous situations that resembled the one at hand; he then selects whatever mode of treatment had the most successful outcome in the past. Id. at 22.

In ordinary clinical treatment, the purpose is not to gain new knowledge but to repeat a success of the past. Id. at 23.

Second, the subject matter and conditions of study are different. "In laboratory work, the experimental material is an intact animal, a part of a person or of an animal, or an inanimate system; in clinical treatment, the material is an intact human being." Id. at 22. The hard scientist initiates the experiment at a time of his own convenience and chooses the material usually without regard to its desire or consent for participation. Id. In clinical medicine, the patient initiates the treatment, choosing the time, place, duration, and clinician. Id. "The physician is not studying the properties of chemical compounds in a test tube; he cannot postpone dealing with cancer in a patient for fifty years because he hopes by then to have a much clearer insight into the nature of the disorder." Id.

Finally, clinical medicine and hard science have markedly different methodologies. A clinician observes at least three types of data for each patient who undergoes treatment: A disease in morphologic, chemical, microbiologic, physiologic, or other impersonal terms; the host in whom the disease occurs and his environmental background, including his personal properties (such as age, race, sex, and education) and external surroundings (such as geographic location, occupation, and financial and social status) before the disease began; and the illness that occurs in the interaction between the disease and its environmental host, consisting of clinical phenomena: the host's subjective sensations, or "symptoms," and "signs," which are findings discerned objectively during the physical examination. Feinstein, at 24-25.

Using these data, the clinician determines a present diagnosis (which gives the disease a name and tells what is wrong), a past etiology and pathogenesis (or how it got that way), and a future prognosis and therapy (or what to do about it). Id. at 25. Some of the data used by the clinician can often be obtained by examining the patient's fluids, cells, tissues, excreta, roentgenograms, graphic tracings, and other derivative substances. The patient's personal environmental data can often be elicited by nurses, secretaries, social workers, or other interviewers. But the history-taking, physical examination, and the determination of symptoms and signs can properly be done only by a doctor skilled in the clinical procedures described above. Id. "Moreover, the [clinical physician's] capacity to make judgments in cases of a kind which he has never seen before must depend ultimately on a cultivated capacity to see equivalences between quite disparate things, that is, on analogy." Murphy, at 9.

In sum, hard or Newtonian scientific knowledge does not comprehend all subjects that theoretically might be subjected to its methodology. It is knowledge of a particular and limited kind, gathered or tested by a particular and characteristic method. T.H. Savory, The Language of Science (1953). Although clinical medicine utilizes parts of some hard sciences, clinical medicine and many of its subsidiary fields are not hard sciences. The purposes, criteria, values and methods of hard or Newtonian science and clinical medicine are far from identical. Fred A. Mettler, The Medical Sourcebook xxxiv (1959). Consequently, the Daubert factors, which are hard scientific methods selected from the body of hard scientific knowledge and methodology generally are not appropriate for use in assessing the relevance and reliability of clinical medical testimony. Instead, the trial court as gatekeeper should determine whether the doctor's proposed testimony as a clinical physician is soundly grounded in the principles and methodology of his field of clinical medicine.[2]

B. Rule 703

Rule 703 provides that:

The facts or data in the particular case upon which an expert bases an opinion or inference may be those perceived by or made known to the expert at or before the hearing. If of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject, the facts or data need not be admissible in evidence.

Prior to Daubert, this court took the position that, before admitting expert testimony, a trial court, as part of or in addition to its preliminary inquiry under Rule 703, must apply the Frye test, i.e., the court must determine that the witness used a well-founded methodology or mode of reasoning sufficiently established to have gained general acceptance in the particular field in which it belongs. Christophersen v. Allied-Signal Corp., 939 F.2d 1106, 1110, 1111, 1115 (5th Cir.1991). In Daubert,

however, the Supreme Court held that the Frye "general acceptance" test was displaced by the adoption of the Federal Rules of Evidence. Daubert, 509 U.S. at 588-589, 113 S.Ct. at 2793-2794. The court stated that the "general acceptance" test is at odds with the "liberal thrust" of the Federal Rules of Evidence and their "general approach of relaxing the traditional barriers to 'opinion' testimony," and concluded that Frye is "incompatible with the Federal Rules of Evidence [and] should not be applied in federal trials." Id. Therefore, any requirement that the trial court apply the Frye "general acceptance" test in determining the admissibility of expert testimony under the Federal Rules of Evidence is no longer tenable in light of the Supreme Court's decision in Daubert that the test should not be applied in federal trials. Accordingly, we now read the Federal Rules of Evidence, including Rule 703, without the influence of a Frye-focal lens.

Under rule 703, a qualified expert may apply his relevant and reliably grounded knowledge and expertise to facts and data in the particular case in order to form and express a pertinent opinion or inference. The facts or data may be derived from (1) the first hand observation of facts, data, or opinions perceived by the witness before trial, (2) the facts, data or opinions presented at trial (as by the familiar hypothetical question or by having the expert attend the trial and hear the testimony establishing the facts, data, and opinions relied on), or (3) facts, data or opinions presented to the expert outside of court other than by his own direct perception. Fed.R.Evid. 703 advisory committee's note. If they are of a type reasonably relied upon by experts in the field, such facts, data or opinions presented to the expert out of court need not be admitted or even admissible in evidence. United States v. Harper, 802 F.2d 115, 121 (5th Cir.1986). The rule is designed to bring the judicial practice into line with the practice of experts themselves when not in court. United States v. Williams, 447 F.2d 1285, 1290 (5th Cir.1971), cert. denied, 405 U.S. 954, 92 S.Ct. 1168, 31 L.Ed.2d 231 (1972), reh'g denied, 405 U.S. 1048, 92 S.Ct. 1308, 31 L.Ed.2d 591 (1972). The Advisory Committee Note accompanying Rule 703, in part, states:

Thus a physician in his own practice bases his diagnosis on information from numerous sources and of considerable variety, including statements by patients and relatives, reports and opinions from nurses, technicians and other doctors, hospital records, and X rays. Most of them are admissible in evidence, but only with the expenditure of substantial time in producing and examining various authenticating witnesses. The physician makes life-and-death decisions in reliance upon them. His validation, expertly performed and subject to cross-examination, ought to suffice for judicial purposes.

See also United States v. Burrell, 505 F.2d 904 (5th Cir.1974); United States v. Williams, 447 2d. at 1290.

The question of whether facts, data or opinions not admitted in evidence are of a type reasonably

relied upon is a preliminary one for the court. Bauman v. Centex Corp., 611 F.2d 1115 (5th Cir.1980); United States v. Lawson, 653 F.2d 299 (7th Cir.1981), cert. denied, 454 U.S. 1150, 102 S.Ct. 1017, 71 L.Ed.2d 305 (1982); Michael H. Graham, Handbook of Federal Evidence § 703.1 (4th Ed.1996). Although only the terms "facts or data" appear in Rule 703, an opinion not in evidence, even if not admissible, may also form the basis of an expert's opinion if reasonably relied upon by experts in the particular field. See Graham, at p. 109-110, n. 18 (citing the Advisory Committee Note to Rule 703). In determining the preliminary question of whether reliance by the expert is reasonable, the party calling the witness must satisfy the court, both that such facts, data or opinions are of the type customarily relied upon by experts in the field and that such reliance is reasonable. See Christophersen v. Allied-Signal, Corp., 939 F.2d 1106, 1113-1114 (5th Cir.1991) (en banc); Bryan v. John Bean Div. of FMC Corp. 566 F.2d 541, 544-47 (5th Cir.1978). But see Peteet v. Dow Chemical Co. 868 F.2d 1428, 1432 (5th Cir.1989), cert. denied, 493 U.S. 935, 110 S.Ct. 328, 107 L.Ed.2d 318 (1989) (in making the 703 determination, "the trial court should defer to the expert's opinion of what data they find reasonably reliable."); See also, 3 Weinstein's Evidence ¶ 703 [03] at 703-17(1981).

Daubert's description of the trial judge's duty as gatekeeper under Rule 702 sheds light on her duty in this capacity under Rule 703 and the relationship between these duties. The trial judge's duty under Rule 702 is to determine whether the expert is qualified; whether his proffered opinion is grounded in the methodology of his discipline, i.e., the body of principles, methods, rules and postulates of his field of expertise; and whether his opinion is relevant to the case. In Daubert, the Supreme Court stated that a judge assessing a proffer must also pay attention to Rule 703, which "provides that expert opinions based on otherwise inadmissible hearsay are to be admitted only if the facts or data are 'of a type reasonably relied upon by experts in the particular field in forming opinions or inferences upon the subject.' " Daubert, 509 U.S. at 595, 113 S.Ct. at 2797. Accordingly, the trial judge as gatekeeper has a duty under Rule 703 to determine whether such facts and data not admitted in evidence are of the type customarily relied upon by experts in the field and whether such reliance is reasonable.

Therefore, it may be inferred that the duties of a judicial gatekeeper in assessing an expert opinion under Rules 702 and 703 are roughly similar to those of an appellate court in reviewing the combined legal and factual decisions of a trial judge. This is because the expert and the trial judge perform similar functions in applying specialized knowledge to facts to reach a conclusion or decision about an issue in a case. Consequently, the appellate court and the gatekeeper also perform similar functions in reviewing the work of the trial court and the expert to determine whether their conclusions are soundly grounded in the correct principles of knowledge and are based on properly and reasonably found facts and data.

C. Rule 403

Rule 403 provides that:

Although relevant, evidence may be excluded if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury, or by considerations of undue delay, waste of time, or needless presentation of cumulative evidence.

The Supreme Court in Daubert admonished that a judge performing her gatekeeping duties under Rule 702 should also be mindful of other applicable rules, including Rule 403. Daubert, 509 U.S. at 595, 113 S.Ct. at 2797. The court stated that "Rule 403 permits the exclusion of relevant evidence 'if its probative value is substantially outweighed by the danger of unfair prejudice, confusion of the issues, or misleading the jury.' " Id. The court quoted Judge Weinstein as explaining: " 'Expert evidence can be both powerful and quite misleading because of the difficulty in evaluating it. Because of this risk, the judge in weighing possible prejudice against probative force under Rule 403 of the present rules exercises more control over experts than over lay witnesses.' Weinstein, 138 F.R.D., at 632." 509 U.S. at 595, 113 S.Ct. at 2797.

As Rule 403 favors the admissibility of relevant evidence, such evidence is to be excluded only if its probative value is substantially outweighed by the danger of unfair prejudice. United States v. Davis, 639 F.2d 239, 244 (5th Cir.1981); See 22 Wright & Graham, Federal Practice and Procedure: Evidence § 5221. Moreover, Rule 403 is an extraordinary remedy to be used sparingly because it permits the trial court to exclude otherwise relevant evidence. E.g., United States v. Thevis, 665 F.2d 616, 633, (5th Cir. Unit B), cert. denied, 456 U.S. 1008, 102 S.Ct. 2300, 73 L.Ed.2d 1303 (1982). There must be a danger of unfair prejudice, not merely the danger of prejudice inherent in any relevant evidence; and its probative value must be substantially outweighed by that danger. As this court stated in United States v. McRae, 593 F.2d 700, 707 (5th Cir.), cert denied, 444 U.S. 862, 100 S.Ct. 128, 62 L.Ed.2d 83 (1979):

Relevant evidence is inherently prejudicial; but it is only unfair prejudice, substantially outweighing probative values, which permits exclusion of relevant matter under Rule 403. Unless trials are to be conducted on scenarios, on unreal factors tailored and sanitized for the occasion, the application of Rule 403 must be cautious and sparing. Its major function is limited to excluding matter of scant or cumulative probative force, dragged in by the heels for the sake of its prejudicial effect. As to such, Rule 403 is meant to relax the iron rule of relevance, to permit the trial judge to preserve the fairness of the proceedings by exclusion despite its relevance. It is not designed to permit the court to" 'even out' the weight of the evidence, to mitigate a crime, or to make a contest where there is little or none." (emphasis in original)

"Virtually all evidence is prejudicial or it isn't material. The prejudice must be 'unfair.' " Dollar v. Long Mfg. N.C., Inc., 561 F.2d 613, 618 (5th Cir.1977), cert. denied, 435 U.S. 996, 98 S.Ct. 1648, 56 L.Ed.2d 85 (1978). The Advisory Committee Note on Rule 403 provides that "[u]nfair prejudice within this context means an undue tendency to suggest decision on an improper basis, commonly, though not necessarily, an emotional one." For example, evidence may be unfairly prejudicial because it appeals to the jury's sympathies, arouses its sense of horror, provokes its instinct to punish, triggers other mainsprings of human action, or may cause a jury to base its decision on something other than the established propositions of the case. 3 Weinstein & Berger ¶ 403[03] 403-37 to 403-40 (citing authorities including United States v. Bowers, 660 F.2d 527 (5th Cir.1981); United States v. Osum, 943 F.2d 1394, 1404 (5th Cir.1991); United States v. Kang, 934 F.2d 621, 628 (5th Cir.1991)). In addition, evidence may threaten "confusion of the issues, or misleading the jury" when "the probability that the proof and the answering evidence that it provokes may create a side issue that will unduly distract the jury from the main issues." McCormick, McCormick On Evidence § 185(West 2d ed.1972); See Ford v. Sharp, 758 F.2d 1018 (5th Cir.1985).

III. Background Facts

On April 23, 1990, Bob T. Moore, a delivery truck driver for Consolidated Freightways, Inc., a motor freight company, delivered a shipment of solvents containing mixed chemicals to Ashland Chemical, Inc. Bart Graves, Ashland's plant manager was on the loading dock when Moore arrived. When the back door of the trailer opened, chemical gases were escaping from two leaking drums. Graves notified Dow Corning Corporation, the manufacturer and shipper of the chemical solvents, of the spill and requested clean up instructions. At Graves' request, Dow Corning faxed him a copy of the Material Safety Data Sheet ("MSDS") regarding the spilled chemical solvents. The MSDS notified Graves of the nature of the chemical contents in the solvents and the health problems associated with exposure to the chemical mixture's vapors.[3]

Significantly, the MSDS stated that the solvents contained a blend of chemicals, including toluene, naphtha, and propylene glycol methyl ether. It warned that inhalation of their vapors could result in injury to the blood, liver, lungs, kidneys, and nervous system. To prevent such injuries, the MSDS cautioned that, in the event of a spill, respiratory protection equipment should be worn unless there is adequate ventilation, or the level of contaminants was below a specified level.

Moore was not shown or informed of the contents of the MSDS.

Moore's rig consisted of a diesel tractor and a 28 foot enclosed trailer. Ventilation in the trailer was limited. Moore told Graves that he wanted to return to Consolidated Freightways and have other employees clean it out. Graves told Moore, however, that the bill of lading would not be signed until

after the spill in the trailer was cleaned up. Moore telephoned his supervisor who told Moore to comply with Ashland's demands regarding the spill clean up. Graves directed Moore to clean up the trailer by placing absorbent material on the chemicals, sweeping them up, and disposing of them in "overpacks" to be placed in the leaking drums.

During the clean up, Moore informed Graves of his recent recovery from pneumonia and requested the use of a respirator to which Graves had access. Graves refused, despite his knowledge of the lack of ventilation in the trailer. Graves also failed to measure the amount of contaminants in the trailer, although he had access to a meter provided by Ashland for this purpose. The clean up job took between 45 minutes and an hour. Within an hour or so after cleaning up the spill, Moore began to suffer dizziness, watery eyes, and difficulty in breathing.

When he returned to Consolidated Freightways, Moore informed his supervisor that he was sick and he was sent to the company doctor. The next day, Moore saw his family physician, who treated him for two to three weeks. Moore then placed himself under the care of Dr. Simi, a pulmonary specialist. Dr. Simi prescribed medication for Moore and released him to work. Moore returned to work during June 1990, but terminated his employment a few weeks later because of his respiratory difficulties.

On June 26, 1990 and subsequently, Moore was seen by Dr. Daniel Jenkins, a pulmonary, environmental and internal medicine specialist. After seeing Moore three times in June, July and August 1990, Dr. Jenkins diagnosed Moore's condition as reactive airways dysfunction syndrome ("RADS"). On November 29, 1990, Moore was seen by Dr. Antonio Alvarez, a pulmonary and internal medicine specialist, who became his treating physician. Dr. Alvarez confirmed and adopted Dr. Jenkins' diagnosis and treated Moore for his disease up to and during the trial. By this time, Moore's condition had deteriorated, he was still unable to work, and he was forced to carry a container of oxygen at all times.

IV. Moore's Proffers of Expert Clinical Medical Testimony

The plaintiffs set out to prove that Moore's personal injury, viz., his reactive airways disease, was proximately caused by his exposure to the mixture of chemicals he encountered at Ashland's premises. Moore's case depended on expert testimony that his disease was reactive airways disease and that it had been caused by his exposure to the chemicals at Ashland. The plaintiffs proffered the opinions and inferences of Dr. Daniel E. Jenkins and Dr. B. Antonio Alvarez based on their clinical medical knowledge and facts and data in this particular case for these purposes.

A. Dr. Jenkins

Dr. Jenkins received his medical degree from the University of Texas in 1940. He received medical training at the University of Michigan Hospital as an intern, resident in medicine, resident in Tuberculosis and Chest Disease, and resident in Allergy in 1940-1945. The American Board of Internal Medicine certified him in 1947. Between 1943 and 1947 he served as Instructor and Chief Resident in Medicine and as Assistant Professor of Medicine and Physician in charge of the Tuberculosis and Chest Unit, University of Michigan Medical School. From 1947 to 1991 he served as Assistant Professor, Associate Professor, and Professor of Medicine at Baylor College of Medicine, Houston, Texas. From 1947 to 1974 he was Chief, Pulmonary Disease Section, Baylor College of Medicine. From 1975 to 1991 he was Chief, Environmental Medicine, Baylor College of Medicine. In 1991, he went into practice with The Respiratory Consultants of Houston, consisting mostly of a group of physicians that he had trained. He is either Attending Physician or Consultant in Medicine or Pulmonary Medicine at eight Hospitals in Houston, Texas. Additionally, Dr. Jenkins is a member of sixteen national, state and local medical organizations and has served as president or chairman of a section for three of them.

In formulating his opinion, Dr. Jenkins personally took a detailed medical history from Moore, performed a thorough physical examination, personally observed him three times, performed or supervised a series of tests on Moore including pulmonary function tests, a bronchial challenge test, a bronchodilator test, a spirometry test, a plethysmographic test, a lung volume determination, an intrapul gas distribution test, a diffusion test, an arterial bloods test, a mechanics test, X-rays, and laboratory tests, reviewed the medical records and reports of Dr. Alvarez and Dr. Simi, including a report of the bronchial dilator test by Dr. Simi two or three weeks after the accident that showed severe airways obstruction and a report of an allergy test performed by Dr. Alvarez-among some fifteen reports of examinations and tests by him-that ruled out allergic or immunologic disease and confirmed reactive airways disease as the proper diagnosis of Moore's illness, reviewed the material safety data sheet “MSDS” prepared by Dow Corning, and consulted a medical treatise, Carl Zenz, Occupational Medicine: Principles and Practical Application (2d ed.1988) and other medical literature.

In his proffered testimony, Dr. Jenkins explained that reactive airways disease, also known as reactive airways dysfunction syndrome (RADS), is recognized in the field of clinical medical knowledge as a disorder consisting of a reactive obstruction of air passageways in the bronchial trees and the lower respiratory tract, producing labored breathing, wheezing, shortness of breath, coughing and the raising of phlegm. Dr. Jenkins' testimony as to the nature and symptoms of reactive airways disease was accepted as accurate by the parties and other experts on both sides. In the history taken by Dr. Jenkins, Moore reported that he had been in comparatively good health until about one hour after his exposure to the chemical gases at Ashland when he began to experience these types of

symptoms. In his physical examinations and tests of Moore, Dr. Jenkins observed symptoms and signs of reactive airways disease. Dr. Jenkins stated that the objective medical tests performed by him and the several doctors who had seen Moore after his exposure indicated conclusively that Moore was not malingering.

Dr. Jenkins offered his opinion that Moore suffered from reactive airways disease that had been caused by Moore's exposure to gases emanating from a spill of blended chemicals which Moore had cleaned up without a respirator. He testified that the manufacturer's material safety data sheet stated that the principal substances contained in the mixture of chemicals that Moore breathed were toluene, naphtha, and propylene glycol methyl ether, and that all of these have irritating properties. He further stated that any chemical with irritating properties can cause reactive airways disease in a person who is capable of responding in that way. Dr. Jenkins also stated that toluene, one of the chemicals to which Moore was exposed, is similar to the chemical nature of other properties upon which there have been written articles on reactive airways disease. Dr. Jenkins testified that, based on the history given by Moore that a substantial amount of the mixed chemical solvent had leaked onto the truck-trailer floor from two 55 gallon drums while the cargo was enclosed and en route, he roughly estimated that Moore had been exposed to 200 parts per million or higher of the chemical vapors. Dr. Jenkins also testified that Moore informed him that neither Ashland nor anyone else had taken air samples with mechanical devices at the time of Moore's exposure.

Although Dr. Jenkins acknowledged that he could not recall having seen a patient who had been exposed to the same chemicals under the same circumstances, he testified that he had examined and evaluated over one hundred other patients who had been exposed to chemicals under various circumstances. During Dr. Jenkins' deposition, the interrogating lawyers and the doctor sometimes referred to the mixed chemical spillage as “toluene,” which was in fact just one of its many ingredients. But a fair reading of the deposition as a whole clearly indicates that when the lawyers and Dr. Jenkins used the word “toluene” they intended to refer to the chemical mixture containing toluene and simply called the solvent mixture “toluene” for the sake of convenience. Dr. Jenkins' proffered testimony was that, based on his education, knowledge, training, and experience, personal examination of Moore, personal taking of Moore's history, supervision and study of his own tests on Moore, review and study of other doctors' reports, tests and opinions, study of a medical treatise and numerous medical literature articles, he concluded that Moore's exposure to the mixture of chemical gases contained in the solvent to which he was exposed caused his disease, because any chemical with irritating properties can cause reactive airways disease, and each of the chemicals in the solvent mixture had irritating properties.

B. Dr. Alvarez

Dr. Alvarez testified that he was born in Mexico and came to the United States in 1964 for internship and residency in internal medicine, followed by two years of fellowship in pulmonary at the Baylor College of Medicine in Houston. Dr. Daniel E. Jenkins was one of Dr. Alvarez's professors at the Baylor College of Medicine. Dr. Alvarez had practiced in Houston since 1973 and was on the active staff of three, and courtesy staff of one, Houston area hospitals.

At the proffer stage, Dr. Alvarez, offered his opinion based on clinical medical knowledge as an internist and pulmonary specialist, enhanced by his experience in having seen fifty to sixty patients injured from exposure to chemicals, and on the facts and data contained in the medical history taken by Dr. Jenkins, the X-rays and numerous medical tests performed by Dr. Jenkins, a sinus X-ray, an allergy or RAST test performed by Dr. Alvarez tending to rule out allergies as the cause of the illness, numerous physical examinations and observations of Moore, and the manufacturer's material data sheet pertaining to the chemicals to which Moore was exposed. Applying his knowledge, education, training and experience to these facts and data, but admittedly relying heavily on Dr. Jenkins' work and opinion, Dr. Alvarez expressed his opinion that Moore suffered from reactive airways disease that had been caused by his inhalation of chemical gases while he was cleaning up the chemical spillage at Ashland. When asked whether he relied heavily on the evaluation and documentation provided from Dr. Jenkins, Dr. Alvarez replied “very much.” In addition, he testified that he had not seen the history and evaluations of Dr. Warren Simi first hand. Dr. Alvarez was asked how important it was to know the duration of an exposure, the amount of chemical present, the dimensions of the area or enclosure, the ventilation, and the temperature. In response, Dr. Alvarez indicated that if such data were available it would be very important, but, he explained, it is always very difficult for a medical doctor, who must make decisions as to causation and diagnosis in treating patients accidentally exposed to chemicals or other toxic substances, to obtain exact or mechanically measured data on these issues because of the very fact that the injury always results from an accident and not a controlled experiment.

C. Dr. Jenkins' opinion as to causation was soundly grounded in traditional clinical medical knowledge, principles and methodology.

Dr. Jenkins, a specialist in pulmonary and environmental disease, based his opinion on principles, theories, methodology and techniques, which are well accepted within his discipline. In summary, the proffered testimony of Dr. Jenkins reflects that he: 1) Examined Moore personally: Dr. Jenkins saw Moore on three occasions, between June 26, and August 1, 1990. On each occasion the doctor personally observed the patient. The doctor performed a thorough physical examination of Moore. (Personal observation has always been an adequate basis for an expert's opinion, and indeed has been called “ ‘the most desirable of all bases.’ ” 3 Weinstein ¶ 703[01], 703-7; Rheingold, The Basis

of Medical Testimony, 15 Vand.L.Rev. 473, 489 (1962)). 2) Personally took a detailed medical history from Moore: Dr. Jenkins personally took Moore's history involving his health and the accident in an interview of approximately one and one-half hours. ("Reliance on patient statements to render a medical opinion is usually justified as trustworthy because patients have a strong incentive to tell their treating physician the truth-the desire to recover." In re Agent Orange Product Liability Litigation, 611 F.Supp. 1223, 1246 (E.D.N.Y.1985); Rheingold, supra at 495; Ferebee v. Chevron Chemical Co., 736 F.2d 1529, 1535 (D.C.Cir.1984)(especially when corroborated by medical records, physical examination, and medical tests); See O'Gee v. Dobbs Houses, Inc., 570 F.2d 1084 (2d Cir.1978); Birdsell v. United States, 346 F.2d 775, 780 (5th Cir.1965); Rheingold, supra at 488.) 3) Used Differential Diagnosis and Etiology: In his determination of the cause and nature of the disease, Dr. Jenkins performed or supervised a series of tests on Moore. He studied, compared and synthesized the results so as to eliminate all possibilities but the most likely diagnosis and cause of the disorder.

The gamut of tests performed on Moore included pulmonary function tests, a bronchial challenge test, a bronchodilator test, an allergy test, X-rays, and laboratory tests. Dr. Jenkins and Dr. Alvarez testified that it would have been impossible for Moore to fake RAD signs on the objective tests. See Birdsell v. United States, 346 F.2d 775, 779-780 (5th Cir.1965) ("[T]he physician making a diagnosis must necessarily rely on many observations and tests performed by others and recorded by them; records sufficient for diagnosis in the hospital ought to be enough for opinion testimony in the courtroom."; McCullock v. H.B. Fuller Co., 61 F.3d 1038, 1043-1044 (2nd Cir.1995); Benedi v. McNeil-P.P.C., Inc., 66 F.3d 1378, 1384 (4th Cir.1995)). 4) Reviewed tests, reports and opinions of other doctors: Dr. Jenkins reviewed the records and reports of Dr. Simi, who had seen Moore shortly after the accident. Dr. Jenkins testified that Dr. Simi's records showed even more severe airways obstruction in response to bronchial dilators which indicated there was not any question that Moore had acquired reactive airways disease. Dr. Jenkins also stated that he had reviewed the allergy studies performed by Dr. Alvarez that confirmed the reactive airways disease diagnosis and ruled out an allergic or immunologic disease as the cause. (Reliance on reports and observations of other physicians and medical technicians is accepted practice in medical field and may be relied on by expert witnesses. Jenkins v. United States, 307 F.2d 637 (D.C.Cir.1962)). 5) Reviewed the MSDS: The Occupational Safety and Health Act authorizes the Secretary to promulgate safety and health standards and requires employers to comply with them. 29 U.S.C. §§ 654(a)(2), 655. Pursuant thereto, the Hazard Communication Standard, 29 C.F.R. § 1910.1200, requires that a manufacturer of hazardous chemicals inform its own employees and downstream employers and employees of the dangers posed by the chemicals. The manufacturer is required to prepare a material safety data sheet (MSDS) for each hazardous chemical, including the identity of the chemical; health hazards posed; and handling precautions. See Martin v. American Cyanamid Co., 5 F.3d 140 (6th Cir.1993) Dr. Jenkins and Dr. Alvarez reviewed the MSDS that Dow Corning provided with the chemicals to

which Moore was exposed. The MSDS is a type of fact or data reasonably relied upon by medical experts in forming opinions or inferences as to medical causation. See McCullock v. H.B. Fuller Company, 61 F.3d 1038, 1044 (2d Cir.1995). Because federal regulations require manufacturers to truthfully disclose in the MSDS the identity and health hazards of materials, it is reasonable for medical experts to rely at least in part on the MSDS in forming diagnostic and causal opinions. See also Peteet v. Dow Chemical Co., 868 F.2d 1428, 1432 (5th Cir.1989)("In making this determination, the trial court should defer to the expert's opinion of what data they find reasonably reliable.") 6) Referred to medical literature on the properties of irritant chemicals that cause RAD: Dr. Jenkins relied on a medical treatise, Carl Zenz, Occupational Medicine: Principles and Practical Application (2d Ed.1988), and a number of published articles in medical literature in forming his opinion or inference that the chemicals to which Moore was exposed were irritants that caused Moore's RAD. ("Facts or data found in the literature of the profession, even though not themselves admissible in evidence, properly form a part of the basis for an expert's opinion." Bauman v. Centex Corporation, 611 F.2d 1115, 1120, n. 6 (5th Cir.1980) (quoting Nanda v. Ford Motor Co. 509 F.2d 213, 222 (7th Cir.1974))). 7) Utilized his training and experience: During his 53 years of medical practice, Dr. Jenkins had a considerable amount of experience with injuries caused by occupational inhalants. Due to the chemical industries along the Gulf Coast, inhalant disease victims were a large part of the patients seen by the Pulmonary and Environmental Medicine sections that Dr. Jenkins headed at Baylor College of Medicine at Houston, Texas for a combined period of 43 years. Dr. Jenkins had been called upon to make a determination whether a particular condition was caused by a particular chemical on more than one hundred occasions. (A witness's training and long experience may qualify him as an expert and enable him to assist the jury regarding subjects within his training and experience. United States v. Chappell, 6 3d. 1095, 1100 (5th Cir.1993); United States v. Hernandez-Palacios, 838 F.2d 1346, 1350 (5th Cir.1988); West Wind Africa Line, Ltd. v. Corpus Christi Marine Services Co., 834 F.2d 1232, 1236 (5th Cir.1988)).

V. Trial Court's Rulings

The defendants moved in limine to exclude the testimony of both Dr. Jenkins and Dr. Alvarez. After the pre-trial in limine hearing, the trial court admitted the testimony of Dr. Jenkins as to diagnosis and that of Dr. Alvarez as to both the diagnosis and the cause of Moore's disease. At that hearing, however, the trial court apparently did not reach a final decision with respect to the proffered testimony of Dr. Jenkins as to cause of disease. The trial court's sketchy oral remarks indicate that a ruling was withheld pending the presentation of further testimony by Dr. Jenkins to explain his deposition and affidavit that plaintiffs had filed in opposition to the defendants-appellees' motion in limine. On a later date during a break in the trial, while the jury was out, the court heard additional testimony by Dr. Jenkins and ultimately decided to exclude his testimony with respect to the cause of

Moore's disease. The court gave only very brief oral reasons for its ruling.

The pre-trial in limine hearing consisted of arguments by counsel, interspersed with the court's questions and the attorneys' colloquies with the bench, suggesting but not clearly defining the reasons for the court's inclination to exclude Dr. Jenkins' testimony as to cause of disease. The court clearly concluded that Dr. Jenkins was qualified as an expert and could testify as to his diagnosis and treatment of Moore. R. Vol. 6 at 27. But the court stated that it could not determine whether Dr. Jenkins had probative and reliable underlying evidence from which to infer a causal link between the exposure and the disease. Id.

During the pre-trial in limine hearing the court was confused as to whether Moore had been exposed to a single chemical, toluene, or to a mixture of several chemicals, one of which was toluene. At this point, the court apparently did not have a full understanding of Dr. Jenkins' deposition or the contents of the chemical mixture disclosed by the manufacturer's MSDS. In response to the court's question, plaintiffs' counsel stated, and defendants-appellees' attorneys tacitly agreed, that Moore was exposed to a mixture of chemical gases, including, but not limited to, toluene. Id. at 23-24. Also, one of the defendants-appellees' attorneys told the court that the chemical mixture contained "propylene glycol methyl ether, toluene, and naphtha." [4] Id. at 23. When informed by plaintiffs' counsel that Dr. Jenkins stated in his affidavit and in his deposition that the mixture of chemical irritants caused Moore's reactive airways disease, the court agreed except for stating that it was not sure that Dr. Jenkins had so stated in his deposition. Id. at 28. Dr. Jenkins had, in fact, testified in his deposition that Moore was exposed to the mixture of chemicals listed in the Manufacturer's MSDS. During the deposition, the attorneys had sewn seeds of confusion, however, by referring frequently to the whole mixture incorrectly as "toluene," sacrificing accuracy for the sake of brevity. Despite the agreement and understanding of counsel at the pre-trial in limine hearing that Moore was exposed to a mixture of chemicals, the court continued to labor under confusion.

Later, focusing on Dr. Jenkins' affidavit, the court stated "I don't know where he got that information. I don't know whether the chemical irritants he's discussing include toluene. I don't know whether you need to have some significant level of exposure to toluene." Shortly thereafter, the court concluded the hearing as to Dr. Jenkins' testimony, stating "[a]s the motion in limine, Defendant's motion is granted if-I mean, the Defendants, I believe, have put you on notice that they want to explore the basis for this. So that's-He can't just say its generally accepted, blah, blah, blah.He doesn't know where that information is derived.I can't assess it because I haven't heard what it is." Id. at 30. From this and later events, we conclude that the court was inclined to grant the defendant-appellees' motion in part but withheld its ruling to permit the plaintiffs to put on additional proffer testimony as to the basis of Dr. Jenkins' causation opinion.

Without interruption in the pretrial hearing, the court turned to the proffer of Dr. Alvarez as both a diagnosis and causation witness. The court immediately made clear that it did not consider the proffer of Dr. Alvarez's causation testimony to be fatally flawed by the lack of exact information as to the duration of exposure, the amount and identity of the chemical, the dimension of the area, or the ventilation of the area. In response to defendants-appellees' argument to the contrary, the court asked: "Why doesn't that go to credibility?" Id. at 32. Later, the court said that arguments as to "the importance of the exposure and the like" will go to the weight of Dr. Alverez's testimony rather than to its admissibility. Id. at 37. Still later, the court observed, "there's nothing before me that indicates that exposure levels are dispositive of such a causal link. There's merely evidence that it's an important factor." Id. at 38.

After hearing arguments, the trial court concluded that Dr. Alvarez could testify as to his opinion that Moore's exposure to the chemicals caused his reactive airways disease, because: He testified that reactive airways disease is closely related to asthmatic conditions, pneumochemical exposures, and the like. His deposition laid the groundwork for an opinion that toluene can be the cause of reactive airways disease. He made a broad assertion of studies, findings, generally accepted medical data, and the like. He had a number of statements and opinions in his deposition that were quite different and distinguishable from Doctor Jenkins. "For instance, the RAST testing which showed that it wasn't an allergic condition which lent credibility to an opinion, it was a chemical exposure, those sorts of things." Id. at 37-38. In conclusion, the court stated, "Doctor Alvarez can indeed testify.I do believe he testified to matters other than a speculative causal link in that he tied it to the testing that eliminated an allergic cause, et cetera." Id. at 54.

On a later date, during a recess of the trial, while the jury was out, the trial court permitted plaintiffs to present the live testimony of Dr. Jenkins in support of their proffer of his expert opinion as to cause of disease. Previously, at the commencement of the trial, the manufacturer's MSDS, which clearly listed the various chemicals in the mixture to which Moore had been exposed, had been introduced as plaintiffs' exhibit no. 16 without objection. Nevertheless, the trial court continued to be plagued by confusion as to the nature of the chemicals involved and its failure to understand that Dr. Jenkins' opinion was based on the fact that Moore had been exposed to the whole mixture of irritating chemicals and not just to the chemical toluene. Dr. Jenkins testified again that, in his opinion, based on his examinations, history taking, and testing of Moore, and the MSDS, the cause of Moore's airways disease was his inhalation of the mixture of chemical substances to which he was exposed; that the principal chemicals in the mixture with irritating properties were toluene, naphtha, and propylene glycol methyl ether; that any chemical with irritating properties can cause reactive airways disease in a subject who is capable of responding in that way; that Moore had a reactive airways predisposition or inheritance; that the absence of an article saying that toluene causes the disease is

not determinative because many substances cause the disease that have not yet been addressed in published articles; and that toluene is similar to the chemical nature of other properties causing the disease about which articles have been published.

At the conclusion of Dr. Jenkins' testimony, the trial court stated, "I don't think this meets the 702 test .for a number of reasons." Still hampered by an incomplete understanding of Dr. Jenkins' deposition, the court stated that "when asked if there was any scientific support for a diagnosis of causation between exposure to toluene and reactive airways disease, he had no such literature or research to back up such causation determination." R. Vol. 10 at 154. The court, also misunderstanding Dr. Jenkins' live testimony, stated that "[t]oday he said nothing other than he relied upon the MSDS, which listed a number of other chemicals, and from that stated that some of these other chemicals are known to lead to reactive airways disease, ergo his conclusion that toluene leads to reactive airways disease." Id. Further, the court again misconstrued Dr. Jenkins live testimony, stating that his testimony was not necessary because "his entire causation testimony is based upon the MSDS," which, "is in evidence." Id. at 155. Also, the court gave as a reason for its ruling the fact that Dr. Jenkins had no scientifically exact information concerning "the level of exposure, amount of exposure, and duration of exposure." Finally, in its remarks pertaining to its Rule 702 ruling, the court stated that Dr. Jenkins had acknowledged that he was not familiar with what type of research techniques the manufacturer used to determine and articulate the warnings of dangers from exposure to the chemical mixture that the manufacturer placed in the MSDS. Id. at 156. Alternatively, the court excluded Dr. Jenkins' testimony as to causation under Rule 403 because "it would be highly prejudicial and misleading to have the jury accept from Dr. Jenkins' history and credentials that his opinion as to causation is other than scientific speculation, because that's what I heard him testify to." Id. at 155.

VI. Standards Of Review

The general rule is that the trial court has broad discretion in the matter of admission or exclusion of expert evidence, and its action is to be sustained unless manifestly erroneous. Salem v. United States Lines Co., 370 U.S. 31, 82 S.Ct. 1119, 8 L.Ed.2d 313 (1962); Congress & Empire Spring Co. v. Edgar, 99 U.S. 645, 658, 25 L.Ed. 487 (1878); Guillory v. Domtar Industries, Inc., 95 F.3d 1320, 1329 (5th Cir.1996); United States v. Moore, 997 F.2d 55 (5th Cir.1993); Carroll v. Morgan, 17 F.3d 787 (5th Cir.1994); McCullock v. H.B. Fuller Co., 61 F.3d 1038 (2d Cir.1995). However, we have held that even though the trial court's discretion to admit or exclude evidence is generally broad, competent evidence cannot be excluded without a sound and acceptable reason. Equal Employment Opportunity Commission v. Manville Sales Corp., 27 F.3d 1089, 1092 (5th Cir.1994); Davidson Oil Country Supply Co. v. Klockner, Inc., 908 F.2d 1238, 1245 (1990).

Moreover, the Supreme Court has indicated that the trial court's determination of preliminary questions of facts concerning the admissibility of evidence under Rule 104(a) should be reviewed by the clearly erroneous standard. Bourjaily v. United States, 483 U.S. 171, 181, 107 S.Ct. 2775, 2781, 97 L.Ed.2d 144 (1987); See 2 Childress & Davis, Federal Standards of Review, § 11.04, p. 11-22 (2d Ed.1992). In Daubert, the Supreme Court reaffirmed Bourjaily, citing it in stating that proof of such facts should be established by a preponderance of proof. Daubert, 509 U.S. at 592 n. 10, 113 S.Ct. at 2796 n. 10 (citing Bourjaily, 483 U.S. at 175-176, 107 S.Ct. at 2778-2779). Regarding the clearly erroneous standard, this court and a substantial number of the other courts of appeal have held that mixed questions of law and fact, legal inferences from the facts, or the application of law to the facts are not protected by the clearly erroneous rule and are freely reviewable. United States v. LULAC, 793 F.2d 636, 642 (5th Cir.1986); Carpenters Amended & Restated Health Benefit Fund v. Holleman, 751 F.2d 763, 767 (5th Cir.1985); United States v. Grayson State Bank, 656 F.2d 1070, 1075 (5th Cir.1981), cert. denied, 455 U.S. 920, 102 S.Ct. 1276, 71 L.Ed.2d 460; Washington v. Watkins, 655 F.2d 1346, 1353 (5th Cir.1981), reh'g denied, 662 F.2d 1116, cert. denied, 456 U.S. 949, 102 S.Ct. 2021, 72 L.Ed.2d 474; See 9A Wright & Miller, Federal Practice & Procedure § 2589 at 608 (2d Ed.1995) (citing authorities); See also Childress & Davis, supra at 11-22 (“Because abuse of discretion review and clearly erroneous review tend to merge when the discretionary judgment calls overlay fact decisions, it is unlikely that the outcome is much altered in most cases.”)

VII. Analysis of Trial Court's Ruling

A. The trial court's ruling was based on numerous clearly and manifestly erroneous findings of facts.

The trial court clearly erred in several preliminary factual findings concerning the admissibility of Dr. Jenkins' testimony under Rule 104(a), viz., (1) that Dr. Jenkins did not consider the results of the allergy test performed by Dr. Alvarez; (Dr. Jenkins testified that he reviewed the allergy test results in determining his final diagnosis and etiology. Moreover, the test results tended to rule out allergies, thus confirming Dr. Jenkins' opinion that Moore's disease stemmed from his exposure to the chemical mixture.) (2) that Dr. Alvarez expressed “a number of statements and opinions” in his deposition that were distinguishable from those of Dr. Jenkins; (Except for Dr. Jenkins' more impressive qualifications and experience, there was no material difference between the bases of medical knowledge underlying the doctors' opinions because Dr. Alvarez relied almost totally on the work, analysis and opinions of Dr. Jenkins. The trial court clearly erred in its single attempt to point to a specific difference, i.e., in its erroneous statement that Dr. Jenkins had not reviewed or considered the results of Dr. Alvarez's allergy test.) (3) that Moore was exposed to toluene only, rather than to a mixture of chemicals; (The MSDS introduced into evidence at the beginning of the trial clearly listed the mixture of chemicals to which Moore had been exposed. Dr. Jenkins' and Dr.

Alvarez testified that, according to the histories taken from Moore and the MSDS, Moore was exposed to a mixture of chemicals, not merely to toluene. Moreover, attorneys for both sides expressly and tacitly agreed to this established fact during the pre-trial in limine hearing.) (4) that at the second proffer hearing Dr. Jenkins said he relied entirely on the MSDS; (Dr. Jenkins, in both his live and deposition testimony, stated that he based his opinion on his examinations, history taking, testing and reviewing other doctors' work on Moore's illness, and only partly on the MSDS. Dr. Jenkins's testimony before the court was clearly supplementary to the proffer of his testimony by way of deposition and affidavit and not in lieu thereof.)

Additionally, the trial court clearly misunderstood the lack of relevance of the fact that Dr. Jenkins' candidly acknowledged that he did not know how the manufacturer assessed the dangers of its product for purposes of affixing the MSDS warnings. Dr. Jenkins did not propose to testify to any knowledge or opinion based on the MSDS warnings, much less to base his opinion as to cause of disease on the warnings. Dr. Jenkins, in arriving at his opinion, used the MSDS only as a source of information as to the types of chemicals that Moore had inhaled. The MSDS was introduced into evidence without objection at the commencement of trial. Moreover, Dr. Alvarez referred to the MSDS for this purpose during his deposition, affidavit and live testimony proffer without any protest by the court or the defendants-appellees. During the trial Dr. Alvarez and Dr. Robert Jones, the defendants-appellees' expert witness on causation, referred to the MSDS for this purpose without objection from the court or the parties. There was no evidence that Dr. Alvarez or Dr. Jones had any knowledge of the research techniques that the manufacturer used in formulating the MSDS warnings. The absence of such knowledge was totally irrelevant to the proposed or actual testimony of any of the expert medical witnesses, including that of Dr. Jenkins.

Hence, the trial court manifestly erred, clearly erred and abused its discretion by relying on these plainly erroneous facts and understandings.

B. Erroneous determinations of mixed questions of law and fact, legal inferences from the facts, and applications of law to the facts; and abuse of discretion in such determinations, inferences and applications.

1. Under Rule 702

The trial court erred in applying Rule 702 to exclude Dr. Jenkins' testimony that Moore's inhalation of the mixture of chemical gases caused his reactive airways disease. Rule 702, as illumined by Daubert, requires that an expert's opinion or inference be soundly grounded in the principles and methodology of his or her discipline. The opinion of Dr. Jenkins was well grounded in the principles and methodology of his field of clinical medicine. Because Dr. Jenkins did not use any novel

technique, method or principle, but employed only the traditional medical knowledge within his field, we conclude that the opinion of Dr. Jenkins was soundly grounded in the principles, experience and methodology of his discipline.

As we noted above, most of the trial court's reasons for excluding Dr. Jenkins' testimony as to cause of disease under Rule 702 were invalid because they were based on the court's clearly erroneous factual findings and its misunderstanding of the relevance of facts clearly established by the record. The single remaining reason assigned by the trial court for its ruling, i.e., that Dr. Jenkins had no scientifically precise information concerning the "level of exposure, amount of exposure, and duration of exposure," reflects the trial court's error and abuse of discretion in applying Rule 702 to the proffer of Dr. Jenkins' opinion based on clinical medical knowledge. By this statement, of course, the trial court did not mean that Dr. Jenkins had no information whatsoever concerning the levels of exposure that could be harmful to a person susceptible to reactive airways disease or the amount and the duration of Moore's exposure to the mixture of chemicals. 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 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 shortness of breath, wheezing, and 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.[5] Obviously, the trial court meant that because no one had taken any air samples or timed Moore's encounter with the mixture of chemicals with a stop watch, Dr. Jenkins did not have scientifically precise exposure information in terms of parts per million and exact minutes and seconds; and that because there had been no known experiments on humans or animals with the particular mixture of chemicals involved, Dr. Jenkins could not have had precise scientific information as to the safe or unsafe exposure levels for average or hypersensitive persons with respect to the risk of reactive airways disease. Plaintiffs' exhibit 7, pp. 1-4.

The goals, principles and methodology of clinical medicine do not require or permit a clinical physician to determine by hard scientific testing the precise amount of a deleterious substance that an accident victim inhaled or the exact duration during which he breathed it in before the doctor must

make the interrelated decisions as to diagnosis, cause and prognosis of a pulmonary or airways disease. Likewise, a clinical physician cannot ethically or practicably delay decisions as to diagnosis-etiology until she conducts experiments with humans or animals to determine the safe level of exposure for average or highly susceptible persons with respect to substances that previously have not been tested or addressed by medical literature. Consequently, as Dr. Jenkins, Dr. Alvarez, and even Dr. Jones, the defendant-appellees' expert, testified, scientifically exact information as to "the level of exposure, amount of exposure, and duration of exposure" is virtually never available to a clinical physician after an inhalation accident or episode. When assessing the basis of Dr. Alvarez's opinion, the trial court correctly ruled that the lack of precise exposure data will go to the weight of his testimony rather than to its admissibility. Yet the trial court inexplicably reversed field and made crucial the importance of precise exposure data in incorrectly and arbitrarily excluding Dr. Jenkins' opinion on cause of disease. Because of the trial court's allusions to lack of "scientific support" and to "scientific speculation" when discussing the proffer of Dr. Jenkins' opinion, we infer that the trial court may have misapplied the "Daubert factors," hard scientific methods appropriate for testing proffers of hard scientific evidence, to the proffer of Dr. Jenkins' opinion based on clinical medical knowledge. The trial court's error in this regard, of course, was compounded by its erratic failure to apply the same reasoning to the proffer of Dr. Jenkins' opinion as it had to Dr. Alvarez's testimony. Accordingly, we conclude that the trial court manifestly erred and abused its discretion in deciding that the lack of precise, hard scientific exposure data prevented Dr. Jenkins' opinion from being soundly grounded in the principles and methodology of his discipline and therefore based on a reliable foundation.

Watkins v. Telsmith, Inc., 121 F.3d 984, 991 (5th Cir.1997) explicitly makes clear that Rule 702, as elucidated by Daubert, authorizes a qualified expert in a realm outside of hard science to testify to an opinion or inference based on his knowledge, skill, experience, training, or education if it is soundly grounded in the principles and methodology of his discipline and is relevant to a fact in issue or to an understanding of the evidence. Even prior to Watkins, however, this circuit and others had at least implicitly understood this to be part of Daubert lore. See United States v. 14.38 Acres of Land, 80 F.3d 1074 (5th Cir.1996)(engineer's opinion of potential for floods; real estate appraiser's opinion of value of land affected); Hopkins v. Dow Corning Corp., 33 F.3d 1116, 1124-25 (9th Cir.1994)(doctors' opinions of silicone breast implants' cause of autoimmune disease); Berry v. City of Detroit, 25 F.3d 1342, 1350 (6th Cir.1994)(former sheriff's opinion of inadequate police discipline's cause of unjustifiable use of deadly force) ("Although . Daubert dealt with scientific experts, its language relative to the 'gatekeeper' function of federal judges is applicable to all expert testimony offered under Rule 702." Id.); Marcel v. Placid Oil Co., 11 F.3d 563, 567 (5th Cir.1994)(economist's opinion of work-life expectancy); Cf. United States v. Murphy, 996 F.2d 94, 98-99 (5th Cir.1993), cert. denied, 510 U.S. 971, 114 S.Ct. 457, 126 L.Ed.2d 389 (1993)(expert's opinion that tools could have made marks on

stolen cars' ignitions admitted).

Furthermore, as one commentator has recognized, simply because a non-scientific expert's testimony touches on evidence that theoretically could be tested by Newtonian science methodology, Daubert should not be interpreted so as to permit an advocate to put his or her opponent to the burden of establishing hard scientific reliability-validity upon demand. See 2 Graham, Handbook of Federal Evidence § 702.5, at 79 (4th ed. 1996) ("For example, it would be ludicrous to require the proponent of a doctor's testimony to introduce evidence that every test the doctor conducted or reasonably relied upon under Rule 703 is scientifically reliable-valid. While 'widespread acceptance' is stated to be merely a factor in a judicial determination of reliability-validity, testimony by the expert that the 'scientific' evidence has received 'general acceptance' . should be sufficient alone to support admissibility of 'scientific' evidence unless the opponent presents evidence creating a genuine issue as to the reliability-validity of the 'scientific' evidence .")(footnotes omitted). See also G. Michael Fenner, The Daubert Handbook: The Case, Its Essential Dilemma, And Its Progeny, 29 Creighton L. Rev. 939, 968 (1996)("Fenner"). Cf. Edward J. Imwinkelried, The Next Step After Daubert: Developing A Similarly Epistemological Approach To Ensuring The Reliability Of Nonscientific Expert Testimony, 15 Cardozo L. Rev. 2271, 2283-94 (1994).

In the field of clinical medicine, courts generally agree that, under Daubert, the methodology and data that diagnosing and treating physicians reasonably consider good grounds for opinions or inferences in medical practice are sufficiently reliable to form the basis of a qualified medical expert's testimony in court. See 3 Weinstein & Berger, Weinstein's Evidence ¶ 703[03], p. 703-24 et seq.(Rel.47-7/93 Pub.803); 2 Graham, Handbook of Federal Evidence § 702.5 at 79 (4th ed.1996); Fenner at 1009.

For example, this court in Carroll v. Morgan, 17 F.3d 787, 790-791 (5th Cir.1994), concluded that a cardiologist's testimony was "ground[ed] in the methods and procedures of science" and was not mere "unsupported speculation," citing Daubert, 509 U.S. at 590, 113 S.Ct. at 2795 despite his refusal to accept, as authoritative, either a single source or a collection of textbooks and journals in toto, because his testimony was based on "thirty years of experience as a practicing, board-certified cardiologist, on his review, among other things, of [the deceased plaintiffs'] medical records and the coroner's records, and on a broad spectrum of published materials."

The Fourth Circuit in Benedi v. McNeil-P.P.C., Inc., 66 F.3d 1378, 1383 (4th Cir.1995), held that the testimony of experts who found a causal link between the plaintiff's liver failure and a combination of alcohol and Extra-Strength Tylenol was reliable although they did not use epidemiological data. Instead, they relied on the plaintiff's history, personal examinations of plaintiff, plaintiff's lab and pathology data, and peer-reviewed literature. In other words, the experts relied on the kind of data the medical community uses regularly in diagnosing patients. The court stated that it would "not

declare such methodologies invalid in light of the medical community's daily use of the same methodologies in diagnosing patients." Id.

The Second Circuit in McCullock v. H.B. Fuller Company, 61 F.3d 1038, 1043 (2d Cir.1995), held that the district court properly admitted the testimony of a medical doctor as to the causal link between glue vapors and plaintiff's injury, rejecting defendant's contentions that the doctor's methodology was flawed because he "could not point to a single piece of medical literature that says glue fumes cause throat polyps" and because " 'differential etiology,' [does not] qualif[y] as scientific under Daubert." Id. However, the basis of the doctor's opinion included his care and treatment of the plaintiff, her medical history, review of her medical and surgical reports, pathological studies, review of defendant's MSDS, his medical training and experience, use of differential etiology, and reference to scientific and medical treatises. Id. The court found that "[d]isputes 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. " 'Vigorous cross examination, presentation of contrary evidence, and careful instruction on the burden of proof are the traditional and appropriate means of attacking shaky but admissible evidence.' " Id.,(citing Daubert, 509 U.S. at 596, 113 S.Ct. at 2798). See also Becker v. Nat'l. Health Prods., Inc., 896 F.Supp. 100 (N.D.N.Y.1995) (admitting one expert's opinion based, in part, on over 30 years experience as a physician, and a second expert's opinion based, in part, on "clinical experience with 10,000 patients solely in gastroenterology"); Cantrell v. GAF Corp., 999 F.2d 1007, 1014 (6th Cir.1993)("Nothing . prohibits an expert witness from testifying to confirmatory data, gained through his own clinical experience, on the origin of a disease or the consequences of exposure to certain conditions").

2. Under Rule 403

The trial court clearly abused its discretion in excluding the testimony of Dr. Jenkins under Rule 403. The only reason the trial court gave was that "it would be highly prejudicial and misleading to have the jury accept from Dr. Jenkins's history and credentials that his opinion as to causation is other than scientific speculation, because that's what I heard him testify to." The trial court's reason was not clearly expressed and suggests several meanings.

The fact that an expert witness is highly credentialed cannot create a danger of "unfair" prejudice. "Unfair prejudice," as used in Rule 403 does not exist simply because the evidence is adverse to the opposing party. Virtually all evidence is prejudicial or it is not material. There must be a danger of "unfair" prejudice in order for the discretion to exclude to arise. Dollar v. Long Mfg., N.C., Inc., 561 F.2d 613 (5th Cir.1977); United States v. McRae, 593 F.2d 700 (5th Cir.1979).

The trial court's reference to "history" was ambiguous. If the court referred to Dr. Jenkins' own

history or experience, this, of course, was part of his credentials or qualification, which could not be unfairly prejudicial for the reason we have stated. If the court was referring to the medical history of Moore taken by Dr. Jenkins, it is equally difficult to see how any unfair prejudice could have been caused. By admitting the testimony of Dr. Jenkins as to his diagnosis of Moore's reactive airways disease, the court also allowed Dr. Jenkins to refer to the history taken as part of the clinical diagnostic process. In fact, Dr. Jenkins specifically stated at trial, without objection before the jury, that he had relied on the history he took of Moore in making his diagnosis as to Moore's condition. Furthermore, by admitting the testimony of Dr. Alvarez as to both diagnosis and cause of disease, the court allowed Dr. Alvarez to refer to the history and other work by Dr. Jenkins used by him as the basis for his own opinion.

The trial court's characterization of Dr. Jenkins' opinion as to causation as "scientific speculation" was essentially a repetition of its reason for excluding that evidence under Rule 702, i.e., for lack of a reliable evidentiary basis. The trial court's exclusion of the evidence as unreliable under Rule 702 was itself manifestly erroneous and an abuse of discretion. Therefore, it cannot serve as a ground for excluding the evidence under Rule 403.

VIII. Harmful Error Affecting Substantial Rights

Federal Rule of Evidence 103(a) provides: "Effect of erroneous ruling. Error may not be predicated upon a ruling which admits or excludes evidence unless a substantial right of the party is affected." This Rule indicates that courts of appeals should not reverse on the basis of erroneous evidentiary rulings unless a party's "substantial right" is affected. Munn v. Algee, 924 F.2d 568, 573 (5th Cir.1991).

Having determined that Dr. Jenkins' testimony as to the cause of Moore's injury was improperly excluded, we must address whether the exclusion affected Moore's "substantial rights". EEOC v. Manville Sales Corp., 27 F.3d 1089, 1094 (5th Cir.1994). This question is not susceptible to mechanical analysis. Munn v. Algee, 924 F.2d at 573(quoting 1 J. Weinstein & M. Berger, Weinstein's Evidence ¶ 103[01] at 103-6 (1990))("Rule 103 is silent as to what factors a court must consider in determining whether substantial rights have been affected, indicating that the court must proceed on a case to case basis rather than apply a mechanical rule.") We have stated repeatedly, however, that an error is harmless if the court is sure, after reviewing the entire record, that the error did not influence the jury or had but a very slight effect on its verdict. E.E.O.C. v. Manville Sales Corp., 27 F.3d 1089, 1095 (5th Cir.1994); Munn v. Algee, 924 F.2d at 573; Pregeant v. Pan Am. World Airways, Inc., 762 F.2d 1245, 1249 (5th Cir.1985); United States v. Underwood, 588 F.2d 1073, 1076 (5th Cir.1979).

After reviewing the record, we cannot be sure that the erroneous exclusion of Dr. Jenkins' causation

testimony did not influence the jury. In fact, we are convinced that it had more than a very slight effect on the jury's verdict. It is highly likely that the jury's verdict was based on a finding that Moore's exposure to the chemical gases did not cause his disease. The exclusion of Dr. Jenkins' testimony on cause of disease eliminated the plaintiffs' most probative evidence that Moore had contracted reactive airways disease as the result of his exposure to the mixture of chemical gases at Ashland. Further, it undermined the effectiveness of Dr. Alvarez, the plaintiffs' lesser qualified and only remaining witness on causation, who relied on Dr. Jenkins' work and analysis but was unable to explain the data and the inference of causation as accurately and persuasively. Also, the exclusion of Dr. Jenkins' testimony on causation created a mismatch between Dr. Alvarez and Dr. Jones, the defendant's more qualified, articulate, and forensically experienced “board certified” expert causation witness; Dr. Jones did not examine Moore but interpreted the medical records and data compiled by Dr. Jenkins to indicate that Moore did not have RADS or any disease caused by his inhalation of the gases at Ashland. Moreover, because Dr. Jenkins was called by the plaintiffs to testify as to his evaluation and diagnosis of Moore's condition but was not asked what caused it, there is a substantial possibility that the jury concluded that Dr. Jenkins' opinion would have been unfavorable to the plaintiffs on that subject.

Dr. Alvarez was forced to admit on cross examination that he relied heavily on the work of Dr. Jenkins, his former teacher, especially for the medical history, earlier examinations and testing of Moore. Dr. Alvarez was unable to explain, as Dr. Jenkins had in his excluded testimony, that early mistaken notes in the medical history as to the type of toluene involved were later corrected and did not affect the doctors' causation analysis. After the plaintiffs' rested their case, the defendants presented only the testimony of Dr. Jones who effectively contradicted Dr. Alvarez's testimony on causation. The defendants' attorney took full advantage of the erroneous exclusion of Dr. Jenkins' causation testimony, pointed out that only Dr. Alvarez had testified that Moore's RADS resulted from his chemical inhalation, that Dr. Alvarez was not “board certified” like Dr. Jones and Dr. Jenkins, and argued that Dr. Alvarez had accepted Dr. Jenkins' medical history and diagnosis without independently evaluating Moore's condition. In its verdict, the jury answered “No” to the question asking whether the negligence, if any, of the defendants had proximately caused Moore's injury.

The defendants-appellees and the dissenting opinion argue that the exclusion of Dr. Jenkins' causation testimony was harmless because it was cumulative to that of Dr. Alvarez. The argument is without merit. The testimony about disease and causation by a doctor who has done the original history taking, examinations, testing, diagnosis and etiology of a patient cannot be cumulative to that of a subsequent treating physician who essentially adopts and relies on the original doctor's work, analysis and opinions. To so contend would be as untenable as arguing that testimony by the author of a medical treatise is merely cumulative to that of anyone qualified to read and explain the text. Dr.

Jenkins was the only expert witness who had made a thorough, comprehensive clinical medical evaluation of Moore; his work was the essential foundation for the opinion and testimony of the other expert witnesses. See Johnson v. United States, 780 F.2d 902, 906 (11th Cir.1986)(wrongly excluded expert's testimony was more comprehensive than that of other experts admitted "and was, therefore, at least partially non-cumulative."); See also 22 Wright & Graham, Federal Practice & Procedure § 5220 at 306 (1978)("[T]he question to be asked is whether the evidence on one side is so full that no jury that rejected it would be likely to change its mind because of the introduction of the proffered evidence."). Dr. Jenkins' qualifications were more impressive and his experience was broader and more extensive than that of Dr. Alvarez. Id. Moreover, Dr. Jenkins' explanation of the knowledge, principles, methodology, and reasoning underlying his causation opinion was significantly more lucid and articulate than that of Dr. Alvarez.

The cases relied on by the dissenting opinion are distinguishable as instances in which the excluded expert testimony was truly cumulative because it was interchangeable with and not foundational or seminal to that of the experts whose testimony was admitted. See Kendra Oil & Gas, Inc. v. Homco, Ltd., 879 F.2d 240, 243 (7th Cir.1989)(court stated that a "gaggle" of experts had been allowed to testify to the exact same issue such that the exclusion of one of the defendants' three experts was harmless error); Collins v. Wayne Corp., 621 F.2d 777, 782-83 (5th Cir.1980)(the plaintiffs had already been allowed to place into evidence, through two other witnesses, the points they sought to prove by putting the defendant's expert's deposition testimony into evidence so that the exclusion of the expert's deposition was harmless error); Miley v. Delta Marine Drilling Co., 473 F.2d 856, 858 (5th Cir.1973)(appellant was allowed two experts at trial to testify to the same issue such that the exclusion of a third was harmless error). In the present case Dr. Alvarez's testimony was heavily dependent upon and not fungible with that of Dr. Jenkins. Moreover, the erroneous exclusion of Dr. Jenkins' testimony caused additional prejudicial effects to plaintiffs' case, such as undermining and confusing Dr. Alvarez's testimony, mismatching Dr. Alvarez against Dr. Jones, and possibly creating the false impression that Dr. Jenkins, the more qualified and experienced of plaintiffs' experts, did not support Dr. Alvarez's causation testimony.

Because we cannot say with conviction that the erroneous exclusion of the testimony of Dr. Jenkins on the issue of cause of disease did not influence the jury or had but a slight effect upon its verdict, we conclude that the plaintiffs' substantial rights were affected and that the error was not harmless.

IX. Refutation Of Inapposite Arguments

The argument by the the defendants-appellees and the dissenting opinion that the proffer of Dr. Jenkins's testimony as to clinical medical knowledge should be assessed for reliability according to whether it is grounded in hard scientific dosage or exposure level methodology begs the question.

First, it assumes without demonstration that this case involves a proffer of hard scientific, not clinical medical, evidence. Next, from that unproven assumption, it infers that the proffer must be tested for reliability as hard scientific evidence by the hard scientific methods set forth in Daubert, also known as the "Daubert factors". Finally, it concludes that the proffered evidence is unreliable because it was not attained by use of the hard scientific methodology.

The argument relies on a misapplication of the Daubert factors. In Daubert, the Supreme Court clearly indicated that the proffer of an expert's testimony must be tested for evidentiary reliability by determining whether the expert's opinion is soundly grounded in the principles and methodology of the proffered expert's discipline. The court derived the hard scientific methods, now called "Daubert factors," from the methodology of the discipline of hard science. The court advised trial judges to use these hard scientific methods or factors in determining whether proffers of testimony as to hard scientific knowledge are well grounded in hard scientific methodology. The Daubert court plainly did not intend to require trial judges to use hard scientific methods to test the reliability of proffers outside the sphere of hard science. The hard scientific methods generally are inappropriate for determining whether an expert's opinion is soundly grounded in the principles and methodology of the discipline of clinical medicine. Only a brief comparison of the disciplines of hard science and clinical medicine is needed to see that they have quite different and disharmonious goals, principles and methodology. See infra., pp. 688-90.

The proffer at issue in the present case is that of an expert's testimony based on clinical medical knowledge. Consequently, under Rule 702, as explained by Daubert, the proffer must be tested for evidentiary reliability by determining whether the expert's opinion is soundly grounded in the principles and methodology of the discipline of clinical medicine. When the proffer of Dr. Jenkins' testimony based on clinical medical knowledge is properly analyzed, as we have shown above, it is evident that his opinion was soundly grounded in his discipline of clinical medicine, was evidentiarily reliable and should have been admitted.

The trial court erroneously failed to assess Dr. Jenkins cause of disease opinion by reference to the principles and methodology of his discipline of clinical medicine. The trial court assumed that Dr. Jenkins' opinion, in order to be evidentiarily reliable under Rule 702 and Daubert, must have been attained by hard scientific methods, such as air samples comparing the ratio of contaminated parts per million with safe dosage or exposure level standards derived from epidemiological studies or experimentation with animals. Dr. Jenkins' opinion, that Moore's exposure to the mixture of chemicals caused his disease, was derived by clinical medical methods and not by use of hard scientific methods. Therefore, the trial court mistakenly concluded that Dr. Jenkins' opinion was not reliable because it was not attained by the use of hard scientific methods.

Inexplicably, the trial court did not test the reliability of Dr. Alvarez's cause of disease opinion, which used the identical basis to reach the identical conclusion, by whether or not he used such hard scientific methods. Instead, the court said that Dr. Alvarez's use of clinical medical methodology instead of hard scientific methods, and his lack of precise information as to exposure levels and standards, would merely go to the weight of his testimony. The trial court acted arbitrarily and abused its discretion by not judging Dr. Jenkins' proffered testimony by clinical medical principles and methodology as it did Dr. Alvarez's testimony.

The argument of the dissenting opinion and the defendants-appellees' brief follows the same erroneous path as the trial court's reasoning. Consequently, in support of their arguments they point only to inapposite cases involving primarily the proffers of experts' testimony based on professed hard scientific knowledge relative to the surreptitious causation of insidious diseases; and they disregard entirely the many pertinent decisions approving the introduction of experts' opinions as to the causation of episodic traumatic injuries and disorders based on well established clinical medical methodology such as the clinical physician's examination, testing, differential diagnosis, and history taking of the patient or victim.

The dissenting opinion relies primarily on Allen v. Penn. Engineering Corp., 102 F.3d 194 (5th Cir.1996), but that case is not persuasive here because it is markedly distinguishable from the present case. Allen was a products liability suit against the manufacturer of ethylene oxide sterilizers by the widow and child of a hospital maintenance worker who died of brain cancer after 20 years on the job in which he occasionally replaced cylinders containing the sterilizers. The plaintiffs proffered expert scientific testimony that there is a causal link between human brain cancer and ethylene oxide exposure. The plaintiffs' experts based their opinions on evidence developed with hard scientific methods, viz., epidemiological studies, animal studies, cell biology, and health organization conclusions. The defendants responded with numerous reputable epidemiological studies indicating there is not a correlation between the ethylene oxide exposure and cancer of the human brain. The trial court found the plaintiffs' experts to be unqualified and also excluded their testimony for lack of sufficient scientific grounding. This court of appeals affirmed, holding that under Rule 702 the scientific data relied on by the experts did not furnish a scientifically valid basis for their conclusions, due to the paucity of epidemiological evidence, the unreliability of animal studies, and the inconclusiveness of cell biology. Id. at 198. In expressing an opinion on an issue not reached by the trial court, this court stated that the evidence was also excludable under Rule 703 because “[i]n this case, there is no direct evidence of the level of Allen's exposure to EtO. The [experts'] opinion relies principally on the affidavit of a coworker and on extrapolations concerning EtO handling at the hospital where Allen worked based on conditions in other hospitals in the 1970's.” Id. at 198.

Because of its dissimilarities the Allen case does not control or even help to understand or to decide the present case. Allen was purely a scientific evidence case, in which the proffer of hard scientific expert testimony was not soundly grounded in scientific principles or methodology, and in which there was no evidence that the deceased was ever actually exposed to the substance that his widow and child alleged had caused his brain cancer. Also, the experts never examined the deceased before or after his death, there was no evidence of his medical history, there was no indication that he had any relevant symptoms or signs during his life, and apparently no tests were ever performed on his body or brain. Thus, the case involved a proffer of hard scientific testimony, not clinical medical testimony, and it had not been shown that the proffered scientific evidence was reliably grounded in scientific principles and methodology.

The present case is purely a clinical medical evidence case. A live plaintiff gave histories to doctors and testified without contradiction that he was in good health until he was exposed to a mixture of chemical gases in and around an enclosed 28 foot trailer for approximately one hour; and that within an hour thereafter he developed severe coughing, wheezing and tightness of the chest. Unlike the Allen case in which there was no evidence of exposure to the dangerous substance, the fact that Moore inhaled a mixture of toxic gases escaping from leaking drums for approximately one hour was not disputed in the instant case. The doctors who examined, tested and took histories from him found that he had signs and symptoms consistent with reactive airways disease. The doctors arrived at opinions that the plaintiff suffered from reactive airways disease caused by his exposure to the mixture of chemicals. Their opinions were soundly grounded in their discipline of clinical medicine. The defendants did not respond with scientific evidence but with the testimony of a third clinical physician who, without ever examining the plaintiff or developing any new data, reinterpreted the facts and data developed by the first two doctors to arrive at a contrary opinion.

The dissenting opinion strays farther afield in its reliance on Wright v. Willamette Industries, Inc., 91 F.3d 1105 (8th Cir.1996). The Eighth Circuit's decision was based largely on Arkansas negligence and proximate cause law. The divided panel held that a family who lived near the defendant's plant at which wood particles were treated with formaldehyde could not recover for their claims of minor afflictions, such as headaches, sore throats, watery eyes, running noses, dizziness, and shortness of breath, because they failed to produce evidence that they were exposed to a hazardous level of formaldehyde from the fibers emanating from the plant. The part of the first passage of Wright which the dissenting opinion quotes does not pertain to the admissibility of evidence but to minimum standards of proof and proximate cause. Id. at 1107. Also, the dissenting opinion omits the remainder of that passage, which reads: “We do not require a mathematically precise table equating levels of exposure with levels of harm, but there must be evidence from which a reasonable person could conclude that a defendant's emission has probably caused a particular plaintiff the kind of

harm of which he or she complains before there can be a recovery." Id. The Eighth Circuit stated, however, that the trial court should have "excluded Dr. Peretti's testimony, as Willamette requested it to do, because it was not based on scientific knowledge." Id. at 1108 (citing Daubert and Rule 702). This certainly indicates that Dr. Peretti purported to present hard scientific testimony. The opinion does not state what kind of doctor Peretti was or upon what he said his opinion was based. Two other doctors mentioned by Wright were Dr. Fred Fowler, an industrial hygienist, and Dr. Jimmie Valentine, a pharmacologist. There is no indication that Peretti was a clinical physician or that he based his opinion on the methodology of clinical medicine.

The Seventh Circuit decision relied upon by the dissenting opinion, Rosen v. Ciba-Geigy Corp., 78 F.3d 316 (7th Cir.1996), is also a scientific evidence case that is clearly distinguishable from the present case involving the proffer of a clinical medical opinion. A 60 year old smoker with a history of coronary artery disease, previous heart attack, high blood pressure, cholesterol count, and continued smoking, who suffered another heart attack after using a nicotine patch for three days, brought a products liability action against the manufacturer of the patch. The court of appeal affirmed a summary judgment based on the trial court's conclusion that the plaintiff's scientific expert's "opinion concerning the role of the nicotine patch in Rosen's heart attack," was inadmissible. Id. at 318. The Seventh Circuit affirmed because the "scientific evidence" supplied "nothing but a bottom line" offering "neither a theoretical reason to believe that wearing a nicotine patch for three days, or removing it after three days, could precipitate a heart attack, or any experimental, statistical, or other scientific data from which such a causal relation might be inferred or which might be cause to test a hypothesis founded on theory." Id. at 318-319. The scientific expert was Dr. Fozzard, "a distinguished cardiologist and department head at the University of Chicago." Id. at 318. His testimony was proffered, however, as hard "scientific evidence," not as clinical medical evidence. Id. at 318. The court of appeal opinion is devoid of any indication that the scientific expert had ever seen, examined, tested or taken a history from the plaintiff. Consequently, the Rosen decision deals solely with the proffer of hard scientific testimony insufficiently grounded in scientific methodology and not the proffer of clinical medical testimony soundly grounded in the principles and methodology of that discipline, as in the present case.

Finally, the defendants-appellees contend that Texas state practice on jury instructions is controlling in this case and that the plaintiffs waived their argument that Dr. Jenkins' testimony was not cumulative. We have considered the arguments and find them to be clearly without merit. In view of our disposition of this case, we do not reach the parties' cross-appeals relative to costs of court assessed by the trial court.

X. CONCLUSION

For the reasons assigned, the judgment of the district court is REVERSED and the case is REMANDED to that court for further proceedings in accordance with this opinion.

I.

I thoroughly disagree with the majority's conclusion that the district court erred in excluding Dr. Jenkins' opinion that Mr. Moore's reactive airway disease ("RAD") was triggered by his exposure to a Toluene solution at Ashland's facility.

The question we must decide is whether the district court was overzealous in performing the "gatekeeper" role the Supreme Court assigned to it in Daubert [1] to admit only expert opinions that are "reliable." Daubert explains that expert testimony must be "scientific," that is based on scientific "knowledge" that is "grounded in the methods and procedures of science," [2] and that assists the trier of fact by having a "valid scientific connection to the pertinent inquiry." Id. at 590-92, 113 S.Ct. at 2795-2796; see also G. Michael Fenner, The Daubert Handbook: The Case, its Essential Dilemma, and its Progeny, 29 Creighton L.R. 939 (1996). At bottom, the district court was charged with making an assessment of whether the reasoning and methodology used by Dr. Jenkins was scientifically valid and whether that reasoning properly applied to the facts at hand.

As in other evidentiary questions, the proponent of the expert testimony must satisfy the trial judge by a preponderance of the evidence that the Daubert conditions have been met. Claar v. Burlington Northern R. Co., 29 F.3d 499 (9th Cir.1994). We review preliminary factual findings of the district court necessary for determining admissibility for clear error. See Bourjaily v. United States, 483 U.S. 171, 175, 107 S.Ct. 2775, 2778, 97 L.Ed.2d 144 (1987). We reverse a district court's evidentiary ruling only for manifest abuse of discretion. Allen v. Pennsylvania Eng'g. Corp., 102 F.3d 194 (5th Cir.1996).

The expert opinion at issue here is, of course, the testimony of Dr. Jenkins on the causal connection between Mr. Moore's exposure to chemicals and his asthmatic-type condition, RAD. Dr. Jenkins is a well-qualified physician specializing in internal medicine and pulmonary disease. Mr. Moore was referred to Dr. Jenkins by his attorney for examination and evaluation. Dr. Jenkins saw Mr. Moore on three occasions, took a history from him, examined him, and gave him a number of tests.

The court did permit Dr. Jenkins to testify concerning his contact with Mr. Moore and to give a diagnosis and prognosis for Mr. Moore's recovery. However, the district court declined to permit Dr. Jenkins to testify concerning the cause of Mr. Moore's condition. Before declining to allow Dr. Jenkins to give an opinion on the causal connection between the chemical exposure and Mr. Moore's condition, the district court allowed Mr. Moore to proffer Dr. Jenkins' live testimony. The district

court also considered Dr. Jenkins' deposition, which had been submitted earlier in support of an in limine motion to exclude his testimony.

My review of the record leads me to conclude that the district court was fully justified in excluding the testimony. The district court's reasons for excluding part of Dr. Jenkins' testimony were adequately spelled out in the record. R. at 10.154-56. The district court found that Dr. Jenkins had no information concerning the level or duration of Mr. Moore's exposure to the chemicals. This finding is fully supported by the record. Dr. Jenkins himself admitted that he did not know the size of the trailer where the spill occurred or the extent of the spill. The district court was entitled to conclude from this that Dr. Jenkins' estimate that the air in the trailer contained over 200 parts per million of the spilled chemicals was nothing more than speculation. Furthermore, at his deposition and at the pretrial motion in limine, Dr. Jenkins could not point to one piece of scientific literature or research linking exposure to the spilled chemicals and RAD. The majority's conclusion rests on a number of premises that will not withstand scrutiny, each of which I consider below.

II.

A.

The majority begins with the remarkable premise that clinical medicine is not “hard” science; ergo, a physician's opinion that an illness was caused by a patient's exposure to a toxic substance is not a “scientific” expert opinion. This leads the majority to conclude that Daubert's teaching is inapplicable to the issue presented to the trial court: Whether to admit Dr. Jenkins' testimony. We need go no further than Daubert itself to demonstrate the fallacy of this conclusion. In Daubert, the Supreme Court considered whether the district court erred in rejecting testimony proffered by the plaintiff to establish a causal connection between the plaintiff's exposure to the drug Bendictin and birth defects. The subject matter of these witnesses' testimony, medical causation, was obviously considered “scientific” by the Court: It was the factual predicate to the Court's guidelines for evaluating whether to admit expert testimony. Although the tendered witnesses in Daubert were not physicians, the focus of the decision is on the subject matter of the testimony. The Court does not suggest that its guidelines would not apply if the bearer of the opinion on medical causation had been a physician rather than a biologist or chemist.

If reinforcement is needed for the proposition that medical causation testimony of physicians is indeed “scientific” testimony, it can be found in our post-Daubert decisions and all of the decisions addressing the issue from sister circuits.

In Allen v. Pennsylvania Eng'g. Corp., 102 F.3d 194 (5th Cir.1996), this Court held that expert testimony

regarding exposure to chemicals and medical causation of cancer was not scientifically valid. The proffered experts' testimony consisted of human epidemiological evidence suggesting a link between ethylene oxide (EtO) exposure and increased risk of brain cancer, scientific studies conducted on rats, and the fact that EtO is known as a mutagen and genotoxin. Id. at 196. There were absolutely no scientific studies on a link between human brain cancer and EtO exposure. Id. at 197. In excluding the proffered expert testimony, the court stated emphatically that

the goal of Daubert and this court's previous cases has been to bring more rigorous scientific study into the expression of legal opinions offered in court by scientific and medical professionals. In the absence of scientifically valid reasoning, methodology and evidence supporting these experts' opinions, the district court properly excluded them.

Id. at 198 (emphasis added).

In Wheat v. Pfizer, Inc., 31 F.3d 340 (5th Cir.1994), the plaintiff sought to offer the testimony of a doctor to support his claim that the drug Feldene caused the plaintiff's hepatitis. While the admissibility of the expert's testimony was rendered moot by the court's resolution of the case on other grounds, the court noted "in passing that [the doctor's] testimony would not have survived the test of Daubert v. Merrell Dow Pharmaceuticals, Inc." Id. at 343 (citation omitted). The court continued:

At the hearing held to evaluate his proffered testimony, Dr. George hypothesized that the combination of Feldene and Chlorzoxazone may have caused [the plaintiff's] hepatitis. He admitted, however, that no study of the combined effects of the drugs had ever been done, and thus his hypothesis lacked an empirical foundation. Neither had it been subjected to peer review and publication, which Daubert also identifies as key.

Id. at 343 (citation omitted).

Finally, in Carroll v. Morgan, 17 F.3d 787 (5th Cir.1994), a case cited by the majority, we considered whether the district court abused its discretion in allowing a cardiologist to give his opinion on the cause of the plaintiff's death. The court recognized that Daubert controlled the analysis. Id. at 789-90.

Our sister circuits are in agreement that medical causation testimony by physicians is indeed "scientific" expert testimony. Holbrook v. Lykes Bros. S.S. Co., Inc., 80 F.3d 777 (3d Cir.1996) (testimony of plaintiff's treating physician on diagnosis and causes of plaintiff's cancer subject to Daubert as scientific evidence); Cavallo v. Star Enter., 100 F.3d 1150 (4th Cir.1996) (doctors' opinions on cause of plaintiffs' diseases properly excluded under Daubert as not being scientifically reliable);

Glaser v. Thompson Med. Co., Inc., 32 F.3d 969 (6th Cir.1994) (physician's testimony as to cause of plaintiff's injuries properly admitted because of valid scientific basis under Daubert); Hose v. Chicago Northwestern Transp. Co., 70 F.3d 968 (8th Cir.1995) (physician's expert opinion on plaintiff's exposure to toxic fumes and dust as causing disease subject to Daubert factors); Joiner v. General Elec. Co., 78 F.3d 524 (11th Cir.1996), cert. granted, 520 U.S. 1114, 117 S.Ct. 1243, 137 L.Ed.2d 325 (1997) (plaintiff's experts' opinions on cause of lung cancer deemed "scientific knowledge"); Raynor v. Merrell Pharm. Inc., 104 F.3d 1371 (D.C.Cir.1997) (doctor's testimony regarding cause of birth defects governed by Daubert factors); Cella v. United States, 998 F.2d 418 (7th Cir.1993) (case decided before Daubert but recognizing that expert medical opinion is "scientific" and should have "an epidemiological or scientific foundation").

In sum, all our post-Daubert cases, along with those of our sister circuits, consistently recognize that the admission of a physician's testimony on medical causation is governed by Daubert's requirements, thus announcing in a voice that is loud and clear that such testimony is indeed "scientific" expert testimony. The majority has not cited a single federal appellate case to support its contention that a physician's testimony on medical causation is not considered "scientific" expert testimony.

If somehow one accepts the majority's view that Dr. Jenkins' testimony was not "hard" "scientific" expert testimony, it is nonetheless controlled by Daubert. In Watkins v. Telsmith, 121 F.3d 984 (5th Cir.1997), this Court concluded that the Daubert analysis applied to proffered expert testimony of an engineer, based on his training and experience, regarding the design of a conveyor. We expressly rejected the holding of the majority in today's case and the position of the Tenth Circuit that "application of the Daubert factors is unwarranted in cases where expert testimony is based solely on experience or training." Id. at 989 (quoting Compton v. Subaru, 82 F.3d 1513 (10th Cir.1996)).

B.

The majority next concludes that we owe no deference to the district court's evidentiary ruling. This determination is based on the conclusion that the district court clearly erred or was confused in its determination of precisely what chemicals were spilled from the drum and inhaled by Mr. Moore. The record does not justify this conclusion.

The Material Safety Data Sheet ("MSDS") was introduced by the plaintiff and was the central item of documentary evidence in the case. This document listed each chemical, including Toluene, that made up the contents of the drum. The MSDS gave special warning about exposure to Toluene, and early in the litigation Mr. Moore focused on Toluene. This is clear from the pleadings of both parties as well as the pretrial depositions of Drs. Jenkins and Alvarez, both of whom had been furnished with

copies of the MSDS. Because the MSDS warned specifically about exposure to Toluene and the physicians focused on Toluene, counsel then concentrated on Toluene, the chemical the physicians thought was important. Following the deposition and just before trial, the physicians submitted affidavits designed to expand their testimony to say that they relied on the entire mix of chemicals in the drum rather than Toluene alone as the causative agent.

The majority's numerous references to the trial court as confused as to whether Moore had been exposed to a single chemical or to a mixture of chemicals; lacking a full understanding of both Dr. Jenkins' testimony and the chemical contents of the leaking drum; and "labor[ing] under confusion" are not supported by a fair review of the record. Excerpts from the record, reproduced in the footnote below, demonstrate that the trial judge was fully aware of the chemicals to which Mr. Moore was exposed at Ashland's facility.[3] The record simply does not justify the majority's refusal to give the deference due the trial court in excluding the evidence.

C.

As an independent basis for excluding the evidence, the district court was entitled to conclude that the expert's opinion was not relevant to the facts at hand. The record does not establish either the level of the chemicals that Mr. Moore breathed or the level required to cause RAD.

In Allen, 102 F.3d at 194, the plaintiff offered opinion testimony that his brain cancer had been triggered by his employment-related contact with cylinders containing ethylene oxide. There was a paucity of evidence relating to the extent and level of Allen's exposure to the alleged harmful chemical. As one ground for affirming the district court's rejection of this causation testimony, the court stated: "Scientific knowledge of the harmful level of exposure to a chemical, plus knowledge that plaintiff was exposed to such quantities, are minimal facts necessary to sustain the plaintiff's burden in a toxic tort case." Id. at 199.

The Allen court cited with approval Wright v. Willamette Industries, 91 F.3d 1105 (8th Cir.1996). In that case, the plaintiffs lived a short distance from the defendant's fibreboard manufacturing plant. Plaintiffs sought damages for injuries they argued were caused by breathing airborne formaldehyde and other harmful chemicals emitted from the plant. The court reversed the district court's ruling allowing expert opinion testimony that the plaintiffs' complaints were related to their exposure to the plant's emissions. The court explained that in a suit to recover damages in a tort action:

It is therefore not enough for a plaintiff to show that a certain chemical agent sometimes causes the kind of harm that he or she is complaining of. At a minimum, we think that there must be evidence from which the factfinder can conclude that the plaintiff was exposed to levels of that agent that are

known to cause the kind of harm that the plaintiff claims to have suffered. See Abuan v. General Elec. Co., 3 F.3d at 333.

Id. at 1107.

D.

Even if the district court had found that Dr. Jenkins had sufficient evidence of the level of chemicals to which Mr. Moore was exposed, the district court was entitled to conclude that Dr. Jenkins had no scientific, technical, or other specialized knowledge that would assist the trier of fact in resolving the causation question. Dr. Jenkins' conclusion that the Toluene solution triggered Mr. Moore's RAD was based on two assumptions: 1) any chemical with irritating properties can cause RAD (R. at 10.132); 2) the manufacturer's general warning contained in the MSDS that exposure to the chemical could cause damage to a number of organs, including the lungs, established that Toluene was an irritant. The temporal connection between Mr. Moore's exposure to Toluene and his onset of symptoms clinched Dr. Jenkins' conclusion.

Dr. Jenkins could cite no scientific support for his conclusion that exposure to any irritant at unknown levels can trigger this asthmatic-type condition. Surely a court is entitled to view such an unsupported, unscientific generality with skepticism. The purpose of Daubert was to exclude such speculation, based primarily on a temporal connection, as lacking any scientific validity.

Dr. Jenkins admitted that he knew nothing about who prepared the MSDS, what tests were conducted to support them, or the warning label on the drum of Toluene. No scientific foundation was laid to support the notion that this general warning could serve as the basis for concluding that exposure to unknown quantities of Toluene would likely cause RAD.[4] Dr. Jenkins had no personal experience with Toluene. He admitted that Mr. Moore was the first patient he had examined who claimed that he suffered injury from exposure to this chemical.

The scientific proof on causation in this case suffers the same infirmities as the causation evidence in Wright, in which the court stated:

It is true that Dr. Frank Peretti, after a great deal of prodding, testified that the Wrights' complaints were more probably than not related to exposure to formaldehyde, but that opinion was not based on any knowledge about what amounts of wood fibers impregnated with formaldehyde involve an appreciable risk of harm to human beings who breathe them. The trial court should therefore have excluded Dr. Peretti's testimony as Williamette requested it to do, because it was not based on scientific knowledge. [citing cases] Dr. Peretti's testimony regarding the probable cause of the Wrights' claimed injuries was simply speculation.

The jury could therefore only have speculated about whether the amount of formaldehyde from Williamette's plant to which each plaintiff was exposed was sufficient to cause their injuries or, indeed, any injuries at all. Without proving hazardous levels of exposure to Williamette's formaldehyde, the Wrights failed to carry their burden of proof at trial on the issue of causation because the evidence failed to support a reasonable inference in favor of the jury's implicit finding against Williamette on the causation issue.

Wright, 91 F.3d at 1108.

The district court also was entitled to consider uncontroverted evidence of other possible causes of Mr. Moore's asthmatic condition. First, Mr. Moore had just returned to work after recovering from pneumonia. Second, Mr. Moore was a cigarette smoker. He had smoked about a pack of cigarettes a day for twenty years. Finally, Mr. Moore admitted that he had suffered from asthma as a child.

E.

I agree with the majority that Dr. Jenkins is a well-qualified pulmonary specialist. But I disagree with the majority's suggestion that when we consider whether an expert has given a scientific opinion we have a sliding scale where the greater the witness' qualifications the less scientific the evidence must be to support the opinion.

In Rosen v. Ciba-Geigy Corp., 78 F.3d 316 (7th Cir.1996), the Seventh Circuit considered the admissibility of a highly qualified medical expert's opinion on causation that lacked formal scientific support. In that case, the plaintiff sought to connect his use of a nicotine patch, to help him stop smoking, to his sudden heart attack. A distinguished cardiologist and department head at the University of Chicago testified that the heart attack was indeed triggered by the use of the nicotine patch. The Seventh Circuit, speaking through Judge Posner, held that the district court correctly declined to permit this testimony because it had an inadequate scientific basis. The court stated: "Under 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(citation omitted).

In summary, I am satisfied that the district court correctly rejected-and certainly did not abuse its discretion in excluding-Dr. Jenkins' testimony as being without sufficient factual or scientific foundation.

F.

Finally, I am satisfied that even if the district court erred in rejecting this evidence, it was harmless error. As outlined in the majority opinion, the district court permitted Dr. Jenkins to testify about his examination and testing of Mr. Moore. The district court also admitted Dr. Jenkins' conclusion that Mr. Moore was suffering from RAD, along with his prediction for future treatment and disability.

Dr. Jenkins' and Dr. Alvarez's testimony was completely consistent except that Dr. Jenkins' examination and tests were arguably more comprehensive than Dr. Alvarez's. The district court allowed the plaintiff to produce evidence of Dr. Jenkins' examination and tests, and Dr. Alvarez accepted Dr. Jenkins' findings as accurate. On the causation issue, Dr. Jenkins' proffered testimony was virtually identical to Dr. Alvarez's testimony. Both testified that the Toluene solution was an irritant, that the MSDS established this fact, and that the temporal connection between Mr. Moore's exposure to Toluene and his onset of RAD justified the conclusion that the two were related. Dr. Jenkins suggested no material factual or scientific basis for his opinion on causation that Dr. Alvarez did not rely on. Dr. Jenkins testified that he had never had a previous patient who claimed that Toluene triggered his RAD and he admitted that he conducted no tests on this question. I am unable to see why a jury would have gleaned any assistance from Dr. Jenkins' testimony on the critical causation issue that it did not find in Dr. Alvarez's testimony. A district court's refusal to permit a party to call two expert witnesses to give cumulative testimony is rarely considered prejudicial error.

As one court observed, where the excluded expert's testimony does not add a new angle or argument to the point at issue, the testimony is considered cumulative and its exclusion is harmless error. Kendra Oil & Gas, Inc. v. Homco, Ltd., 879 F.2d 240 (7th Cir.1989); see also Collins v. Wayne Corp., 621 F.2d 777, 782 (5th Cir.1980); Miley v. Delta Marine Drilling Co., 473 F.2d 856, 858 (5th Cir.1973). Mr. Moore's position on causation was presented by Dr. Alvarez; he was not entitled to have that same position repeated by Dr. Jenkins.

III.

The Supreme Court has directed the district courts to control with a firm hand expert testimony to prevent litigation abuse so familiar to all of us. The district court took a careful look at Dr. Jenkins' testimony, applied the correct standard, and excluded the testimony. After reviewing the record, I fail to see how the district court could have reached any other conclusion. The majority's “let it all in” view sends exactly the wrong message to conscientious district courts. I therefore dissent.

ORDER

Nov. 12, 1997

A majority of the judges in active service having determined, on the court's own motion, to rehear this

case en banc,

IT IS ORDERED that this cause shall be reheard by the court en banc with oral argument on a date hereafter to be fixed. The Clerk will specify a briefing schedule for the filing of supplemental briefs.

FOOTNOTES

2. The Daubert factors may be relevant and appropriate, however, in assessing other types of expert evidence outside the realm of hard science. For example, this court and others have recognized the utility of testing as a factor for assessing the reliability of proffered expert engineering testimony in alternative design cases. Watkins v. Telsmith, Inc., 121 F.3d 984 (5th Cir.1997); Cummins v. Lyle Industries, 93 F.3d 362 (7th Cir.1996); Peitzmeier v. Hennessy Industries, Inc., 97 F.3d 293 (8th Cir.1996). It is self evident, of course, that an engineer's proffered conclusion as to a feasible alternative design lends itself to verification by controlled testing or experimentation, whereas a medical patient usually cannot practicably, ethically or humanely be subjected to experimentation under conditions like those believed by a clinical physician to have caused the patient's disease simply to verify the doctor's proffered opinion.

3. The MSDS that Dow Corning faxed to Graves stated, in part: * * * * * *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: ZAInhalation: Short vapor exposure may cause drowsiness and irritate nose and throat. Vapors may injure blood, 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. * * * * * *Section VIII-SPILL, LEAK, MAINTENANCE/REPAIR AND DISPOSAL PROCEDURES: * * * * * *Inhalation: Use respiratory protection unless local exhaust ventilation is adequate or air sampling data show exposures are within TLV and PEL guidelines. * * * * * *

4. Footnote number 3 of the dissenting opinion quotes from this passage in an attempt to show that the trial court was not confused as to whether the chemical mixture contained chemicals other that toluene. This excerpt merely shows that the attorneys and experts were not confused. A fair reading of the whole record indicates that the trial court vacillated in its understanding of the nature of the chemicals involved.

5. The dissenting opinion at page 710 is simply mistaken in stating that Dr. Jenkins had “no

information" concerning the size of the trailer, the amount of the spillage, the level or duration of exposure. The dissent, like the trial court, fails to heed Daubert's admonition that "[t]he focus . must be solely on principles and methodology, not on the conclusions that they generate." Daubert, 509 U.S. at 595, 113 S.Ct. at 2797.

1. 509 U.S. 579, 113 S.Ct. 2786, 125 L.Ed.2d 469 (1993).

2. 509 U.S. at 589-90, 113 S.Ct. at 2794-2795.

3. During the final pretrial conference, held three days before trial, the following exchange occurred:THE COURT: Isn't that the only chemical at issue though?MR. BLACK: No. No, Your Honor.THE COURT: What chemical-(Talking off the record)MR. BANOWSKY: The product was naphtha, that I could recall-naphtha, some propylene glycol methyl ethers, toluene, and naphtha.THE COURT: But your loss is premised on-is it toluene, what is it?MR. BLACK: Toluene.THE COURT: Toluene. The loss is premised on toluene, isn't it?MR. DAVIS: Your Honor, it's generically referred to as toluene throughout this litigation; however, what this chemical is and what everybody knows in this case from the MSDS is that it is Dow Corning I25-35 release coated which is a component mixture of various chemicals. It is a chemical-THE COURT: Okay. Let me stop you.MR. DAVIS:-release coating used.THE COURT: You're saying that whatever chemical is listed in the Dow Chemical MSDS as toluene is what's at issue here.MR. DAVIS: No. All the chemicals are at issue here because it's the entire-this release coating is what spilled in the truck. The release coating is made up of toluene, naphtha, petroleum dystolate [sic] and propylene glycol methylene.THE COURT: All right. That's what I'm trying to determine. There is evidence in the record that these other chemicals were involved in the release? That's all I want to know.MR. DAVIS: Yes.THE COURT: Okay. All right. Go on, Mr. Black.R. at 6.23-24.The following two excerpts are of testimony given at a hearing outside of the jury's presence on the motion in limine to exclude Dr. Jenkins' testimony:BY MR. GREEN:Q All right. After you looked at the MSDS sheet that was based upon testing, took the history, you performed the test, you did the examination. Did you come to a conclusion as to the cause of Mr. Moore's reactive airways disease?A [by Dr. Jenkins] Yes.Q And what was that conclusion?A Well, I feel it was the chemical substances to which he was exposed. There are several of them.Q All right. And what was that?A Well, toluene, naphtha, propylene glycol methyl ether I think were the principal ones that had irritating properties.R. at 10.132.THE COURT: . Mr. Carpenter, while Dr. Jenkins is looking at that, Mr. Green, would you listen to this and tell me if this is the correct rendition of the chemicals you asked Dr. Jenkins about? Naphtha-And what else?MR. GREEN: Naphtha, toluene, ethyl methyl glycol ether, I believe.R. at 10.135-36.We can tell from the trial judge's reasons for excluding Dr. Jenkins' testimony that she had not forgotten the MSDS or "the substance" it described:Last but not least, I don't know why, if his entire causation testimony is based upon the

MSDS, that his testimony would be necessary since the MSDS is in evidence and the MSDS recites that under certain circumstances this substance may be irritant to throat and nose, and vapors may injure, quote, “blood, liver, lungs, kidney, and nervous system depending upon the degree and the effects of concentration and length of exposure.”R. at 10.155.

4. The only literature Dr. Jenkins arguably relied on was an article by Brooks on several case studies. One of these studies related to a 19-year-old store clerk's exposure to floor sealant containing, among other things, Toluene. In addition to the scientific limitations of a single case study, the circumstances surrounding that study were markedly different from Mr. Moore's exposure to the chemical. The floor sealant to which the store clerk was exposed contained a number of irritants in addition to Toluene. Some of the other ingredients may have been more irritating than Toluene. Also, the clerk was exposed to Toluene while working in a small space for two and one-half hours. While he was still on the job, the clerk experienced a number of symptoms, such as dizziness and headaches.

DENNIS, Circuit Judge:

MOORE v. ASHLAND CHEMICAL INC (1997)

Docket No: No. 95-20492.

Decided: October 20, 1997

Court: United States Court of Appeals,Fifth Circuit.

For Legal Professionals

- Practice Management
- Legal Technology
- Law Students

Get a profile on the #1 online legal directory

Harness the power of our directory with your own profile. Select the button below to sign up.

Sign up >

Get email updates from FindLaw Legal Professionals

Enter your email address to subscribe

* Indicates required field

Email *

Learn more about FindLaw's newsletters, including our terms of use and privacy policy.

Learn About the Law

Get help with your legal needs

FindLaw's Learn About the Law features thousands of informational articles to help you understand your options. And if you're ready to hire an attorney, find one in your area who can help.

Go to Learn About the Law >

Need to find an attorney?

Search our directory by legal issue

Enter information in one or both fields (Required)

Legal issue

I need help near (city, ZIP code or county)

Thermal, California

Find a lawyer >

BACK TO TOP

Questions?

At FindLaw.com, we pride ourselves on being the number one source of free legal information and resources on the web. **Contact us.**

ABOUT US >

Our Team

Accessibility

Contact Us

SELF-HELP RESOURCES

Legal Forms & Services

LEGAL RESEARCH

Stay up-to-date with how the law affects your life. Sign up for our consumer newsletter.

ENTER YOUR EMAIL ADDRESS

FOLLOW US:

FIND A LAWYER >

By Location

By Legal Issue

By Lawyer Profiles

By Name

Learn About the Law

State Laws

U.S. Caselaw

U.S. Codes