

Leading Expert Evidence: An American Perspective

David Bernstein*

Over the last decade or so, a controversy has raged in the United States over the standards courts should use in determining whether to permit experts to testify in toxic tort cases.¹ This controversy reached the United States Supreme Court in *Daubert v Merrell Dow Pharmaceuticals Inc.*² in 1993.

The precise legal issue in *Daubert* was whether Federal Rule of Evidence 702, which governs expert testimony, requires, or even permits, a court to adhere to the common law *Frye*³ rule. The *Frye* rule holds that a court should exclude novel scientific evidence that is based on a theory or method that is not generally accepted in the scientific community. Rule 702 states that any qualified expert who possesses 'scientific, technical, or other specialised knowledge' which will be helpful to the trier of fact may testify at a trial.

In *Daubert*, the plaintiffs alleged that use of Bendectin, an oft-prescribed morning sickness drug, caused birth defects in children. The problem the plaintiffs faced was that scientists had conducted over 30 epidemiological studies showing no statistically significant correlation between Bendectin and birth defects. The plaintiffs' experts had no similarly strong evidence supporting the inference that Bendectin causes birth defects. The plaintiffs therefore tried to get the trial court to admit in evidence a study by one of their experts that re-analysed the data used in the other 30 studies. This re-analysis purportedly showed that Bendectin did cause birth defects.

* Mellon Foundation Research Fellow in the Julius Silver Program in Law, Science and Technology, Columbia University.

¹ Toxic tort cases are cases in which a plaintiff alleges that exposure to a pharmaceutical product or environmental pollutant caused injury.

² 113 S. Ct 2786 (1993).

³ *Frye v United States* 293 F. 1013 (1923).

At first instance, evidence was excluded on the ground that the expert's study conflicted with the generally accepted view in the scientific community that Bendectin did not cause birth defects. The Court of Appeals affirmed, emphasising that the expert's re-analysis was not peer reviewed or published in a scientific journal. The court held under *Frye*, that such a study is not generally accepted, particularly when used to contradict 30 published, peer-reviewed studies. The plaintiffs appealed to the Supreme Court, arguing that the *Frye* rule had been superseded by promulgation of the Federal Rules of Evidence.

Daubert was the first case involving the admissibility of scientific evidence in civil trials to reach the Supreme Court, but it was far from the first such case to attract controversy. Prior to *Daubert* there was an explosion of tort litigation based on 'junk science' in the United States. Junk science is scientific evidence based on theories that have little, if any, support in the relevant scientific community. Most experts who promoted junk science theories in US courtrooms were sincere in their belief that the mainstream scientific community was wrong; others were venal guns for hire.

Plaintiffs, backed by experts with eccentric theories, were often able to succeed in toxic tort suits. One reason for this success is that both judges and juries are ignorant of science and the scientific process. With regard to juries, this point should be obvious. Many, perhaps most, judges will 'flub' scientific issues unless constrained by a rule forcing them to rely on the standards of the scientific community.

In 1985, for example, in *Wells v Ortho Pharmaceutical Corp.*,⁴ Shoob J, sitting in place of a jury, reviewed expert testimony proffered in a case involving allegations that a commonly used spermicide caused a plaintiff's birth defects. In resolving this issue, Shoob J did not weigh the scientific credibility of the studies upon which the experts relied. Instead, he 'paid close attention to each expert's demeanour and tone'. 'Perhaps most important', the judge stated, 'the Court did its best to ascertain the motives, biases, and interests that might have influenced each expert's opinion.'⁵ The issue was resolved in favour of the plaintiff, despite overwhelming contrary scientific evidence.⁶

Several years later, the New Jersey Supreme Court reviewed an appellate court decision vacating a trial court's exclusion of evidence purporting to show that exposure to PCBs caused a decedent's fatal cancer.⁷ The court explicitly disavowed reliance on scientific standards in deter-

⁴ *Wells v Ortho Pharmaceutical Corp.*, 615 F. Supp. 262 (N.D. Ga. 1985), *aff'd in part, modified in part* 788 F.2d 741 (11th Cir.), *cert. denied*. 479 U.S. 950 (1986).

⁵ *Id.* 267.

⁶ See James L. Mills, 'Spermicides and Birth Defects', in Kenneth R. Foster, David E. Bernstein and Peter Huber (eds.), *Phantom Risk: Scientific Inference and the Law* (Cambridge, Mass: MIT Press, 1993), 87. For more on the *Wells* case, see Marc Klein, 'After *Daubert*: Going Forward with Lessons from the Past', (1994) 15 *Cardozo Law Review* 2219.

⁷ *Rubanick v Witco Chem. Corp.*, 593 A.2d 733 (N.J. 1991).

mining whether to exclude the evidence, arguing that '[t]he scientific method... fails to address or accommodate the needs and goals of the tort system'.⁸ The court proceeded to ignore the scientific method and relied on 'common sense', 'informed intuition', and legal articles and precedent. The court relied on an article written by a law student for a crucial (but dubious) scientific proposition.⁹ The law student had relied on two other law review articles.¹⁰ The court ultimately upheld the decision below.¹¹ Science itself was somehow lost in the process.

The second reason that plaintiffs dependent on fringe experts were able to succeed is that even when juries do recognise that scientific evidence favours the defendant, they will often find for the plaintiff, either because they sympathise with the plaintiff, or because they wish to punish the defendant for perceived wrongdoing. Bendectin plaintiffs, for example, relied heavily on jury sympathy for their deformed children. In the first Bendectin case that went before a jury, the court found that the defendant did not cause injury to the child plaintiff, and therefore damages were not awarded. The jury, nevertheless, awarded damages to the parents. The court overturned this award; if there was no causation, the defendants could not have injured the parents.¹² Had the jurors understood this dynamic, however, they assumedly would have changed their verdict in order to ensure that the parents could receive some compensation for their suffering.

The temptation of jurors to ignore scientific evidence put before them may be even stronger when they consider the defendant should be punished, even if the plaintiff was not harmed. In the longest jury trial in American history, the defendants spilled the chemical dioxin in a nearby community. The jurors awarded the plaintiffs only \$1 actual damages, a reflection of their understanding from the scientific evidence presented that the dioxin spill had not caused personal injury to any of the plaintiffs. The jurors also awarded \$16 million in punitive damages. This award was so clearly disproportionate that the Court of Appeals overturned it.¹³ However, had the jury realised its will was to be thwarted, it could simply have awarded \$8 million in compensatory damages and \$8 million in punitives. Such an award would most likely have been upheld.

Assumedly, some juries are more clever than the two described above. Such juries also recognised the lack of evidence of causation, but structured their verdicts in favour of the plaintiffs in such a way as to make a successful appeal unlikely.

⁸ *Id.* 741.

⁹ *Id.* 747.

¹⁰ Note, 'Tort Actions for Cancer: Deterrence, Compensation, and Environmental Carcinogenesis', (1981) 90 *Yale Law Journal* 840.

¹¹ *Id.* 738–50.

¹² *Mekdeci v Merrell National Laboratories*, 711 F.2d 1510 (11th Cir. 1983).

¹³ *Kemner v Monsanto*, 217 Ill. App. 3d, 160 Ill. Dec. 192, 576 N.E.2d 1146, appeal denied, 142 Ill.2d 655, 164 Ill. Dec. 918, 584 S.E. 2d 1301 (1991).

The combination of scientific ignorance on the part of triers of fact, combined with jury prejudice in favour of plaintiffs and against defendants, meant that the only way that defendants could avoid liability was to persuade judges to engage in strict scrutiny of plaintiffs' scientific evidence before trial, and dismiss claims found wanting. Most courts adopted a *laissez-faire* approach, and allowed any plaintiff with a credentialed expert to take his or her claim to the jury.

Jury verdicts grew ever more ridiculous. One jury awarded tens of millions of dollars to a class of alleged victims of a chemical spill. Their experts, relying on the discredited theory of 'clinical ecology', told the jury that the spill had resulted in the plaintiffs contracting 'chemical AIDS'.¹⁴

By the late 1980s, some federal judges, appalled at the misuse of scientific evidence in tort cases and embarrassed by growing criticism by scientists, began to aggressively exclude scientific testimony that did not meet mainstream scientific standards, such as peer review. Some courts excluded dubious scientific evidence based on a strict reading of the Federal Rules of Evidence. Other courts applied the *Frye* rule, and excluded evidence that they found was not generally accepted.

As the strict scrutiny movement gained momentum, Peter Huber's book, *Galileo's Revenge: Junk Science in the Courtroom* was published. Huber's book, aimed at a mass audience, detailed the misuse of scientific evidence in a range of civil cases. The book attracted a great deal of attention, and made the issue of 'junk science' a matter of public debate. A consistent theme of Huber's book was that courts should defer to mainstream scientific opinion when reviewing scientific evidence, to avoid the risk of being bamboozled by fringe scientists. Huber strongly advocated 'a sophisticated, modern application of *Frye* [that] looks to the methods behind a scientific report'.¹⁵

Among those who found Huber's book persuasive was Kozinski J who wrote the Court of Appeals opinion in *Daubert*. He cited Huber several times, and adopted Huber's position on *Frye*.

At this point, the Supreme Court intervened in the junk science controversy by agreeing to review *Daubert*. The Supreme Court's decision in *Daubert* established new guidelines for the admissibility of scientific evidence.

The court stated that the Federal Rules of Evidence had superseded *Frye*, and a 'general acceptance' approach to the admissibility of scientific evidence violates those rules.¹⁶ The court also rejected the 'let-it-all-in' relevancy approach, affirming that district court judges have an important role to play as 'gatekeepers' in excluding unreliable scientific

¹⁴ *Elam v Alcolac, Inc.*, 765 S.W. 2d 42 (Mo. App. 1988).

¹⁵ Peter Huber, *Galileo's Revenge: Junk Science in the Courtroom* (New York: Basic Books, 1991), 200.

¹⁶ *Daubert v Merrell Dow Pharmaceuticals Inc.*, 113 S. Ct 2786 (1993), 2793-4.

evidence.¹⁷ The court noted that Rule 702 'clearly contemplates some degree of regulation of the subjects and theories about which an expert may testify'.¹⁸ Rule 702 requires that proffered scientific evidence must constitute scientific knowledge. The adjective 'scientific' 'implies a grounding in the methods and procedures of science', while the word 'knowledge' 'connotes more than subjective belief or unsupported speculation'.¹⁹

Having rejected the 'let-it-all in' standard, the court established a two-part reliability and helpfulness test in determining the admissibility of scientific evidence under Rule 702. Unlike *Frye*, courts must apply the *Daubert* test to *all* scientific evidence, not just novel evidence.²⁰

First, the court held that the Rule's requirement of 'scientific knowledge' establishes a standard for evidentiary reliability. 'Evidentiary reliability', the court held, means 'trustworthiness' and depends on 'scientific validity'.²¹

The court then considered the second half of Rule 702, which requires that proposed expert scientific testimony 'assist the trier of fact to understand the evidence or to determine a fact in issue'. It was held that this language mandates the proposed testimony be scientifically relevant to the issue at hand. The relevant consideration is one of 'fit' — evidence that meets the standards of scientific validity for one purpose is not necessarily scientifically valid for other purposes.²² Rule 702's 'assist the trier of fact' language 'requires a valid scientific connection to the pertinent inquiry as a precondition to admissibility'.²³

As described above, under the test established by *Daubert*, courts confronted with challenged expert scientific testimony must conduct two distinct inquiries: first, are the studies or data upon which the expert is relying trustworthy? Second, if so, are these studies or data actually probative of the issues before the court?

The court proceeded to enumerate factors that may 'bear on the inquiry' as to whether scientific evidence is admissible. First, courts faced with challenged scientific evidence should determine whether the theory or technique at issue can be (or has been) tested.²⁴ Peer review and

¹⁷ *Id.* 2798.

¹⁸ *Id.* 2795.

¹⁹ *Ibid.*

²⁰ *Id.* 2796: 'Although the *Frye* decision itself focused exclusively on "novel" scientific techniques, we do not read the requirements of Rule 702 to apply specially or exclusively to unconventional evidence.'

²¹ *Id.* 2795. Two articles relied upon by the court in addressing the issue of scientific validity, *supra* n. 4 at 2793; see also Bert Black, 'A Unified Theory of Scientific Evidence', (1988) 56 *Fordham Law Review* 595; James E. Starrs, '*Frye v United States* "Restructured and Revitalised"', A Proposal To Amend Federal Evidence Rule 702', (1986) 26 *Jurimetrics Journal* 249.

²² *Id.* 2796.

²³ *Daubert v Merrell Dow Pharmaceuticals Inc.*, 113 S. Ct 2786 (1993), 2796.

²⁴ *Id.* 2796-7; see Mills, *supra* n. 4 at 433.

publication are important, though not generally dispositive, factors.²⁵ The court also directed judges' attention to determining the known or potential rate of error of a technique in question, as well as the existence and maintenance of standards controlling the technique's operation.²⁶ Moreover, despite the official demise of *Frye*, general acceptance of the method or theory at issue is still a consideration: it was noted that '[w]idespread acceptance can be an important fact in ruling particular evidence admissible'.²⁷ These factors, however, do not constitute a definitive checklist or test, and courts may consider other factors as well.²⁸

Since *Daubert* there has been an ongoing controversy over its meaning. Most controversial has been the *Daubert*'s holding that Rule 702 requires 'a valid scientific connection to the pertinent inquiry as a precondition to admissibility'. Courts should only examine an expert's methodology, not his or her conclusions.²⁹

A court attempting to discern whether a valid scientific connection exists between the underlying basis of an expert's testimony and the expert's conclusions should first enquire if the expert is using appropriate methodology. If a plaintiff's expert, for example, relies on an animal study to prove Bendectin caused a plaintiff's birth defect, the court should first determine whether experts use animal studies of that type to help determine if an agent is teratogenic (causes birth defects) in humans.

Some commentators have argued the inquiry should stop there, and that the court should not explore whether the study relied upon by the expert can validly support their conclusion.³⁰ This position has attracted some support in the case law.³¹

The Ninth Circuit, however, deciding *Daubert* on remand,³² noted the *Daubert* criteria demands, that in reviewing an expert's principles and methodologies, a court should determine whether there is a valid scientific connection to the pertinent inquiry. The pertinent inquiry is not simply whether Bendectin can cause birth defects, but whether it more probably than not caused the plaintiffs' birth defects. The plaintiffs' experts' evidence was reviewed to determine whether it provided sufficient information to allow a conclusion that Bendectin caused the plaintiffs' birth defects.

²⁵ *Daubert v Merrell Dow Pharmaceuticals Inc.*, 113 S. Ct. 2786 (1993), 2797; Mills, *supra* n. 4 at 434.

²⁶ *Daubert v Merrell Dow Pharmaceuticals Inc.*, 113 S. Ct. 2786 (1993), 2797.

²⁷ *Ibid.* Mills, *supra* n. 4 at 433, 435.

²⁸ *Daubert v Merrell Dow Pharmaceuticals Inc.*, 113 S. Ct. 2786 (1993), 2796.

²⁹ *Id.* 2797.

³⁰ Kenneth J. Chesebro, 'Taking *Daubert*'s "Focus" Seriously: The Methodology/Conclusion Distinction', (1994) 15 *Cardozo Law Review* 1999; Michael H. Gottesman, 'Admissibility of Expert Testimony after *Daubert*: The "Prestige" Factor', (1994) 43 *Emory Law Journal* 867.

³¹ *United States v Bonds*, 12 F.2d 540, 555-9 (6th Cir. 1993); *Hopkins v Dow Chem. Corp.* 33 F.2d 1116, 1124 (9th Cir. 1994), *cert. denied*, 115 S. Ct. 734 (1995).

³² *Daubert v Merrell Dow Pharmaceuticals*, 43 F.2d 1311 (9th Cir. 1994).

Daubert has had little effect on toxic tort litigation in the United States. Courts that were previously inclined to scrutinise scientific evidence are continuing to do so. Courts that were inclined towards a more liberal position have interpreted *Daubert* in such a way as to more frequently allow the admission of questionable testimony. One federal appellate court, for example, has held it will give a 'hard look' to cases in which a lower court has made a *Daubert* ruling — but only when the court has ruled testimony inadmissible.³³ (Every other federal appellate court has held that it will only reverse a trial court's ruling when there has been an 'abuse of discretion'.)

Another issue to vex the courts since *Daubert* is the standard which should apply to technical or quasi-scientific testimony. One type of quasi-scientific testimony, testimony based on psychological theories, has, since *Daubert*, been broadly excluded in both criminal and civil litigation. Thus, courts have excluded testimony by psychiatrists and psychologists on issues involving child abuse,³⁴ post-traumatic stress disorder³⁵ and child abuse accommodation syndrome.³⁶

Although *Daubert* expressly restricted its holding to scientific testimony, lower courts have regularly subjected technical evidence — also covered by Rule 702 — to full *Daubert* gatekeeper analysis. Thus, *Daubert* has been applied to a broad range of specialised expert testimony in civil cases, including economics, statistics and accounting.³⁷ In contrast, only rarely has a court held that *Daubert* is not relevant to the admissibility of technical expert testimony.³⁸

The effect of *Daubert* on technical evidence can be seen in *Mistich v Volkswagon of Germany Inc.*³⁹ *Mistich* was an automotive products claim in which the plaintiff attacked the seat design in a subcompact automobile struck in the rear violently and at high speed by a full-sized pickup truck. The passenger died, and a battle of experts ensued regarding the alleged defectiveness of the seat design. The plaintiff emerged victorious at trial level.

³³ *In re Paoli R.R. Yard PCB Litig.*, 35 F.3d 717 (3d Cir. 1994), cert. denied 131 L. Ed. 2d 134 (1995).

³⁴ *Gier v Educational Service Unit No. 16*, 1994 WL 44316 (D. Neb.); see also *Borawick v Shay*, 842 F. Supp. 1501 (D. Conn. 1993) (excluding hypnotically-refreshed testimony).

³⁵ *State v Alberico*, 116 N.M. 151, 861 P.2d 192 (1993) (partial exclusion).

³⁶ *State v Foret*, 628 So.2d 1116 (La. 1993).

³⁷ Cf. *Marcel v Placid Oil Co.*, 11 F.3d 563 (5th Cir. 1994); *Joy v Bell Helicopter Textron, Inc.*, 999 F.2d 549 (D.C. Cir. 1993); *Scales v George Washington University*, 1993 WL 304016 (D.D.C.); *Liu v Korean Air Lines Co. Ltd.*, 1993 WL 478343 (S.D.N.Y. 1993) (partial exclusion); *Martincic v Urban Redevelopment Authority of Pittsburgh*, 844 F. Supp. 1073 (W.D. Pa. 1994); *Wilt v Buracker*, 1993 WL 517042 (W. Va.) (all holding testimony to be inadmissible), with *Lightning Lube, Inc. v Witco Corp.*, 4 F.3d 1153 (3d Cir. 1993); *Petruzzi's IGA Supermarkets, Inc. v Darling-Delaware Co. Inc.*, 998 F.2d 1224 (3d Cir. 1993); *Seagate Technology Inc. v C.I.R.* 102 T.C. No. 9 (U.S.T.C. 1994); *Davis v Southern Bell Telephone & Telegraph Co.*, 1994-1 Trade Cases (CCH) ¶ 70,510 (S.D. Fla. 1994) (all holding testimony to be admissible).

³⁸ *Tamarin v Adam Caterers Inc.* 13 F.3d 51 (2d Cir. 1993) (*Daubert* not relevant to payroll review by accountant).

³⁹ 650 So. 2d 385 (1995).

Before *Daubert*, courts gave very little scrutiny to expert testimony in automobile design cases. Indeed, in *Mistich*, the court admitted the plaintiff's expert's testimony for the following reason: 'He has been qualified by courts across the land, and I do not presume that all of them were incorrect.' On appeal, however, the defendant successfully attacked this reasoning under *Daubert*. The Louisiana Court of Appeals, a jurisdiction that has adopted *Daubert*, criticised the trial court's lackadaisical review: 'Testimony before other judges is not "peer review". Scientific expertise and dogma should not be judged by a standard of *res judicata*. Courts decide individual cases, but the scientific community sets scientific standards.'⁴⁰ The court added that to qualify as scientific evidence under *Daubert*, 'an inference, assertion, or opinion must be derived by the scientific method'.⁴¹ The court continued that proponents of expert testimony 'must show that the testimony offered is based on sound scientific procedures and acceptability of the methodology validating the proposition. Conclusory testimony is no longer enough, but must be supported to some extent with the scientific methodology employed to verify the hypotheses.'⁴²

The court proceeded to review the expert testimony offered by the plaintiff. It was found the expert lacked sufficient qualifications, noting he had no engineering degree and, having failed in a career in the automotive field, had become a professional expert. Review of the scientific basis of the expert's testimony was found to be severely lacking. The expert, for example, admitted that 'delta V' analysis is widely used in gauging crash accident severity, although he 'could not support his opinion about the severity of the crash in this case in terms of G forces and delta V and how they relate to available seat design'. Additionally, he did not calculate the tensile strength of the metal used in the seat structure even though he found the structure inadequate in strength. The expert claimed that he did not need to calculate G forces and delta V because sufficient information existed on which to base his opinion: a visual inspection of the car and 'his past experience'. The Appellate Court found these were not the 'scientifically reliable data' needed to support the engineering opinions allowed in by the trial court. The court held that the trial court erred in admitting the expert's testimony, and reversed the verdict for the plaintiff.

In contrast to the emerging doctrine under *Daubert*, *Frye* courts seldom applied its 'general acceptance' test to technical evidence. The readiness of post-*Daubert* courts to screen such testimony for reliability indicates that *Daubert* has caused closer scrutiny of expert testimony in civil cases than the *Frye* rule would have permitted.

⁴⁰ *Id.* 391.

⁴¹ *Id.* 390.

⁴² *Id.* 391.

On the other hand, *Frye* is undergoing something of a renaissance in state courts. Initially, most observers predicted that many state courts would adopt *Daubert*, which is only binding on federal courts. Instead, few state courts have adopted *Daubert*, and three of the five most populous States, California, New York and Florida, have all rejected *Daubert* and retained the *Frye* rule.⁴³

The most recent development with regard to *Daubert* is that the US House of Representatives has passed a bill, HR 988, that would amend Rule 702 of the Federal Rules of Evidence to make a scientific opinion inadmissible unless it is (1) 'Scientifically valid and reliable', (2) 'has a valid scientific connection to the fact it is offered to prove' and (3) 'is sufficiently reliable so that the probative value of such evidence outweighs the dangers specified in Federal Rule of Evidence 403' — to wit, unfair prejudice, confusion of the issues or misleading the jury. The provision creates a presumption of inadmissibility for scientific evidence. The Congressman sponsoring the legislation has stated that the bill 'seeks to maintain a simple definition that will be interpreted in conjunction with, and not as superseding, the *Daubert* case'.

Perhaps more significantly, the bill amends Rule 403 as it applies to scientific evidence. It would make evidence inadmissible if its prejudicial value 'outweighs' (rather than 'substantially outweighs', as is currently provided in Rule 403) its probative value. The standard for judging prejudice versus probative value existing in Rule 403 is lowered for cases involving scientific evidence. Prospects in the Senate for this bill are uncertain.

Regardless of the ultimate fate of this bill, it is clear that expert evidence in civil cases in the United States will continue to be subjected to greater scrutiny than ever before. Despite mixed interpretations in the lower courts, the Supreme Court's opinion in *Daubert* is having the overall effect of encouraging careful judicial scrutiny of scientific testimony and, more broadly, of expert evidence in general. These results are in full accord with the reliability standard established by the Supreme Court in *Daubert* and of its 'gatekeeper' mandate. *Frye*, once considered the epitome of a conservative stance towards scientific evidence by American commentators, is considered by many to be far more liberal than *Daubert*. The ultimate result of the trend towards application of strict exclusionary rules to expert evidence is likely to be substantial decrease in the number of dubious tort claims filed in the United States.

⁴³ *People v Leahy*, 34 Cal. Rptr. 2d 663 (1994); *State v Flanagan*, 625 So. 2d 827 (1993); *People v Wesley*, 83 N.Y. 2d 417, 633 N.E. 2d 451, 611 N.Y.S. 2d 97 (1994).