The Veil of Science over Tort Law Policy

INTRODUCTION

The tort or personal injury law is the main area of the law that provides redress for injuries suffered, whether caused by car accidents, defective products or toxic molecules. However, a significant, unseen revolution in the tort law has been in progress since 1993. It is hidden from the public, except for those litigating tort law issues and well-informed researchers. The legal changes are difficult to discern because they are veiled behind a fabric of scientific complexity and detail, as well as arcane legal procedures that are not well known and are difficult to penetrate. Yet this veil should be lifted, the scientific and legal issues understood and put into perspective in order to appreciate the policy modifications in our legal system that can substantially affect the safety of ordinary citizens, both plaintiff and defense bars, corporate behavior, and fundamental legal relationships between citizens. This revolution involves science, law, and the possibility of justice for those who have been injured by the actions or products of others. What is the relationship among science, law, and the possibility of justice that it poses a problem?

Typically, we might think that science has little or nothing to do with justice. It does provide one of the most reliable means for investigating empirical claims and producing comparatively objective evidence about them. Scientific research has resulted in considerable accumulation of knowledge about the world,¹ in a substantial track record of predicting observable events,² and in “huge advances in human understanding [of the natural world and forces in it] . . . over the ages.”³ This research substantially informs our understanding of human and animal biology, our environment and the larger world around us. Knowledge and understanding

are the dominant virtues of scientific inquiry. Some scientific fields – epidemiology, toxicology, and clinical medicine, among others – are centrally needed to assist courts about whether and to what extent exposure to a product might have contributed to someone’s injuries and these are especially pertinent to our inquiry.

Justice, in contrast, provides norms for guiding citizens’ behavior and for judging our institutions, our laws, and our relations to one another. It assists the design of laws or institutions when it is necessary to create new ones. It is the “first virtue of social institutions” and the preeminent virtue of the law. One central principle of justice is that if one person injures another without legitimate justification or excuse, the first should “put the matter right” with the injured party.

Putting matters right might “require the harm-doer to restore something to the person harmed, or to repair a damaged object, or (when the unharmed position cannot be restored, as it usually cannot be) to compensate the harm-sufferer.” This is a matter of corrective or rectificatory justice. Matters must redressed between the parties because “the harm-doer and harm-sufferer are to be treated as equals, neither more deserving than the other . . . one is not entitled to become relatively better off by harming the other.” The tort law provides a legal forum to redress harm.

The relationship among science, law, and justice has become a pressing issue because of a trilogy of decisions by the U.S. Supreme Court in Daubert v. Merrell Dow Pharmaceutical (1993) and its sequela, General Electric v. Joiner (1997) and Kumho Tire v. Carmichael (1999) and their implementation by lower courts. A variety of considerations probably moved the Court to rule on the issues in these cases, consider two. Primary among them was that Congress had modified the law on evidence and expert testimony in litigation, but it took the Court seventeen years to recognize this. In addition, it sought to ensure that legal cases should not be based on grossly mistaken science. The particular mechanism it used to ensure this was to create a heightened duty for judges to review scientific testimony and its foundation

9 Justice Stephen Breyer, “Introduction,” Federal Reference Manual on Scientific Evidence, 2nd ed. (Washington, DC: Federal Judicial Center, 2000), 3–4. Other motivations included how to handle different types of evidence in toxic tort litigation, a concern that too much “junk science” entered the courtroom, a desire to foster case-processing efficiency and economy. Perhaps they were even interested in changing the balance between plaintiff and defendants (toward defendants) and shifting decision-making power from judges to juries. See Margaret A. Berger, “Upsetting the Balance between Interests: The Impact of Supreme Courts Trilogy on Expert Testimony in Toxic Tort Litigation,” Law and Contemporary Problems 64 (Summer 2001): 289–326, as well as Michael H. Gottesman, “From Barefoot to Daubert to Joiner: Triple Play or Double Error,” Arizona Law Review 40 (1998): 753–780, for discussions of these points.
before experts could testify before a jury (this is a review of the “admissibility” of testimony and its supporting evidence). These Supreme Court decisions apply to all litigation that uses experts, but two of them concerned toxic torts, or claims for personal injuries in which the plaintiffs alleged that toxic substances had harmed them. Moreover, adjudication of toxic torts centrally needs science to ensure justice between parties. Toxic torts, thus, are the focus of this book.

Concerns about the possibility of justice for wrongfully injured parties have developed as a result of the Supreme Court decisions and how courts have subsequently reviewed scientific testimony and its foundation. Most judges have surely increased their scientific sophistication as a result of the trilogy of cases. They have further to go, however. If courts do not review the foundation of testimony sufficiently well, they risk denying one of the parties at the bar the possibility of justice. Plaintiffs are at greatest risk, because they have the initial burden to produce evidence. However, even if courts review evidence well, the fact and perception of greater judicial scrutiny increases litigation costs and attorney screening of clients. These, too, decrease citizen access to the law and decrease the possibility of justice for those injured by toxic substances. Together they can threaten the legitimacy of torts as an institution committed to correcting wrongs inflicted on citizens.

As citizens we cannot “see,” that is, appreciate, the institution and the subtle changes that are occurring without understanding some of the details of science, law, and the science-law interaction. The subjects addressed in this book arise from the fact that we live in a scientific and technological society, but we have not yet fully developed sufficient institutional expertise, norms, and procedures to ensure that science and the law will function well together and to give injured parties a realistic possibility of justice.

Increases in scientific understanding have resulted in products that are among the benefits of an advanced technological society. These include not only the products of an earlier period of industrialization but also the products of the chemical revolution, born in the nineteenth century and growing to maturity following World War II. There is also the promise of social benefits from more recent developments that have yet to fully mature in DNA and biotechnological research, as well as nanotechnology, the science of the vanishingly small.

However, the same beneficial products may also carry risks of harm themselves or in their manufacture, by-products, use, or disposal. In some instances, these may have unanticipated features that can cause actual harm to those who are exposed to them. The tort law is the main institution that can redress any harm that might result.

Some legal institutions have the responsibility to try to prevent such harms from occurring in the first place – typically these are the administrative public health institutions. The Food and Drug Administration (FDA) and parts of the Environmental

10 Berger, “Upsetting the Balance between Interests,” 300.
Protection Agency (EPA) they have legal authority to screen some products or substances, for example, pharmaceuticals (under the FDA) or pesticides (under the EPA and FDA), before they enter commerce and there is substantial human exposure. Laws authorizing such interventions are so-called premarket laws. These laws impose legally mandated testing, scientific review, and some level of demonstrated safety before the products may enter commerce. Other agencies, such as the Occupational Safety and Health Administration (OSHA), the Consumer Product Safety Commission (CPSC), and parts of the FDA and EPA, operate under laws that permit products to enter commerce without any required toxicity testing and then authorize them to identify the risks of harm after the products are in commerce and people are exposed. In theory the laws authorize the use of surrogates to identify risks before they materialize into actual human health and environmental harm (although this may not be carried out well in practice). These are so-called postmarket laws.

If premarket laws function well, risks and harms to persons will largely be prevented. If postmarket laws function well and quickly, risks will be identified and reduced, or eliminated, before they cause (too much?) harm. However, postmarket laws in themselves or as administered too often do not catch the risks before harm occurs to the public, the workforce, or the environment.

If firms, regulatory agencies, and others miss toxic substances or otherwise fail to protect citizens from harm, the tort law offers the possibility of postviolation, postinjury redress of injuries. It aims to provide compensation sufficient to restore the injured person to the condition he or she would have been in had the injury not occurred in the first place (this, of course, is an ideal that in many cases cannot be realized). In addition, the threat of tort suits for harmful behavior or products aims to provide general deterrence of risky activities and products and further deterrence by making examples of those who harm others. Torts, thus, could serve as a kind of backup to other institutions, if it functioned well.

Postinjury compensation (like punishment in the criminal law) is a distant second to avoiding injuries in the first place; “An ounce of prevention is worth a pound of cure,” for the victim, his or her family, and typically for society as a whole.

At its best, the tort law has functioned imperfectly. Citizens who have clearly been injured rarely use the tort law. Indeed, researchers have pointed out that in order for torts better to serve the aims of justice and deterrence there should be much more claiming on behalf of injured parties than typically occurs. How federal and state courts review the use of expert testimony and its scientific foundation in the

11 In quite extreme cases, the criminal law may be utilized to try to deter firms from acting in ways likely to injure others and may be utilized to punish those who deliberately or recklessly cause harm. See, for example, People v. O’Neill, Film Recovery Systems, et al., 550 N.E. 2d 1090 (1990).

aftermath of the Supreme Court decisions profoundly affects the possibility of justice for citizens injured without legitimate excuse or justification.

It is difficult to overestimate the social and legal importance of *Daubert*, its progeny, and their implementation by lower courts, which pose substantial philosophic and social issues. For example, following this decision the percentage of cases ending in summary judgments before trial more than doubled with 90 percent of them going against plaintiffs. The Federal Judicial Center surveyed federal judges and attorneys about expert testimony in 1991 and 1998. Although in 1991 75 percent of the judges reported admitting all proffered expert testimony, by 1998 59 percent indicated that they admitted all proffered expert testimony without limitation. Significantly, what little research has been done suggests that when trial courts have excluded scientific experts and litigants appealed, federal appellate courts decided more cases against plaintiffs than against defendants. Appellate courts also tend to rule more against plaintiffs than did the trial courts of origin. A 2013 review of the effects of the *Daubert* line of cases based on four million decisions found, “the adoption of *Daubert* in federal court did, in a statistically significant manner, motivate defendants to remove their cases from more plaintiff friendly states using the Frye rules to federal jurisdictions using *Daubert* and its progeny that tend to be more friendly to defendants.”

Instead, some courts’ implementation of *Daubert* and its progeny have erected even higher barriers based on scientifically mistaken views. Scientific evidence and reasoning appear to be more complex than judges were prepared for when the Supreme Court enhanced their responsibilities. Such decisions result in a factually inaccurate and often nonscientific bases on which to rest further legal proceedings. These often deny the victims of toxic exposures the possibility of a trial for alleged wrongful injuries and the possibility of justice. Less commonly, they can deny defendants a reasonable defense.

In some cases, courts set substantive policies in the tort law

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15 Kevin M. Clermont and Theodore Eisenberg, “Anti-Plaintiff Bias in the Federal Appellate Courts,” *Judicature* 84 (2000): 128. (New research “reveals an unlevel appellate playing field: defendants succeed significantly more often than plaintiffs on appeal from civil trials – especially from jury trials” (128).)


17 The City of Chicago was required to compensate a man for brain-stem injuries following an encounter with the police. The city was unable to mount a defense based on an alternative theory of injury because its expert’s theory was judged “too speculative” and the expert was not admitted for trial. (Margaret Cronin Fisk, “Chicago Hope: A $28M Verdict,” *National Law Journal*, November 10, 1999, A10.) In a car accident case, a trial judge refused to admit defendants’ toxicology report, frustrating their defense at trial. However, this decision was overturned on appeal (Ruiz-Troche v. Pepsi Cola of Puerto Rico Bottling Company, 161 F. 3d 77 (1998)).
but disguise them behind a veil of scientific rulings. How courts conduct evidentiary reviews also may threaten the constitutional right to a jury trial, if a trial judge overreaches his or her authority to review the scientific foundation of expert evidence and mistakenly keeps a plaintiff from receiving a jury trial.\textsuperscript{18} Poor implementation of \textit{Daubert} and its progeny will also decrease plaintiffs’ access to the legal system, because of courts’ dismissal of cases for misplaced reasons or attorneys’ screening out all but the most winnable of cases.\textsuperscript{19} As a result, there will be fewer settlements and fewer successful trials for deserving plaintiffs, further weakening any tort law message of deterrence to those who create, use, and distribute toxic products.\textsuperscript{20} It may also decrease incentives for firms to reduce or prevent the use of potentially toxic substances in commercial goods and causing harm. There is a substantial record of firms that put the public or workforce at risk because of insufficient public health and tort law deterrence.\textsuperscript{21} Poor implementation of \textit{Daubert} may drive knowledgeable and respectable scientists from participating in the legal system, a task they are reluctant to undertake in any case. Of course, if courts admit too many experts who testify beyond the evidence or their expertise or, worse, are

\textsuperscript{18} Raphael Metzger, “The Demise of Daubert in State Courts,” Commentary for Lexis Nexis MEALEY’S Emerging Toxic Torts 14 (5) (June 3, 2005); located at www.mealey.com. Some state and federal courts also have expressed such views: \textit{Howerton v. Arai Helmet, Ltd.} (2004) 348 N.C. 440, 677 S.E.2d 674, 692 (Under the authority of \textit{Daubert} courts “may unnecessarily encroach upon the constitutionally mandated function of the jury to decide issues of fact and to assess the weight of the evidence.”); \textit{Brasher v. Sandoz Pharmaceuticals Corp.} (N.D. Ala. 2001) 160 F. Supp. 2d 1291, 1295 (applying Daubert, but noting that “[f]or the trial court to overreach in the gatekeeping function and determine whether the opinion evidence is correct or worthy of credence is to usurp the jury’s right to decide the facts of the case”); \textit{Logerquist v. McVey}, 196 Ariz. 470, 485, 1 P.3d 113, 121 (2000) (“The Daubert/Joiner/Kumho trilogy of cases . . . puts the judge in the position of passing on the weight or credibility of the expert’s testimony, something we believe crosses the line between the legal task of ruling on the foundation and relevance of evidence and the jury’s function of whom to believe and why, whose testimony to accept, and on what basis.”); \textit{Bunting v. Jamieson}, 984 P.2d 467, 472 (Wyo. 1999) (adopting Daubert, but nonetheless expressing concern that “application of the Daubert approach to exclude evidence not meeting the standards established by Daubert et al. may drive knowledgeable and respectable scientists from participating in the legal system, a task they are reluctant to undertake in any case.”)

\textsuperscript{19} Gillette and Krier, “Risk, Courts and Agencies,” 1077–1109.


dishonest, this can lead to overdeterrence and keep beneficial products from the market or increase their costs. Thus, it is important for courts to accurately review expert testimony within the appropriate scope of their responsibilities in order to serve both sides of the bar and justice in torts.

However, even if judicial admissibility decisions were implemented well, there remains a concern about whether this would be adequate. Heightened judicial screening of scientific experts per force increases the pretrial costs and adds to procedural hurdles of bringing a case. This almost certainly reduces plaintiffs’ realistic access to the law because of greater attorney and expert screening of the merit of victims’ cases. Without access injured parties are denied the possibility of justice. It also is likely to exacerbate existing perverse incentives for defendants not to test and not to monitor their products. Finally, it does not adequately address more fundamental science-law problems. Within existing laws, there is insufficient legal concern with the safety of products before they enter commerce. There is too little legally required testing of products prior to commercialization and significant human exposure, except under pharmaceutical and pesticide laws. Too many products and substances enter commerce with poor or no scientific understanding of their properties and consequences (Chapter 10). Once products are in commerce there is too little monitoring to detect adverse effects. In addition, in the tort law, legally the burden of proof is on injured parties to show that the substances caused their harm, not an easy task. Moreover, scientific efforts to show harm are hindered by the kinds of risks and injuries involved, by often insensitive human studies, by complex scientific procedures, and by the need to identify risks and harms on the frontiers of scientific disciplines. In many instances, the public and workforce, as well as the environment, become random guinea pigs for determining which substances are harmful and which not.

Redress of any injuries and any deterrence protection from toxicants is the joint outcome of the law-science interaction in torts. Understanding these issues necessitates some understanding of details of two complex “institutions”: science and the law. How do they interact to produce unfortunate outcomes and how could they interact better to deter the risks and redress harms that can arise from the products of a modern technological society? I briefly sketch these issues and then develop them in the remainder of the book.

THE LEGAL ADMISSIBILITY OF EXPERT TESTIMONY AND SCIENTIFIC EVIDENCE

In establishing a legal case for compensating an injured party, the plaintiff must show that a defendant, who the plaintiff believed harmed her, had a legal duty to prevent harm, that the defendant breached that legal duty, that the plaintiff suffered a legally compensable injury, and that the defendant’s action was the factual and legal cause of the injury in question.
In many cases, the requisite legal action is in products liability, typically a strict liability body of law (in which defendant’s negligence or carelessness need not be shown). However, it is critical that plaintiffs show that defendant’s action or products caused or contributed to plaintiffs’ injuries. In federal toxic tort cases, plaintiffs typically must establish that a defendant’s substance “can cause” the adverse effect in question (so-called general causation) as well as that defendant’s action or product “did cause” plaintiff’s injury (so-called specific causation). Litigants seek to show such claims in toxic torts by means of scientific evidence and expert testimony, with experts testifying about what scientific studies show concerning alleged causal connections. However, for scientific experts to perform this function, they must be permitted to testify at trial; in legal argot, they must be “admitted” to give that testimony.

Before 1993, introducing scientific evidence and having experts admitted tended not to be overly difficult. If a litigant had well-qualified experts whose testimony was relevant to the scientific and technological issues, would assist a jury in understanding them, and was based on studies “generally accepted in the relevant scientific community,” judges tended to admit them and let cross-examination during trial determine whose experts the jury believed.\(^2\)

Since the 1993 Daubert decision and its sequelae, judges have conducted much more searching reviews of expert testimony and its foundation before full trials commence. After initial complaint(s) and answer(s) have initiated a legal case, and after discovery about what each knows about evidence in the case (including reports from experts and depositions of the parties and experts), during pretrial hearings a judge hears from both parties and reviews whether the experts will be permitted to testify before a jury. If an expert critical to a party’s legal claims is not admitted, the litigant (typically the plaintiff) may be unable to establish factual premises needed for causation, in which case the judge would dismiss the attempted legal action because there would be no factual issue for the jury to decide.\(^3\) (These issues are developed further in Chapter 2.)

Thus, “preliminary” reviews of experts can result in dismissal of the case without a trial. Consequently, how and how well judges conduct their preliminary review of experts can determine the outcome of a legal action, affect the possibility of justice between parties, and strongly influence wider social effects of the tort law.


\(^{3}\) Fleming James, Jr. and Geoffrey C. Hazard, Jr., Civil Procedure, 2nd ed. (Boston: Little, Brown and Company, 1977), 149. (Defendant is entitled to judgment as a matter of law, when there is no genuine issue of fact between the litigants.)
The Need for Scientific Studies

The same scientific institutions, some of whose results have led to beneficial technological products, have developed investigative procedures, standards of proof, and research methods designed to produce comparatively objective knowledge that will stand the test of time. These are important features of the scientific enterprise and part of what provides its honorific standing among empirical inquiries. A subset of the health and biological sciences assists in identifying risks and harms to persons on which parties to litigation must rely to argue for or defend against claims that a product has harmed someone. These include, inter alia, epidemiology, toxicology, genetic studies, mechanistic research, and clinical medicine. Science is known for controlled studies (or studies that sufficiently mimic controlled studies) in which a variable in question is identified and studied in isolation from other effects to see if it makes a causal contribution to an effect. Typically, such studies would involve appropriate numbers of experimental and control subjects to reveal adverse effects. Researchers seek to ensure that any results are not merely the result of accidental relationships but are appropriate representatives of more general features of substances and the affected population. Moreover, scientists seek to ensure that results are not mere artifacts of the studies themselves.

The careful design of studies, winnowing of data, and presentation of results that are the hallmark of scientific research uncritically transposed into the context of the tort law, perhaps surprisingly, can pose problems. There must be information available for study. There must be funding to generate data. Scientists must design sufficiently sensitive studies and have sufficient time to conduct them properly to detect the risk or harm in question. Procedures internal to science can slow the discovery of harm. Any scientific results to be utilized in a court case must be pertinent to the legal issues involved (but usually they are not designed for such purposes). There must be effective communication between scientists and judges, but conventions of science can hinder this.

The preceding comments are merely an abstract statement of some of the problems concerning scientific studies needed for the tort law, but the practical use of them for a particular legal issue is often not straightforward; these conditions are not always easy to satisfy. Courts and many commentators may have underestimated these problems in toxic tort cases (issues I take up in Chapters 6 and 7).

Special Features of Toxic Substances

Properties of toxic substances exacerbate some of these problems, stressing and straining the law. In order to show that exposure to toxic molecules contributed to human harm substantial, time-consuming, often long-term studies are needed. Statistically based epidemiological studies can be good evidence of human harm from toxic exposure because they are conducted on humans. However, these often
have not been conducted directly on a substance or product at issue in a tort case. Except in unusual circumstances it may difficult to determine exposures and how much exposure people received. The studies can be expensive to conduct. More seriously, judges and the larger public may not appreciate how insensitive they can be (comparatively rare diseases or subtle effects pose problems). Sometimes they cannot detect an adverse effect, even if it is present.

Scientists additionally utilize studies on experimental animals, typically on rats or mice but also on dogs or monkeys, to provide evidence that substances cause or contribute to human harm. Most scientists, and especially toxicologists, view animal studies as quite valuable evidence for identifying the adverse effects of toxicants. The main reason is that the pathological development of adverse effects in other mammals resembles that in humans, since the molecular, cellular, tissue, and organ functions are believed to be similar between different species of mammals, including rodents and humans. This is a feature of the “vertical integrity” of organisms. Moreover, animal studies tend to have some advantages over human studies, as few epidemiological studies have been done. However, they are time-consuming and costly to conduct, taking at a minimum five years and costing $2 million to $5 million in 2004 dollars. In addition, often because of the rareness of diseases, it is difficult to determine adverse effects at exposures to which humans are subject, thus, exposures in animal research tend to be higher than human exposures to create sensitive studies that can detect diseases. As a result, extrapolation from adverse effects in animals to adverse effects in humans provides an opening for criticisms. Because of properties of toxicants, subtleties of their effects, and often rareness of diseases, there are enough needed scientific inferences to invite critiques. Animal studies (and other kinds of toxicological evidence) that can identify human harms are often demigrated and dismissed for legal or public relations purposes, although these kinds of evidence are better than many federal judges have said they are and usually much better than defendants will admit in court.

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26 Rall et al., “Alternatives to Using Human Experience in Assessing Health Risks,” 362–363 (noting that for most chemicals, particularly environmental and occupational chemicals, epidemiologic data are insufficient to confirm the absence or presence of significant risk).

27 Jerold Last, Director, University of California Toxic Substances Research and Teaching Program, personal communication, April 18, 2004.