

EDITORIAL

Scientific Evidence and Public Policy

In June 1993, the US Supreme Court ordered federal trial judges to become “gatekeepers” of scientific testimony. Under the *Daubert v Merrell Dow Pharmaceuticals, Inc* decision and two related Supreme Court rulings, trial judges are now required to evaluate whether any expert testimony is both “relevant” and “reliable.” What began as a well-intentioned attempt to improve the quality of evidentiary science has had troubling consequences. The picture is disturbing: on the basis of a lay judge’s ruling, respected scientists have been barred from offering expert testimony in civil cases, and corporate defendants have become increasingly emboldened to cavalierly accuse any adversary of practicing “junk science.” Such a challenge requires a wealth of resources. Thus, in a striking contrast to civil actions where defendants are usually corporations, scientific standards are not rigorously applied in criminal trials, sometimes costing innocent and impoverished defendants their freedom, if not their lives. Increasingly, scientific evidence, which is relied upon by federal regulatory agencies charged with protecting public health, is being subjected to *Daubert*-like challenges. All three developments—in civil actions, criminal trials, and rulemaking—favor the powerful in our society over the weak and vulnerable.¹

Close analysis of the Supreme Court decision reveals a series of concerns. The requirements *Daubert* imposes on federal judges are unreachable—no absolute criteria exist for assessing the validity of scientific evidence.

Scientific reasoning is no more susceptible to a mechanical approach than legal reasoning. Checklists of criteria, although appealing in their convenience, are inadequate tools for assessing causation.^{2,4} Alternatively, judges may rely on their own experience and “common sense,” which has inherent biases and limitations.

Compounding this problem, the *Daubert* decision provides no philosophical tool to help judges identify “good science.” The ruling itself is an amalgam of two incompatible philosophies of science, Popper’s and Hempel’s, neither of which is capable of supplying the criterion of reliability the Court seeks.³ It is, therefore, not surprising that judges are no better able to evaluate scientific evidence than groups of jurors, who use a deliberative process to pool their collective wisdom and assess the evidence presented to them.⁵

When scientists evaluate scientific evidence in regulatory agencies, consensus committees, or even on the witness stand, they commonly apply a weight-of-evidence approach, a process or method in which all of the scientific evidence that is relevant to the status of a causal hypothesis is taken into account. A second, related Supreme Court decision, *General Electric Co v Joiner*, encourages judges to evaluate separate elements of scientific evidence individually rather than by assessing the totality of the evidence. This approach, methodologically questionable when applied in civil liability cases, runs directly counter to the precau-

tionary policies built into most health, safety, and environmental statutes.^{6,7}

Daubert has also resulted in judges arbitrarily selecting one scientific discipline (e.g., epidemiology) over another (e.g., toxicology) in positing scientific validity.^{8,9} Uncertainty in science, which is the norm not the exception, does not mean the science is flawed, nor do disagreements among scientists mean that one of the parties is wrong or is using “junk science.”^{9,10}

Furthermore, the criteria that make scientific claims valid within scientific settings are not easily transferable to legal settings.^{11,12} As Sheila Jasanoff writes, “the grand question for the law is not how judges can best do justice to science; the more critical concern is how courts can better render justice under conditions of endemic uncertainty and ignorance.”¹¹

The likelihood that questions of scientific validity are raised in a legal proceeding is related to the wealth of the parties involved. Indigent defendants in criminal trials, for example, are rarely capable of hiring experts to counter questionable science that purports to link them with a crime.¹³ In contrast, corporate defendants often hire teams of lawyers and scientific experts to use *Daubert* to make it difficult and costly for plaintiffs to put on their scientific cases through expert witnesses. The tobacco industry, for example, used its extensive resources to challenge the testimony of numerous expert witnesses; it recognized that driving up the costs to plaintiff attorneys

would help insulate the industry from legal accountability for producing a dangerous product.¹⁴ Overall, it appears that *Daubert* has likely discouraged plaintiffs without scientifically sound claims from pursuing them in court, whereas others with strong claims but insufficient resources have also been prevented from pursuing just compensation for injury.¹⁵

Manufactured Uncertainty

Magnifying or manufacturing scientific uncertainty is another tactic used to delay or prevent public health and environmental protection. The approach was used with great success by the tobacco industry and other manufacturers of dangerous products; now, it is rare for proposed regulations *not* to be challenged with claims that the scientific evidence is flawed or otherwise imperfect.¹⁶ Manufactured uncertainty has achieved a new level of official respectability in the Data Quality Act, which requires federal agencies to establish procedures to ensure the quality of information disseminated by government. Promoted by tobacco and other opponents of regulation, this largely unknown statutory provision was slipped into a thick federal appropriations bill and passed without debate. It allows parties subject to regulation to challenge every piece of evidence considered by regulators.¹⁷

Opponents of regulation have deceptively promoted the Data Quality Act and the application of *Daubert* in regulatory proceedings as a plea for "sound science." In reality, while these "sound science" reforms "sound like science," they have little to do with the way science and scientists work. Instead, they are yet

another tactic to delay or halt the imposition of requirements to protect the public's health and environment.^{7,18,19}

The Coronado Conference Papers

Concerned about these developments, a group of scientists, several of whom had directed federal public health regulatory programs, came together in 2002 to form the Project on Scientific Knowledge and Public Policy (SKAPP). With support from the Common Benefit Trust, a fund established pursuant to a court order in the Silicone Gel Breast Implant Products Liability Litigation, SKAPP has examined the use and misuse of science in two forums in which public policy is shaped: the courts and the regulatory arena. SKAPP is currently based at The George Washington University School of Public Health and Health Services.

The core papers in this special issue of the *American Journal of Public Health* are the product of a conference on "Scientific Evidence and Public Policy" convened by SKAPP in March 2003. Our objective was to bring new perspectives and academic disciplines to the discussion of science in public policy and to examine why polluters and manufacturers of dangerous products have been so successful in influencing our systems of justice and regulation.²⁰ In particular, we felt that whereas the Supreme Court's *Daubert* decision had been the focus of much legal scholarship, its philosophical underpinnings and impacts had not been examined in the scientific community. The 2-day symposium, held in Coronado, CA, provided a forum for scientists, philosophers, cognitive linguists, and science studies scholars to

have a dialog with legal scholars and federal judges. Early drafts of several papers were first presented at the Coronado Conference and greatly strengthened by lively debate. Other papers were written subsequent to the conference, informed by, and in response to issues raised there.

We hope the Coronado Conference papers in this issue will inform public thinking and policy around the use of science in courts and in protecting the public's health. To facilitate this, the papers are available for download at the SKAPP Web site, www.DefendingScience.org, and have been deposited at PubMed Central, the National Institute of Health's free digital archive of biomedical and life sciences journal literature.²¹

The Coronado Conference papers provide an important assessment of *Daubert*. Science is more subtle and less rigid than *Daubert* characterizes it. Whether applied in the courts or by regulatory bodies, *Daubert's* demand for scientific certainty runs counter to the workings of science, as well as to the basic principle that policy decisions should be made with the best available evidence and must not wait until every piece of evidence is in and until every conceivable doubt is erased. ■

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