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Toxic Torts, Autism, and Bad Science: Why the Courts May Be Our Best Defense Against Scientific Relativism

Joëlle Anne Moreno*

Autism is tragic. Although it sometimes seems like my ten year-old son Adam has been speaking to me nonstop since he learned to talk, when he was little I worried that one morning I could wake up to a stranger. As a nervous new mother, I was familiar with the odds. I had learned that autism could appear quite suddenly during the toddler years, and that autism is much more common among boys. As my son Adam and his brother Nathan have advanced into that brief safety zone between toddler and teenager, I have met families with children diagnosed with autism. Most parents respond to their children’s problems with astonishing and admirable grace, but it is impossible not to empathize with their sadness and frustration. It is difficult to even imagine watching your own child struggle with a debilitating condition that has no cause or cure. This makes it easy to understand why so many parents of autistic children want answers and someone or something to blame.

I. THE ANTI-VACCINE CRUSADE

For more than a decade, a growing number of parents have begun to suspect that their children were made autistic by the mercury-based chemical thimerisol, which was previously used as a preservative in childhood vaccines.¹ This explanation has obvious and immediate appeal.

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¹ Thimerosal was used as a vaccine preservative until approximately 2001. Thimerosal was removed in response to a 1999 recommendation by the American Academy of
We have known about the dangers of mercury for a long time. Although Alice might not have realized it, her host, the Mad Hatter, was an early victim of mercury poisoning.\(^2\) Everyone knows that mercury is dangerous. The mainstream media often describes mercury as a serious environmental hazard. Problems arise when lakes and oceans are contaminated with mercury because the mercury accumulates in the fish that swim in these waters. The public is repeatedly warned that they must avoid mercury-containing fish. Pregnant women often receive additional warnings, because mercury can cause a fetus to be born with mental retardation, cerebral palsy, seizures, eye damage, and/or hearing loss.

The internet has enabled groups like Moms Against Mercury to reach millions of parents throughout the world with the message that mercury in vaccines can cause autism. If you visit the homepage of any of these anti-vaccine websites, you will find stories like this:

My son was born a healthy child. As time went on and the more he was vaccinated, the more he started to change. Not knowing until he was four years old that mercury is in vaccines, I had no idea what was wrong with him. . . . Upon inadvertently finding out about the mercury in vaccines, it was then I realized by putting all his abnormal tests together that he was truly mercury toxic. I was outraged that I was not told that the most powerful neurotoxin was going to be injected into my new born [sic] child.\(^3\)

This message has also been spread through mainstream entertainment. On the popular Fox television series “The Shield,” Vic Mackey and his ex-wife Corrine have repeatedly contemplated suing vaccine manufacturers on behalf of their autistic children.\(^4\) On this show, the pediatrician who attempts to explain the lack of scientific evidence linking vaccines to autism is portrayed as ill-informed and heartless.

Anti-vaccine advocacy groups have also gained the support of well-placed politicians, including Senator Joseph Lieberman and Representatives Dan Burton and Dave Weldon.\(^5\) Representative Burton,

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2. See http://www.worldwidewords.org/qa/qa-mad2.htm (identifying the origins of the expression “mad as a hatter”).
4. Autism advocacy web sites have referred to this television show with approval. See, e.g., http://www.cureautismnow.org/home/article/news/4320.jsp.
5. Harris & O’Connor, supra note 1.
who served as the chairman of the Government Reform Committee until January 2003, is a powerful ally who repeatedly describes the experience of his grandson as the impetus for his actions. For example, during a 2002 Government Reform Committee hearing, Representative Burton’s opening statement included the following anecdote:

My only grandson became autistic right before my eyes, shortly after receiving his federally recommended and State mandated vaccines. Without a full explanation of what was in the shots being given, my talkative, playful, outgoing, healthy grandson, Christian, was subjected to very high levels of mercury through his vaccines. He also received the MMR [measles, mumps, rubella] vaccine and within a few days, he was showing signs of autism.6

More recently, in the summer of 2005, New York Governor George Pataki signed a bill banning thimerosal from all medicine given to children under three years old.

Parents who believe that thimerosal causes autism think that this explains how the symptoms of autism can occur suddenly during toddler years and why reported autism diagnoses have increased from approximately 1 in 10,000 in the 1980s to 1 in 166 in 2003.7 By 2006, these parents had filed more than 5,000 civil lawsuits against vaccine manufacturers. The anti-vaccine websites, television shows, political rhetoric, and civil lawsuits all share the same problem. There is no evidence that thimerosal can cause autism.

When Governor Pataki chose to pander to anti-vaccine constituents, he rejected strenuous opposition from the American Academy of Pediatrics (“AAP”). In response, the AAP’s New York Chapter issued the following statement: “This legislation represents very bad public health policy that is based on junk science and mass hysteria, not on the evidence of science . . . [and w]e at the AAP District II believe this bill is bad for our patients and


7. These statistics are often misunderstood. Even if this data is accurate, the numbers do not mean that there has been a fifty-fold increase in autism cases over the past two decades. These numbers reflect a trend in favor of diagnosing autism for a class of symptoms that were previously undiagnosed or received a different diagnosis and more aggressive reporting practices generally. They also reflect an increase in the diagnosis of a variety of autism-like conditions, such as Asperger Syndrome, which fall under the autism rubric. See generally D.V.M. Bishop, Autism, Asperger’s Syndrome and Semantic-Pragmatic Disorder: Where are the Boundaries?, 24 BRITISH J. OF DISORDERS OF COMM. 107 (1989), available at http://www.mugsy.org/bishop.htm, for an excellent discussion of the difficulties of autism diagnosis.
bad for all New Yorkers . . . ." The AAP urged the governor to recognize the grave public health dangers that would arise if New York State appeared to be encouraging parents to refuse to vaccinate their children.

To enact this legislation implies that the vaccines that have virtually eradicated many diseases, constituting one of the greatest public health accomplishments of the past century, are dangerous. This bill denigrates our informed scientific and medical communities while supporting all of the anti-vaccine factions in our society. This legislation potentially jeopardizes our most vulnerable communities.

This new law and its counterparts in other states grant unwarranted legitimacy to beliefs that are grounded in fear and speculation, not in science.

II. THE SCIENTIFIC EVIDENCE

No sound scientific evidence links autism to thimerosal. Even non-scientists can easily understand the hypothesis that thimerosal can cause autism could be explored in at least two simple ways. One way is to ascertain whether the mercury used in thimerosal is the same mercury that has been linked to the development of neurological disorders. Another way would be to critically examine the available medical literature looking for statistical data connecting children who received thimerisol-preserved vaccines and those who developed autism.

The first inquiry must begin with the fact that mercury exists in different chemical structures. Concerns about the dangers of mercury exposure have focused on methyl mercury, which has been clearly linked to a variety of neurological disorders. Thimerosal contains ethyl mercury, which is a different chemical compound. Because methyl and ethyl mercury have different chemical structures, they do not present the same health risks.

9. Id.
10. "Thimerosal, which is approximately 50% mercury by weight, has been one of the most widely used preservatives in vaccines. It is metabolized or degraded to ethylmercury and thiosalicylate. Ethylmercury is an organomercurial that should be distinguished from methylmercury, a related substance that has been the focus of considerable study." Ctr. for Biologics Evaluation and Research, U.S. Food and Drug Admin., Thimerosal in Vaccines, available at http://www.fda.gov/cber/vaccine/thimerosal.htm (last updated Jan. 31, 2006).
Different forms of mercury are associated with different levels of toxicity. Methyl mercury, an organic compound whose molecules directly and easily penetrate the nervous system, causes extremely serious environmental damage and poses a major health risk, especially to pregnant women and children. But neither thimerosal nor ethyl mercury, the compound into which the body breaks it down, cross the blood-brain barrier and enter the nervous system. Both are eliminated from the body quite rapidly and do not accumulate between vaccine doses. In the tiny amounts formerly associated with vaccines, there is no sign that either is toxic.\textsuperscript{11}

Studies conducted at the University of Rochester and the National Naval Medical Center have further confirmed that "there are differences in the way that thimerosal and methyl mercury are distributed, metabolized, and excreted [and that] thimerosal appears to be removed from the blood and body more rapidly than methyl mercury."\textsuperscript{12} In an effort to prevent the public from mistakenly assuming that methyl and ethyl mercury pose the same risks, the World Health Organization issued the following statement:

In 1999, concerns were raised in the United States about exposure to mercury following immunization. This was based on the realization that the cumulative amount of mercury in the infant immunization schedule potentially exceeded the recommended threshold set by the United States government for methyl mercury. However thimerosal, the preservative in some vaccines, contains ethyl mercury not methyl mercury.\textsuperscript{13}

Advocates of the vaccine-autism link add to the public confusion by ignoring the evidence of the different health risks associated with methyl and ethyl mercury.


\textsuperscript{12} N A T’L INST. OF ALLERGY AND INFECTIOUS DISEASES, N A T’L INSTS. OF HEALTH, Frequently Asked Questions: NIAID-Supported Studies on Mercury, Thimerosal, and Vaccine Safety (April 2005), http://www.niaid.nih.gov/factsheets/thimerosalqa.htm. In these studies doctors examined levels of mercury in blood from infants who had received routine immunizations with thimerosal-containing vaccines. The blood levels of mercury did not exceed safety guidelines and the mercury was cleared from the infants' systems much faster than would have been predicted for methyl mercury. "These results suggest that there are differences in the way that thimerosal and methyl mercury are distributed, metabolized and excreted." Id.

The second inquiry would involve an effort to test the hypothesis that vaccines cause autism by analyzing the existing medical data. Over the past few years, five major medical studies have failed to establish a connection between thimerosal and autism. The most comprehensive recent study was conducted in Denmark and published in 2002 in the New England Journal of Medicine.\textsuperscript{14} The Danish study focused on the MMR (measles, mumps, rubella) vaccine, which has often been at the center of this debate. This was an exhaustive study involving the examination of medical records of more than 500,000 children born between 1991 and 1998. Researchers found that although 82% of Danish children had received the MMR vaccine containing thimerosal, the incidence of autism was virtually identical for the children who had been exposed to thimerisol as for children who had not been exposed to thimerisol. The remaining four studies contained similar findings. As a result of these medical studies, the link between thimerosal and autism has been specifically rejected by the Centers for Disease Control and Prevention, the Food and Drug Administration, the Institute of Medicine, the World Health Organization, and the American Academy of Pediatrics.\textsuperscript{15}

Most anti-vaccine advocates ignore these studies while repeatedly citing the work of Dr. Mark Geier, author of the only published work purporting to establish a causal connection between vaccines and autism. In a June 25, 2005 article, the \textit{New York Times} analyzed the six articles written by Dr. Geier and his son David.\textsuperscript{16} Two Times science reporters, Gardiner Harris and Anahad O’Connor, discovered that Dr. Geier, a plaintiffs’ expert witness in over ninety cases against vaccine manufacturers, conducts his experiments in the basement of his suburban Maryland home. Dr. Greier has been referred to by one judge as “a professional witness in areas for which he has no training, expertise and experience” and that his work has been deemed “uninterpretable” and “voodoo science” by others in his field.\textsuperscript{17}

III. THE CONSPIRACY THEORISTS

In July 2005, Robert F. Kennedy, Jr., a senior attorney for the Natural Resources Defense Counsel, wrote an article published simultaneously in Salon and Rolling Stone. This article, “Deadly Immunity,” represents the nadir of the public debate. Although Mr. Kennedy purports to have

\textsuperscript{14} See generally Kreesten Meldgaard Madsen, et. al., \textit{A Population-Based Study of Measles, Mumps, and Rubella Vaccination and Autism}, 347 \textit{NEw ENG. J. MED.} 1477 (2002).

\textsuperscript{15} Harris & O’Connor, \textit{ supra} note 1.

\textsuperscript{16} \textit{Id.}

\textsuperscript{17} \textit{Id.}
conducted a three-year investigation into the vaccine industry, his article presents a biased, poorly supported, and alarmist view of the dangers that arise when, in his view, corrupt business and government officials conspire to kill children. According to Mr. Kennedy, who simply assumes away all of the scientific evidence that fails to link vaccines and autism, the real problem is that government agencies and vaccine manufacturers have been in cahoots for decades. Mr. Kennedy apparently believes that he has uncovered "evidence [that] suggests, our public-health authorities knowingly allowed the pharmaceutical industry to poison an entire generation of American children" and that "instead of taking immediate steps to alert the public and rid the vaccine supply of thimerosal... [conspired] to cover up the damaging data."

It is comforting to note that the backlash against Mr. Kennedy's article has been strong. On ABC, both "20/20" and "Good Morning America" cancelled scheduled interviews with Mr. Kennedy after his article was published. Although this was viewed by some as evidence of the reach of the vaccine manufacturers' conspiracy, more sensible voices, like the author of the excellent scientific blog www.oracknows.com, suggested that "ABC News probably figured out that the article was a biased and shoddily researched piece of crap..." Unfortunately, dangerous beliefs that lack a scientific basis and should be further discredited by this type of flagrant conspiracy-mongering can survive and flourish.

IV. THE GLOBAL PUBLIC HEALTH RISKS

Misinformation about vaccine safety is dangerous and the public health consequences extend far beyond our borders. Information disseminated on the web is obviously available anywhere. The international public health costs may be even greater than the domestic costs. In addition to encouraging parents to forgo vaccines in countries where children are more likely to die from disease, these lawsuits may result in companies curtailing the use of vaccine preservatives which limits packaging options. If developing countries are forced to bear the much greater cost of paying for single-dose vaccine packaging, vital childhood immunization programs could become prohibitively expensive. Although privately-funded programs, like the Children's Vaccine Program (CVP), a project of the Bill & Melinda Gates Foundation, play a vital financial role, these groups

19. Id. at 58.
21. See id.
recognize that they must devote time, money, and attention to dispelling the negative impact of "rumors and speculation" regarding vaccine safety. In developing countries where parents have refused to vaccinate their children, diseases like polio have recently reemerged.\textsuperscript{22} In response, the CVP joined with other organizations to form the Allied Vaccine Group.\textsuperscript{23}

The Allied Vaccine Group was created in response to the recent proliferation of Web sites disseminating rumors and speculation that do not pass scientific review. This unreliable information can be confusing, and may lead parents to refuse or delay immunizations that could save their child's life and prevent local epidemics.\textsuperscript{24}

Perhaps reputable scientific organizations like the Allied Vaccine Group will be heard above the cacophony of electronic and media voices.

Childhood vaccine programs are among the most important and successful public health projects. Parents who decline vaccinations and politicians who support anti-vaccine constituents ignore the scientific evidence and the public health risks.\textsuperscript{25}

V. THE ROLE OF THE COURTS

Under these circumstances, judges are the most powerful decision makers in the best position to shape the future both inside and outside the courtroom. Judges lack the emotional connection of parent litigants and, unlike politicians, they do not need to be perceived as responsive to particular interest groups to keep their jobs. If the trial judges who must decide the 5,000 pending civil cases against vaccine manufacturers take a hard look at the quality of the scientific evidence, these lawsuits could be disposed of before a single juror is seated. It does not really matter if a particular state uses a \textit{Daubert}\textsuperscript{26} or \textit{Frye}\textsuperscript{27} type standard to assess the

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\textsuperscript{23} See http://vaccine.org/members.htm homepage for list of members.


\textsuperscript{26} \textit{See generally Daubert v. Merrell Dow Pharmaceuticals, Inc.}, 509 U.S. 579 (1993) (holding that the \textit{Frye} test was superseded by the Federal Rules of Evidence, particularly Rule 702).

\textsuperscript{27} \textit{See generally Frye v. U.S.}, 293 F. 1013 (D.C. 1923) (establishing a `general
admissibility of the scientific evidence. Plaintiffs in all of these cases must convince a judge that their scientific evidence meets a threshold level of scientific validity—either because it bears the hallmarks of valid science or because it is generally accepted in the relevant field. Judges operating either pretrial standard should have the confidence to exclude plaintiffs’ evidence, because there simply is no true scientific controversy.

Judges must be concerned about the quality of the scientific evidence presented in their courtrooms. When the best available scientific evidence has consistently failed to establish any link between vaccines and autism, presenting jurors with two competing expert opinions creates the misleading impression that both opinions are legitimate. In this situation, the burden of the decisions falls to the jurors, despite the fact that even the most conscientious and objective juror lacks the time, training, experience, and resources to accomplish the task. The plain lesson from the decade-long breast implant litigation debacle is that jurors who think that they have heard a real “battle of the experts” can award huge verdicts to plaintiffs, despite the fact that their claims lack valid scientific support. Similarly, verdicts against vaccine manufacturers will contribute to the false impression that these claims are scientifically sound. This, in turn, will: spur additional lawsuits; create more anti-vaccine legislation; impair the development and distribution of vaccines here and abroad; dissuade parents from immunizing their children; and in the end cause more children to die.

When Justice Stephen Breyer said that because “[t]he practice of science depends upon sound law,” and vice versa, and that “the law must seek decisions that fall within the boundaries of scientifically sound knowledge and approximately reflect the scientific state of the art,” he recognized that judges play an important role in the developing public understanding of science. In science-based legal cases, judges will sometimes need to exclude evidence that falls short of the appropriate standard to ensure that the legal outcome remains within the boundaries of scientifically sound decisions. These judges perform a vital public service. If they can model a neutral and conscientious evaluation of the scientific evidence, they will add a voice of reason that will contribute to greater public understanding of what is, and what is not, science. Certainly, the parents who believe that vaccines cause autism will initially be disappointed. But in the long run, these groups could redirect their energy by supporting new research, providing greater family support and services, and creating new autism education programs.

acceptance’ standard for admissibility of scientific evidence at trial).
