Looking Backward to Move Forward with Your Defense: Using History to Overcome Jurors' Misunderstandings About Science

By Bruce R. Parker and David S. Gray

SUCCESSFULLY defending product liability lawsuits involving pharmaceuticals or medical devices presents a host of challenges. Viewing a handful of ambiguous, cherry-picked documents with "perfect" hindsight, jurors may feel tempted to conclude that a defendant knew about the possible harms attributed to the product, overlooked those potential harms in the name of profit, or even intended that product users purportedly suffer those harms. Opposing counsel lend their voices to this cause, aided by professional experts who parrot the party line. Time itself poses potential hurdles, as the consolidation that has characterized these industries could make key employees virtually unavailable, make document retrieval tricky, and amplify the possibility that jurors will evaluate a defendant's actions with the benefit of a rearview mirror. Even finding key employees does not ensure success: while brilliant at executing their jobs, they may struggle to communicate with their friends, family members, and even those paid to listen to them. Of course, the task becomes even more daunting, as most jurors receive only a fraction of their wages, the commitment can last for weeks or even months, and opposing counsel offer inflammation rather than information.

The simplicity that plaintiffs' experts often trumpet can be the steepest challenge faced by the defense. On the

Bruce R. Parker, a Partner in Venable's Products Liability Practice Group, has served on several mass tort litigation trial teams, including breast implants, diesel exhaust, latex gloves, Gelfoam, Mirapex, and Vioxx. A Fellow in the American College of Trial Lawyers, he has served as lead counsel in MDL Daubert *hearings and tried several cases in mass tort litigation to verdict. Bruce was President of the IADC (2006-07), President of the Maryland Defense Counsel (1988), Director of the IADC Trial Academy (August 2004), and on DRI's Board of Directors (2005-08), and has been Appointed Dean for the IADC Corporate Counsel College in 2011.*

David S. ("D.S.") Gray is an associate in Venable's Products Liability Practice Group. He works on a wide variety of pharmaceutical and medical device litigation, as well as complex commercial litigation and insurance coverage matters.

The authors wish to thank Douglas L. Weed, M.D., M.P.H., Ph.D., DLW, Consulting Services LLC, Kensington, Maryland, and Julie Galbo-Moyes, an associate in Venable's Products Liability Group, for their invaluable contributions to this paper.

surface, the rudimentary theories extolled by plaintiffs' experts could not sound more logical, clear, or persuasive. They nonetheless may lack scientific merit. All too often, however, simplistic, inaccurate reasoning resonates with juries because it just "sounds right." Such basic theories also play on jurors' misunderstandings about science and medicine. Proving that an opposing expert is wrong thus can be tantamount to telling jurors that they, too, are wrong. Yet, with very limited exceptions, a defendant must address those misunderstandings lest the plaintiff taint the manner in which the jury views the defense, its witnesses, and its evidence.

History—as shared through carefully selected and crafted stories—provides one way through which defense counsel and their experts can improve their odds of convincing jurors to pierce such simplistic reasoning. Stories about how things "used to be" and the ways in which scientists discovered the errors of their own may particularly help debunk the ways in which jurors may be tempted to view scientific evidence. Indeed, for most jurors, past experiences provide a readily accessible basis for present decision-making. Or, as the Spanish philosopher George Santayana observed: "Progress, far from consisting in change, depends on retentiveness. Those who cannot remember the past are condemned to repeat it."[1] A rock-solid nugget of history that any adult can understand and that many adults may remember learning can breathe life into a critical presentation that otherwise could test the bounds of the jury's attention, comprehension, and patience.

Section I of this paper discusses the importance of recognizing and openly addressing jurors' misunderstandings about science and medicine. Section II examines why historical examples of fallacious reasoning provide a promising tool for identifying the errors undermining opinions offered by plaintiffs' experts, educating jurors about the proper means of evaluating scientific and medical evidence, and humanizing defense witnesses. Section III discusses historical examples of fallacious reasoning that defense attorneys can couple with stories to reveal the weaknesses in plaintiffs' scientific or medical evidence. Although historical examples cannot remedy every witness's flaws, clarify every document's ambiguity, and patch every circumspect argument, they provide a unique opportunity to further case themes, build trust with jurors, and deliver memorable evidence that makes its way into jury deliberations.

I. Why Defense Counsel Must Address Jurors' Misunderstandings

Jurors do not leave the biases created through life's experiences at the courtroom door. In this context, the notion of juror biases does not refer to overt prejudices against plaintiffs or,

[1] GEORGE SANTAYANA, THE LIFE OF REASON OR THE PHASES OF HUMAN PROGRESS: REASON IN COMMON SENSE 284 (2d ed. 1924), quoted in Alvan Feinstein, *The Santayana Syndrome 1: Errors in Getting and Interpreting Science*, 41:1 PERSPECTIVES IN BIO. & MED. 45, 45 (1997).

conversely, corporations.[2] Rather, the terms "bias" and "biases" refer to the filters through which jurors receive and process information.

> Cognitive psychologists believe that decision-making is a two-step process involving: (1) an interaction between a rational system that is deliberative and analytical; and (2) an experiential system that encodes how we feel about the information we receive and process. It is the second step that leads to cognitive distortions and mistakes. To encode, people use "effects" to mold or structure decision-making. These "effects" are thought to trigger cognitive "biases" used by people to perceive and utilize information. It is believed that these effects and biases are powerful enough to influence the decision-making process, often without an individual's awareness.[3]

Such biases thus provide the lens through which jurors view the world, those around them, and the evidence comprising a defendant's case.[4] In certain trials, they also provide an almost undeniable issue with which defense counsel must deal or potentially face a substantial verdict. In all cases, trial attorneys must know and play to their audiences.[5]

---

[2] That is not to say that some jurors do not have an anti-corporation bias. *E.g.*, DOMINIC GIANNA, OPENING STATEMENTS § 1.1 (2d ed. 2009) ("Our younger jurors are skeptical of large corporations (most of them have heard and think badly of Halliburton) and mistrust most of corporate America. But, they are also very skeptical of lawyers in general and plaintiff personal injury attorneys in particular."); Nancy L. Neufer and Scott L. Berman, *Assess Early the "Background Noises" That Can Bias a Jury Pool*, ATL. COAST IN-HOUSE, May 2008, at 2 ("In a drug case, anti-pharmaceutical industry feelings are well known and documented by the national polling agencies."); Lyn Pruitt, *Overcoming Jury Bias: Trial Advocates Must Understand It and Cope with It*, 69 DEF. COUNS. J. 331, 331 (2002) ("For example, jurors now generally believe that most corporations are more interested in profits than they are in safety.").

[3] Paul Bennett Marrow, *Crafting a Remedy for the Naughtiness of Procedural Unconscionability*, 34 CUMB. L. REV. 11, 22 (2003-2004) (footnotes omitted).

[4] Joyce Tsongas and Arthur Monson, *The Powerful and Mysterious American Jury: Common Misunderstandings by Attorneys, Judges and the Public* (Aug. 2002) ("The experiences, attitudes and opinions of potential jurors are a much more reliable source of information than demographics when evaluating how potential jurors may weigh in on case issues during deliberations."), (copy on file with author); Pruitt, *supra* note 2, at 334 ("Since jurors base their verdicts on perceptions of reality, it is incumbent on the skilled advocate to create those perceptions in the minds of the jurors."); Cynthia R. Cohen, *Effective Defense Voir Dire*, 68 DEF. COUNS. J. 348, 348 (2001) ("During their lives, jurors have experienced many things that filter how they will view the trial process. The closer their experiences match the central case issue of a case, the stronger their convictions about the issue.").

[5] Theresa Zagnoli, et al., *The Changing Image of the FDA and How It Affects the Trial* 4 (2007), available at http://www.zmf.com/Articles/Changing_Image_FDA_(AB_JEL_TZ).pdf (last visited August 2, 2011) ("In planning a litigation strategy, it is important to

Jurors' biases can affect the success of a science-based defense. Life experiences shape what information jurors find significant, how they interpret that information, and what they do with that information. "People choose information that comports with their views of prior events and that makes them appear natural, even inevitable."[6] For example, family members, learning environments, and/or education teach some potential jurors to be particularly skeptical. Those jurors will process testimony and documentary evidence in a fundamentally different manner than others whose life experiences have conditioned them to accept information presented to them without question. Where—as is most often the best case scenario for the defense—a jury includes both those who do and those who do not think particularly critically,[7] counsel must adjust the presentation of the defense according to the jurors' biases. The sometimes misguided aura of infallibility associated with pseudo-scientific evidence[8] and the consensus required by the jury deliberation process[9] accentuate the need to account for these biases and the difficulty inherent in this task.

Although voir dire provides an opportunity to identify potential biases, it may not expose all biases that may affect how potential jurors will process evidence. Jurors may believe that they do not have biases and can honestly say to themselves and counsel that they have no intent to deceive anyone.

Courts and attorneys also have less than an adequate opportunity to expose biases.[10] Very rarely should attorneys ask venirepersons whether, during childhood, their parents, friends, or teachers encouraged them to think critically and even more rarely would such inquiries

identify the underlying expectations of the audience – whether it is a group of jurors, a judge, a mediator, or an arbitration panel. Once the existing expectations are understood, the work of crafting a 'story' that works within those expectations can begin.").

[6] Derek E. Bambauer, *Shopping Badly: Cognitive Biases, Communications, and the Fallacy of the Marketplace of Ideas*, 77 U. COLO. L. REV. 649, 679 (2006).

[7] Mark S. Sobus and Dan Jacks, *The Appeal of Junk Science*, 45:7 FOR THE DEFENSE 16 (2003) ("It is critical to remember that most of the population, and thus most people who sit on juries, do not possess the scientific training or background necessary for critically evaluating the scientific validity of a theory.").

[8] Renee A. Forinash, *Analyzing Scientific Evidence: From Validity to Reliability with a Two-step Approach*, 24 ST. MARY'S L.J. 223, 243-244 (1992) ("Jurors easily overestimate the probative value of the scientific evidence, misinterpreting conjecture or an erroneous theory as an accepted scientific conclusion." (footnotes omitted)).

[9] Cass R. Sunstein, Book Review, *The Perception of Risk*, 115 HARV. L. REV. 1119, 1135 (2002) ("It is well established that when a group deliberates, group members tend to move toward a more extreme position in line with their predeliberation inclinations."); James P. Levine, *The Impact of Sequestration on Juries*, 79 JUDICATURE 266, 268 (1996) ("Relatively few juries are unanimous at the outset of deliberations; some degree of persuasion is normally necessary to achieve the unanimity that most jurisdictions still require.").

[10] The availability, breadth, and value of voir dire vary widely. *See generally* Janeen Kerper, *The Art and Ethics of Jury Selection*, 24 AM. J. TRIAL ADVOC. 1, 1 (2000), available at 24 AMJTA 1.

prove fruitful. Few people would volunteer a belief that they blindly accept all proffered information.[11] Even less obvious inquiries may yield inaccurate results. While, for example, counsel may sometimes view education as a surrogate for critical thinking skills, it is not at all uncommon to encounter highly educated persons (maybe even attorneys) who do not critically evaluate evidence and high school graduates who would be very skeptical about the types of "data" on which plaintiffs' experts often rely.[12]

Further complicating the search for potential jurors' biases and the empanelling of the "perfect" jury with the "perfect" biases for a defendant's case is opposing counsel. As ferociously as defense counsel may try to empanel critical thinkers or vice versa, plaintiffs' counsel may be equally ferocious in striking those same venirepersons. Left behind are jurors who neither side felt strongly enough about to strike, who elicited no legitimate basis to strike, and who had the (mis)fortune of having a sufficiently low juror number to be empanelled.

Unless the venire process miraculously yields a collection of jurors universally capable of critically examining scientific evidence, at least some (if not all) of the jurors will have misperceptions and misunderstandings about science and medicine. These are not just loosely held default settings that jurors activate and deactivate: for such individuals, misunderstandings about science and medicine reflect their reality. Defense counsel may have to overcome these initial instincts in order to convince jurors to accept evidence and arguments demonstrating that the plaintiffs' experts have misused scientific data or have no scientifically derived data at all.

A lecture by a defense expert holds little chance of correcting jurors' understanding. As noted by two jury consultants:

> A common misconception among attorneys is that the best way to combat junk science theories is to educate juries about the merits of the real science theory (i.e., "if I can just get them to understand the epidemiology"). This "educate the jury" approach has some major obstacles. First, providing a successful education requires that there actually be a straightforward

[11] Barbara A. Spellman and Simone Schnall, *Emerging Paradigms of Rationality*, 35 QUEEN'S L.J. 117, 159 (2009) ("People also view themselves as more independent thinkers than others and less likely to 'follow the crowd.'").

[12] Richard C. Waites and David A. Giles, *Are Jurors Equipped to Decide the Outcome of Complex Cases?*, 29 AM. J. TRIAL ADVOC. 19, 23-24 (2005) ("[R]esearch and anecdotal evidence indicate that trial judges are usually no more capable than lay jurors in comprehending and interpreting complicated subject matter or in determining the reliability and value of an expert's testimony."); Sobus and Jacks, *supra* note 7, at 16 ("While we normally find that demographic characteristics such as education are some of the least helpful factors in predicting how a jury will evaluate the defense's case, there is some truth to the belief that, all other things being equal, the defense would rather be talking to a jury pool that has the capacity to understand the defense's scientific evidence, rather than people who are inclined to automatically take the simple path to verdict."); Tsongas and Monson, *supra* note 4.

> way to describe the real science. It also requires "students" who are motivated to learn, find you and your sources credible, and are capable of understanding and using the information you provide. These requirements are difficult to satisfy.[13]

This is a very delicate line to walk, however, as

> the real problems with jury decision-making in complex cases present themselves not because jurors are asked to accept or reject evidence, but because they are required to apply it. Jurors do not disregard evidence because they do not understand it or because they harbor some aversion to science. Rather, when faced with the need to make a decision, and lacking the proper tools to evaluate the options, they turn to secondary or peripheral considerations. This may include using preexisting ideas to sort out facts, gut reactions to evaluate the trustworthiness of a source, or whatever type of information is easier to incorporate into one's mental framework of a situation. This is not a deficiency of jurors in particular, but the product of thousands of years of evolution. This is how human beings make difficult decisions.[14]

In other words, if jurors are not taught the scientific and medical principles underlying a defendant's case, they will be ill-equipped to identify the inadequacies of plaintiffs' purportedly scientific evidence or to move past their own misimpressions.[15]

As part of an overarching theme or story, examples or illustrations from history help defang the misunderstandings that jurors have about science and medicine, without lecturing to them. Good trial advocacy starts with a finely crafted story about the client.[16] As with their comprehension of any form of entertainment, advertising, or persuasion, juries often consider information about what happened to be the tip of the iceberg. Instead, they understandably express interest in the characters involved (e.g., a defendant, its employees, the plaintiff), how they did whatever they did (e.g., efforts to distribute a safe product versus efforts to distribute any product), when they did it (e.g., addressing safety concerns versus marginalizing safety concerns), and why they did it (e.g., protecting product users

[13] Sobus and Jacks, *supra* note 7, at 16.

[14] Eugene Morgolis, Note, *Juror Reactions to Scientific Testimony: Unique Challenges in Complex Mass Torts*, 15 B.U.J. SCI. & TECH. L. 252, 270 (2009).

[15] Tsongas and Monson, *supra* note 4.

[16] Pruitt, *supra* note 2, at 335 ("The skilled advocate will learn to create word pictures in the minds of the jurors through the use of demonstrative evidence, evocative language, storytelling techniques, very careful word selection, and the use of rhetorical devices combined with the logical presentation of the validating documentary proof and oral testimony."); H. Mitchell Caldwell, et al., *Primacy, Recency, Ethos, and Pathos: Integrating Principles of Communication into the Direct Examination*, 76 NOTRE DAME L. REV. 423, 477 (2001) ("The jurors do not sit and react in a vacuum. Instead, they tend to view the evidence as a story, full of real flesh-and-blood characters.").

versus protecting the profit margin).[17] The more jurors can empathize with the persons involved on behalf of the defendant, the dilemmas they faced, and the decisions they made, the more likely those jurors will find in favor of that defendant.[18] The story, as told by defense counsel, also helps to shape the stories that jurors themselves create from the evidence and that they likely take into the jury room.[19]

Surprisingly few attorneys—particularly defense counsel—engage in this form of advocacy. Lawyers are trained to think logically, a skill that often constitutes the antithesis of storytelling. Paradoxically, therefore, the intellectual tools that enable lawyers to solve complex problems may not provide the best skill set for effective storytelling and jury persuasion.[20]

---

[17] Gianna, *supra* note 2, at § 1.1 (describing younger jurors: "And, because they want to know what drives your client, you and your client must be more emotionally accessible. That is, your clients must express the whys, the reasons, and, more importantly, the motives behind the action they chose."); Caldwell et al., *supra* note 16, at 483 ("Jurors, like all of us, want and even demand a context, a framework, for understanding events." (footnote omitted)).

[18] Pruitt, *supra* note 2, at 335 (counsel can inspire a jury with "effective storytelling and [by] persuasively presenting themes and messages that enable jurors to identify with the client's cause and inspire them to a just result"); Caldwell et al., *supra* note 16, at 474 ("If the jurors like and trust a witness, they are more likely to believe that witness's view of events." (footnote omitted)).

[19] Morgolis, *supra* note 14, at 262 ("[T]he story is driven by the evidence; jurors merely filter it through their experience and interpretation of the case. The question remains, however, where these anchors and filters come from and whether, in practice, they are truly distinguishable from ideological biases." (footnote omitted)); Debra L. Worthington, et al., *Hindsight Bias,* Daubert, *and the Silicone Breast Implant Litigation: Making the Case for Court-appointed Experts in Complex Medical and Scientific Litigation*, 8 PSYCHOL. PUB. POL'Y & L. 154, 157 (2002) ("[T]o avoid the complicated and often contradictory scientific evidence in a typical personal injury or mass tort lawsuit, jurors will tend to reason back from what actually happened—viewing the evidence retrospectively—in order to determine what the defendant's perspective, pre-outcome should have been. When this occurs, jurors can then 'match' the evidence to the outcome as they construct a story explaining the plaintiff's injury. Evidence that best 'fits' the story will be emphasized and subsequently incorporated into jurors' schema of events." (citations omitted)); Caldwell et al., *supra* note 16, at 487 (describing study in which "the researchers found that mock jurors made sense of the evidence by creating a cohesive and probable story.").

[20] Gary S. Gildin, *Reality Programming Lessons for Twenty-first Century Trial Lawyering*, 31 STETSON L. REV. 61, 73 (2001) ("Rather than default to the traditional form of legal argumentation, based upon inductive and deductive logic, the syllogism, the analogy, and the contrasting case, the advocate—like the film director, nonfiction writer, and news and sports reporter—must tell the jury a story." (internal quotation marks and footnote omitted)); Caldwell et al., *supra* note 16, at 453.

II. How History-Based Stories of Fallacious Reasoning Change (or at Least Minimize) Juror Misunderstandings

A. Juror Misunderstandings

Illustrating how stories and historical examples can help address juror misunderstandings starts with identifying some of the more prevalent misperceptions that jurors possess.

One widespread belief embraced by jurors is that science and medicine have answered the critical questions that affect their lives. At least on a subconscious level, many jurors do not want to believe that scientists do not fully understand the world in which we live, the manners in which our bodies function, and the effects of agents on biological processes.[21] Experienced trial counsel who handle pharmaceutical and medical device litigation know that it does not take long for intellectually honest scientists and physicians to concede that they do not know the reason for certain phenomena.[22] Plaintiffs' experts, however, are often unwilling to acknowledge the impact of idiopathic processes because, "no matter how absurd it may appear to the educated observer," the plaintiff's theory often provides the jury with the "sought-after cause that explains the effect."[23] Furthermore,

> [i]n trials, stories told with certitude can be assessed to see how fully and plausibly they account for the evidence, but stories based on probabilities are not so easily weighed. Indeed, this helps explain why jurors tend to find experts who state definite conclusions more persuasive than those who do not.[24]

This creates a challenge for a defendant whose adversary can present simple, clear explanations for complex problems that may not necessarily be

---

[21] Sobus and Jacks, *supra* note 7, at 16 ("At a superficial level, it is actually not surprising that a jury would find a junk science theory appealing, even if the experts disagree. Like junk food, junk science gives jurors what they want. And what they want most is a clear explanation for why the plaintiff's injuries occurred."); Forinash, *supra* note 8, at 242, 243 ("Often jurors will use scientific information improperly because the jurors harbor the traditional view of science," i.e., that the scientific method "is a completely objective process, void of values and biases" and "there are fundamental and absolute laws in science"). Other jurors may actually have the polar opposite perspective, i.e., that scientists cannot explain certain phenomena, but try to convince the public that they can. *See* Morgolis, *supra* note 14, at 261 ("Writing about the breast implant litigation, [Marcia] Angell suggests that one reason behind the jury verdicts was an active rejection of the science involved. 'The United States is amidst a groundswell of anti-science feeling,' she states, citing the renewed rejection of evolution theory as one example." (quoting MARCIA ANGELL, SCIENCE ON TRIAL: THE CLASH OF MEDICAL EVIDENCE AND THE LAW IN THE BREAST IMPLANT CASE 177 (1996)).

[22] Forinash, *supra* note 8, at 236 ("To the scientist, truth is more a process than a result. The scientist determines truth slowly and systematically. In fact, a scientist may spend his entire life searching for truth and never discover it.").

[23] Sobus and Jacks, *supra* note 7, at 16.

[24] Morgolis, *supra* note 14, at 269 (quoting RANDOLPH JONAKAIT, THE AMERICAN JURY SYSTEM 240 (2003)).

conducive to straightforward answers. If they have to choose between a simple, but incorrect, explanation and a complicated, but correct, explanation, jurors will face a powerful incentive to accept the simple answer.[25] Opposing counsel and the realities of the American judicial system only strengthen that incentive. Plaintiffs' attorneys often emphasize that a trial presents their clients' "only chance" for justice or compensation, thereby negating the possibility of science catching up with justice. Statutes of limitations and laches likewise preclude plaintiffs from waiting until a hypothetical time when scientists reach a definitive answer about causation.

Younger jurors can present even higher hurdles to presenting exceedingly complex scientific evidence. Often, this generation has grown up believing that a Google search yields the answer to virtually any question. In a world of instant (albeit often incorrect) information, it is understandable why jurors accustomed to using the Internet as easily as their parents and grandparents used a telephone reject expert testimony that does not offer clear answers.[26] It also helps to explain why younger jurors sometimes have shorter attention spans that necessitate quick answers to complicated questions.[27] Explanations that require long lectures or provide no clear-cut answer have almost no chance of success with such jurors.[28]

B. Why Tell Stories About History?

To be sure, effective storytelling may not entirely overcome the above-identified difficulties. For several reasons, it nevertheless offers defense counsel a legitimate opportunity to counteract the simplistic explanations offered by plaintiffs' experts, reach jurors who insist on quick explanations, and counteract jurors' suspicions that answers currently exist to most of life's questions.

First, aside from certain historians' efforts at "revisionist" history, significant events underlying medical history remain relatively undisputed. Plaintiffs' counsel and their experts therefore have fewer opportunities to distort the truth of historical events. By way of example, more than 150 years ago, surgeons operated on patients without washing their hands—a practice that would strike many as defying our modern-day version of "common sense." The work of Dr. Ignaz Semmelweis, the first to demonstrate the ill effects of unwashed

---

[25] *See* PETR SKRABANEK AND JAMES MCCORMICK, FOLLIES & FALLACIES IN MEDICINE 40-41 (1990) ("But, as H.L. Mencken pointed out, 'for every complex problem there is a solution that is simple, direct, and wrong.'").

[26] Gianna, *supra* note 2, at § 1.1.

[27] Some believe that "most Americans," not just younger jurors, have decreasing attention spans. Caldwell et al., *supra* note 16, at 457-458 ("[T]o conform with the typical juror's attention span, short examination blocks should be utilized. Because the attention span of the typical juror is seven minutes, blocks should be limited, to the extent possible, to about seven minutes." (footnotes omitted)).

[28] Gianna, *supra* note 2, at § 1.1; *see* Sobus and Jacks, *supra* note 7, at 16 ("It should be noted, however, that even good company behavior rarely makes the jury receptive to an idiopathic theory of causation. Jurors want alternative explanations, not alternative unknowns.").

hands in the healthcare environment, was at first "largely met with derision."[29] Fifty years would pass before the healthcare community would recognize the importance of handwashing to prevent infection—a notion that reasonable people today would not dispute.[30] This is also a dramatic example of how the medical profession and scientific community erred by rejecting an idea that, if adopted, would have saved human lives and of how "common sense" has evolved over time.

Second, trial lawyers are encouraged to develop their cases by using one or two themes.[31] According to that school of thought, attorneys should present cases in a manner that establishes, builds on, and ultimately takes advantage of those trial themes, which (the theory goes) will resonate with a jury and provide favorable jurors with concepts to use during the deliberation process.

Historical events may provide the defense with a good source of trial themes. Suppose a significant defense theme is that the government, media, and medical community rushed to judgment on the supposed connection between a client's antihypertensive drug and earaches. In response, the defense could borrow from the story of Richard Jewell, the now deceased security guard who warned attendees of the 1996 Olympic Games about a mysterious knapsack that subsequently exploded. At first, Mr. Jewell was lauded as a hero who saved many lives—much like a defendant that brought a successful antihypertensive to the public, which reduced patients' risk of suffering from heart attacks. Within days of the explosion, however, the media identified Mr. Jewell as a "target" of the federal investigation—much like erroneous media reports and/or advertising by plaintiffs' attorney may have poisoned the public's perspective about the value of a pharmaceutical product.[32] The federal government

---

[29] CDC, *Wash Your Hands*, http://www.cdc.gov/Features/HandWashing/ (last visited August 2, 2011).

[30] *Id.*

[31] *E.g.*, Diane P. Sullivan and Hope S. Freiwald, *The Modern Jury: How to Build Sympathy for the Big Guy*, NAT'L L.J. (Feb. 4, 2008) ("Better to decide upon a couple of themes that are core to the client's case and that will resonate with jurors."); Tsongas and Monson, *supra* note 4 (suggesting development of "compelling themes that summarize your legal and factual case clearly and succinctly" as a way in which trial attorneys can respond to juror expectations about trials, as developed by the news media and fictional portrayals); Caldwell et al., *supra* note 16, at 444 ("In the same way that it is critically important for advocates to understand the cognitive processes of jurors, it is essential that they appreciate the value of distilling their case to an easily remembered central theme. . . . Trial lawyers, much like advertising executives, must develop a case theme, repeat it, and incorporate it so that by the time the direct and cross-examination occur, the case theme is well established in the jurors' minds." (footnote omitted)).

[32] *See* Sobus and Jacks, *supra* note 7, at 16 ("In fact, our studies demonstrated that even after reputable scientific institutions reported no autoimmune problems as a result of silicone implants, jurors routinely rejected this information in favor of what they already believed. It took a great deal of time to undo the inaccurate beliefs formed as a result of the bad press surrounding this product. Given the power of these pre-existing beliefs, attending

subsequently cleared Mr. Jewell of any wrongdoing and acknowledged that the focus on Mr. Jewell actually hindered its investigation of the real culprit(s)—much like the jury, once it hears all of the evidence, should clear the defendant of alleged wrongdoing.

Third, when done effectively, storytelling can provide an entertaining vehicle through which to explain complex concepts to a jury.[33] Juries sometimes dismiss a scientific defense because of the impenetrability of the defendants' message.[34] As stories often provide a principal means for educating young children, storytelling should resonate with the early learning experiences of many jurors.[35] Storytelling additionally enhances comprehension and recall.[36] Jurors thus more easily remember a good story than a litany of facts supporting a defense.[37]

Finally, telling stories about history helps humanize an expert, defense counsel, and the defendant itself. Whereas plaintiffs' counsel will endeavor to paint a defense expert as something of a hired gun (or worse), having the expert colorfully describe a historical event can help gain the jurors' trust.[38] If supported by the applicable law, it is one thing to argue to a judge that case reports do not

---

to the print and electronic media's spin on your client's product is crucial.").

[33] *See* Stacy Caplow, *Putting the "I" n Wr*t*ng: Drafting an A/Effective Personal Statement to Tell a Winning Refugee Story*, 14 J. LEGAL WRITING INST. 249, 261 (2008); Bret Rappaport, *Tapping the Human Adaptive Origins of Storytelling by Requiring Legal Writing Students to Read a Novel in Order to Appreciate How Character, Setting, Plot, Theme, and Tone (CSPTT) Are as Important as IRAC*, 25 T.M. COOLEY L. REV. 267, 276 (2008) ("Great lawyers use stories because emotion persuades."); Waites and Giles, *supra* note 12, at 59 ("In addition to teaching survival principles or moral lessons, the stories that are remembered and used as problem solving guides tend to be entertaining at some level.").

[34] Tsongas and Monson, *supra* note 4 ("When jurors struggle with a difficult concept in a mock trial, the lack of clear explanation by counsel is usually the reason.").

[35] Rappaport, *supra* note 33, at 296 ("Studies of language development suggest that children are predisposed to learn the elements of narration early on so that they can narrate and make sense of their daily lives."); Waites and Giles, *supra* note 12, at 59 ("Today, we know that children's learning and value systems develop largely through storytelling and the inference they associate to their real-life and vicarious experiences.").

[36] Rappaport, *supra* note 33, at 276 ("Storytelling in general and literature in particular affects and persuades readers because the human mind has adapted over eons to process information through narratives.").

[37] Abraham P. Ordover, *Persuasion and the Opening Statement*, 12:2 LITIGATION 12 (1985) ("Lawyers and jurors share the common heritage of learning from stories. It began in childhood. If we would persuade, we must first grab the jury's attention. This is done not by a recitation of dry, unconnected facts, but rather through a simple story that contains the facts that support the theory of the case."); Waites and Giles, *supra* note 12, at 59 ("As human beings, we have an innate ability to tell stories and a desire to hear stories. Researchers have long realized that the easiest way to get people to accept a new idea is to link it to an idea or concept they already know and understand.").

[38] *See generally* Caldwell et al., *supra* note 16, at 439-440 ("Jurors must like the witness and understand the witness." (footnotes omitted)).

establish an association between an agent and a disease, much less causation.[39] It is something else entirely for an expert witness to identify "instances in which controlled studies have failed to substantially confirm the initial case reports (e.g., the alleged connection between coffee and pancreatic and bladder cancer or the infectious etiology of Hodgkins disease)," notwithstanding any premature enthusiasm that the scientific community may have expressed concerning the initial reports.[40] For expert witnesses who work as professors, teach students, and have to explain why they approach problems in certain ways, storytelling also can help these defense experts teach jurors about classic flaws that a plaintiffs' expert would have avoided had he or she attended the experts' classes.

III. Using Historical Stories to Attack Fallacies Often Used by Plaintiffs' Experts

The initial step in attacking the fallacious premise on which an "expert" witness bases an opinion is identifying the premise. Defense counsel can then select an appropriate historical example that highlights the opposing expert's error, demonstrates what the opposing expert should have done to reach his or her opinion, and/or reaffirms the propriety of the approach(es) taken by the defense and its experts.

Drs. Petr Skrabanek and James McCormick identify several misapplications of purportedly medical and scientific reasoning in the second chapter of *Follies and Fallacies in Medicine* (1990), which we highly recommend. The following will highlight some of the more commonly seen fallacies that crop up in pharmaceutical and medical device litigation and how stories and history help illustrate the misguided nature of those fallacies.

A. Fallacy of the Simple Explanation

This is arguably the most widely used fallacy that plaintiffs' causation experts employ in product liability litigation. Simple, but incorrect, explanations have "no explanatory power but appear to explain everything."[41] This is an especially powerful tool because it satisfies the jurors' need for certainty and their expectation that science and medicine, through a suitably credentialed expert, can provide that certainty.[42] Although there is no dearth of simple explanations premised on faulty data, "[m]any erroneous interpretations of ***correct evidence*** can be attributed to

---

[39] 1 DAVID FAIGMAN, ET AL., MODERN SCI. EVID. § 6:9 (2005-2006) ("In particular, a growing number of courts reject the use of case reports (also called 'adverse event reports') to the Food and Drug Administration to infer, by themselves, that a drug causes a disease. However, other courts have stated in dictum that there may be situations in which Daubert allows differential diagnoses and case reports as the basis for an expert opinion of causation." (footnotes omitted)).

[40] FEDERAL JUDICIAL CENTER, REFERENCE MANUAL ON SCIENTIFIC EVIDENCE 474 (2d ed. 2000) (footnote omitted) [hereinafter *Reference Manual*].

[41] Skrabanek and McCormick, *supra* note 25, at 41.

[42] Morgolis, *supra* note 14, at 269.

mental stenosis: the closed-mindedness with which a facile, simple explanation is accepted and then retained despite alternative explanations for the observed phenomenon."[43]

Since plaintiffs' experts present their opinions before those of the defense experts, they often emphasize the simplicity of their positions.[44] In doing so, however, plaintiffs' experts frequently sacrifice accuracy for clarity and certainty.[45] Except for cross-examination—during which a professional witness may refuse to acknowledge even fundamental problems—the defense may have to wait days, weeks, or even months to identify those inaccuracies. The details required to rebut those assertions also may weigh down the presentation of the defense to a level of incomprehensibility.

Medical history provides defense counsel with many rich examples of errors that prove the wisdom of Santayana's observation that if we do not understand the mistakes that we make, we are destined to repeat them. When attempting to remind jurors of the many missteps resulting from simple explanations not properly tested or embraced by physicians and scientists, any one of the following medical stories can help to demonstrate this point.

One example involves bloodletting,[46] a practice that existed for centuries. The procedure was predicated upon "knowledge" that emanated from Greek society of the four humors (blood, phlegm, yellow and black bile), which explained the balance between health and illness. Powerful authorities, such as the church, fully supported bloodletting as a means to restore the balance of these four humors. This practice persisted at the cost of many lives (allegedly including George Washington's) until scientists

---

[43] Feinstein, *supra* note 1, at 52-53 (emphasis added).

[44] *See* 1 AMY SINGER, TRIALS AND DELIBERATIONS PERSONAL INJURY § 13:26 (2009) ("It is extremely important that the prospective juror express his or her belief as to probabilities, i.e., given the danger signals described, what is the probability of additional future harm? Was the handwriting on the wall? The plaintiff needs to keep the matter extremely simple, and the defendant needs to make a circuitous and byzantine trail where there are defendants on every side and every corner.").

[45] Bertrand Russell has commented, "To be perfectly intelligible, one must be inaccurate, and to [be] perfectly accurate, one must be unintelligible." ROBERT H. FLETCHER AND SUZANNE W. FLETCHER, CLINICAL EPIDEMIOLOGY: THE ESSENTIALS 18 (Lippincott Williams & Wilkins, eds., 4th ed. 2005); *see also*, American Association for Justice, *Making and Breaking the Expert Witness: Direct and Cross-Examination*, 2 Ann. 2007 AAJ-CLE 1209 (2007) (observing that the "decisions jurors make about the testimony of medical experts are generally not based on the accuracy or correctness of the expert's opinions, but rather on how credible those opinions are" and recommending that attorneys keep "it as short and simple as possible" as a technique for presenting effective expert testimony).

[46] *See generally* KATHRYN A. KALANICK, PHLEBOTOMY TECHNICIAN SPECIALIST: A PRACTICAL GUIDE TO PHLEBOTOMY 4 (2003).

observed that individuals healed just as swiftly without bloodletting.[47]

Another excellent example of the fallacy of simple explanation (coupled with the fallacy of authority) was the uncritical acceptance of the doctrine of "Brunonianism," first propounded by John Brown in the mid-1770s.

> Brown thought that every disease was either overstimulation (sthenia) or inhibition (asthenia) and that the respective treatments were either opium or alcohol in massive doses. The system was enthusiastically accepted by doctors; and according to historian Johann Bass, this treatment was responsible for more deaths than the French Revolution and the Napoleonic Wars combined.[48]

Yet another example comes from the miasmatic theory of disease, which was prevalent in the mid-1800s. According to this theory, diseases were caused by a miasma or cloud that covered portions of the Earth at low altitudes; those living at higher altitudes were thought to enjoy better health. This explanation was embraced by leading scientists to explain an outbreak of cholera that was raging throughout London. Proponents cited data showing that inhabitants of the lower-lying regions of London had higher incidences of cholera infection. A British physician, John Snow, disagreed and thought that the disease was being spread through a contaminated water supply. Snow was able to demonstrate that people who lived at higher altitudes were getting their water from a cleaner location of the Thames River.[49]

Good stories also can be offered for more recent events. For years, the idea that vitamins would prevent cancer persisted. The NIH even funded research to prove that Vitamin A averted cancer. After much money was spent advancing this belief, a prospective epidemiological study debunked it.[50]

Another more modern example may be stress. Skrabanek and McCormick comment that stress is a condition offered to explain a large number of illnesses, although the actual data to support that hypothesis is, at best, spotty.

B. The Fallacy of *Post Hoc* Reasoning

At the heart of this false reasoning is the acceptance of *post hoc* thinking. This term comes from the Latin phrase "*post hoc ergo propter hoc*," often translated to mean "after this, therefore because (on account) of this." This form of misguided reasoning essentially provides that if a patient was sick, was treated, and was subsequently cured, the treatment must be

[47] Lawrence Cohen and Henry Rothschild, *The Bandwagons of Medicine*, 22:4 PERSPECTIVES IN BIO. AND MED. 532-533 (Summer 1979).

[48] Skrabanek and McCormick, *supra* note 25, at 41; Cohen and Rothschild, *supra* note 47, at 533.

[49] LEON GORDIS, EPIDEMIOLOGY 11 (Elsevier Saunders 3d ed. 2004).

[50] Gilbert S. Omenn, *Chemoprevention of Lung Cancer Is Proving Difficult and Frustrating, Requiring New Approaches* 92 J. NAT'L. CANCER INST. 959-960 (2000), available at http://www.jnci.oxfordjournals.org/cgi/content/full/92/12/959 (last visited August 2, 2011).

the reason for the cure.[51] When physicians resort to treatments based solely on past experience rather than pursuing evidence-based treatments or searching for reliable data regarding a potential treatment that is *post hoc* thinking.[52] Learning from experience, however, "may lead to nothing more than learning to make the same mistakes with increasing confidence."[53]

This fallacy routinely finds its way into plaintiffs' experts' opinions offered as part of drug or medical device litigation. Seasoned product liability attorneys will recognize this hypothetical: Mr. A ingested Drug Z and developed a certain condition within a certain number of minutes, hours, days, or weeks; therefore, Drug Z is associated with that condition. Or even worse, Drug Z causes that condition. Association (much less temporality) does not equal causation. While that concept may be easily stated, convincing jurors may be difficult.

In cases alleging that a pharmaceutical product can cause or did cause an adverse health effect, plaintiffs' experts also will argue that discontinuation of the drug ("dechallenge") followed by an improvement in symptoms "proves" that the drug caused the symptoms. This overly simplistic account—an exemplar of *post hoc* thinking—ignores many alternative explanations for the purported association between use of the product and symptom relief, including a powerful placebo effect, the body's own immune system, and litigation bias.[54] Moreover, in purportedly applying the Bradford-Hill criteria, plaintiffs' experts often place undue influence on temporality by claiming that the plaintiffs' alleged symptoms did not start until they started ingesting the product at issue.[55]

Stories of tragic blunders that occur when scientists and physicians ignore the distinction between association and causation (or just slip right to *post hoc* reasoning) abound. As previously discussed, certain historical "treatments"

---

[51] Skrabanek and McCormick, *supra* note 25, at 28.

[52] "The recognition that rigorous scientific evidence is not available for many medical situations has led to the acceptance of a flexible version of evidence-based medicine, defined by one well known treatise as 'the integration of the best available research evidence with clinical judgment and experience in the care of patients.'" 3 FAIGMAN, ET AL., MODERN SCI. EVID. § 21:26 (2005-06) (quoting DANIEL B. MARK, *Decision-Making in Clinical Medicine*, in 1 HARRISON'S PRINCIPLES OF INTERNAL MEDICINE 6, 6 (Dennis L. Kasper, et al., eds., 16th ed. 2005)).

[53] Skrabanek and McCormick, *supra* note 25, at 28.

[54] Feinstein, *supra* note 1, at 50 ("The evidence was correct that symptoms had improved after treatment with blood-letting, blostering, purging, or puking. The error, however, was to attribute the improvement to the treatment, rather than to the natural course of events, or what is sometimes called 'placebo effect'"). As used here, the phrase "litigation bias" means the increased number of reports in exposed individuals when compared with unexposed individuals after "there has been publicity about any alleged association between a factor and a disease." TODD P. LANGELO AND JENNIFER WILLIAMS ZWAGERMAN, DEFENDING PESTICIDES IN LITIG. § 7.5 (2009).

[55] *See also* Skrabanek and McCormick, *supra* note 25, at 31 (separately describing the "Fallacy of Noncausal Time Correlation").

were based on the premise that because some patients subsequently improved, the treatment initiated the recovery. For example, physicians practiced bloodletting because symptoms of a common cold abated five or six days afterward. It therefore should come as no surprise that the occurrence of two events close in time also can tempt jurors into assuming causation.[56]

Another, more lighthearted example of *post hoc* reasoning focusing on causation is the strong association between increasing shoe sizes of an infant and the infant's improved vocabulary. While this association suggests that larger feet improve vocabulary, the real causal factor is, of course, the confounding variable of age.[57] Furthermore, there is a correlation between increasing sales of ice cream and increasing rates of violent crime. Does ice cream consumption really cause people to commit violent crimes? The more likely explanation is that increased ice cream consumption and violent crime are independently related to confounding factors, such as increased temperatures and seasonal changes.

C. Fallacy of Authority

Physicians and scientists tend to accept statements by a leading authority, even in the absence of supporting data, based on the speaker's standing in the field.[58] Having invested their professional lives becoming specialists in a particular area, physicians are understandably loathe to accept scientific discoveries that could potentially strip them of their authority. Thus, the nature of medicine is to support the status quo and jurors (as patients as well) are conditioned to defer to those who practice medicine, notwithstanding the strong possibility that those "experts" use *post hoc* reasoning.[59] The focus should be on the message, not the speaker.

With the evolution of "evidence-based medicine," the medical community has started to move away from the blind acceptance of authority. The legal community likewise recognizes that, no matter how qualified the source may be,

---

[56] Miles Hutton, *A Roadmap for Defending an Industry: Five Common Juror Misconceptions in Pharmaceutical Product Liability Cases* 3 (2008), available at http://www.decisionquest.com/utility/showArticle/?objectID=110 (last visited August 11, 2011).

[57] *Reference Manual*, *supra* note 40, at 148.

[58] Skrabanek and McCormick describe this phenomenon as follows: "It must be true because I read it in the paper, saw it on television, the surgeon said so, the *Lancet* published it." Skrabanek and McCormick, *supra* note 25, at 37. With regard to the *Lancet*, its publication of Andrew Wakefield et al., *Ileal-lymphiod-nodular Hyperplasia Non-specific Colitis, and Pervasive Developmental Disorder in Children*, 351 LANCET 637, 637-641 (1998), unfortunately supported the now profoundly rejected hypothesis that vaccination with the measles, mumps, and rubella vaccine can cause or contribute to autism and related disorders. In February 2010, the editors of the *Lancet* "fully" retracted that study "from the published record." *Retraction—Ileal-lymphoid-nodular Hyperplasia, Non-specific Colitis, and Pervasive Developmental Disorder in Children*, LANCET (Feb. 2, 2010), available at http://www.press.thelancet.com/wakefieldretraction.pdf (last visited August 2, 2011) (footnote omitted).

[59] Skrabanek and McCormick, *supra* note 25, at 37.

emphasis must be placed on the theory itself.[60] Until such time, if any, that courts exclude all "quack-based evidence"—even that offered by the most well-credentialed "quacks" repeating what is "well established"[61]—defense trial counsel may have to defend an unfairly maligned product.

Medical history provides numerous examples of well-regarded authorities who reached conclusions that, upon further examination, turned out to be absurd or even worse. Still, some jurors might think that modern society would see right through the misguided thinking that contributed to medical errors committed over 100 years ago. Even more mainstream practitioners in the modern era have committed similar errors, however, often with tragic consequences. For example:

- Nobel Prize Laureate Linus Pauling strongly supported the hypothesis that cancer patients should be treated with Vitamin C. As described by Skrabanek and McCormick, a "fairly recent well-conducted controlled trial showed that Vitamin C not only did not benefit such patients but had a deleterious effect that was significant at the 5 percent level—that is, the odds are only one in twenty that a difference of this magnitude could have occurred by chance."[62]
- Following World War II, many in the scientific community asserted that premature infants should be treated with 100% oxygen therapy to assist in lung development. Appropriate controlled clinical studies revealed that this treatment actually contributed to about 10,000 infants developing blindness.[63]
- The modern acceptance of tonsillectomy procedures, which date back to the ancient Greek civilizations, began in the early 20th century. The assumption – uncritically accepted by both physicians and parents – that whether a child retained his or her tonsils would determine the severity of future throat infections was never scientifically tested. Despite over 300 deaths recorded from complications of tonsillectomies, the procedure continued until recent years, when there has been a growing understanding it offers very little benefit.[64] This story will have personal relevance to jurors 40 years old and older.

---

[60] *See, e.g.,* United States v. Joiner, 522 U.S. 136, 146 (1997) ("'But nothing in either *Daubert* or the Federal Rules of Evidence requires a district court to admit opinion evidence that is connected to existing data only by the ipse dixit of the expert.'").

[61] *See* Skrabanek and McCormick, *supra* note 25, at 40.

[62] *Id.* at 39 (footnote omitted).

[63] Robert Jacobson and Alvan Feinstein, *Oxygen as a Cause of Blindness in Premature Infants: Autopsy of a Decade of Errors in Clinical Epidemiologic Research*, 45 J. CLIN. EPIDEMIOL. 1265 (1992).

[64] Cohen and Rothschild, *supra* note 47, at 534.

- While headed by a prominent professor of evolutionary biology, a very well-respected American genetics laboratory served as an epicenter for research into eugenics, the "science of creating a better human race." Subsequent research into genetics has rejected many of the findings underlying that "research."[65]

The legal system has not been immune to disastrous misuse of purportedly scientific knowledge. For example, "in the fifteenth century, European courts used the laws of nature to convict and punish accused witches for causing blights, droughts, and diseases. The American colonies followed suit in the seventeenth century."[66] And, as "recently as 1968, courts have relied upon judicial precedent to admit erroneous scientific evidence that a traumatic blow could cause cancer."[67]

Yet, defense attorneys must exercise caution when using the fallacy of authority as a teaching example. When plaintiffs' attorneys retain top authorities in their respective fields to offer unsubstantiated causation explanations, telling stories to illustrate the fallacy of authority can work. In other litigation, however, plaintiffs' experts promote junk science or theories that the scientific and medical communities have rejected. Plaintiffs' experts will claim that the mainstream rejects their views because the establishment seeks to maintain the status quo, has not invested the same time researching the topics at issue, and/or has a greater interest in rejecting different conclusions instead of adopting them into the practice of medicine. Such David v. Goliath tactics can particularly resonate with jurors when a defendant relies on expert witnesses with bulletproof curricula vitae who agree with the consensus of the scientific community. Given the appropriate circumstances, however, historical examples illustrating the fallacy of authority can be a valuable teaching tool.

D. Fallacy of Risk

It is easy to confuse the distinction between relative risk and absolute risk. This can be especially tempting in a courtroom, as juries and judges take "'phantom risks' quite seriously."[68]

Relative risk "estimates the magnitude of an association between exposure and disease and indicates the likelihood of developing the disease in the exposed group relative to those who are not exposed."[69] Relative risk is a measure of the strength of an association.[70] By contrast, absolute risk is a measure of the incidence of disease in

---

[65] Jeremy Harrell, *Learning from History: Long Island's Cold Spring Harbor Laboratory*, LONG ISLAND BUS. NEWS, Apr. 7, 2006, available at http://www.findarticles.com/p/articles/mi_qn4189/is_20060407/ai_n16188002/?tag=content;col1/.

[66] Forinash, *supra* note 8, at 225 (footnotes omitted).

[67] *Id.* at 226 (footnote omitted).

[68] Sunstein, *supra* note 9, at 1127 (footnote omitted).

[69] CHARLES H. HENNEKINS AND JULIE E. BURING, EPIDEMIOLOGY IN MEDICINE 77 (Sherry L. Mayrent ed., 1987).

[70] Gordis, *supra* note 49, at 179; Skrabarek and McCormick, *supra* note 25, at 43.

a population.[71] It is a measure of the probability that an individual will acquire a disease.[72]

Some plaintiffs' experts nonetheless inflate relative risks into support for a purported major public health problem. Suppose an epidemiological study yields data indicating that there is relative risk of 3.0 of users of a particular drug or medical device subsequently experiencing a certain adverse event. Plaintiffs' experts will tell jurors that using the product will increase the risk of experiencing that event threefold or by 300%. Such testimony overdramatizes the extent of the risk since the absolute risk—the far more important variable in assessing the public health impact of a drug or medical device—may still be miniscule.

Another commonly understandable example comes from air travel. Comparing a percentage increase in risk (relative risk) of a fatal aircraft crash when flying in a 747 versus a much smaller commercially operated commuter aircraft may yield a potentially impressive finding, despite the fact that the absolute risk to anyone flying in either plane remains extraordinarily small.

Skrabanek and McCormick offer two other examples that may be more relevant in some cases. They point out that researchers have reported that alcohol consumption had increased breast cancer nearly twofold, while at the same time reporting that smoking had decreased the risk by half. If, as plaintiff's experts might claim, the quantity of their risk is to be taken seriously, then as the authors note, these "researchers did not have the guts to offer the inevitable conclusion to harassed and bewildered women: If you drink, for God's sake, smoke as well."[73]

The debate about passive smoking offers a more graphic example of the deliberate confusion of relative risk and absolute risk:

> It was stated in Parliament that passive smokers were thirty percent more at risk of lung cancer than others. This illustrates two forms of cheating. First, had this been expressed as a relative risk of 1.3, the effect would have been noticeably less dramatic. Second, as Katherine White-Horn noted in her *Weekly Observer* column, this risk, in absolute terms, has moved from .09 per one-thousand to .12 per one-thousand - a risk increase of less than four hundredths of one percent. Hardly a proper cause for concern.[74]

E. Fallacy of Inappropriate Extrapolation

This fallacy arises from the notion that, since experts may know that a high dose of an agent produces a known effect, a lower dose produces similar, but less intense effects. Known primarily for its starring role in chemical exposure litigation, this fallacy nonetheless crops up in any litigation involving pharmacological and toxicological issues.

On the surface, this fallacy sounds logical. Many toxic exposures, however,

---

[71] Gordis, *supra* note 49, at 177.

[72] Skrabanek and McCormick, *supra* note 25, at 43.

[73] *Id.* at 43.

[74] *Id.* at 44.

simply do not follow a linear relationship.[75] Extrapolating from known, high toxic levels down to zero is therefore scientifically unsound because it incorrectly assumes that toxic effects occur at all dosages. Small doses of many substances, such as radiation, alcohol, and water, have beneficial effects. Only when doses reach a certain level over a certain period of time can exposure raise the possibility of cancer, liver disease, or drowning. Even materials maligned in modern day toxic tort litigation, such as asbestos and arsenic, are present in ambient air at background levels and cause no known ill effects.[76]

In *How to Lie with Statistics*, Darrell Huff explores this fallacy in a slightly different context by citing none other than Mark Twain, who recognized "the nonsense side of extrapolation" when he wrote the following:

> In a space of 176 years, the lower Mississippi has shortened itself 242 miles. This is an average of a trifle over one mile and third per year. Therefore, any calm person, who is not blind or idiotic, can see that in the old Oolitic Silurian, just a million years ago next November, the lower Mississippi River was upwards of one-million three-hundred thousand miles long, and stuck out over the Gulf of Mexico like a fishing rod. And by the same token, any person can see that 742 years from now the lower Mississippi will be only a mile and three-quarters long and Cairo and New Orleans will have joined their streets together, and be plodding comfortably along under a single mayor and a mutual border of aldermen. There is something fascinating about science. One gets such wholesome returns of conjecture out of such a trifling investment of fact.[77]

---

[75] Mark A. Behrens and William Anderson, *The "Any Exposure" Theory: An Unsound Basis for Asbestos Causation and Expert Testimony*, 37 S.W. U. L. REV. 479, 492 (2008) ("Most toxins do not follow such a line, but present a curvilinear relationship that drops to zero disease as the exposures approach the threshold (usually well above zero exposures)."); Carl Meyer, *Science and Law: The Quest for the Neutral Expert Witness: A View from the Trenches*, 12 J. NAT. RESOURCES & ENVTL. L. 35, 44-45 (1996-97) ("The dose-response evaluation is complicated by the fact that toxic effects are not linear, that multiple agents are not linearly additive, and that the experimental determination of long-term exposure to low toxic levels is time consuming, expensive and that most toxic effects are non-specific, i.e., the clinical manifestations of toxic symptoms such as headaches, and gradual memory loss may be the same as those caused by other disease, or the effects of aging.").

[76] *See also Reference Manual*, *supra* note 40, at 426 ("For agents that produce effects other than through mutations, it is assumed that there is some level that is incapable of causing harm. If the level of exposure was below this no observable effect, or threshold, level, a relationship between the exposure and disease cannot be established.").

[77] DARRELL HUFF, HOW TO LIE WITH STATISTICS 142 (Norton & Co., Inc. ed., 1954).

F. The Fallacy of Insignificant Significance

This fallacy refers to attempts by clinicians and researchers to "equate statistical significance with clinical importance, forgetting that statistical significance is a *probability* statement (the likelihood of rejecting the null hypothesis if true) and has nothing to do with the *magnitude* of a measured difference."[78] The public's perception of risk as an "'all or nothing' matter" and the public's mistaken belief that it is possible and sometimes appropriate "to eliminate risk entirely" only heighten the importance of addressing this fallacy.[79]

The insistence of some courts on limiting the admission of epidemiological evidence to that generated with well-designed epidemiological studies reporting relative risks greater than 2.0 helps to weed out truly marginal findings.[80] Even statistically significant findings, however, say nothing about whether those findings have biological importance, clinical significance, or even applicability to any given set of circumstances with which patients present.

Suppose, hypothetically speaking, that a plaintiff experienced an adverse event after taking a defendant's pharmaceutical product. If the plaintiff's expert points to a head-to-head clinical trial indicating that a competing product posed a statistically significant lower risk of subjects experiencing this adverse event than your client's product, does that mean that a defendant is definitely on the hook for distributing a defectively designed drug? Of course not. Before absolving the defendant and its product, however, the jury may need to appreciate the quantum of difference represented by the statistically significant difference, that is, whether the purportedly lower risk would really have impacted the plaintiff's risk of experiencing an adverse event in light of that plaintiff's genetics, comorbidities, medical history, and presentation. Defense counsel also may want to highlight the price to be paid for that "statistically significant" lowered risk, for example, any appreciable differences in the side effects identified for those two products, any increased risks associated with the competing product, any medical procedures that the plaintiff would have had to undergo to benefit from the competing product, and the familiarity (or lack thereof) with the competitor's product.

Defense counsel can educate the jurors on this point simply by talking about batting averages. For example, well before the end of the season, a player will have had enough at bats such that the difference in his batting average compared with that of another player is likely to achieve statistical significance. Most sports fans, however, would reject a notion that a statistically significant

---

[78] Skrabanek and McCormick, *supra* note 25, at 49.

[79] Sunstein, *supra* note 9, at 1128-1129 (footnotes omitted).

[80] *E.g.*, *In re* Silicone Gel Breast Implants Prods. Liab. Litig., 318 F. Supp.2d 879, 893 (C.D. Cal. 2004) ("When statistical analyses or probabilistic results of epidemiological studies are offered to prove *specific* causation, however, under California law those analyses must show a relative risk greater than 2.0 to be 'useful' to the jury."); Merrell Dow Pharms., Inc. v. Havner, 953 S.W.2d 706, 716 (Tex. 1997).

difference between one player who has hit .300 and another who hit .290 is a meaningful difference. A baseball enthusiast is going to know that whether the batter with the higher average is a "better batter" depends upon a number of factors, such as how often he hits when men are on base, the number of extra base hits he hit to develop his average, and whether he bats in streaks or has been relatively consistent.

A statistically significant difference between two numbers therefore does not mean that the difference is meaningful. All it means is that the difference that exists is not likely to have been the result of chance. As Huff very ably states: "[S]ometimes the big ado is made about a difference that is mathematically real and demonstrable but so tiny as to have no importance." This is in defiance of the fine, old saying that a difference is a difference only if it makes a difference.[81]

IV. Conclusion

Storytelling is a powerful medium with which to teach, and history provides valuable lessons to teach. If done correctly, melding these two concepts can provide entertaining, educational, and memorable evidence and arguments that break through the jury room door. Such an approach also may help give the cold, hard facts and data vindicating a defendant's product a chance to resonate with jurors in a way that impressively credentialed witnesses, mind-numbing document-based presentations, and even reasonable analysis may not. Counsel therefore should attempt to use storytelling whenever appropriate.

This paper examines just a handful of fallacies that are often woven into the opinions offered by a plaintiff's expert witness. Once the fallacies are identified, recounting historical events, discoveries, and events can be a particularly effective means of attacking them. Tales of history can reveal the mistakes that science and medicine have made in the past. They can reveal the mistakes of even well-meaning, but misguided, individuals. They also can reveal the very real dangers of failing to avoid those mistakes in evaluating the evidence offered against and by a defendant manufacturer. As told by defense counsel and expert witnesses, those tales may likewise illustrate that, if the jurors do not learn from the errors of the past, they too will be condemned to repeat them.

---

[81] Huff, *supra* note 77, at 58.