

THE  
PANIC  
VIRUS

*A True Story of Medicine,  
Science, and Fear*



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## CHAPTER 3

# THE POLIO VACCINE: FROM MEDICAL MIRACLE TO PUBLIC HEALTH CATASTROPHE

On June 6, 1916, the first two polio cases of the summer were diagnosed in New York City. At the time, polio—or infantile paralysis, as it was often called—was a mysterious and frightening, although not terribly common, childhood illness. It had been a quietly persistent presence in human populations for thousands of years, but continual, widespread epidemics didn't appear until the 1880s. The virus quickly made up for lost ground, and in the first decade of the twentieth century, countries around the world were ravaged by outbreaks, especially during warmer weather. One reason for the disease's sudden virulence was undoubtedly the crowded living conditions of modern cities: Polio, like typhoid, cholera, and hepatitis A, is transmitted through what's clinically referred to as the fecal-oral route, which typically occurs as a result of inadequately treated drinking water, improper food handling, and poor sewage methods.<sup>10</sup>

Even with the growing number of epidemics, polio victims in the first decade and a half of the twentieth century generally did not suffer from lifelong consequences—in fact, in the vast majority of cases, the infection was so minor as to be barely noticeable. Approximately 5 percent of the time, however, the virus reached the central nervous system. Usually, even those infections resulted in relatively benign symptoms—headaches, diarrhea, muscle pain—that disappeared in a matter of weeks. In fewer than 2 percent of cases, however, the virus attacked motor neurons in the spinal cord and brain. At first, those patients also exhibited flulike symptoms such as achiness or general discomfort. Soon the muscles became weak and spastic, before eventually becoming completely unresponsive. The result was paralysis or, if the muscles of the chest became permanently incapacitated, death.

The epidemic of 1916 completely upended those percentages, and the result was unlike anything New York City, or the country, had experienced before. To start with, the virus was spreading exponentially faster than it previously had. Even more terrifying: The fatality rate among those with clinical infections spiked to between 20 and 25 percent, five times higher than expected. Since 1911, when New York's Department of Health began keeping statistics, the city had averaged 280 polio patients a year, and the annual death toll had fluctuated

from a high of seventy to a low of thirteen. By the end of June, more children were dying of polio every week than had died in the previous five years combined.

The epidemic that overwhelmed New York City that summer was so unexpected, so inexplicable, and so lethal that it affected the public's perception of health and medicine for years to come. Every funeral highlighted doctors' helplessness; every paralyzed child was a stark reminder of the lack of effective treatment. One local expert told the media that polio seemed to "pick the strong and well children in preference to the weak"—an anti-Darwinian truism that mocked scientific progress and knowledge. A mishmash of confusing and contradictory emergency measures only heightened the panic and confusion. Sometimes infected children were told to remain at home; others were instructed to go immediately to the nearest hospital. Quarantines were put into effect in some neighborhoods but not others. Some parents of sick children were unable to find help: In Staten Island, after watching his son die in his car on the way to the hospital, a father proceeded to drive around "with the boy's body for hours looking for someone who would receive it." Others fought to resist quarantine efforts: In one instance, a local newspaper reported that it took "the authority and strength of four deputy sheriffs and two physicians to get a child from its father." Before long, surrounding communities closed their doors to New York City residents: In Hoboken, New Jersey, "policemen were stationed at every entrance to the city—tube, train, ferry, road and cow path—with instructions to turn back every van, car, cart, and person."

By early August, with the weekly death count approaching four hundred and parts of New York City poised to descend into anarchy, the police department gave its blessing to the Home Defense League, a "volunteer vigilance force" whose 21,000 members were authorized to patrol the streets and barge into homes looking for "violations of the sanitary code that might mean a spread of infantile paralysis." Conspiracy theories took hold: In the town of Oyster Bay, on Long Island, city counselors accused John D. Rockefeller and Andrew Carnegie of using their millions to corrupt "men and microbes" in order to create "causeless hysteria and . . . needless hardships."

By the end of November, when the epidemic had run its course, 26,212 people had been infected in a total of twenty-eight states. In New York City alone, there were 9,023 total victims and 2,448 deaths. The vast majority of them were under ten years old.

For the next thirty years, the spread of polio waxed and waned without any discernible logic. In 1923, only 695 cases were reported nationwide. In 1931, that number rose to 14,105. Eleven years later, it was back under 3,000. Then,

just as the United States was recovering from its involvement in World War II, the country was battered again. In 1946, the total number of reported polio cases approached those recorded thirty years earlier. Two years later, the number of victims hit an all-time high. The year after that, it rose again—this time by an astounding 35 percent, to 40,076. With parents no clearer than they'd been decades earlier on how to protect their children, each summer's outbreak undercut the country's sense of postwar victory and security. Polio might not have been the biggest public health threat—for much of the 1940s, an average of 190,000 Americans died of the flu each year—but it took up the most space in the public's imagination.

By 1952, when more than 58,000 people were infected, polio ranked second only to the atomic bomb as the thing Americans feared most. This outsized anxiety was, to be sure, partly due to what a leading medical writer of the time called “polio's uncommon nastiness.” It was also fueled by the popular press, which then, as now, relied on dramatic stories to draw in readers. Perhaps most responsible of all was the National Foundation for Infantile Paralysis, which had been founded in 1937 by President Franklin D. Roosevelt, polio's most famous victim.<sup>11</sup> By 1945, when Roosevelt died just over a year into his fourth term in office, the foundation had become the best-known charity in the country. Year after year, its celebrity-studded March of Dimes campaigns highlighted its prodigious fund-raising prowess. Outside the federal government, it was perhaps the only organization that had the prestige and the national apparatus in place to unite the public around a single cause. When, in November 1953, a foundation-funded virologist at the University of Pittsburgh named Jonas Salk announced that he'd developed a polio vaccine, millions of citizens had already been primed to do whatever they could to fight this national menace. Within days, parents were lining up to volunteer their children for what would be the largest medical field trial in history.

The Salk trials began in the spring of 1954; by May, 1.8 million children had been injected in 211 counties spread over forty-four states—and there were still six months of tests remaining. (At the end of the year a Gallup poll found that more people knew about Salk's field trials than knew the president's full name.) This degree of public involvement and scrutiny created inevitable pressures. While Salk, the foundation, and the government worked together, they all stood to gain something different. For Salk, the success of the vaccine would make him among the most revered people on the planet; for the foundation, it would validate the billions of dollars it had raised and spent over the years; and for the government, success would be a fulfillment of an implicit promise to defend its citizens, thereby solidifying its place as a positive force in people's lives.

That summer and fall, another 25,000 Americans came down with polio, but for the first time there was the expectation of a future free of paralyzed children confined to iron lungs. When the foundation announced that it was committing another \$9 million to buy 25 million doses of the vaccine, the press surmised that the trials had already been proven effective; why else, they reasoned, would anyone spend all that money? At one point, the *New York World-Telegram and Sun* reported that Salk's vaccine had worked in one hundred percent of the test subjects. Almost nobody bothered to point out that that was a scientific impossibility; with the next March of Dimes campaign set to start in January, there was nothing to be gained by tempering expectations.

As the year drew to a close, Thomas Francis, a professor of epidemiology and a postdoc advisor of Salk's, was chosen to review the reams of data that had been collected and to write an independent report analyzing the results. With the entire world looking over his shoulder, he set to work. The following spring, mere months before that year's polio season would begin, he announced that he was ready with his conclusions.

On April 12, 1955—the tenth anniversary of FDR's death—five hundred doctors and scientists, and hundreds more reporters, gathered in the University of Michigan's Rackham Auditorium to watch Francis, a short, stocky man with a neat mustache, present his findings. Francis used the same measured tone and somnolent cadence as he did when talking to colleagues or students; even so, one newspaper described the morning as being infused with a sense of “fanfare and drama far more typical of a Hollywood premiere than a medical meeting.” At the back of the auditorium, a special riser supported the sixteen television cameras covering the event; three flights up, a media center housed another two hundred members of the press.<sup>12</sup> In ballrooms and conference halls around the country, 54,000 doctors had assembled to watch Francis's presentation via closed-circuit broadcasts. Six thousand crammed into Manhattan's Waldorf-Astoria alone.

At 10:20 a.m., as spotlights clicked on and cameras whirred, Francis strode purposefully to a lectern. Salk's vaccine, he announced, was “safe, effective, and potent.” He spoke for another ninety minutes—detailing the tests, describing his analyses, cautioning against over-optimism—but those three words, which had been so eagerly anticipated for so long, were all anyone needed to hear. The seeming inevitability of Francis's announcement did nothing to temper the jubilation that swept the country: Air raid sirens were set off; traffic lights blinked red; churches' bells rang; grown men and women wept; schoolchildren observed a moment of silence.

The rest of the day brought more of the same. The chairman of the board of

trustees of the AMA said the success of Salk's vaccine was "one of the greatest events in the history of medicine." *The New York Times* devoted almost all of its front page and five full interior pages to coverage of the event. "Gone are the old helplessness, the fear of an invisible enemy, the frustration of physicians," its editors wrote in an editorial that called for "world-wide rejoicing and thanksgiving. . . . Science has enriched mankind with one of its finest gifts." Oveta Culp Hobby, the secretary of the Department of Health, Education, and Welfare, said, "It's a wonderful day for the whole world. It's a history making day." In the second half of the twentieth century, only the assassination of John F. Kennedy, the moon landing, the resignation of Richard Nixon, and the fall of communism commanded as much of the nation's attention. Never again would science be held in such unequivocal admiration.

At five that afternoon, Hobby and the surgeon general, Leonard Scheele, licensed six preapproved pharmaceutical companies to manufacture the vaccine, a move they said would enable production of enough vaccine to inoculate every child in the country before the polio season began in earnest. Injections were taking place by the following morning.

Over the next hours and days, no accolade would be too lofty, no honor out of reach, no prediction too optimistic. Salk would surely win a Nobel Prize. The foundation, confident that victory over polio was within its grasp, discussed where to focus its energies in the future. Questions and concerns about national vaccine programs that had been present for more than a century seemed to melt away.

It didn't take long for that initial bout of euphoria to fade. The foundation had poured incredible effort into convincing citizens that fighting polio was their patriotic duty, but it had neglected to educate the public about the inherent limitations of its planned eradication campaign. Depending on the strain of the polio virus, the Salk vaccine failed to generate immunity anywhere from 10 to 40 percent of the time. Another factor was polio's standard incubation period, which meant there would be people who'd been infected in the weeks immediately preceding vaccination but wouldn't show symptoms until later. There was also a period of vulnerability between receiving the vaccine and protection taking hold. Finally, there was the inevitable reality that out of the millions of Americans who received the polio shot, some would have a negative reaction.

One illustration of the public's overhyped expectations was the panic brought about by rumors of widespread shortages. (Partisan political jockeying didn't help matters, as Democrats in Washington blamed any and all problems on President Dwight Eisenhower's incompetence while Republicans spoke sotto

voce of a mysterious, Democrat-fueled “black market” that was siphoning off valuable supplies.) Ten days after Francis’s celebratory press conference, Surgeon General Scheele told reporters that there would likely not be enough doses for everyone to get vaccinated before the end of the year. The day after that he retracted his forecast and promised that by August 1, there would be enough doses for all children ages one to nine.

In the midst of this frantic activity, the first reports of children who had become sick with polio *after* receiving the vaccine began to trickle into Washington. This was not necessarily cause for alarm, but as soon as the distribution of those cases began to be analyzed, it became clear that something had, in all probability, gone wrong. By April 26, exactly two weeks after Francis’s announcement, the Public Health Service had identified six children who’d been paralyzed after receiving doses from Berkeley, California’s, Cutter Laboratories—a significantly higher number than would have been expected to occur under normal circumstances. Before dawn the next morning, Scheele told Cutter to halt production and ordered a recall of all Cutter-produced doses that had already been distributed. Publicly, he put on a brave face. “This action does not indicate even that the vaccine was in any way faulty,” he said, stressing that the program should continue and parents should not be concerned.

Within twenty-four hours, that attitude of insouciance had evaporated. What everyone had hoped was a statistical aberration quickly became a full-blown disaster, as dozens of children who’d received Cutter-produced vaccines were paralyzed or killed. As if on cue, the parties that had been so quick to claim credit for the vaccine’s success began sniping at each other through official statements and thinly veiled, off-the-record comments: The foundation said it had “no control of the manufacturing of the vaccines” and that testing was the “sole responsibility” of the government; the same AMA officials who had so recently celebrated “one of the greatest events in the history of medicine” now announced that they had not been shown an advance copy of Francis’s report and therefore had never given their imprimatur to Salk’s vaccine; and President Eisenhower, at a loss to explain the situation, speculated at one of his weekly press conferences that the vaccine might have a “provocative effect” that activated a “latent” form of the virus already present in some people. “The actual puncture of the skin with this, to give the shot might—and they have not proven this—but it isn’t impossible that that might cause some trouble,” he said. That this conjecture went against virtually every piece of scientific evidence did not stop Eisenhower from telling reporters that perhaps it made sense to suspend the program until *after* the peak periods of transmission that summer.

Eisenhower’s emphasis on damage control over sound science extended to



discussions occurring behind the scenes. Before continuing with the nationwide effort, his aides said, public health officials needed to promise that there would not be any more children who were diagnosed with polio after being vaccinated. That, as anyone with an elementary understanding of immunology knew, was an impossible guarantee to provide, and so, instead of trusting people to understand and accept that there are risks with every medical procedure and that correlation does not equal causation, or trying to explain that the problems appeared to be related to the specific conditions under which the infected batches had been produced and not with the safety of the vaccine generally, the government took the one step guaranteed to undermine public confidence: On May 7, Scheele announced that the polio vaccine program was being shut down so that the government, “with the help of the manufacturers,” could undertake “a reappraisal of all of their tests and procedures.”<sup>13</sup> “The Public Health Service believes that every single step in the interest of safety must be taken,” he said. “We believe—and I am sure the American people join us in believing—that in dealing with the lives of our children, it is impossible to be too cautious.”

That was most definitely not what the “American people” wanted to hear. Did these new safety steps mean that previously the Public Health Service had *not* believed it had to exercise the utmost caution? Why, after insisting that the doses of the vaccine that were already at distribution centers were safe to use, did Scheele reverse course? Would the vaccinations start again in two weeks, as some officials were saying? Would it be a month, as others claimed? Or in the fall, as Eisenhower had hinted? (Both the president and members of his administration continued to be particularly inept messengers. At one point Eisenhower attributed the premature release of the vaccine to unspecified “pressure,” and said scientists had likely taken “shortcuts” on some safety tests. His appointees, meanwhile, had a habit of making baldly inaccurate statements, such as when Secretary Hobby told a Senate committee, “No one could have foreseen the public demand for the vaccine.”) As it happened, it took only a week for the government to certify another million doses—but by then, the public’s initial elation had been transformed into mistrust and apprehension. “The nation is now badly scared,” read an article in *The New York Times*. “Millions of parents fear that if their children don’t get the vaccine they may get polio, but if they get the vaccine, it might give them polio.”

Before the end of the month, when the first of many investigations into what became known as the Cutter Incident had been completed, it was already obvious that the problem had been the result of a combination of inadequate safety guidelines and a lack of official oversight. The government had not required the pharmaceutical companies making the vaccine to divulge any safety

issues that arose during manufacturing, turning what should have been a collaborative effort into one driven by competitive commercial interests. As a result, neither the independent scientists working on the project nor the public health officials in charge of implementing it had known that Cutter had discarded a full third of the batches it had produced because of failed safety tests.

Among those listening to officials' conflicting and confused pronouncements with increasing horror were Robert Gottsdanker and his wife, Josephine. The couple was better acquainted than most with the ravages of the polio virus: The children of several friends of theirs had been infected with the disease, giving them a firsthand view of the suffering that it could cause. The Gottsdankers were academics with jobs at the University of California's Santa Barbara campus—he was a psychologist, she was a counselor—and they'd always believed in the ability of science to make the world a better place. Even before the results of the Salk trials had been announced, they'd done everything possible to ensure that their two children were among the first to receive the vaccine. Within days of Thomas Francis's April 12 press conference, the Gottsdanker family physician arrived at the family's home to personally inject five-year-old Anne and seven-year-old Jerry.

At first, the Gottsdankers were relieved that their lobbying efforts had paid off: With a vacation planned for the week of April 18, they didn't want to risk missing out due to the rumored nationwide shortages. It didn't take long for them to start to question their zeal. By the time the family reached Calexico, a small border town about 120 miles east of San Diego, both children had fallen ill. Jerry soon recovered, and in later years he could barely remember being sick at all. His sister was not so lucky. By the time the family arrived back in Santa Barbara, Anne had lost the use of both of her legs. A week after being vaccinated, the Gottsdankers' younger child had developed fullblown, paralytic polio.

By the end of the month, Anne's parents learned that she had been among the children injected with the contaminated doses produced by Cutter Labs. (Her case was one of the ones that set off those first alarm bells in Washington.) The eagerness with which the Gottsdankers had sought out the vaccine only exacerbated the betrayal they felt after their daughter was infected, and they were one of the first of more than forty families to sue Cutter for damages. On November 22, 1957, just nineteen months after Salk's vaccine was first made available to the public, opening arguments in *Gottsdanker v. Cutter Laboratories* were heard in Alameda County Superior Court. From the outset, the trial was an odd one. Each side readily conceded central aspects of its opponent's argument: Walter Ward, Cutter's medical director, agreed that Anne's paralysis was in all

likelihood the result of her having been injected with live virus, while Melvin Belli, the Gottsdankers' attorney, acknowledged that the contamination had resulted from fundamental flaws in the government's safety protocols and not from negligence on Cutter's part.

The case, then, would hinge on whether the Gottsdankers could show that Cutter had violated what in legal terms is referred to as an "implied warranty." If anyone was capable of convincing a jury that this was the case, it was Belli, a man who'd been dubbed the King of Torts by the press and Melvin Bellicose by his enemies.<sup>14</sup> Belli had first achieved national prominence thirteen years earlier, when, at age thirty-five, he'd represented a waitress named Gladys Escola, who sued the Coca-Cola Bottling Co. after a glass soda bottle exploded in her hand for no reason and without warning. (The blood vessels, nerves, and muscles in Escola's thumb were severed in the incident.) In order to win that case, Belli had successfully overturned a century's worth of precedents regarding the doctrine of privity, which holds that there needs to be a contract between two parties in order for one of them to file suit. (In the Escola case, for example, both the waitress and Coca-Cola had agreements with the diner, but not with each other.) Belli's victory pushed privity aside in favor of the doctrine of foreseeability, which has been the cornerstone of modern product-liability law ever since.

With *Gottsdanker v. Cutter*, Belli was trying to radically expand the parameters he'd set with his 1944 victory. In that case, it was clearly negligent of Coca-Cola to produce bottles that shattered willy-nilly; the debate was who (or what) had standing to sue the company for its negligence. Cutter, on the other hand, had just as clearly *not* been negligent: It adhered to the government-dictated safety standards every step of the way. (That the lab had faith in its work was evidenced by Cutter's lead pathologist injecting his own children with vaccine produced by the company.) Belli, in an effort to square that circle, argued that the mechanism that caused the vaccine to be unsafe was beside the point—the bottom line was that whether the company was aware of it or not, it had abused the Gottsdankers' trust. "There is no doubt in my mind," Belli told the jury, "and there should be none in yours, that the process could and should be perfect." (This abstract notion of perfection is, of course, just that: an abstraction. In its most extreme application, a strict adherence to that standard would prohibit all medical care, since there is always the possibility that a given remedy will be improved, and every treatment carries with it at least some measure of risk.)

After more than five weeks of testimony, Belli's case remained shaky, at best, and Cutter likely would have prevailed had it not been for instructions from Judge Thomas J. Ledwich. Cutter's compliance with government regulations,

Ledwich said, had no bearing on the question of liability: “If you find that the vaccine contained infectious amounts of live virus and that the vaccine caused [Anne Gottsdanker] to become infected,” he said, “implied warranty is applicable.”

These instructions, which remain controversial to this day, threw the jurors into turmoil. On January 17, 1958, they returned the verdict they felt they’d been all but forced to deliver: Cutter was liable for Anne Gottsdanker’s paralysis. The jurors made their frustration known by including an impassioned (and highly unusual) statement with their decision, in which they wrote that “a preponderance of the evidence” had convinced them that “the defendant, Cutter Laboratories, was *not* negligent either directly or by inference.”

The \$147,300 the Gottsdankers were awarded did not end the family’s pain, which ultimately extended far beyond Anne’s paralysis. For the remainder of their lives, the Gottsdankers seemed to simultaneously obsess over Anne and deny the realities of her condition, refusing even to install a wheelchair ramp in their home. Jerry Gottsdanker grew increasingly resentful of the attention his parents lavished on his sister; he later admitted that he had been “cruel” to Anne while growing up. Robert Gottsdanker, meanwhile, seemed to lose faith in the world. “He was a scientist,” his son said in a 2005 interview. “And he felt science had let him down.”

For the Gottsdankers and the families of the other fifty-six children who’d been paralyzed after receiving contaminated doses of the polio vaccine, the Cutter Incident was a life-altering personal tragedy. It also sullied the reputations of everyone from Salk and Scheele to the leaders of the AMA and the National Foundation for Infantile Paralysis. As a result of their obfuscation and equivocation, rumors whipped around the country: Health officials and drug makers had conspired to lie to the public; the nation’s schoolchildren were the subject of massive experiments; the vaccine had *never* been safe. The outcome was as predictable as it was unnecessary: Confused and unsure about what to believe, citizens who had just weeks earlier fought to make sure they weren’t passed over began to wonder if it was such a good idea to get the vaccine after all.

If anything positive were to come from the entire affair, it would depend on future leaders’ capacity to learn from these mistakes. Instead, the precise formula that resulted in such chaos a half-century ago has been repeated time and time again. Perhaps nothing illustrates this better than a contemporaneous account that ran in the August 1955 issue of *Harper’s*—an account that could just as easily characterize numerous incidents in the years since:

[D]emagogy and political expediency . . . contributed to the brew. So did over-sensationalism by the press, radio, and TV, and a misguided attempt by the Department of Health, Education, and Welfare to withhold from the public for many weeks information the public was entitled to have from the beginning. Also involved were timidity and lack of leadership; a complete failure to educate the public properly on vaccines (despite all the propaganda); the constitutional unwillingness of scientists to give absolute guarantees; and many things more.

The point is, though, that the mess was unnecessary. . . . The vaccination program was perhaps not the best that could have been devised. But it was not a bad program. It could have been kept on the track. All that was necessary was a little judgment and some capacity for decisive action in the right places at the right time.

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One final legacy of the polio vaccine's scandal-tinged rollout involves a little known agency of crack infectious disease specialists housed within the CDC. The Epidemic Intelligence Service (EIS) was the brainchild of a public health giant named Alexander Langmuir, who in 1951 convinced federal health officials that the country needed a team of medical doctors to conduct the first wave of investigation whenever new and disturbing disease patterns emerged.

It had been the EIS that had first traced the defective batches of polio vaccine back to Cutter Laboratories, and the speed with which it worked had been a major factor in preventing the total collapse of the polio campaign. But in the same investigation in which Langmuir's ground troops had fingered Cutter, they discovered that Wyeth Pharmaceuticals, one of the other manufacturers licensed to make the vaccine, had also produced defective batches. When confronted with the possibility that a second revelation could spark a panic that would fatally cripple the vaccine program, Langmuir concluded that the risks attributable to Wyeth were small enough that it would be better to keep quiet. Seven years later, Langmuir faced a similar decision after EIS investigators found that in very rare cases—less than one person out of every million vaccinated—the oral polio vaccine developed by Albert Sabin caused paralysis. By that point, polio had all but vanished from the United States. Given this situation, Langmuir chose to bury the data implicating Sabin's vaccine, calculating that it was better to avoid the potential reemergence of the virus than to let the public know all the facts. Whether he made the correct decision is a subject for medical ethicists and

philosophers to reason through. What is beyond debate is that in the years to come, public health officials learned the disastrous consequences of failing to educate the public about the risks and realities of fighting disease.

10 This method of viral transmission occurs much more frequently than we'd like to admit. Viruses that are transmitted through the ingestion of animal fecal matter are also quite common. Take toxoplasmosis, a parasitic disease that occurs most commonly in cats: In the United States, approximately one-third of the population has been infected; in France, the rate is closer to two-thirds. Food for thought the next time you don't wash your hands before a meal.

11 In 2003, an academic paper presented convincing evidence that Roosevelt's age when he first got sick (he was thirty-nine) and the disease's progression made it likely that he had actually suffered from Guillain-Barré syndrome, an autoimmune disorder that attacks the nervous system and was all but unknown at the time.



12 Reporters on site had received an embargoed copy of the report at 9:15 a.m., which was delivered under the protection of four policemen. Proving that the media's frenzy for beating competitors by mere minutes is not a product of the Internet age, NBC immediately broke the embargo, and was just as quickly denounced by its competitors as forever tainting the sanctity of agreements made between reporters and their sources.

13 The difficulty in determining whether correlation equals causation causes an enormous number of misapprehensions. Until a specific mechanism demonstrating how A causes B is identified, it's best to assume that any correlation is incidental, or that both A and B relate independently to some third factor. An example that highlights this is the correlation between drinking milk and cancer rates, which some advocacy groups (including People for the Ethical Treatment of Animals) use to argue that drinking milk *causes* cancer. A more likely explanation is that cancer diagnoses and milk consumption both have a positive correlation with increased age: On average, milk drinkers live longer than non-milk drinkers, and the older you are, the more likely you are to develop cancer. This does not, however, mean that drinking milk actually causes people to live longer: It could be that people who drink milk have better access to high-quality health care or eat more healthily than those who do not.

14 Belli's tort-related work, which resulted in more than \$600 million in damages by the time he died in 1996, was not all he was known for: He served as Jack Ruby's pro bono counsel in his trial for the murder of Lee Harvey Oswald; he received a letter from the Zodiac Killer; in 1969, he helped set up the Rolling Stones-headlined concert at Northern California's Altamont Speedway at which a member of the Hell's Angels stabbed a fan to death; over the course of his career, he represented everyone from Mae West to Zsa Zsa Gabor and Chuck Berry to Muhammad Ali; he accused his fifth (of six) wife of throwing their pet dog off the Golden Gate Bridge; and he played an evil overlord named Gorgan in a *Star Trek* episode titled "And the Children Shall Lead." Ironically, one of his last victories led to his financial ruin: In 1995, Belli won a class-action lawsuit against breast implant manufacturer Dow Corning, but his firm was unable to recover the \$5 million it had spent on the trial when the company declared bankruptcy.