

# An Epidemic of Fear

One man's battle against the anti-vaccine movement. by Amy Wallace

PHOTOGRAPH BY ANDREW ZUCKERMAN



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# To hear his enemies talk,

you might think Paul Offit is the most hated man in America. A pediatrician in Philadelphia, he is the coinventor of a rotavirus vaccine that could save tens of thousands of lives every year. Yet environmental activist Robert F. Kennedy Jr. slams Offit as a “biostitute” who whores for the pharmaceutical industry. Actor Jim Carrey calls him a profiteer and distills the doctor’s attitude toward childhood vaccination down to this chilling mantra: “Grab ‘em and stab ‘em.” Recently, Carrey and his girlfriend, Jenny McCarthy, went on CNN’s *Larry King Live* and singled out Offit’s vaccine, RotaTeq, as one of many unnecessary vaccines, all administered, they said, for just one reason: “Greed.” ¶ Thousands of people revile Offit publicly at rallies, on Web sites, and in books. Type *pauloffit.com* into your browser and you’ll find not Offit’s official site but an anti-Offit screed “dedicated to exposing the truth about the vaccine industry’s most well-paid spokesperson.” Go to Wikipedia to read his bio and, as often as not, someone will have tampered with the page. The section on Offit’s education was once altered to say that he’d studied on a pig farm in Toad Suck, Arkansas. (He’s a graduate of Tufts University and the University of Maryland School of Medicine). ¶ Then there are the threats. Offit once got an email from a Seattle man that read, “I will hang you by your neck until you are dead!” Other bracing messages include “You have blood on your hands” and “Your day of reckoning will come.” A few years ago, a man on the phone ominously told Offit he knew where the doctor’s two children went to school. At a meeting of the Centers for Disease Control and Prevention, an anti-vaccine protester emerged from a crowd of people holding signs that featured Offit’s face emblazoned with the word **TERRORIST** and grabbed the unsuspecting, 6-foot-tall physician by the jacket. ¶ “I don’t think he wanted to hurt me,” Offit recalls. “He was just excited to be close to the personification of such evil.” Still, whenever Offit gets a letter with an unfamiliar return

address, he holds the envelope at arm’s length before gingerly tearing it open. “I think about it,” he admits. “Anthrax.”


So what has this award-winning 58-year-old scientist done to elicit such venom? He boldly states—in speeches, in journal articles, and in his 2008 book *Autism’s False Prophets*—that vaccines do not cause autism or autoimmune disease or any of the other chronic conditions that have been blamed on them. He supports this assertion with meticulous evidence. And he calls to account those who promote bogus treatments for autism—treatments that he says not only don’t work but often cause harm.

As a result, Offit has become the main target of a grassroots movement that opposes the systematic vaccination of children and the laws that require it. McCarthy, an actress and a former *Playboy* centerfold whose son has been diagnosed with autism, is the best-known leader of the movement, but she is joined by legions of well-organized supporters and sympathizers.

This isn’t a religious dispute, like the debate over creationism and intelligent design. It’s a challenge to traditional science that crosses party, class, and religious lines. It is partly a reaction to Big Pharma’s blunders and PR missteps, from Vioxx to illegal marketing ploys, which have encouraged a distrust of experts. It is also, ironically, a product of the era of instant communication and easy access to information. The doubters and deniers are empowered by the Internet (online, nobody knows you’re not a doctor) and helped by the mainstream media, which has an interest in pumping up bad science to create a “debate” where there should be none.

In the center of the fray is Paul Offit. “People describe me as a vaccine advocate,” he says. “I see myself as a science advocate.” But in this battle—and make no mistake, he says, it’s a pitched and heated battle—“science alone isn’t enough ... People are getting hurt. The parent who reads what Jenny McCarthy says and thinks, ‘Well, maybe I shouldn’t get this vaccine,’ and their child dies of Hib meningitis,” he says, shaking his head. “It’s such a fundamental failure on our part that we haven’t convinced that parent.”

Consider: In certain parts of the US, vaccination rates have dropped so low that occurrences of some children’s diseases are approaching pre-vaccine levels for the first time ever. And the number of people who choose not to vaccinate their children (so-called philosophical exemptions are available in about 20 states, including Pennsylvania, Texas, and much of the West) continues to rise. In states where such opting out is allowed, 2.6 percent of parents did so last year, up from 1 percent in 1991,

A man with short, graying hair is seated in a dark blue office chair, looking thoughtfully to his left. He is wearing a maroon button-down shirt with two chest pockets and dark trousers. His hands are clasped in his lap. The background is a dark wooden bookshelf filled with books. A red text box is overlaid on the right side of the image.

"I don't think he wanted to hurt me," says pediatrician and vaccine inventor Paul Offit. "He was just excited to be close to the personification of evil."

## The Misinformants

according to the CDC. In some communities, like California's affluent Marin County, just north of San Francisco, non-vaccination rates are approaching 6 percent (counterintuitively, higher rates of non-vaccination often correspond with higher levels of education and wealth).

That may not sound like much, but a recent study by the *Los Angeles Times* indicates that the impact can be devastating. The *Times* found that even though only about 2 percent of California's kindergartners are unvaccinated (10,000 kids, or about twice the number as in 1997), they tend to be clustered, disproportionately increasing the risk of an outbreak of such largely eradicated diseases as measles, mumps, and pertussis (whooping cough). The clustering means almost 10 percent of elementary schools statewide may already be at risk.

In May, *The New England Journal of Medicine* laid the blame for clusters of disease outbreaks throughout the US squarely at the feet of declining vaccination rates, while nonprofit health care provider Kaiser Permanente reported that unvaccinated children were 23 times more likely to get pertussis, a highly contagious bacterial disease that causes violent coughing and is potentially lethal to infants. In the June issue of the journal *Pediatrics*, Jason Glanz, an epidemiologist at Kaiser's Institute for Health Research, revealed that the number of reported pertussis cases jumped from 1,000 in 1976 to 26,000 in 2004. A disease that vaccines made rare, in other words, is making a comeback. "This study helps dispel one of the commonly held beliefs among vaccine-refusing parents: that their children are not at risk for vaccine-preventable diseases," Glanz says.

"I used to say that the tide would turn when children started to die. Well, children have started to die," Offit says, frowning as he ticks off recent fatal cases of meningitis in unvaccinated children in Pennsylvania and Minnesota. "So now I've changed it to 'when *enough* children start to die.' Because obviously, we're not there yet."

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The rejection of hard-won knowledge is by no means a new phenomenon. In 1905, French mathematician and scientist Henri Poincaré said that the willingness to embrace pseudo-science flourished because people "know how cruel the truth often is, and we wonder whether illusion is not more consoling." Decades later, the astronomer Carl Sagan reached a similar conclusion: Science loses ground to pseudo-science because the latter seems to offer more comfort. "A great many of these belief systems address real human needs that are not being met by our society," Sagan wrote of certain Amer-

icans' embrace of reincarnation, channeling, and extraterrestrials. "There are unsatisfied medical needs, spiritual needs, and needs for communion with the rest of the human community."

Looking back over human history, *rationality* has been the anomaly. Being rational takes work, education, and a sober determination to avoid making hasty inferences, even when they appear to make perfect sense. Much like infectious diseases themselves—beaten back by decades of effort to vaccinate the populace—the irrational lingers just below the surface, waiting for us to let down our guard.

Before smallpox was eradicated with a vaccine, it killed an estimated 500 million people. And just 60 years ago, polio paralyzed 16,000 Americans every year, while rubella caused birth defects and mental retardation in as many as 20,000 newborns. Measles infected 4 million children, killing 3,000 annually, and a bacterium called *Haemophilus influenzae* type b caused Hib meningitis in more than 15,000 children, leaving many with permanent brain damage. Infant mortality and abbreviated life spans—now regarded as a third world problem—were a first world reality.

Today, because the looming risk of childhood death is out of sight, it is also largely out of mind, leading a growing number of Americans to worry about what is in fact a much lesser risk: the ill effects of vaccines. If your newborn gets pertussis, for example, there is a 1 percent chance that the baby will die of pulmonary hypertension or other complications. The risk of dying from the pertussis vaccine, by contrast, is practically nonexistent—in fact, no study has linked DTaP (the three-in-one immunization that protects against diphtheria, tetanus, and pertussis) to death in children. Nobody in the pro-vaccine camp asserts that vaccines are risk-free, but the risks are minute in comparison to the alternative.

Still, despite peer-reviewed evidence, many parents ignore the math and agonize about whether to vaccinate. Why? For starters, the human brain has a natural tendency to pattern-match—to ignore the old dictum "correlation does not imply causation" and stubbornly persist in associating proximate phenomena. If two things coexist, the brain often tells us, they must be related. Some parents of autistic children noticed that their child's condition began to appear



**Jenny McCarthy**

"Many people ask me if I had to do it all over again with a new baby, would I vaccinate? The answer is no. Hell no. Most parents who know they have a vaccine-injured child usually are that adamant about it."

## Prominent voices in the anti-vaccine crusade.



**Jim Carrey**

"With many states like Minnesota now reporting one in 80 children affected with autism, can we afford to trust those who serve two masters or their logic that tells us 'one size fits all' when it comes to vaccines?"



**Joe Scarborough**

"I can't prove it, but intuitively, you look at the spike [in autism], you look at thimerosal, there is no doubt in my mind ... we're gonna find out that thimerosal causes, in my opinion, autism."



**Don Imus**

"As everybody on the planet knows, thimerosal is a neurotoxin. Injecting it at the levels they do and used to do, and still do, by the way, into the bloodstreams of infants must do something."



**Robert F. Kennedy Jr.**

"It's time for the CDC to come clean with the American public. Its tactics of deception and obfuscation are jeopardizing the credibility of the entire vaccine program and posing an enormous danger to public health."



**Joe Lieberman**

"Parents still have to be very careful in the application of vaccines to their kids. That's what I've asked my kids to do with my grandkids."

shortly after a vaccination. The conclusion: "The vaccine must have caused the autism." Sounds reasonable, even though, as many scientists have noted, it has long been known that autism and other neurological impairments often become evident at or around the age of 18 to 24 months, which just happens to be the same time children receive multiple vaccinations. Correlation, perhaps. But not causation, as studies have shown.

And if you need a new factoid to support your belief system, it has never been easier to find one. The Internet offers a treasure trove of undifferentiated information, data, research, speculation, half-truths, anecdotes, and conjecture about health and medicine. It is also a democratizing force that tends to undermine authority, cut out the middleman, and empower individuals. In a world where anyone can attend what McCarthy calls the "University of Google," boning up on immunology before getting your child vaccinated seems like good, responsible parenting. Thanks to the Internet, everyone can be their own medical investigator.

There are anti-vaccine Web sites, Facebook groups, email alerts, and lobbying organizations. Politicians ignore the movement at their peril, and, unlike in the debates over creationism and global warming, Democrats have proved just as likely as Republicans to share misinformation and fuel anxiety.

US senators John Kerry of Massachusetts and Chris Dodd of Connecticut have both curried favor with constituents by trumpeting the notion that vaccines cause autism. And Robert F. Kennedy Jr., a scion of the most famous Democratic family of all, authored a deeply flawed 2005 *Rolling Stone* piece called "Deadly Immunity." In it, he accused the government of protecting drug companies from litigation by concealing evidence that mercury in vaccines may have caused autism

in thousands of kids. The article was roundly discredited for, among other things, overestimating the amount of mercury in childhood vaccines by more than 100-fold, causing *Rolling Stone* to issue not one but a prolonged series of corrections and clarifications. But that did little to unring the bell.

The bottom line: Pseudo-science preys on well-intentioned people who, motivated by love for their kids, become vulnerable to one of the world's oldest professions. Enter the snake-oil salesman.

## When a child

is ill, parents will do anything to make it right. If you doubt that, just spend a day or two at the annual conference of the nonprofit organization Autism One, a group built around the conviction that autism is caused by vaccines. It shares its agenda with other advocacy groups like the National Autism Association, the Coalition for SafeMinds, and McCarthy's Generation Rescue.

All these organizations cite similar anecdotes—children who appear to shut down and exhibit signs of autistic behavior immediately after being vaccinated—as proof. Autism One, like others, also points to rising rates of autism—what many parents call an epidemic—as evidence that vaccines are to blame. Finally, Autism One asserts that the condition is preventable and treatable, and that it is the toxins in vaccines and the sheer number of childhood vaccines (the CDC recommends 10 vaccines, in 26 doses, by the age of 2—up from four vaccines in 1983) that combine to cause disease in certain sensitive children.

Their rhetoric often undergoes subtle shifts, especially when the scientific evidence becomes too overwhelming on one front or another. After all, saying you're against *all* vaccines does start to sound crazy, even to a parent in distress over a child's autism. Until recently,

# How to Win an Argument About Vaccines

## The anti-immunization crowd clings to well-worn myths. Arm yourself with facts.

### 1 MYTH: Vaccines cause autism.

**FACT:** Until 2001, vaccines included thimerosal, a preservative containing ethylmercury. Mercury, of course, can cause neurological damage. But there's scientific consensus that the amount once used in vaccines—around 50 micrograms per 0.5-ml dose—was far short of toxic. And autism rates have continued to climb, suggesting that there's either a different cause or, more likely, that a better understanding of the condition has increased diagnoses. A comprehensive review of the research, conducted in 2004 by the prestigious Institute of Medicine, found no evidence of a connection between vaccines and autism. None.

### 2 MYTH: Giving too many vaccines overwhelms a child's immune system.

**FACT:** This argument echoes the “too much of a good thing” chestnut, but there's no science behind it. With millions of vaccines administered every year, a handful of allergic reactions do happen. But

severe cases are so rare that the CDC cannot calculate a statistical risk for the population—the numbers are just too small.

### 3 MYTH: Vaccines cause diabetes.

**FACT:** This idea relies on the flawed work of one doctor, who gathered data on a slew of vaccines and failed to follow standard study protocols. No other study—including those using the same data—could reproduce the results. The CDC and the Institute of Medicine have both dismissed any possible link. This argument also ignores the obvious and well-established fact that diabetes rates in children are climbing because obesity rates are climbing.

### 4 MYTH: Vaccines are no longer necessary, because the diseases are no longer a threat.

**FACT:** The opposite is true. Because of vaccines, diseases that once killed millions are now invisible. But if only a few families stop vaccinating, the illnesses could reemerge in a community. And the diseases are horrible—mumps

and *Haemophilus influenzae* type b cause meningitis, which can lead to deafness, epilepsy, and cognitive impairment. Measles can lead to encephalitis, blindness, and death.

### 5 MYTH: Scientists are divided about the safety of vaccines.

**FACT:** By any measure of scientific consensus, there is total agreement: Vaccines are safe, effective, and necessary. Twelve studies have shown that the measles/mumps/rubella vaccine is safe. Many other studies have disproved the theory that the Hib shot is toxic. The few dissenters get lots of attention, but it's always the same old names.

### 6 MYTH: Aluminum in vaccines is just as toxic as mercury.

**FACT:** Aluminum, the most common metal in nature, is perfectly safe in small amounts. (A dose of antacid has about 1,000 times as much as a vaccine does.) Aluminum salts are used in vaccines to increase antibody response. They make it possible to use less vaccine less often. —Erin Biba

have found no data that links the MMR (measles/mumps/rubella) vaccine to autism; six studies have found no trace of an association between thimerosal (a preservative containing ethylmercury that was used in vaccines until 2001) and autism, and three other studies have found no indication that thimerosal causes even subtle neurological problems. The so-called epidemic, researchers assert, is the result of improved diagnosis, which has identified as autistic many kids who once might have been labeled mentally retarded or just plain slow. In fact, the growing body of science indicates that the autistic spectrum—which may well turn out to encompass several discrete conditions—may largely be genetic in origin. In April, the journal *Nature* published two studies that analyzed the genes of almost 10,000 people and identified a common genetic variant present in approximately 65 percent of autistic children.

But that hasn't stopped as many as one in four Americans from believing vaccines can poison kids, according to a 2008 survey. And outreach by grassroots organizations like Autism One is a big reason why.

At this year's Autism One conference in Chicago, I flashed more than once on Carl Sagan's idea of the power of an “unsatisfied medical need.” Because a massive research effort has yet to reveal the precise causes of autism, pseudo-science has stepped aggressively into the void. In the hallways of the Westin O'Hare hotel, helpful salespeople strove to catch my eye as I walked past a long line of booths pitching everything from vitamins and supplements to gluten-free cookies (some believe a gluten-free diet alle-

viates the symptoms of autism), hyperbaric chambers, and neuro-feedback machines.

To a one, the speakers told parents not to despair. Vitamin D would help, said one doctor and supplement salesman who projected the equation  $NO\ VACCINES + MORE\ VITAMIN\ D = NO\ AUTISM$  onto a huge screen during his presentation. (If only it were that simple.) Others talked of the powers of enzymes, enemas, infrared saunas, glutathione drips, chelation therapy (the controversial—and risky—administration of certain chemicals that leech metals from the body), and Lupron (a medicine that shuts down testosterone synthesis).

Offit calls this stuff, much of which is unproven, ineffectual, or downright dangerous, “a cottage industry of false hope.” He didn't attend the Autism One conference, though his name was frequently invoked. A California woman with an 11-year-old autistic son told me, aghast, that she'd personally heard Offit say you could safely give a child 10,000

Autism One's Web site flatly blamed “too many vaccines given too soon.” Lately, the language has gotten more vague, citing “environmental triggers.”

But the underlying argument has not changed: Vaccines harm America's children, and doctors like Paul Offit are paid shills of the drug industry.

To be clear, there is no credible evidence to indicate that any of this is true. None. Twelve epidemiological studies

vaccines (in fact, the number he came up with was 100,000—more on that later). A mom from Arizona, who introduced me to her 10-year-old “recovered” autistic son—a bright, blue-eyed, towheaded boy who hit his head on walls, she said, before he started getting B-12 injections—told me that she’d read Offit had made \$50 million from the RotaTeq vaccine. In her view, he was in the pocket of Big Pharma.

The central message at these conferences boils down to this: “The medical establishment doesn’t care, but we do.” Every vendor I talked to echoed this theme. And every parent expressed a frustrated, even desperate belief that no one in traditional science gives a hoot about easing their pain or addressing their theories—based on day-to-day parental experience—about autism’s causes.

Actually, scientists *have* chased down some of these theories. In August, for example, *Pediatrics* published an investigation of a popular hypothesis that children with autism have a higher incidence of gastrointestinal problems, which some allege are caused by injected viruses traveling to the intestines. Jenny McCarthy’s foundation posits that autism stems from these bacteria, as well as heavy metals and live viruses present in some vaccines. Healing your child, therefore, is a matter of clearing out the “environmental toxins” with, among other things, special diets. The *Pediatrics* paper found that while autistic kids suffered more from constipation, the cause was likely behavioral, not organic; there was no significant association between autism and GI symptoms. Moreover, gluten- and dairy-free diets did not appear to improve autism and sometimes caused nutritional deficiencies.

But researchers, alas, can’t respond with the same forceful certainty that the doubters are able to deploy—not if they’re going to follow the rules of science. Those tenets allow them to claim only that there is no evidence of a link between autism and vaccines. But that phrasing—what sounds like equivocation—is just enough to allow doubts to not only remain but to fester. Meanwhile, in the eight years since thimerosal was removed from vaccines (a public relations mistake, in Offit’s view, because it seemed to indicate to the public that thimerosal *was* toxic), the incidences of autism continue to rise.

In the wake of the latest thimerosal studies, most of the anti-vaccination crowd—even Autism One, despite the ever-changing rhetoric on its Web site—has shifted their aim away from any particular vaccine to a broader, fuzzier target: the sheer number of vaccines that are recommended. It sounds, after all, like common sense. There must be something risky about giving too many vaccines to very young children in too short a time. Opponents argue that for some children the current vaccine schedule creates a “toxic overload.”

“I’m not anti-vaccine,” McCarthy says. “I’m anti-toxin.” She stops just short of calling for an outright ban. McCarthy delivered the keynote address at the Autism One conference this year, just as she had in 2008. She drew a standing-room-only crowd, many of whom know her not from her acting but from her frequent appearances on TV talk shows, Oprah Winfrey’s Web site, and Twitter (@JennyfromMTV). McCarthy has authored two best-selling books on “healing” autism and is on the board of the advocacy group Generation Rescue (motto: “Autism is reversible”). With her stream-of-consciousness rants (“Too many toxins in the body cause neurological problems—look at Ozzy Osbourne, for Christ’s sake!”) and celebrity allure, she is the anti-vaccine movement’s most popular pitchman and prettiest face.

Barbara Loe Fisher, by contrast, is indisputably the movement’s brain. Fisher is the cofounder and president of the National Vaccine Information Center in Vienna, Virginia, the largest, oldest, and most influential of the watchdog groups that oppose universal vaccination. At the Autism One conference, Fisher took the podium with characteristic flair. As she often does, Fisher began with the story of her son Chris, who she believes was damaged by vaccines at the age of two and a half. A short film featuring devastat-

ing images of sick kids—some of them seemingly palsied, others with tremors, others catatonic—drove the point home. The film, accompanied by Bryan Adams’ plaintive song “(Everything I Do) I Do It For You,” ended with this message emblazoned on the screen: “All the children in this video were injured or killed by mandatory vaccinations.”

Against this backdrop, Fisher, a skilled debater who often faces down articulate, well-informed scientists on live TV, mentioned Offit frequently. She called him the leading “pro-forced-vaccination proponent” and cast him as a man who walks in lockstep with the pharmaceutical companies and demonizes caring parents. With the likely introduction of a swine flu vaccine later this year, Fisher added, Americans needed to wake up to the “draconian laws” that could force every citizen to either be vaccinated or quarantined. That isn’t true—the swine flu vaccine, like other flu vaccines, will be administered on a voluntary basis. But no matter: Fisher’s argument turns vaccines from a public health issue into one of personal choice, an unwritten bit of the Bill of Rights.

In her speech, Fisher borrowed from the Bible, George Orwell, and the civil rights movement. “The battle we are waging,” she said, “will determine what

**“THE CHOICE NOT TO GET  
A VACCINE IS NOT A  
CHOICE TO TAKE NO RISK.**

**It’s just a choice to  
take a different risk.”**

both health and freedom will look like in America.” She closed by quoting the inscription above the door of the Holocaust Memorial Museum in Washington, DC: “The first to perish were the children.” And then she brought it home: “If we believe in compassion, if we believe in the future, we will do whatever it takes to give our children back the future that | **CONTINUED ON PAGE 166**





## Epidemic of Fear

CONTINUED FROM PAGE 135

is their birthright.” The audience cheered as the words sank in: *Whatever it takes*. “No forced vaccination,” Fisher concluded. “Not in America.”

**Paul Offit has a slightly** nasal voice and a forceful delivery that conspire to make him sound remarkably like Hawkeye Pierce, the cantankerous doctor played by Alan Alda on the TV series *M\*A\*S\*H*. As a young man, Offit was a big fan of the show (though he felt then, and does now, that Hawkeye was “much cooler than me”). Offit is quick-witted, funny, and—despite a generally mild-mannered mien—sometimes so assertive as to seem brash. “Scientists, bound only by reason, are society’s true anarchists,” he has written—and he clearly sees himself as one. “Kaflooy theories” make him crazy, especially if they catch on. Fisher, who has long been the media’s go-to interview for what some in the autism arena call “parents rights,” makes him particularly nuts, as in “You just want to scream.” The reason? “She lies,” he says flatly.

“Barbara Loe Fisher inflames people against me. And wrongly. I’m in this for the same reason she is. I care about kids. Does she think Merck is paying me to speak about vaccines? Is *that* the logic?” he asks, exasperated. (Merck is doing no such thing). But when it comes to mandating vaccinations, Offit says, Fisher is right about him: He is an adamant supporter.

“We have seat belt rules,” he says. “Seat belts save lives. There was never a question about that. The data was absolutely clear. But people didn’t use them until they were required to use them.” Furthermore, the decision not to buckle up endangers only you. “Unless you fly through the window and hit somebody else,” he adds. “I believe in mandates. I do.”

We are driving north (seat belts on)

across Philadelphia in Offit’s gray 2009 Toyota Camry, having just completed a full day of rounds at Children’s Hospital. Over the past eight hours, Offit has directed a team of six residents and med students as they evaluated more than a dozen children with persistent infections. He pulls into the driveway of the comfy four-bedroom Tudor in the suburbs where his family has lived for the past 13 years. It’s a nice enough house, with a leafy green yard and a two-car garage where a second Toyota Camry (this one red, a year older, and belonging to his wife, Bonnie) is already parked. Let’s just say that if Offit has indeed made \$50 million from RotaTeq, as his critics love to say, he is hiding it well.

Offit acknowledges that he received a payout—“several million dollars, a lot of money”—when his hospital sold its stake in RotaTeq last year for \$182 million. He continues to collect a royalty each year. It’s a fluke, he says—an unexpected outcome. “I’m not embarrassed about it,” he says. “It was the product of a lot of work, although it wasn’t why I did the work, nor was it, frankly, the reward for the work.”

Similarly, the suggestion that pharmaceutical companies make vaccines hoping to pocket huge profits is ludicrous to Offit. Vaccines, after all, are given once or twice or three times in a lifetime. Diabetes drugs, neurological drugs, Lipitor, Viagra, even Rogaine—stuff that a large number of people use every day—*that’s* where the money is.

That’s not to say vaccines aren’t profitable: RotaTeq costs a little under \$4 a dose to make, according to Offit. Merck has sold a total of more than 24 million doses in the US, most for \$69.59 a pop—a 17-fold markup. Not bad, but pharmaceutical companies do sell a lot of vaccines at cost to the developing world and in some cases give them away. Merck committed \$75 million in 2006 to vaccinate all children born in Nicaragua for three years. In 2008, Merck’s revenue from RotaTeq was \$665 million. Meanwhile, a blockbuster drug like Pfizer’s Lipitor is a \$12 billion-a-year business.

To understand exactly why Offit became a scientist, you must go back more than half a century, to 1956. That was when doctors in Offit’s hometown of Baltimore operated on one of his legs to correct a club foot, requiring him to spend three weeks recovering in a chronic care facility with 20 other children, all of whom had polio. Parents were allowed

to visit just one hour a week, on Sundays. His father, a shirt salesman, came when he could. His mother, who was pregnant with his brother and hospitalized with appendicitis, was unable to visit at all. He was 5 years old. “It was a pretty lonely, isolating experience,” Offit says. “But what was even worse was looking at these other children who were just horribly crippled and disfigured by polio.” That memory, he says, was the first thing that drove him toward a career in pediatric infectious diseases.

There was something else, too. From an early age, Offit embraced the logic and elegance of the scientific method. Science imbued a chaotic world with an order that he found reassuring.

“What I loved about science was its reason. You have data. You stand back and you discuss the strengths and weaknesses of that data. There’s just something very calming about that,” he says. “You formulate a hypothesis, you establish burdens of proof, you subject your hypothesis to rigorous testing. You’ve got 20 pieces of a 1,000-piece puzzle ... It’s beautiful, really.”

There were no doctors in the Offit family; he decided to become the first. In 1977, when he was an intern at the Children’s Hospital of Pittsburgh, he witnessed the second event that would determine his career path: the death of a little girl from a rotavirus infection (there was, as yet, no vaccine). The child’s mother had been diligent, calling her pediatrician just a few hours after the girl’s fever, vomiting, and diarrhea had begun. Still, by the time the girl was admitted, she was too dehydrated to have an intravenous line inserted. Doctors tried everything to rehydrate her, including sticking a bone marrow needle into her tibia to inject fluids. She died on the table. “I didn’t realize it killed children in the United States,” Offit says, remembering how the girl’s mother, after hearing the terrible news, came into the room and held her daughter’s hand. “That girl’s image was always in my head.”

The third formative moment for Offit came in the late 1980s, when he met Maurice Hilleman, the most brilliant vaccine maker of the 20th century. Hilleman—a notoriously foulmouthed genius who toiled for years in the Philadelphia labs of Merck—invented vaccines to prevent measles, mumps, and rubella (and later came up with the combination of the three, the MMR). He

## Epidemic of Fear

CONTINUED FROM PAGE 166

created vaccines for hepatitis A and B, Hib, chicken pox, pneumococcus, and meningococcus. He became Offit's mentor; Offit later became Hilleman's biographer.

Offit believes in the power of good storytelling, which is why he writes books, five so far. He dearly wants to pull people into the exciting mysteries that scientists wrestle with every day. He wants us all to understand that vaccines work by introducing a weakened strain of a particular virus into the body—a strain so weak that it cannot make us sick. He wants us to revel in this miracle of inoculation, which causes our immune systems to produce antibodies and develop “memory cells” that mount a defense if we later encounter a live version of that virus.

It's easy to see why Offit felt a special pride when, after 25 years of research and testing, he and two colleagues, Fred Clark and Stanley Plotkin, joined the ranks of the vaccine inventors. In February 2006, RotaTeq was approved for inclusion in the US vaccination schedule. The vaccine for rotavirus, which each year kills about 600,000 children in poor countries and about 40 children in the US, probably saves hundreds of lives a day.

But in certain circles, RotaTeq is no grand accomplishment. Instead, it is offered as Exhibit A in the case against Offit, proving his irredeemable bias and his corrupted point of view. Using this reasoning, of course, Watson and Crick would be unreliable on genetics because the Nobel Prize winners had a vested interest in genetic research. But despite the illogic, the argument has had some success. Consider the CDC's Advisory Committee on Immunization Practices, which reviews new vaccines and administration schedules: Back in the late '90s and early '00s, Offit was a member of the panel, along with experts in infectious diseases, virology, microbiology, and immunology. Now the 15-person panel is made up mostly of state epidemiologists and public-health officials.

That's not by accident. According to science journalist Michael Specter, author of the new book *Denialism: How Irrational Thinking Hinders Scientific Progress, Harms the Planet and Threatens Our Lives*, the controversy surrounding vaccine safety has

made lack of expertise a requirement when choosing members of prominent advisory panels on the issue. “It's shocking,” Specter says. “We live in a country where it's actually a detriment to be an expert about something.” When expertise is diminished to such an extent, irrationality and fear can run amok.

Hence the death threats against Paul Offit. Curt Linderman Sr., the host of “Linderman Live!” on AutismOne Radio and the editor of a blog called the Autism File, recently wrote online that it would “be nice” if Offit “was dead.”

I'd met Linderman at Autism One. He'd given his card to me as we stood outside the Westin O'Hare talking about his autistic son. “We live in a very toxic world,” he'd told me, puffing on a cigarette.

It was hard to argue with that.

**Despite his reputation**, Offit has occasionally met a vaccine he doesn't like. In 2002, when he was still a member of the CDC's advisory committee, the Bush administration was lobbying for a program to give the smallpox vaccine to tens of thousands of Americans. Fear of bioterrorism was rampant, and everyone voted in favor—everyone except Offit. The reason: He feared people would die. And he didn't keep quiet about his reservations, making appearances on *60 Minutes II* and *The NewsHour with Jim Lehrer*.

The problem with the vaccine, he said, is that “one in every million people who gets it dies.” Moreover, he said, because smallpox is visible when its victims are contagious (it is marked by open sores), outbreaks—if there ever were any—could be quickly contained, and there would be plenty of time to begin vaccinations then. A preventive vaccine, he said, “was a greater risk than the risk of smallpox.”

Ah, risk. It is the idea that fuels the anti-vaccine movement—that parents should be allowed to opt out, because it is their right to evaluate risk for their own children. It is also the idea that underlies the CDC's vaccination schedule—that the risk to public health is too great to allow individuals, one by one, to make decisions that will impact their communities. (The concept of herd immunity is key here: It holds that, in diseases passed from person to person, it is more difficult to maintain a chain of infection when large numbers of a population are immune.)

Risk is also the motivating idea in Offit's life. This is a man, after all, who opted to give his own two children—now teenagers—the flu vaccine before it was recommended for their age group. Why? Because the risk of harm if his children got sick was too great. Offit, like everyone else, will do anything to protect his children. And he wants Americans to be fully educated about risk and not hoodwinked into thinking that dropping vaccines keeps their children safe. “The choice not to get a vaccine is *not* a choice to take no risk,” he says. “It's just a choice to take a *different* risk, and we need to be better about saying, ‘Here's what that different risk looks like.’ Dying of Hib meningitis is a horrible, ugly way to die.”

Getting the measles is no walk in the park, either—not for you or those who come near you. In 2005, a 17-year-old Indiana girl got infected on a trip to Bucharest, Romania. On the return flight home, she was congested, coughing, and feverish but had no rash. The next day, without realizing she was contagious, she went to a church gathering of 500 people. She was there just a few hours. Of the 500 people present, about 450 had either been vaccinated or had developed a natural immunity. Two people in that group had vaccination failure and got measles. Thirty-two people who had not been vaccinated and therefore had no resistance to measles also got sick. Did the girl encounter each of these people face-to-face in her brief visit to the picnic? No. All you have to do to get the measles is to inhabit the airspace of a contagious person within two hours of them being there.

The frightening implications of this kind of anecdote were illustrated by a 2002 study published in *The Journal of Infectious Diseases*. Looking at 3,292 cases of measles in the Netherlands, the study found that the risk of contracting the disease was lower if you were completely unvaccinated and living in a highly vaccinated community than if you were completely vaccinated and living in a relatively unvaccinated community. Why? Because vaccines don't always take. What does that mean? You can't minimize your individual risk unless your herd, your friends and neighbors, also buy in.

Perceived risk—our changing relationship to it and our increasing intolerance of it—is at the crux of vaccine safety concerns, not to mention related fears of pesticides, genetically modified food, and cloning. Sha-

## Epidemic of Fear

CONTINUED FROM PAGE 168

ron Kaufman, a medical anthropologist at UC San Francisco, observes that our concept of risk has evolved from an external threat that's out of our control (think: statistical probability of a plane crash) to something that can be managed and controlled if we just make the right decisions (eat less fat and you'll live longer). Improved diagnostic tests, a change in consumer awareness, an aging society determined to stay youthful—all have contributed to the growing perception that risk (of death, illness, accident) is our responsibility to reduce or eliminate. In the old order, risk management was in the hands of your doctor—or God. Under the new dispensation, it's all up to you. What are the odds that your child will be autistic? It's your job to manage them, so get thee to the Internet, and fast.

The thimerosal debacle exacerbated this tendency, particularly when the American Academy of Pediatrics and the Public Health Service issued a poorly worded statement in 1999 that said “current levels of thimerosal will not hurt children, but reducing those levels will make safe vaccines even safer.” In other words, there's no scientific evidence whatsoever, but you never know.

“When science came out and said, ‘Uh-oh, there may be a risk,’ the stage was already set,” Kaufman says, noting that many parents felt it was irresponsible *not* to have doubts. “It was Pandora's box.”

The result is that science must somehow prove a negative—that vaccines don't cause autism—which is not how science typically works. Edward Jenner invented vaccination in 1796 with his smallpox inoculation; it would be 100 years before science, such as it was, understood *why* the vaccine worked, and it would be even longer before the specific cause of smallpox could be singled out. Until the cause of autism is discovered, scientists can establish only that vaccines are safe—and that threshold has already been met.

The government is still considering funding more research trials to look for a connection between vaccines and autism. To Kaufman, there's some justification for this, given that it may be the only way to address everyone's doubts. But the thimerosal panic suggests that, if bungled, such trials could make a bad situation worse. To scientists

like Offit, further studies are also a waste of precious scientific resources, not to mention taxpayers' money. They take funding away from more pressing matters, including the search for autism's real cause.

**A while back**, Offit was asked to help put together a reference text on vaccines. Specifically, his colleagues wanted him to write a chapter that assessed the capacity of the human immune system. It was a hypothetical exercise: What was the maximum number of vaccines that a person could handle? The point was to arm doctors with information that could reassure parents. Offit set out to determine two factors: how many B cells, which make antibodies, a person has in a milliliter of blood and how many different epitopes, the part of a bacterium or virus that is recognized by the immune system, there are in a vaccine. Then, he came up with a rough estimate: a person could handle 100,000 vaccines—or up to 10,000 vaccines at once. Currently the most vaccines children receive at any one time is five.

He also published his findings in *Pediatrics*. Soon, the number was attached to Offit like a scarlet letter. “The 100,000 number makes me sound like a madman. Because that's the image: 100,000 shots sticking out of you. It's an awful image,” Offit says. “Many people—including people who are on my side—have criticized me for that. But I was naive. In that article, I was being asked the question and that *is* the answer to the question.”

Still, he hasn't backed off. He feels that scientists have to work harder at winning over the public. “It's our responsibility to stand up for good science. Though it's not what we're trained to do,” he says, admitting that his one regret about *Autism's False Prophets* is that it didn't hold scientists accountable for letting fear of criticism render them mute. “Get out there. There's no venue too small. As someone once said, it would be a very quiet forest indeed if the only birds that sang were those that sang best.”

So Offit keeps singing. Isn't he afraid of those who wish him harm? “I'm not that brave,” he says. “If I really thought my life was at risk or my children's lives were at risk, I wouldn't do it. Not for a second.” Maybe, he acknowledges, he's in denial.

Later, I ask his wife the same question. When it comes to her husband's welfare, Bonnie Offit is fiercely protective. A pediatrician with a thriving group practice, she

still makes time to monitor the blogosphere. (Her husband refuses to read the attacks.) She wants to believe that if you “keep your finger on the pulse,” as she puts it, you can keep your loved ones safe.

Still, she worries. On the day I find myself sitting at her dining room table, every front page in the nation features an article about George Tiller, the abortion doctor gunned down at his church in Wichita, Kansas. When her husband leaves the room, Bonnie brings up the killing. “It upsets me,” she says, looking away. “I didn't even tell him that. But it absolutely upsets me.”

Her husband, meanwhile, still rises every morning at 4 am and heads to his small, tidy study in a spare bedroom. Every morning, he spends a couple of hours working on what will be his sixth book, a history of the anti-vaccine movement. Offit gets excited when he talks about it.

In 19th-century England, he explains, Jenner's smallpox vaccine was known to be effective. But despite the Compulsory Vaccination Act of 1853, many people still refused to take it, and thousands died unnecessarily. “That was the birth of the anti-vaccine movement,” he says, adding that then—as now—those at the forefront “were great at mass marketing. It was a print-oriented society. They were great pamphleteers. And by the 1890s, they had driven immunization rates down to the 20 percent range.”

Immediately, smallpox took off again in England and Wales, killing 1,455 in 1893. Ireland and Scotland, by contrast, “didn't have any anti-vaccine movement and had very high immunization rates and very little incidence of smallpox disease and death,” he says, taking a breath. “You'd like to think we would learn.”

Offit wants the book to be cinematic, visually riveting. He believes, fervently, that if he can hook people with a good, truthful story, maybe they will absorb his hopeful message: The human race has faced down this kind of doubt before.

His battle is, in at least one respect, probably a losing one. There will always be more illogic and confusion than science can fend off. Offit's idea is to inoculate people one by one, until the virus of fear, if not fully erased, at least recedes. ■

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