

The Truth About Vaccines

A Conversation with Nina L. Shapiro

Dr. Nina L. Shapiro is the director of pediatric otolaryngology and a professor at the David Geffen School of Medicine at UCLA. A graduate of Harvard Medical School and Cornell University, Shapiro has been honored with several prestigious awards, including the American Society of Pediatric Otolaryngology Awards for Clinical and Basic Science Research, the UCLA Head and Neck Surgery Faculty Teaching Award, and the American Academy of Pediatrics Young Investigators Award, among others. In 2008 and 2012–2014, she was named a “Super Doctor” by *Los Angeles Magazine*; she is a Castle and Connolly 2014 “Top Doctor” and is listed in *Who’s Who in America*. She has given over 200 national and international scientific lectures, and written over 80 peer-reviewed journal articles, two medical books, and 16 academic book chapters. Dr. Shapiro is an editor of “50 Studies Every Pediatrician Should Know” (Oxford University Press, 2016), and she is working on a book about hype in popular health advice. Her work and expert commentary have been featured in the *Los Angeles Times*, *The Hollywood Reporter*, *Time*, *BBC World*, *Salon*, and on NPR.

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Harris: Thanks for taking the time to speak with me, Nina. There are a few background issues I should mention so that our readers understand the context of our conversation. An [article](#) in the *Hollywood Reporter* attracted a tremendous amount of attention because it revealed that some private schools in Los Angeles and Orange County have vaccination rates similar to those of countries in sub-Saharan Africa. This is true of affluent areas in northern California as well, such as Marin County. Then there was an outbreak of measles, a disease that had once been declared eradicated in the US, which came courtesy of a happy congregation of unimmunized people at Disneyland. This story also became national news, and measles has now spread to at least 17 states.

So my first question is, why aren’t people getting their children vaccinated against preventable and often very serious illness in the year 2015? I have my own thoughts on the topic, but I was wondering if you could comment as a pediatric ENT and surgeon.

Shapiro: I think there are several reasons why people have chosen—and I use the word “chosen” specifically because I think most people now have a luxury of choice when it comes to their medical care—not to vaccinate their children. One is that they haven’t seen these illnesses. Most people with young children have never seen a case of measles; they’ve never seen mumps, rubella, polio, or whooping cough; so these illnesses are just abstractions to them. Their families are healthy, so why should they worry about something they’ve never seen?

And there's the concern that these vaccines cause autism. No matter how many studies are done to show in hundreds of thousands of children that there is no association between immunizations and the development of autism, there's still that inkling of fear. Because most people know what autism looks like. They don't know what measles looks like, but they understandably want to do everything they can to prevent autism.

Another issue—especially in what one would call “health-conscious” communities in California and parts of Colorado—is this notion that vaccines have what people call “toxins” in them. This is a very tricky word, because most non-scientists don't really know what a toxin is. Vaccines are not toxic. The air we breathe is much more toxic than the vaccines that children receive. They receive more viral and bacterial exposure just by being outside for a few hours than they would from vaccines. But there's this pseudoscientific idea, “I'm going to keep my children natural and healthy and feed them organic food and protect them from any unnecessary toxic exposure,” that seems to stand in opposition to vaccines.

Harris: I think the fact that most people are totally unfamiliar with the consequences of contracting one of these illnesses plays a huge role here. No current parent of school-age children knows what it's like to fear that his or her child may come down with polio and have to be placed in an iron lung. The carefree attitude we now enjoy is the result of the *success* of vaccines. This is why people are no longer dying of smallpox. So we live in a world that has been more or less purged of terrifying, preventable illness because we have used vaccines for generations. Bliss leads to ignorance. People have the luxury of ignoring “herd immunity” (a concept we will talk about) once it has been provided by their neighbors.

I think a few more things are working in the background here. I get the sense, through my personal interactions with people and from what I've read in the media, that more or less everyone has lost trust in public institutions. We've lost our faith in government in general and bodies like the CDC and the FDA in particular, and we don't trust the pharmaceutical companies or the media either. In some respects this erosion of trust is understandable, even warranted, because most of us now have a sense that the incentives in these institutions are often misaligned. A pharmaceutical company that spends \$1 billion to develop a new drug will often be tempted to ignore any data that suggests the drug shouldn't be used, whether for reasons of efficacy or for reasons of safety. There's been enough evidence of corporate malfeasance on this front to suggest that these concerns are often justified. We also have good reason to believe that the government is not competent to police this space effectively, owing to both lack of funding and bad incentives. So the prospect of corruption and just sheer incompetence on this front is galling to everyone.

Another factor is that people are often confused about scientific and statistical reasoning. Even doctors can fail to reason scientifically, and a few prominent pediatricians are failing egregiously to give their patients rational advice about vaccines.

Finally, there may be something at work here that I'm less sure about: the idea that in the very act of trying to protect one's child—by injecting a substance into her body in the

hope of protecting her, and causing pain in the process—one might actually be *poisoning* her. It's no fun watching your toddler writhe under the pediatrician's needle and then howl with pain, and the idea that you might be imposing a risk of injury or death on her in the process is horrible to contemplate. Even when, in reality, you're imposing much less risk than you often do just for fun. Which is more of a hazard to your child's health—all the potentially life-saving vaccines she'll ever receive, or that ski trip you take as a family each year? The time on skis, clearly. But it doesn't *feel* that way.

Shapiro: As a mother, and as a physician who treats children, I understand that parents have this fear that they could be hurting their child. Just in the presence of the needle itself, even if we were injecting nothing, there's this sense that because shots hurt, they must be bad. Nobody wants to knowingly inflict pain on his or her child.

But if you look at pictures of kids from the 1950s lining up to receive vaccines, you'll often see that their faces are calm. They're not crying. They're not running away. They're actually standing patiently in line without their parents.

But in photographs from the past 10 years—even in the literature advocating for the necessity of vaccines—you see screaming children and sad-looking parents physically restraining them. I think there's been a societal shift, regardless of what's in these needles. We now assume that children should not feel pain for any reason.

So there's this broader issue with what many call “helicopter parenting”—everybody wins, everybody gets a trophy, every child is above average. There has been a change in parenting and a change in what we can comfortably tolerate. And yet the kids themselves must be just like those of 40 or 50 years ago. They're pretty tough and resilient.

Harris: I think it's difficult to exaggerate how fully the context has changed. In the 1950s, parents had a truly rational fear that their children might contract a serious contagious disease, like polio. Now, we have all habituated to a world in which there is very little evidence of this risk—precisely because vaccines have worked so well.

Shapiro: Yes. But I think the change is even more global. It used to be that if a child needed surgery, the parents would drop him or her off at the hospital and pick the child up three days later.

Harris: I'm going to go with a little more helicopter parenting than that. “Helicopter parenting” does *not* mean that you just drop your kids from a helicopter as you fly by the hospital.

Shapiro: Sure. Most of these changes have been for the good. But when you combine this attitude of “Why put my child through any suffering?” with the apparent absence of disease, you run into problems. As you said, when those kids were lining up for polio vaccines in the 1950s, their parents had lived through polio. Their neighborhoods were filled with people suffering from the scourge of this disease. Families were desperate to get those shots. I think that even this recent outbreak of measles, as small as it was, is making people understand that things can suddenly get a lot worse.

Harris: In many discussions on this topic, scientists, for perfectly sane public-policy reasons, treat anti-vaccination fears as illegitimate; instead, I'd like us to take a moment to acknowledge that vaccines are not without risks. Any medical intervention presents some possibility of injury or death. I'm sure that someone, somewhere, has died as a result of having a hangnail trimmed. So of course there are risks associated with vaccines. But we should put these risks in context. How reasonable is it to be motivated by the fear that your child might have a bad reaction to a vaccine?

Shapiro: Yes, it is true that no medical intervention, including vaccines, is without risk. Some risks are common and mild; some are extremely rare and significant. A mild risk from vaccines, which we see relatively frequently, is fever. A lot of kids who get vaccines will have a fever a few days later, and that's not to be written off as nothing, because it is quite disconcerting when a two-month-old, a four-month-old, or a six-month-old has a high fever. In extremely rare cases children have had seizures, with or without an associated fever.

The chicken pox vaccine can, on rare occasions, trigger an episode of chicken pox—either a mild case, where the patient gets a little chicken pox mark right at the injection site, or a severe one. The chicken pox vaccine is usually given at age 12 months or so, and for a 12-month-old baby to have a severe case of chicken pox is serious.

Harris: No doubt. We should also mention that some people can't get vaccines because they have certain health conditions or they're either too young or too old. There is even something called the [Vaccine Injury Compensation Trust Fund](#), set up in 1988, which provides compensation for those who are harmed by vaccines, whether they belong to a vulnerable population or not. However, the people who are significantly harmed in this way appear to number in the [hundreds at most](#), and often fewer, among the millions who receive vaccines each year.

Compare this with the risk of dying from using nonsteroidal anti-inflammatories— aspirin, ibuprofen, and so forth. Here we should perceive a much greater danger. These over-the-counter medications kill [3,000 to 16,000](#) of us outright each year. And not necessarily from overdoses. I'm talking about the statistical risk one runs of a GI bleed or a stroke from as little as 80 milligrams of aspirin, a fraction of an analgesic dose.

All interventions present some risk of injury or death, and because we're talking about the behavior of millions and millions of people each year, you can always find some terrible story about some unlucky person who died or was severely injured by what is, in fact, a very low risk behavior.

So, while we have to admit that vaccines are not without risk, the risk is lower than for interventions that most people consider trivial and wouldn't hesitate to employ, and lower than for genuinely risky lifestyle choices that many of us make. Needless to say, if you text on your phone while driving your kids in the car, it's completely insane to worry about the relative risk of vaccines. Getting one's risk tolerances aligned with reality is something that could cure a lot of these fears.

Shapiro: Yes. I often see kids riding bicycles without wearing helmets. I also see young children riding in the front seats of cars. When it comes to preventable injuries, many people are taking large risks unknowingly. And then they feel they're avoiding risk by refusing to vaccinate.

Harris: So we're back to the general problem of people's having lost touch with the real risks of these preventable diseases. People hear about "whooping cough" (pertussis) and think, It's just a cough. What's the big deal? Well, here is what it looks like for an infant to have this cough.

If you decline to get your kids vaccinated against pertussis, they can spread this virus to infants who are too young to be vaccinated. About 20 infants die this way in the U.S. each year.

Shapiro: Yes. In fact, we had a pertussis death in California just this week.

Harris: People also assume that measles is more or less benign—just a rash and, perhaps, a fever. I recently came across a touching letter written by Roald Dahl, the famous children's book author, about his daughter who died of measles. She died in 1962, but he wrote [this letter](#) in 1986 as a public service announcement. Here is how it starts:

Olivia, my eldest daughter, caught measles when she was seven years old. As the illness took its usual course, I can remember reading to her often in bed and not feeling particularly alarmed about it. Then one morning, when she was well on the road to recovery, I was sitting on her bed showing her how to fashion little animals out of coloured pipe-cleaners, and when it came to her turn to make one herself, I noticed that her fingers and her mind were not working together and she couldn't do anything.

"Are you feeling all right?" I asked her.

"I feel all sleepy," she said.

In an hour, she was unconscious. In twelve hours she was dead.

Shapiro: I think people believe that if their children are otherwise healthy and contract one of these illnesses, they'll be strong enough to fight it. But that's not always the case. Dahl's child was seven. We're not talking about an infant. She was a healthy child at the time. It doesn't necessarily matter how healthy or how old you are once you get one of these illnesses.

Harris: There's the additional irony that we are sending medical teams to risk their lives in countries like Pakistan and Nigeria to stamp out polio and other diseases, and these people get attacked by locals as a result of the same kind of superstition and confusion we're beginning to talk about here. I recently saw an interview with Bill Gates, who is now doing more than anyone else to direct private funds toward solving some of the greatest health problems of humanity. When he was asked what was the most important thing he had accomplished through his philanthropic work in the developing world, he said, "[Vaccines make the top of the list.](#)" The man is raising billions of dollars to improve human health globally, and yet highly educated, liberal technophiles in the Bay Area and

in southern California—some of his best customers—are declining to get their kids vaccinated and driving down herd immunity in their communities to levels comparable to those in some of the most dangerous places to live on earth. It is a bizarre situation.

I just uttered the phrase “herd immunity” for the second time, so we should define it. It’s a very important concept that exposes one of the moral illusions at the heart of the anti-vaccination movement: the idea that the choice about whether and when to vaccinate one’s children is an entirely personal one.

What should our readers understand about herd immunity, Nina?

Shapiro: Right. Well, we are human, but we are also animals that live in herds. And depending on the effectiveness of a vaccine and the degree of contagiousness of the corresponding illness, a certain percentage of people in a community need to be immunized to protect everybody. It’s not necessarily 100%, although that’s obviously the goal. But for measles, for instance, 92% to 94% of a community needs to be protected to protect the remaining members who cannot be immunized—because they’re either too young or immuno-compromised in some way. With this level of vaccination, if the disease enters that community, those who are not immunized still have some protection.

So it really is a matter of public responsibility. And so many people are now relying on the immunity of the herd that there is no longer a herd. Some school communities have a 20% immunization rate—so 80% of people are unprotected. There’s no herd there.

Again, it depends a little bit on the vaccine itself and a little bit on how contagious an illness is. We use measles because that’s current. The measles vaccine is one of the best we have as far as efficacy goes. One measles vaccine will protect 95% of those who receive it, and two vaccines will protect 99%. Compare this to the pertussis vaccine, which is only about 60%–70% effective. But pertussis is not as contagious as measles, so there’s a wider margin. One person with measles can easily infect 10 to 20 people. With pertussis, he may infect only a few.

Generally speaking, the herd depends on greater than 90% to 95% immunization for all of us. It creates a web of protection. When you are immunized for all these illnesses, the herd gets that much stronger.

Harris: So the truth is that if you decide to forgo vaccines, you are not making this choice only for your child. You are spreading risk to your neighbors and their children—some of whom can’t be immunized. Wherever you and your children go, you cross paths with infants and the elderly. There may be a kid at your school who has leukemia, or who is immuno-compromised in some other way, who is *entirely dependent* on the immunity of the herd. And because most vaccines aren’t 100% effective, even healthy, vaccinated people are to some degree relying on the redundant levels of protection provided by the rest of us.

So there is an unflattering moral truth here, which we should spell out: The only reason anti-vaxxers are in a position to even entertain the possibility of not immunizing their children is that there is still so much herd immunity. These people cannot reasonably hope that *everyone* will stop using vaccines—that is, unless they hope to return to a world

where people get paralyzed by polio because they shook another person's hand. If you decline to get your child vaccinated because you fear that vaccines may cause autism, say, you are relying on your neighbors to keep *your* children safe by imposing this unconscionable risk of autism on *their* children. So it's not a defensible ethical position, even if we were to grant that vaccines imposed a significant risk of complications. In order to follow the advice of some of these pediatricians who recommend that you not vaccinate or that you delay specific vaccines, you're relying on those who *don't* follow that advice to keep your kids safe. But of course the real ethical problem is that by avoiding vaccines, you are putting everyone's children, and *especially* your own, at risk of contracting dangerous and entirely preventable diseases.

Shapiro: Right. And many people don't want to immunize their children because they think a disease like measles doesn't exist anymore. We don't have smallpox vaccines anymore; smallpox has actually been eradicated. But the progress against measles and mumps is more tenuous, so immunization needs to continue. I think people believe that it's probably not necessary and that if worse comes to worst, they'll be protected by those who are still "naively" getting immunized.

Harris: Can you say something about the choice that many people make to delay certain vaccines? What are the medical implications of that choice?

Shapiro: Yes. The idea of vaccine delay is in some ways even more pseudoscientific than the choice not to vaccinate. People imagine that by spacing out the vaccines, they are giving them in a much gentler, safer way. But nothing shows that this is better for your child. All it does is weaken the herd.

Vaccines are scheduled for very specific reasons that are not arbitrary. For instance, you need the pertussis vaccine at two months, four months, six months, fifteen months, five years, and ten years. It needs to follow that schedule in order to keep the herd protected, and every time an individual family decides to spread out this schedule, it undermines herd immunity over a long period of time.

Harris: It also exposes your child to a greater risk of contracting whooping cough in the period during which he or she is not fully vaccinated against it.

Shapiro: Exactly. And it takes a long time. People don't realize that they're not protected the day they get an immunization, nor are they protected the day after that. Some vaccines require several boosters to grant what one would call immunity. So again, the idea of delaying has no scientific backing. But it gets entangled with the notion that parents are taking charge of their child's health care—they are working with their physician as a team—and this seems like the safest, gentlest way to protect their child. But there's no data to back that up. All it does is make the parents feel better.

And one of the vaccines that people have chosen to delay is the measles vaccine. Many people believe that if there's the smallest risk of autism—despite the fact that there really is no known risk of autism—they should wait until their child is three, because at three it will be clear whether or not he or she is autistic. Well, if they wait that long to get their

first measles vaccine, then between ages one and three their child will be at very high risk in the presence of measles. And they're weakening whatever herd they're in during that period as well. Then it snowballs: They get their first vaccine at three and their second vaccine at six or seven—over time there's a domino effect, leading to relatively large gaps in the immunity of the herd.

Harris: Just to be clear about the issue of autism: While we acknowledged that all vaccines have some associated risks, an increase in the incidence of autism associated with the MMR vaccine does not appear to be among them. All the research suggests that there is no link between autism and MMR, and yet the fear that there is, born of Andrew Wakefield's fraudulent study, is still burning brightly in affluent, liberal, well-educated communities. This shows how difficult it is to correct for misinformation once it has spread.

Unfortunately, when you confront people with evidence against their cherished beliefs, they often double down on those beliefs. In psychology, this is now referred to as "the backfire effect." So Wakefield did a lot of harm with that study.

Shapiro: Yes. But most people who have this concern have never read [his study](#), though it's really not a hard study to read. If they would read it or even just skim the introduction, they'd see that he looked at 12 children. We're not talking about a large sample—and even within this group of 12 children it was fraudulent research.

The problem is that autism is more readily diagnosed at about the time that the measles vaccine is given—anywhere from 12 months to 18 months, sometimes a little bit later.

Harris: And of course it would be associated with whatever was being done to your child during that time.

Shapiro: Right. And whether you look at it or not the drug-risk insert for any vaccine has to list anything that might happen to a child within 42 days of receiving it. The chicken pox vaccine insert even lists "teething" as a possible risk. This vaccine is routinely administered to 12-month-olds, who are clearly in the throes of teething woes—vaccine or no vaccine. And that goes for any drug—everything has to be listed, so autism is listed. But it's an association, not a statement of causation. So, yes, children will be diagnosed a month or two after they have their MMR vaccine, but it has nothing to do with the vaccine.

Harris: Let's talk about some of these prominent pediatricians in southern California who seem to be at the center of the anti-vaccination movement: Jay Gordon in Los Angeles and Bob Sears in Orange County. I've seen Jay Gordon interviewed on this topic, and it seems to me that he is acting quite irresponsibly. He admits that the science does not support a link between MMR and autism, but he's heard a few stories from patients who believe that their child got autism because of the vaccine, and he is valuing those stories as evidence.

So he says very clearly that stories of personal experience do not amount to science, but he then goes on to use these stories to support his recommendations to his patients *in*

defiance of existing science. He's signaling an awareness of an illusion but then being doubly motivated by it. He seems to feel perfectly comfortable practicing medicine in a way that is guaranteed to be confusing to his patients. It's very strange behavior.

Shapiro: Yes. People who are not scientists will respond much more to a heartbreaking story than to a boring chart showing statistical data drawn from hundreds of thousands of children. Here you have a seemingly caring doctor saying, I've never seen a case of measles, but let me tell you this really sad story of this two-year-old I know who was just beautiful until he received the MMR vaccine. Of course people are going to respond to this on an emotional level. It's probably not an accident that most of his patients aren't vaccinated against measles. Unfortunately, he has the authority to get away with this.

There are other pediatricians in the country who do this, and they're very caring and very thoughtful. And the reality is that the overwhelming majority of children are healthy. They need very little medical care. Most kids can get through childhood with a little bit of hand-holding. They have good immune systems, and most will not get a vaccine-preventable illness. Most of them will not get measles, mumps, or rubella, even if they aren't immunized. As a doctor, you can get away with this in a very small population and come across as a hero.

Working in academic medicine, we would never get away with that sort of thinking. We poke fun at anyone who says "in my experience"—because that means one case. "Time after time after time" means just three cases. When a doctor in a boutique practice in a lovely neighborhood says, "I've never seen a case of measles," anyone working in a major medical center will just roll his eyes. It's a statistical illusion. He's living in a bubble of health, which is fortunate. But it gives no indication of what's going on in the real world.

Harris: It's amazing to me that these pediatricians haven't received more professional pressure to get their act together. They're just not thinking like scientists.

Shapiro: Yes, it's been a challenge. The American Academy of Pediatrics issues only vaccine guidelines, not a mandate. So one won't necessarily lose membership over this. What I wonder about are the standards of care—because the medical-legal term "standard of care" refers to the practice within a given community for a given condition. These doctors are practicing below the standard of care for this, and that becomes a legal issue, not necessarily one of licensing or professional society membership. I wonder what would happen from that standpoint if a horrible event occurred, or a patient developed a vaccine-preventable illness in one of these practices.

Harris: What about the responsibility of schools, or the state, to mandate sound public health policy here? My understanding is that it's illegal in California for a school to refuse to grant a "personal belief exemption" and say that a child cannot come to school without having the full course of vaccines. Which is bizarre, because a school can mandate things like uniforms. If you don't want your child to wear a uniform, you simply can't come to that particular school. If you don't want your child to wear shoes, there's probably not a school in the country that would have you. But if you don't want your

child to be vaccinated—where not being vaccinated will reliably spread a risk of serious illness both to other students and to their siblings at home—there’s nothing the school can do. That sounds like a law in desperate need of rewriting.

Shapiro: Yes, and I think the schools that have looser vaccine policies have realized in the past few months that this may not be the best way to go. These schools are genuinely concerned that if there is a case of measles in their school, it will become big news and very costly for the school—because people will have to be quarantined for 21 days at home. Teachers with young children could be seriously affected. I think many schools will tighten the reins in the coming year. I’m curious to see how the numbers change in 2015 and 2016. I do think that the families who were delaying vaccines, as opposed to forgoing them altogether, may catch up more quickly. We’ll have to see.

Harris: I hope so. Again, what I think many people just don’t see is that we’re grappling here with the illusion that it is merely a personal choice. When you send your kid to school unimmunized, you are putting at risk someone in the school, or someone’s relative at home, who can’t get immunized for a real reason. Apart from the health of one’s own child—which is really best protected by getting the recommended vaccines—it is this cascade of effects that one should worry about.

Shapiro: Yes. But it is a challenge to convince people that it isn’t a personal choice. We hear this all the time: “I’ve made this decision for my family. This is best for my family.” But your family doesn’t live in a bubble. Your family lives in a community, and you have to have some level of social responsibility.

Harris: And, again, a person can consider this a personal choice only because most other families are making the *opposite* choice. Such a person can’t reasonably wish that everyone would follow his or her example, because then we’d all be dropping like flies from preventable disease.

Well, this has been very useful, Nina. I much appreciate your taking the time to speak with me.

Shapiro: It was a pleasure. Thank you, Sam.