Thank you for this award; it’s very kind. I was asked to speak about how I came into medical writing, which was reluctantly, so let me tell you how I got there.

Although trained in pediatrics professionally, I am, for the most part, a viral immunologist. I worked for 25 years trying to identify what parts of rotavirus induce protected immunity and what parts of rotavirus make you sick. In doing so, we created strains that eventually became the bovine human reassortment vaccine, RotaTeq, which was licensed for use in all children in this country in 2006 and for all children in the world in 2013. It was a team effort; the key member of the team is Dr Fred Clark, on the left. So, that’s really how I saw myself—as a viral immunologist.

What happened to me, what got me out of the lab for better or worse, happened in 1998. I was asked to be on the Advisory Committee for Immunization Practices, which is the major recommending group for vaccines in the United States. And between 1998 and 2000, there were 3 big hits to vaccines. One was that Rota Shield was removed from the market. It was the first time a vaccine had been taken off the market because of an issue of safety in 50 years.

Second, it was discovered that there was an ethylmercury-containing preservative in vaccines called thimerosal. Basically, the public health service put a gun to the head of the pharmaceutical industry and said, “You’re going to have to take this out of all vaccines as quickly as possible.” It really scared people and, frankly, created antivaccine groups.

And third, Andrew Wakefield—and this is a story you know all too well—published a paper claiming that the combination measles/mumps/rubella (MMR) vaccine caused autism. On that committee, we, as voting members, were actually asked to vote on whether or not we should divide that vaccine into its 3 separate parts because that’s what Andrew Wakefield thought would end the autism epidemic.

I think what struck me in all this was that I didn’t see scientists standing up to address this. Certainly, the American Academy of Pediatrics stood up. They had pediatricians. They got out there and said, “You know, vaccines are good; vaccine-preventable diseases are bad. You know, we vaccinate our own children.” But I didn’t see anybody addressing the science. Certainly, the epidemiology exonerated ethylmercury as a cause of the problem or exonerated the MMR vaccine, but I didn’t see people saying, “Here’s why it didn’t make any biological sense that that would be true.” I thought that was our job as scientists to do that, and I didn’t think we were doing it.

That got me interested in trying to explain science to the public. So, initially I took a somewhat safer route—I wrote a couple of books. One was called The Cutter Incident about a polio vaccine that was made badly in 1955 when Cutter Laboratories failed to inactivate their polio vaccine. As a consequence, about 120,000 children were inoculated with live, fully virulent polio virus. Approximately 40,000 of these children developed abortive polio, 164 developed permanent paralysis, and 10 were killed. I think it was one of the worst biological disasters to ever happen in this country’s history, and it gave birth to vaccine regulation.
The second book that fell into the category of just trying to explain the science of vaccines was a book about Maurice Hilleman called *Vaccinated*. Dr Hilleman, who most people don’t know, was actually the primary researcher for development on 9 of the 14 vaccines that we currently give children. He was diagnosed with disseminated pancreatic cancer, and he was kind enough to let me interview him for the last 6 months of his life because I didn’t want to lose those stories. I thought it was a better way to explain the modern vaccines with this man’s voice.

Where I think I crossed the lines was with these 2 books—*Autism’s False Prophets* and *Deadly Choices*—because now I wasn’t just a scientist anymore. Now, I was sort of pulling back the curtain explaining what was motivating the people who were antivaccine. Who was funding them? Did people know that Andrew Wakefield had a patent on a safer measles-containing vaccine? Did people know that he’d received hundreds of thousands of dollars to essentially launder legal claims through a medical journal? And with that, I put an X on my back. As a scientist, I was now forced more into being in the media.

I guess for the rest of this talk, I just want to tell you about all the mistakes I’ve made basically being in the media, so you won’t have to make the same ones. For example, I had to appear in front of Dan Burton’s committee on government reform. I was on many morning and evening news shows including this news show—*CBS This Morning*. And then, I had to be interviewed by Samantha Bee on *The Daily Show*.

So, here are the challenges that I’ve learned. In general, scientific training is the opposite of media training, and here’s some examples. I think one challenge is the scientific method. So, for example, when Andrew Wakefield wrote his paper claiming that the MMR vaccine caused autism, it basically described 12 children, 8 of whom had developed autism within a month of receiving vaccines. (By the way, anybody who’s interested in doing epidemiology, you should always have more study subjects than authors—just as a tip.) The best thing you could say about this paper is that he raised a hypothesis. As you know, the way hypotheses work in science is you create the null hypothesis. So, in this case, the null hypothesis is that MMR vaccine does not cause autism.

You can do 2 things with that null hypothesis. You can reject it, which is to say that when autism follows receipt of the MMR vaccine it occurs at a level greater than would be expected by chance alone. Or you could not reject it, which is to say that when autism follows receipt of the MMR vaccine, it occurs at a level that would be expected by chance alone.

There are many studies now—there were actually 18 studies done in 7 different countries, on 3 different continents involving hundreds of thousands of children costing millions and millions of dollars showing that you’re no more likely to have autism if you got the MMR vaccine than if you didn’t.

I think if this paper proved anything it was that the MMR vaccine does not prevent autism. If you get the MMR vaccine, you might still develop autism because the only thing MMR does is prevent measles, mumps, and rubella infection. It doesn’t prevent everything else that happens in the first few years of life.

But what you can’t do is accept the null hypothesis, which is to say you can never prove never. I think that epidemiological studies aren’t mathematical theorems. There aren’t proofs; there are just associations of 1 event with another at a certain level of statistical power. And so, you’re aware of that. When you testify in front of committees or you go on these shows, technically, you can’t say MMR does not cause autism. So, what you end up doing initially—it sounds like you’re waffling: “All the evidence to date doesn’t support the hypothesis that MMR causes autism or that thimerosal at the level contained in vaccines causes developmental delays.” It sounds like you’re waffling, or worse, it sounds like you’re covering something up. And so, that’s something you’re always dealing with. You sort of have to get over that. You have to be able to realize you can say that.

For example, when I was a little boy, I used to watch the television show *Superman*—this was the one with George Reeves (before Christopher Reeves, which is probably the one you know). But in any case, Superman flew. I mean, he put his hands in front of him with this interlocking thumb grip, and he either sort of went to the left or he went to the right. His cape is flying behind him. His hair is flying. He was looking down at the city. When you’re 5 years old, television does not lie! So, I went out to my backyard, put a towel around myself, and jumping from a small height using the key interlocking thumb grip, I tried to fly. (Spoiler alert—unsuccessfully!)

So, I could have tried a million times. That also wouldn’t have proven that I couldn’t fly. It would only have made it all the more statistically unlikely. You can’t prove that there weren’t
weapons of mass destruction in Iraq. You can only say that they were nowhere that you looked. You can’t prove that I’ve never been to Juno, Alaska (even though I’ve never been to Juno, Alaska). You can just show a series of pictures of buildings in Juno, Alaska, with me not standing next to them.

I think the other challenge for scientists are our personalities. This is an old but true joke—how can you tell the difference between introverted scientists and extroverted scientists? When introverted scientists talk to you, they stare down at their shoes. When extroverted scientists talk to you, they stare down at your shoes. And that’s true. We’re not made for this. If you put in “scientists” in Google and then select Images, usually this is sort of what you find.

I think also our training is in many ways really the opposite of media training, as I said earlier. I mean, we’re much more comfortable sharing and analyzing data in the hopes of discerning central truths about natural processes. We’re generally less comfortable when we’re expected to be dramatic advocates for a particular position. It’s the opposite of what we’re trained to do.

A good scientific paper is full of caveats. The worst thing you can do in science is go anywhere beyond the data in front of you. And let me tell you, this does not work on The Colbert Report or on TV. I mean, you have to be able to say things a little more definitively. Goodness knows, the other side is saying them definitively with no data. So, you have to be able to do that, and it’s really against everything in your body to do that.

So, for example, I was on The Colbert Report here in January of 2011. And he’s actually great, Stephen Colbert. He meets with you before the show, and he says, “Look I play a character. I’m going to stay in character the entire interview. Don’t let my character get away with anything. I mean, if you do, it’s going to be a boring show. I agree with you.” As many of you know, his father was an infectious disease immunology specialist who died in a plane crash when Colbert was a little boy, when he was 10 years old. He’s very sympathetic to science, as frankly all the comedians are. I mean, take your pick—Penn and Teller, Jimmy Kimmel, and John Oliver have all been great about science because they’re skeptics, so they know nonsense when they see it.

This is an old but true joke—how can you tell the difference between introverted scientists and extroverted scientists? When introverted scientists talk to you, they stare down at their shoes. When extroverted scientists talk to you, they stare down at your shoes.

They won’t tell you what questions they’re going to ask on the show. Emily Lazar, who is his producer, will say, “Here are the do’s and don’ts of The Colbert Report.” So, for example, watch this show—this is a don’t. And Atul Gawande was a don’t. The reason he was a don’t was he was talking about his book, The Checklist Manifesto, and the don’t was he kept coming back to his talking points. People don’t watch The Colbert Report to learn how hospitals can be more efficient. They watch The Colbert Report to laugh at Stephen Colbert. That’s the goal. Because when people joke with you, your instinct is to joke back. But again, you’re not funny. Stephen Colbert’s funny. You’re a straight man on a comedy show. Get used to it.

I don’t know if you can see that there’s a little blue card in front of him. So, you’re sitting there while your life is passing before your eyes for about 5 minutes before he comes over from the big seat to this little table in front of this false fireplace. Assuming you can read upside down, the first question was, “Why haven’t you taken off your clothes for Playboy?” It was like a Jenny McCarthy sort of reference. So, I’m looking at my 2 young children sitting in the front row, anxious to hear what you’re going to say, and thinking, “God don’t let him ask this question.”

The second time I was on Colbert was worse, actually. As I said earlier, I was fortunate enough to be part of a team that created the vaccine RotaTeq, and so one of the many ways people attack me is to say I’m just a pharma shill. And so he said, “So it’s true you’re in the pocket of industry.” How do you respond to that? So, I said, “At Children’s Hospital of Philadelphia, we’re not in the pocket of industry. If anything, we’re in the pocket of children because we do this and this and this.” At which point, 300 people in the studio audience booted loudly. So, I didn’t understand that. I was sort of walking out with the assistant producer, and I said, “Why did people boo like that?”
She said, “You don’t understand that when people like you, when you’re on a comedy show and you said you were in the pocket of children, it made you sound like a pedophile.” So, my daughter was there. She was 17 at the time, and my wife was with me. So, we’re taking the cab back to the train station to go back to Philly, and I said to my wife and daughter, would you ever have thought of that?

And my daughter says, “Yeah, I thought of it; that’s why I booed.”

I think the other thing is you have to be fairly thick-skinned in dealing with the media. It really surprised me, actually—I never imagined science could be so politicized and so mean, and that, I think, is something that has happened. I certainly get a lot of hate mail. I occasionally have been physically harassed and have gotten 3 legitimate death threats.

So, if you want to know, just for your knowledge—just for any of you who get death threats (and there’s actually thousands of death threats on the Internet every day)—the FBI considers it legitimate if (1) it’s a threat made by 1 person more than once and (2) it’s specific. So, it can’t be sort of “Watch your back. Hopefully, nothing will happen to you.” It has to be, “I’m going to do this. I’m going to come into your office and shoot you with a gun.” And (3) it has to be by somebody who they think could do it, meaning like a paranoid schizophrenic. At which point, they get involved. They will monitor that person to see what they’re—I’m not encouraging you now to really go into this—they’ll see whether that person bought a weapon. They’ll see whether that person is travelling to your area. They actually completely violate that person’s civil liberties. (Which is fine with you, by the way. Any notion you have of civil liberties goes out the window the minute you’re threatened.) But that certainly happened here. This just an example of that: “Wanted for genocide.” So that’s fairly typical.

Czechoslovakia was the heart of physics in the 1950s. All the great physicists came from Czechoslovakia, and then the government did not consider that important. It didn’t, and so it ended. The same thing was true of Germany in the 1930s. A lot of the Nobel Prize winners were German up until that point, and then, Adolph Hitler decided that science was not important to him. And so, then it wasn’t for that 12-year Reich. (It was about 988 years short of the 1,000-year Reich he promised.)

So again, I think we do need to stand up. And I’ll just stop right there. And thanks for your attention.

Author declaration and disclosures: The author notes no commercial associations that may pose a conflict of interest in relation to this article.

“Wanted for genocide” attack ad.

So, I think it’s really important to stand up for science now more than ever. We are in an era, I think, in which scientific literacy has morphed into scientific denialism. People simply declare their own truths: vaccines cause autism, climate change is a hoax perpetrated by the Chinese, creationism and evolution are equally valid hypotheses. We’re in a tough spot right now. Now more than ever, I think we need to stand up here. And no venue is too small.

I remember when my daughter was in the eighth grade. She was in an all-girls school in suburban Philadelphia. I was asked actually to come to speak to her class about vaccines. I thought this was going to be fun. My daughter didn’t. On the entire ride there she just kept saying, “Dad, don’t make jokes. People my age are not going to get old people’s jokes. Don’t make jokes. Don’t embarrass me in front of my friends.” Honestly, it was the most harrowing talk I’ve ever given in my life. The 19 girls seemed to be enjoying it, but one just stared grimly forward with a look on her face that said, “Don’t embarrass me.”

I think we all assume that people are challenging bad information, but it’s not really true. I don’t think a lot of people really are comfortable standing up in this arena for obvious reasons. And for me, I was fortunate enough to be funded by the National Institutes of Health for 25 years through an R01 mechanism. I mean, who was funding me? It was the public who was funding me. It was the voter who was funding me. And they can just as easily stop funding me.

Please see our Online-Only Supplement (www.amwa.org/page/Members_Only_Issues), which continues our postconference coverage.

I hope you find this issue’s insight into the annual Medical Writing & Communication Conference to be of value. As you can see, if you missed the conference, you missed a lot! I hope to see you at the 2020 conference in Baltimore, Maryland, where we will celebrate 80 years of AMWA!

—Jim