

Sidedoor S2 Ep. 18 Killer Viruses and One Man's Mission to Stop Them *Transcription*

[MUSIC]

Tony Cohn: This is Sidedoor, a podcast from the Smithsonian with support from PRX. I'm Tony Cohn.

[MUSIC]

Lexi Lord: I always remember a quote which was, "the bodies piled up something fierce."

Tony Cohn: In 1918, a super deadly virus spread across the world. Alexandra Lord, the chair and the curator of medicine and science at the Smithsonian's National Museum of American History has spent years studying what made 1918 so deadly.

Lexi Lord: When we think about bodies accumulating and a city not able to keep up with burying the dead, we think that's something that happened in the Middle Ages. No, it happened in the 20th century in an industrialized nation, our nation, but also nations across the world.

[MUSIC]

Tony Cohn: In October, just October, the disease killed 196,000 people in the US alone. A year later, 675,000 people were dead. And again, that was just in the United States! Worldwide, the body count was as high as 100 million.

[MUSIC]

Lexi Lord: It was one of the most intense pandemics that we've ever seen.

[MUSIC]

Tony Cohn: So, what caused the 1918 pandemic? Bubonic plague? Scarlet fever? Nope. It was influenza. Just the common flu. The thing you try not to get every year, and especially this year, in 2018, when the flu's been particularly aggressive. But fortunately, we're better off today than we were in 1918 thanks to (clears throat) science.

[CHIMES SFX]

Tony Cohn: In fact, science actually helped us avoid another pandemic. Or rather a scientist helped us avoid it. You heard that right. A scientist; like actually one guy helped us avoid a pandemic, just 40 years after those bodies piled up in the streets. And that wouldn't even be the only disaster he'd help us avoid. The scientist's name: Dr. Maurice Hilleman.

[MUSIC]

Tony Cohn: If you're thinking, "Huh? Never heard that name before." You're not alone. I didn't know his name before we started doing this story. But it's a name that deserves to be known.

[MUSIC]

Tony Cohn: So, this week on Sidedoor, you're gonna hear that name, Maurice Hilleman, over and over again; a man, who has been credited with saving more lives than any other scientist in the 20th Century. All of that, right after a quick break.

[MUSIC]

Tony Cohn: So, how many lives do you think Superman's saved? Millions? Probably. But, and I hate to break this to you, Superman is not real. You know who is real, though? Dr. Maurice Hilleman.

[MUSIC]

Tony Cohn: Dr. Maurice Hilleman was a microbiologist and a vaccine pioneer who actually did save millions of lives. Except, the bad guys Dr. Hilleman was fighting could only be seen with a microscope. That's because he was going after microbes; things like bacteria and viruses, that cause disease. And, like all good heroes, Dr. Maurice Hilleman has a tidy origin story that, if this were fiction, would explain his uncommon drive. In Hilleman's case, he was born during one of the world's biggest pandemics ever.

Lorraine Hilleman: He was born in 1919, during an influenza pandemic. It was one of the worst in history.

Tony Cohn: That pandemic was the same one we learned about earlier. Bodies in the streets. You remember. And that voice you heard was actually Maurice's wife, Lorraine Hilleman. We asked both Lorraine and Jeryl Lynn Hilleman, Maurice's daughter, to help us tell this story.

Jerri Hilleman: He, uh, has a really interesting background, growing up in a very poor, uh, subsistence farm area, in eastern Montana.

Lorraine Hilleman: And as, uh, young children, they worked from sunup to sundown. In the wintertime, when they couldn't work outside, they made horseradish and they made brooms to sell and things like that.

Tony Cohn: But just like Superman, Hilleman didn't stay on the farm for long.

[MUSIC]

RECORDING OF MALE VOICE: The world needs a man of such extraordinary capabilities. That is why you must leave this farm. You must go where they can best be put to use.

1940s Superman: Very well. And when I leave, I'll get a job that'll keep me close to world events. Then, when anything happens, I'll know about it at once.

[MUSIC]

Tony Cohn: Hilleman didn't end up in Metropolis. Instead he made his way to Washington, DC, possibly by plane since the 1950s were in full swing. In fact, by 1957, more people traveled across the Atlantic by air than by sea. But these travelers were bringing some deadly baggage with them. Here's Alexandra Lord again.

Lexi Lord: We tend to think, when we look at the history of medicine, we tend to think, "Oh, things improve, you know, over time." Actually, diseases spread faster in the 50s and 60s, then they did in 1910 simply because we travel much more quickly.

[MUSIC]

Tony Cohn: April 17, 1957 was one of those perfect mild spring days in Washington, D.C. The cherry blossoms were in bloom, and the hero of our story, vaccine-researcher, Dr. Maurice Hilleman grabbed a coffee, maybe a doughnut, and a copy of the New York Times. He sat down at his desk at the Walter Reed Army Medical Center to read it. Here's what Hilleman read about the flu outbreak in Hong Kong.

New York Times: "Thousands of cases of influenza have been reported here, during the last few days, in the worst epidemic outbreak in years," according to health authorities.

Tony Cohn: And skipping ahead...

New York Times: "The press estimated there were about 250,000 residents receiving treatment."

Tony Cohn: Here's Maurice Hilleman himself from the documentary, *Hilleman: A Perilous Quest to Save the World's Children*.

Maurice Hilleman: 20,000 people lined up. And I looked at that, they said "Babies have glassy eyed stares." Oh my God, this is the pandemic. It's here.

[MUSIC]

Tony Cohn: In order to stop this potentially disastrous pandemic, Hilleman needed a vaccine, except there really wasn't one, at least not for this particular version of influenza. Hilleman would have to create one of his own.

[MUSIC]

Tony Cohn: To really understand the challenge Dr. Maurice Hilleman faced, we turned to one of the leading virus researchers in the United States, if not the world.

[MUSIC]

Dr. Anthony Fauci: Okay. My name is Dr. Anthony Fauci and I'm the director of the National Institute of Allergy and Infectious Diseases, here at the National Institutes of Health.

[MUSIC]

Tony Cohn: Dr. Fauci is so good at his job, that he's been the guy who Presidents turn to when we have a national, viral health crisis.

Dr. Anthony Fauci: Usually, outbreaks of disease in which they've called upon me to uh, to talk to them about what the best approach is, be it a pandemic flu or HIV AIDS or Ebola, or Zika, what have you.

Tony Cohn: Dr. Fauci knows a lot about infectious diseases and the vaccines that prevent them. So, I knew I could ask him my toughest questions.

Tony Cohn: What is a vaccination?

Dr. Anthony Fauci: A vaccination is injecting or orally giving to someone, uh, something that resembles or is related to a particular microbe that you want to protect that person against.

Tony Cohn: Okay so it's a little complex, but let's look at it like this, and really this wouldn't be Sidedoor without a cheesy metaphor.

[LARGE CROWD NOISE]

Tony Cohn: So, there's a bouncer at a hot new club in town. They're big and muscular, dressed all in black. And they've also got this list with pictures of people who aren't allowed in the club. Think of the immune system as the bouncer. That night, a guy named, "Measles" walks up to the club. The bouncer checks the list and lets the guy in. But once inside, the guy dances so wildly that he ends up wrecking the place. The bouncer calls the club's security; these are antibodies and cell-mediated immunity. And they chase him around for a long time.

[MUSIC]

Tony Cohn: Eventually, they catch him and manage to kick him out. Then, they add his name to the bouncers "Do Not Enter" list. That way, anytime "Measles" tries to get in, the bouncer knows to stop him and call security. Access denied. Forever.

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[MUSIC]

Tony Cohn: But, if the owner of this club, aka: the person whose immune system this is, if they were to have gotten their measles vaccine, measles wouldn't be able to get into the club in the first place. His name would already be on the bouncer's list. And the club's security would be on the lookout. Because a vaccine works by introducing a dummy version of a virus into the body, which our immune system is able to practice fighting off. Then, any time we come across the real-deal virus, our immune system can recognize it, and call upon our antibodies and cells to take care of the threat. The other cool thing about the immune systems is that once they fight off the virus, or a related virus, they can recognize it and fight it off forever; at least in a lot of cases.

Tony Cohn: But then I think about things like the flu, which I've gotten the flu vaccine every year for the last 10 years, but I still have to get it every year.

Dr. Anthony Fauci: Right, right. Okay. So, now you're entering into the one of the single exceptions to this rule.

[LAUGHTER]

Tony Cohn: Of course, I am.

Dr. Anthony Fauci: And the exception is that unlike measles, which just doesn't change from year to year. So, the measles that I got infected with decades ago when I was a child, before we had the vaccine, is the same measles now that circulates in countries that still have measles. Influenza is a RNA virus that happens to have the capability of changing very, very consistently. It's called "drifting" from year to year.

Tony Cohn: Because influenza has the ability to change, when scientists make the flu vaccine, they have to predict what next year's flu will be. Often, they're right. But when they're not, the vaccine doesn't prepare our immune system the way it's supposed to. Like this year, for instance. Most years, the flu vaccine is between 40 and 60 percent effective. But in 2018, it's only 10% effective against the worst version of the flu going around. Even at 10% effective though, the flu vaccine can still save lives and help ease flu-symptoms.

Dr. Anthony Fauci: Rarely, when it changes so much that it's entirely different than previous influenzas, that's when you have a pandemic, which is one of the reasons why we are working so hard to develop a vaccine that induces a response against that part of the influenza virus that doesn't change from year to year. And we refer to that as a universal influenza vaccine and there's a lot of activity going on right now to try and develop that in fact I've made that the top priority for my institute over the next several years.

[MUSIC]

Tony Cohn: That makes me so happy. I would love a world where there wasn't the flu.

Tony Cohn: But how exactly do the scientists create these vaccines?

[MUSIC]

Dr. Anthony Fauci: The vaccines are made by a couple of ways. It's the time-honored way of growing the actual virus. Take influenza. So, you isolate the influenza that looks like it's going to be circulating next year, you grow it up and then you either kill it or inactivate it, purify it, put it in a form that you can inject and zing, you get an injection. So, the body now thinks that you've been exposed to influenza.

Tony Cohn: But, it's really a dead version of influenza.

Dr. Anthony Fauci: It's a dead version.

[MUSIC]

Tony Cohn: And just in case you were wondering; no, a flu shot cannot give you the flu. Until we have a universal flu vaccine, we're stuck getting them every year. But that's okay, because without them, we'd face more flu pandemics that kill millions of people, which we almost learned the hard way back in 1957. And we'll get to that, right after a quick break.

[MUSIC]

Tony Cohn: Welcome back. So, here's what you really need to know right now. In 1918, there was a huge global flu pandemic that was said to have killed up to five percent of the world's population. The next year, Maurice Hilleman was born. As an adult, he became a promising vaccine researcher. In 1957, he read an article in the New York Times about particular strain of influenza that was sending hundreds of thousands of people to the hospital in Hong Kong, and Hilleman sensed a disaster headed for the United States. He arranged to get a sample of the virus sent to his lab. He tested it. And, it was a totally new version of the flu. Nobody, to his knowledge, had even seen this virus. And that meant, neither had their immune systems. They needed a vaccine. And they needed it fast. Here's how Dr. Hilleman, himself, remembers that time, as told in the documentary "Hilleman: A Perilous Quest to Save the World's Children."

Maurice Hilleman: By George, I was able to announce to the world, and I had guts at that time. I said that there would be a pandemic, which would start when school began in the fall.

[MUSIC]

Tony Cohn: This was a big call. Keep in mind, it was spring, 1957. Imagine suggesting that major pharmaceutical companies spend millions of dollars to create a flu vaccine in just months. Hilleman knew this prediction would follow him for the rest of his career, whether he was right, and especially if he was wrong.

[MUSIC]

Tony Cohn: After convincing the other researchers at Walter Reed that a pandemic was literally months away, the team went to work. By June, the first batch of the vaccine was ready. Then, one month later, they began vaccinating millions of school-aged kids, so they'd be protected by the time school started in the fall.

[MUSIC]

Tony Cohn: So, did the vaccine work?

Maurice: The pandemic of '57 of Asian influenza began on time. But, now having had early detection and that alert from the New York Times, then allowed us; I could go to the manufacturers and get them going on an immediate basis without having to go through the bureaucratic red tape. And we had 40 million doses of vaccine by the time that the end of the year came and um, it was used. And that's the only time we ever averted a pandemic with a vaccine.

[MUSIC]

Tony Cohn: Between 1957 and 1958, about 70,000 people died from the flu in the U.S. Some predicted that the death toll would have reached 1,000,000 without Hilleman's vaccine.

[MUSIC]

Tony Cohn: So now, that Hilleman had saved hundreds of thousands of lives, his career was on fire.

[MUSIC]

Jerry Hilleman: Uh, at which point there was a big change in his life in that I came into the picture.

Tony Cohn: That's Maurice's daughter, Jerryl. Hilleman wanted to give Jerryl the best life he could, so the family packed up and moved to Philadelphia where Hilleman accepted a job with the firm Merck, and like Pac Man chomping some blue ghosts, he attacked all of the worst infectious diseases affecting children and adults alike.

[SFX: PACMAN VIDEO GAME MUSIC]

Tony Cohn: Hilleman developed vaccines for measles...

[SFX: PACMAN VIDEO GAME MUSIC]

Tony Cohn: Mumps...

[SFX: PACMAN VIDEO GAME MUSIC]

Tony Cohn: Rubella...

[SFX: PACMAN VIDEO GAME MUSIC]

Tony Cohn: Meningitis...

[SFX: PACMAN VIDEO GAME MUSIC]

Tony Cohn: Hepatitis...

[SFX: PACMAN VIDEO GAME MUSIC]

Tony Cohn: Pneumococcal Pneumonia...

[SFX: PACMAN VIDEO GAME MUSIC]

Tony Cohn: And chicken pox.

[SFX: PACMAN VIDEO GAME MUSIC]

Tony Cohn: And many, many more.

[SFX: PACMAN VIDEO GAME MUSIC]

Tony Cohn: The actual number of vaccines Hilleman either created, helped to create, or improved? 40. 40 vaccines! In fact, Dr. Hilleman developed nine of the 14 vaccines, routinely recommended for children by The American Academy of Pediatrics. Maurice Hilleman was super prolific. Again, here's Dr. Anthony Fauci.

Tony Cohn: What do you think made Dr. Hilleman so successful?

Dr. Anthony Fauci: Well first of all, you have to start off with, he was a brilliant guy. The second thing, he had an incredible amount of energy. He was a very, very hardworking person. So, you take somebody who's intellectually brilliant, hardworking, great ideas, has a great team behind him, has a major company behind him and is laser focused. That's it. That's the ingredients.

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Tony Cohn: Calling Hilleman “hardworking” does not cut it. He was well-known for working seven-day weeks. Here are his daughter Jeryl and his wife Lorraine again.

Jerri Hilleman: And then, after dinner, uh, he would go into his office and continue to work. In fact, he had a sofa bed in his office because I spent so much time in there and I would often fall asleep.

Tony Cohn: Wow. Were there any domestic tasks that he was really good or enthusiastic about like, I don't know, barbecuing? Maybe even doing the dishes?

[MUSIC]

[LAUGHTER]

Lorraine Hilleman: No, we didn't barbecue. He said it was carcinogenic.

Tony Cohn: Of course, he did.

[LAUGHTER]

[MUSIC]

Tony Cohn: After a long career, Dr. Maurice Hilleman passed away in 2005 at the age of 85.

[MUSIC]

Lorraine Hilleman: He did not want to see anybody suffer. He had a lot of empathy for especially for children, but for adults as well. And he just thought he wanted to help rid the world of all these horrible diseases.

[MUSIC]

Tony Cohn: Maurice Hilleman isn't a household name. But his legacy is everywhere. It's in the millions of people who are alive today when, just a few decades ago, they might not have lived past childhood. Hilleman actually made it possible for us to not worry so much about the thing that probably worried him the most. Here's Alexandra Lord one last time.

Lexi Lord: Hilleman actually eradicated diseases so we don't talk about them. So, it's easy for us to forget, you know, the person who led to their eradication.

Tony Cohn: In fact, Dr. Hilleman did so much, it's actually difficult to keep all of his accomplishments straight: 40 vaccines, eradicating diseases, avoiding pandemics, saving lives, and on and on.

Dr. Anthony Fauci: It's stunning that a person, uh, a single person, has developed those kinds of vaccines that have saved so many lives.

Lorraine Hilleman: He was a man of science. He was a man of history. He was a man of destiny.

Tony Cohn: What do you think he would want the public to know about himself and his work?

Lorraine Hilleman: That it's important to maintain your, um, vaccination schedule.

[MUSIC]

Tony Cohn: Maurice Hilleman didn't have super powers. But what he did have in common with Superman was the drive to make the world a better place.

[MUSIC]

Tony Cohn: You've been listening to Sidedoor, a podcast from the Smithsonian with support from PRX.

[MUSIC]

Tony Cohn: If you want to learn more about what you heard on today's show, check out the Smithsonian's National Museum of American History's super cool "Antibodies Initiative," an online database of all of the disease and vaccine-related objects and research from the museum's collections.

[MUSIC]

Tony Cohn: In May 2018, the Smithsonian's National Museum of Natural History will debut a brand-new exhibition called "Outbreak: Epidemics in a Connected World" to coincide with the 100-year anniversary of the 1918 influenza. It's gonna be sick!

[MUSIC]

Tony Cohn: We want to give a very special thanks to Donald Mitchell for letting us use all of that great audio from his documentary, "Hilleman: A Perilous Quest to Save the World's Children." Be sure to check it out at HillemanFilm.com. Also, thanks to Alexandra Lord, Diane Wendt, and Valeska Hilbig and for all of their help with this episode.

[MUSIC]

Tony Cohn: Original score is by Nico Porcaro. Our theme song is by Breakmaster Cylinder.

[MUSIC]

Tony Cohn: Our podcast team is Justin O'Neill, Rachel Aronoff, Jason Orfanon, Gabe Kosowitz, Jess Sadeq, Greg Fisk, Nico Porcaro, and Elisabeth Pilger. Extra support comes from John Barth, Genevieve Sponsler and Andrea Mustain. I'm your host, Tony Cohn. Thanks for listening.

[MUSIC]