

[applause]

Steph Meyer: “Good evening. To many of you, this may look like Matthew Modine. And maybe more of you know him from *Stranger Things*, but to me, this is him in the role of Don Francis. Don Francis is an American epidemiologist who worked on the first Ebola outbreak in 1976, in Sudan, and in 1981 began his work on AIDS. He was one of the first to suggest that AIDS had an infectious cause, and he fought tooth and nail to get the federal government to recognize the AIDS epidemic. The story of his work in the early days of HIV is depicted in the book and movie, ‘*And the Band Played On*’ by Randy Schultz, and it is to this day one of my favorite stories in public health. It’s fascinating. It’s full of detective work and linking of evidence to all these different scenarios. And to me, when I was young, seeing this cast of movie stars and to know that they are real people who really did this work. It had me hooked.

“The trouble was, I thought you had to be a doctor to be an epidemiologist. And I didn’t want that. I wanted to be a disease detective. So I decided I would study microbiology. I got a job in a laboratory at Iowa State University, and I was entrusted with starting up pulse field gel electrophoresis, or PFGE analysis on salmonella isolates. Now, I had no idea what PFGE was, and I needed to figure it out quick. So in a panic, I searched for literature on PFGE, and I found that some of the most interesting and early articles were coming out of Minnesota, and they were about salmonella. So jackpot. I looked up the phone number for the Minnesota Department of Health, and I asked to speak with Doctor Jeff Bender, who is now a friend and a colleague at the University of Minnesota. And Jeff was kind enough to hear out this 19-year-old who didn’t know anything about anything. And he connected me with our public health laboratory. And there, I was fortunate enough to meet Dave Boxrud, who’s a good friend of mine to this day. Dave tirelessly answered my questions. He even showed me how to build things that I couldn’t afford to buy out of PVC pipe and rubber cement. And from there, I started isolating salmonella, and I isolated the DNA out of salmonella and analyzed it and compared it. And most importantly to me, I now had a phone-a-friend. I had someone I could call and ask all my questions. I finished my salmonella research. I graduated with a degree in microbiology, and I was at a crossroads. Now what?

“I’m not a disease detective, but maybe I can be an assistant to Matthew Modine? So I researched working for the Centers for Disease Control (CDC), and I applied to master’s degree programs in epidemiology. I would study epidemics. I was accepted at the University of Minnesota, and I desperately needed a job. So again, I called my phone-a-friend, Dave. I knew PFGE, I had learned from the best, I could even build things, I love salmonella. So I lucked out and I landed a job in the lab, doing the very thing that I was trained to do. And from there I met and worked for epidemiologists, an entire team of them constantly investigating outbreaks. And I loved the idea of working for this group of detectives solving infectious disease mysteries. And the name of their student team was ‘Team Diarrhea.’ My mother will be so proud. And from there, I was hired on as a full-time epidemiologist and disease detective. And I’d investigated hundreds of clusters of disease, worked on more outbreak investigations than I can count, and solved many mysteries. And one of the most impactful investigations of my career was the PCA peanut butter outbreak.

“In the fall of 2008, there were several salmonella typhimurium cases identified across multiple states linked by PFGE, that method that I had learned as an undergraduate, and the first several cases did not turn up any common threads. So by late December, the outbreak had spread to a nursing home in Minnesota, a setting where disease transmission can be devastating. A colleague, and outstanding epidemiologist and good friend of mine, Carlota Meduse, investigated this outbreak with me. We

teamed up to look at the menu of food offerings at the nursing home. So we then identified the outbreak strain in another resident of a separate nursing home across town, and in two children in an elementary school in a different town.

“And in all of these incidents, we had the benefit of looking at receipts and purchase orders. This is the key we were looking for. If I ask you what you eat for breakfast or lunch or dinner yesterday, you might be able to tell me. But who here remembers what they ate last Tuesday? Asking you about a time before you got sick can be very difficult to recall, even for the best historians. But having a distinct menu, having receipts and delivery dates, clear product names, invoices, that is a goldmine of information. Carlota and I printed off reams of invoices combing through weeks and weeks of food orders, comparing anything that might even be remotely related. Was the corn that was mentioned at this place, the same as the corn that was served at the school? Let's flag that. That could be related. What about the flour, the sugar, the chicken, the pork, the fruits, the vegetables, anything you could think of. You name it. We looked into it. We ruled things out, highlighting interesting findings as we went, and narrowing our field of investigation.

“In the end, the standout was King Nut Creamy Peanut Butter. We found it in all three places. And we also found it in invoices for a juvenile detention center where there's a case in Oregon. Meanwhile, an open tub of this peanut butter was collected and tested by the Minnesota Department of Agriculture in early January. The next day, we obtained information about yet another nursing home case, and this time the person had died. In the days before their illness, they hadn't been eating any solid foods, but they did eat toast with peanut butter. And the nursing home was serving King Nut Creamy Peanut Butter. By Friday of that week, we had a positive finding of salmonella from the bottom of this open tub of peanut butter. The problem that comes into play is that the peanut butter was open. What if someone contaminated it? What if we were wrong?

“In disease risk communication with the public, you struggle with two things: you want to be first, but you want to be right. You want to be both. Because if you are wrong, you lose the public's trust and you risk ruining an industry. If you are late, you're late in sharing information that can protect the public. But if you are first and you are right, you will help people and they will listen to you. I also often consider my own family and friends. If I'm going to call my relatives and say, ‘Hey, maybe don't buy peanut butter until this whole investigation blows over.’ I should be saying the same message to the general public. So we did do a press release, and the company that processed the peanuts, Peanut Corporation of America, quickly responded with statements on the safety of their food and that no salmonella had ever been found in any of PCA's products. But further investigation into cases identified more links to institutional peanut butter in nursing homes and universities, a county courthouse cafeteria. Then more foods were identified, like peanut butter crackers, and granola bars, and other snacks that were ultimately linked to PCA and their peanut paste. Throughout January and February, the Food and Drug Administration began what is still one of the largest recalls in the United States. The mystery continued to unravel, and epidemiology friends throughout the country called and emailed us about their findings. Over 700 cases of salmonella were linked to this outbreak from 46 states with nine deaths, three of which occurred in Minnesota. Over 3000 products were pulled off shelves and from institutional sales.

“And further investigation by FDA identified cover ups by the company, including memos instructing the sale and distribution of peanuts that were known to be contaminated. They knew, and they covered it up. The criminal investigation ensued, and PCA declared bankruptcy in February of 2009. The financial

damage to the peanut industry has been estimated to be more than \$1 billion, and then executives from PCA were indicted on criminal charges. The former president of PCA received the largest criminal sentence in a food safety case in U.S. history, and two others were charged for their criminal actions. We ultimately found the threads that unraveled this mystery.

“We hope we saved lives. We tried our best to be first and right. And much of the work from this outbreak shaped my career. I've talked with countless groups about outbreak investigations and how to conduct them, how to be a disease detective, and how to have a career in public health. And then a pandemic happened. The COVID-19 pandemic changed the landscape of public health in a way that will cause aftereffects for years. Politics, risk communication, and disease transmission all intertwined in a time and a space where there were no clear answers. Being first did not always mean being right, and communication was extraordinarily difficult. There were needs to understand what the public can do, what they should do, and what will actually make a difference. How do these things affect mental health? How do they affect the economy? Public Health practitioners have not always worked across all aspects of society, and the pandemic demanded that breadth and as well as a depth of knowledge that didn't exist about a disease, we were very uncertain about.

“There is hope for the future of public health, but there is work to be done. We have to be honest about our flaws. We have to understand our role and how we interact with politicians, and the public, and scientists, across the board. Public health has long been the stalwart defending population health, and we can do this again. But we have been turned upside down. We cannot make blanket statements about trusting the science. We must have real discussions about the science that we know and that we don't know. Questions are okay. Talking to your neighbor and listening is important. We have to bring people together instead of pushing them apart. And once we break down some of that polarization, public health will shine again.

“The future is hopeful, and we have to hang on to that hope.

“Thank you.”

[applause]

Sara Vetter: “Thank you so much, Steph. Your talk reminded me of a point I often give on our tours. Is that sometimes, like when the news cycle is slow, they like, find things. And, um, sometimes they publish that the Minnesota Department of Health, Minnesota has a high number of foodborne outbreaks. Um, and the truth is just, we find them all. [laughter] It's not that like, our food here is unsafe, it's not like you shouldn't be, you shouldn't be afraid to eat Cantaloupe, though some of us don't. It's just that we find it, and that's just the incredible work that goes into always being first and right. And we do it again and again.

“And also, I mean, COVID still triggers me a little bit. There's a lot of us veterans at the health department that have been through it, and it's been amazing to live through this experience and to be at the before and now to be at the after and just see, you know, how we've changed and how we've grown, and how we're still healing.

“But...hope. I think a lot of us still have hope, and that's what keeps us here.”