CDC Ebola Response Oral History Project

The Reminiscences of

Carol Rao

David J. Sencer CDC Museum

Centers for Disease Control and Prevention

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Carol Rao

Interviewed by Samuel Robson
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Interview 1 of 1

CDC Ebola Response Oral History Project

Q: This is Sam Robson here with Dr. Carol Rao. Today is Friday, October 21st, 2016, and we're here in the audio recording studio at CDC's [United States Centers for Disease Control and Prevention] Roybal Campus in Atlanta, Georgia. I'm interviewing Carol today as part of our CDC Ebola Response Oral History Project. Dr. Rao, thank you so much for being here with me. The first thing I ask people is, can you tell me—actually, can you say the sentence, "My name is," and then pronounce your full name?

Rao: My name is Carol Rao.

Q: Thank you. And can you tell me what your current position is with CDC?

Rao: I currently work at the Center for Global Health in the Division of Global Health Protection, in the Epi [Epidemiology], Informatics, Surveillance, and Laboratory Branch, and the program that we are mostly working with is called the Global Disease Detection, GDD program. I'm an epidemiologist. Currently, though, I have been working on the Zika outbreak for the past seven months, eight months, and I'm currently the USAID [United States Agency for International Development] liaison for Zika, so I spend part of my time in [Washington] DC now.

Q: Thank you. If you were to summarize your experience with the Ebola response in just a few sentences, what would you say?

Rao: Hmm. A few sentences. I would say that it—I don't know. [laughs]

Q: Sure. Just a description of what, of your role or whatever.

Rao: Of my role, oh, okay, of my role. I participated in the response two times. The first time was working on infection control in Sierra Leone. The second time was to work on STRIVE, which was the Sierra Leone Trial to Introduce a Vaccine against Ebola. So I worked on a clinical trial, which was the first time I'd ever done anything like that.

Q: Thank you for that. Now we're going to back up and do your little life review, if that's cool.

Rao: Okay, [laughs] okay.

Q: Can you tell me when and where you were born?

Rao: I was born in 1970 in New York City, in Queens. In New York.

Q: Right. [laughter] Did you grow up in New York?

Rao: I spent the first couple of years there and then my parents decided, after they had a couple of kids, that they needed to be somewhere that was not so urban, so we ended up in New Jersey. I grew up in New Jersey. Born in New York, raised in New Jersey.

Q: Where in New Jersey?

Rao: In a small town called Freehold, that is near—that is in Monmouth County.

Q: What's it like there?

Rao: It's very suburban. I don't know if I can say—it's very white. At the time that I grew up it was very white, and I'm Chinese American, first generation. But schools were good, it was safe. It was a very quiet life.

Q: What kinds of things were you interested in as a kid?

Rao: As a kid? Reading. I liked to read a lot.

Q: What did you like to read?

Rao: Anything. Anything I'd get my hands on. That's what my mom said. My mom said, when I was in first or second grade, at like the mid-year—I think it might have been first

grade—at the mid-year parent-teacher conference, the teacher said, "Carol has read every book in this room already." I really loved to read. I like animals. I watch a lot of TV, too. I love TV and movies. [laughs]

Q: Did you have favorites like growing up?

Rao: Growing up? Mostly action. I still love action movies.

Q: Cool. What did your parents do?

Rao: My dad is an electrical engineer and he worked for the Port Authority of New York and New Jersey. He was an engineer that worked on the subways, the tunnels between New York and New Jersey. My mom was a housewife, so she stayed at home, but she always did something and worked at home to make a little bit of money, especially when they were early in their marriage.

Q: Can you just tell me more about transitioning from what I assume was a diverse neighborhood in Queens to white New Jersey?

Rao: I don't remember it at all. At all. Because I was so little at the time. I think I might have been two when we did the move. But I think it was difficult for my parents, very difficult. My mom, her English wasn't very good at that time. It was just difficult for them to integrate, especially my mom, who's a stay-at-home mom. But she tried really

hard, and I think—the thing that I love about my mom is she tried to give us the American experience. We had these weird things where she would try and give us this American experience, but there would be like some Asian bent to it. But she made sure that we loved hot dogs and hamburgers, and we would have barbecues, but with like Chinese sides. Macaroni and cheese, peanut butter and jelly, chocolate chip cookies, all these things she learned how to make because she wanted to give us the American experience.

Q: Wow. And what was it like in school?

Rao: Funny you should ask. School, I don't remember it being anything bad. But my mom had a different experience, I think, from me. I'm the oldest, so I was the first one to go. My sister's a year younger than me. I remember when I graduated from grad [graduate] school with my doctorate, on that day—so I graduated from Harvard [University], and she said, "I wish"—on that day, my graduation day, she said, "I wish your first-grade teacher could see you now." I was like, "Why?" She said, "Your first-grade teacher thought you were retarded." I said, "How do I not know this story?" [laughs] She said yeah, so apparently because I was—we didn't have a lot of friends outside. I was, from basically zero to six, five or six—I was always at home with my mom, who spoke to me in Chinese. I didn't know much English when I went to school. She went in and she told the teacher that I was not retarded, I just didn't understand English. The teacher at that time said, "Well, I have twenty other students. I cannot spend extra time with her. I have to put her in special education." So my mother went to the

principal and said, “Please do not ruin Carol’s career, or Carol’s life. If you put this tag on her, it will be very hard for her to succeed in school.” The promise that the principal got out of my mother was that they would never speak to me in Chinese again when in the home. That I would start watching TV [television] like Sesame Street and at that time Electric Company and things like that, and that I would have to attend summer school.

My parents did all of that. I attended summer school, and I remember when I went to summer—I could not, I did not know why I was going to summer school. I did not understand it. Of course, at that time, like I said, my mom said I had read all the books, because you know, I’m not retarded, [laughs] right? I’m in summer school, I can’t figure out why I’m there. Everything’s pretty easy for me. I think within a couple of weeks they moved me to the second grade summer school, because I was too advanced for the first grade [laughs] summer school, so they already moved me up. I just remember asking my mom, “I graduated from high school, I have a bachelor’s, I have a master’s, and you wait until my doctorate to tell me this story? Did you just want to make sure I wasn’t retarded?” [laughs] But I don’t know why she never told me that story before. She thought she had. But the thing, the other thing was, my mom’s English at that time still wasn’t very good and she was a stay-at-home mom, she didn’t have much interaction with outsiders. And because of who she is and the way that she loves her children, she went to school and went to bat for me and I think that’s pretty amazing.

Q: That’s really incredible. And to sacrifice speaking in your native tongue with your child at home—

Rao: And you know what? This was in the seventies, in New Jersey, where there were not that many immigrants in that area. I remember—this is also when the Vietnamese boat people started coming and across the street, a Vietnamese family bought a house. And the police were often called on them because there were too many people living in the house. One time, when my mom's sister, my aunt, moved in—they moved over from Thailand. They were Taiwanese, moved to Thailand, and then came over. They stayed at our house for a couple of months, the family, until they bought their own place. The police were called on us. Because we live in a single—we live in an area zoned for single families, and we were the only minorities in the neighborhood.

Q: Yeah. Highly visible to the community at large.

Rao: Yes. And a bunch of you know, yellow people running around the neighborhood. [laughs]

Q: So growing up, as you get older, were there subjects in school that you found yourself attracted to?

Rao: I was particularly attracted to and particularly good at sciences, any of the sciences: chemistry, math, biology, physics. That also led to the things I was interested in, in college.

Q: Right. And then what, tell me about college.

Rao: I went to school at UC Berkeley [University of California, Berkeley], so I went from this very white area, very suburban area to this very urban area that was like not even, I think by the time I left, by the time I graduated Berkeley there was no majority at Berkeley anymore. Caucasians were less than fifty percent. Basically, it was so diverse. People I—ethnicities I had never met before. You're going to think this is very strange, but even people—like, we didn't have very many divorced families in New Jersey at the time. I met people, I met children of divorced people. You're going to think I'm weird, but—

Q: No I won't.

Rao: Children of divorced people, I went, oh, you're so normal. [laughter] Because my impression was children of divorced people, in divorced couples, were a little—you know, not well adjusted. I met people that were perfectly normal. Gay people, straight people, Africans, African Americans, Hispanics. I think when I left Berkeley, I don't know if I had any white friends. [laughs] I mean, that's how diverse it was. It really changed who I was, after four years at Berkeley.

Q: Wow. What were you studying there?

Rao: I was studying biophysics, and the thing that I found out after—biophysics is very theoretical, and I do not want to do theoretical science. I do not want to study one gene from one thing for my entire career. That's what made me decide that I want to do something very applied. So I ended up in public health.

Q: Was it pretty quickly after college that you ended up—

Rao: I went straight through. I went bachelors, master's, doctorate. I never took a break.

Q: Wow. Where'd you get the, was it bachelor's to MPH [master of public health]?

Rao: To a master's in industrial hygiene.

Q: Oh, industrial hygiene.

Rao: Which was probably the most applied science there is.

Q: Can you tell me about that? What was the master's like? What did you—did you have a thesis?

Rao: We didn't have a thesis. I did my master's also at Harvard School of Public Health. It was unusual for me to get accepted because they tend to—because it's so applied, they tend to like people to have a little bit of experience and then go into that master's

program. But somehow, they liked what I wrote in my application, so they accepted me. There was no thesis, but it was very much applied, so we would go out to foundries and other manufacturing sites to evaluate worker exposure.

Q: Yeah. A very ground-level—

Rao: Very, very hands-on, yeah. It's probably one of the most hands-on applied sciences in public health.

Q: Did you find at that time that that was satisfying to you?

Rao: I loved it. I love working with people. I loved talking to people. I love being in the field. Then at that time, I feel like I've been very lucky to meet certain people in my life. I never would have applied to Harvard for a master's for this program if it weren't for one of the—one of the people I was doing research with as a student. I was talking to her about graduating, I didn't know what to do, and she had just finished a postdoc at Harvard School of Public Health, had come to Berkeley to be on faculty. She's like, "I really think you would enjoy public health and you should apply to Harvard." I'm like, "I'm never going to get into Harvard," [laughs] she's like, "You should just apply," and so I did. During that time I took a class on environmental microbiology that I really liked. Got on well with the professor. She's like, "You should apply for the doctoral program." "I'm never going to get into the doctoral program." [laughter] So I got in and yeah. After several years, got my doctorate with her.

Q: Wow. So you had a dissertation, though.

Rao: For the doctoral program, yes. My dissertation was looking at environmental molds and mold exposures in indoor environments and potential health effects from such exposure. At the time, this is in the mid to late nineties, this was a very hot topic about potential mycotoxins and people having lung issues, breathing, toxic responses to molds. That's what my dissertation was on.

Q: I wasn't aware it was such a hot topic in the nineties.

Rao: Mm-hmm.

Q: Why?

Rao: If you look back on CDC's history, you will see, yes.

Q: Okay, listeners, look back at the history, because that sounds fascinating.

Rao: It's something with a particular mold that I did my doctoral thesis on, what's called *Stachybotrys chartarum*, and there was a field investigation that CDC conducted that looked at a family that lived in a house in Chicago. The father had these strange

neurological outcomes, and they attributed it to this toxic mold that was growing in their house. This is when —I don't know if you know about mold remediation nowadays.

Q: Not a lot.

Rao: Have you heard anything about that? When there's a moldy house now, you can't just clean up the mold. It's almost like you have to do a full remediation and close everything off because of this toxic mold. And when you sell a house, any mold damage is reportable. This all started back in the nineties. That's what I did my doctoral thesis on, was, was there really a relationship? Trying to determine whether or not there was a relationship or an association between mold exposure in indoor environments and a toxic response.

Q: What did you find?

Rao: I did my studies, I did my work with animals. I exposed animals to the mold, and it does look like that at high doses, that there is a toxic effect in the lungs of animals. But whether or not that toxic, high-level toxic dose could ever be achieved by a human in a living environment breathing is something different. Because what I did was I actually took the mold spores and inserted it into the rat lung. High, high doses. When we calculated, it was highly unlikely that any human could inhale that amount.

Q: Does that mean that there's kind of a culture-wide overreaction to some of this?

Rao: That's what we really believed, that there was overreaction. The one thing I do have to say about mold, that there are people who are sensitive. Just like, why are some people allergic to pets and some people not? Why do some people walk into a house with a cat and immediately have a reaction? Some people are sensitive. I think that that's probably the same with molds. But whether or not this mold was causing pulmonary hemorrhaging and babies dying, because that's what people were saying, that babies were dying from being exposed to these molds in their houses.

Q: Okay, that's all fascinating. What do you do after the doctorate?

Rao: Then I went to work at the National Institute for Occupational Safety and Health. Well, actually, I take that back. I spent one year on a Fulbright. I had a Fulbright [Program] student fellowship and I basically did my postdoc [postdoctoral research] in Finland, in Kuopio, at their national public health institute in Kuopio, Finland, for one year.

Q: Were you studying similar kinds of things?

Rao: It's the same exact thing. I was studying the same mold exposures, but looking at allergic responses instead of toxic responses.

Q: How did you like Finland?

Rao: It was cold. [laughter] I did not live in Helsinki, I lived between Helsinki and the Arctic Circle in a little town called Kuopio. It was a very small town. I went from Boston, where Harvard is, to this incredibly small town in the middle of Finland. It was a great experience. I'd never been to Europe before, and I traveled overseas before, but only really to Taiwan, where my parents are from, or to Mexico, things like that. Really had not done much of any international work before that. A grad student the whole time. It was amazing. It was amazing to be in Finland. To work with a group that was so well known in this area of mold and indoor air quality.

Q: Wow. What happens then?

Rao: After that, I got a position working at the National Institute for Occupational Safety and Health. NIOSH, which is an institute within CDC—some people don't know that, [laughs] but NIOSH is an institute at CDC. I started that, and I was a health scientist, industrial hygienist working in Morgantown, West Virginia.

Q: You're in Morgantown.

Rao: Yes. People were like, I do not know how you will live in Morgantown, because I tend—so I went from a suburban area to very—then spent a majority of my adult life at that time in a very urban area, whether it be Berkeley or Boston, and I became a very urban type of person. The idea that I would be living in West Virginia was just

unthinkable to many of my friends. It was not an easy time for me, I think, to live in that area. Again, being where very few, very few minorities, and the minorities that they did know—this is where I got most of it, like, "Where did you learn to speak English so well?" And "Where are you from?" "New Jersey." "No, where are you really from?" "New Jersey." "Where were you born?" "New York." [laughter] I would get those types of things and people were like, "Let me introduce you to this person. I think you guys would hit it off really well." They would introduce me, just friends, just friends, and they would introduce me to the foreign exchange student that just came over from China. I'm like, I've never even been to China, [laughs] my Chinese is pretty much awful, and you think that I have more in common with this Chinese immigrant than I do with you. That was Morgantown.

Q: Wow. What was the work like?

Rao: The work at that—I found it interesting because I love to learn. Usually, when I start a new job, I love it because it's learning new systems, learning new things, learning even the way processes work. The first couple of years I had a great time, and I was hired to help set up their indoor air quality program. I had a team under me, and it was my first job. I think if I'd gone in now, what I know now, I would probably have done it a little differently, but I also felt like I had something to prove because I was a woman in a primarily male field. Industrial hygienists tend to be generally male.

Q: How did that affect your work?

Rao: I just had to—I felt like I just had to prove myself over and over, and especially against—not against, but with industrial hygienists that had been working for NIOSH for ten, fifteen years with a master's. Now I come in with my doctorate, and I'm a woman, and I'm a minority. It took a little getting used to, I think, on everybody's part.

Q: Gotcha. Wow. Sorry, I keep saying, I've got to stop saying "wow" after everything [laughter] but I'm very much enjoying this interview. Apologies. How long are you in Morgantown?

Rao: I was there for five years. I did not think I was going to last that long, and I think what happened was time goes by, time goes by really fast, and setting up this program and traveling, and so the next thing I know, three or four years have gone by and the program's now running. And then I start thinking, I don't think I want to do this anymore. I've noticed this about myself: about every three to five years, I just don't want to do the same-old, same-old. If you tell me that I have to run the same protocol in just a new site, this is the most boring thing. I can't do this again.

At that time, I started looking at new things. The other thing that happened was we would do interviews like this, and I would interview patients or people that were having—experiencing indoor air quality symptoms. I was like, if I have to listen to another person tell me about how their eyes itch when they enter this building and how they think it's because it's the building's fault and they can't function—these are all office workers,

right. I'm like, I don't, I can't do this anymore. I could barely keep my eyes open when they're telling me. I can barely keep my eyes from rolling. People are dying in this world and there's serious, serious issues. Not that indoor air quality is not a serious issue, but I just—I just didn't want to do it anymore.

I worked in molds, so the other [side of] the coin of molds, including allergic and toxic response, is also infectious. I had always had a little bit of interest in infectious diseases. But cracking infectious diseases at CDC, getting into here, getting into infectious diseases is very difficult. What I decided to do was I actually joined EIS [Epidemic Intelligence Service] after that. I did it a little bit backwards. Instead of joining EIS first and then going to NIOSH or doing whatever, I quit my permanent FTE [full time equivalent position] at NIOSH in order to join EIS, to basically do the switch into infectious diseases.

Q: Right. Where did you land in EIS?

Rao: I landed in mycotics, which is the infectious portion, the infectious part of mold. So I knew the bug. I knew the pathogen, but I didn't know anything about the outcome. That's what I really learned when I was with mycotics, is how to do investigation, how to do outbreaks, how to do infectious disease outbreaks. I spent a lot of time doing hospital infection control because a lot of mold infections tend to be with immunocompromised patients, especially environmental mold. We're not talking about *Candida* and things like that, but we're talking about environmental molds that people get lung infections or skin

infections or surgical site infections. They tend to be more environmental, which is also perfect for me, because that's what I had done. I'd done environmental assessments for molds. So it was really a good match for me. I only needed to learn half of the stuff. I didn't need to learn the molds because I already knew, I'd basically spent my doctorate and all my time the past ten years studying molds, but now I could spend two years studying the outcome and the infection.

Q: Wow. [pauses] I did it again. I apologize. [laughter] So you enjoyed it.

Rao: I loved EIS. First, I think it was a little difficult for EIS, like my EIS supervisor and me because when I was at NIOSH, I was in charge of a program, I was in charge of staff, I was in charge of a budget. I was actually surprised that they accepted me into EIS. Because I'm pretty experienced. Most EIS officers are generally straight out of residency or straight out of a doctoral program. Very few people have the experience that—I supervised EIS officers when I was at NIOSH. [laughs] Afterwards, I asked the EIS office, why did they accept me? Because I was so much more experienced, and I think they felt like with my personality, and during my interview, that I came across as a classic EIS officer. I guess I was persuasive enough to say that doing this change was like I was doing a new program or a new degree, that I had never done infectious disease before. It was just something new. So they accepted me.

Q: What happens after that?

Rao: For my EIS supervisor, who also is very used to supervising people straight out of residency, no CDC experience, we just had to come to some agreement and level of comfort. But in the end, I think we got along very well. In the end, he respected what I brought and I respected so much what he was able to teach me, and so everything worked out fine.

Q: Yeah, I can imagine—no, I don't need to dig into that. So, do you stay with mycotics afterwards?

Rao: No. There was no position in mycotics after that, so I ended up going to the Division of Healthcare Quality Promotion, based on my infection control background, based on my occupational background, and apparently based on my ability to complete projects. Someone recommended me to somebody at DHQP, Division of Healthcare Quality Promotion. I started working on influenza, influenza exposure, and how to aerosolize influenza; to look at, like, survivability rate in the air. These are things that brought my master's, my doctorate, my NIOSH experience—also looking at healthcare worker influenza vaccination, helping set up a national surveillance system for that. It brought up all of my previous experiences into this job.

Q: Who did you work with?

Rao: I worked with Mike Bell, Michael Bell, who's now the deputy director of the division. He was great. He basically left me alone. I tend to do well when people leave

me alone. If I have a problem or a question, that I go ask them, and they have an open-door policy, and I can always ask for advice or guidance. But I tend not to do well with a lot of oversight and a lot of—now, anyway, with too much micromanaging, I tend not to do too well. [laughs]

Q: You seem like you have a pretty good idea of what's going on a lot of the time. [laughs] Can you tell me what year, what EIS year you were?

Rao: I was the class of 2005.

Q: Two thousand five. So DHQP in 2007.

Rao: Seven, to 2009, that's right.

Q: Two-thousand-nine?

Rao: Yeah. Two years, a little over two years at DHQP.

Q: Cool. What happens after that?

Rao: So, wait. I just want to go one back—

Q: Please do.

Rao: One thing back to DHQP was, the other thing —I have had such opportunities in my life, and I really appreciate what DHQP did for me, too, because I got a second Fulbright. I went as a Fulbright scholar. And because they were interested in building dynamics with infectious disease transmission. I got this Fulbright to go to Finland again to work with a different group, the building sciences group, to do research on building dynamics, like how air flow—this is around the time of SARS [severe acute respiratory syndrome]—well, this is after SARS. But about this idea about SARS and influenza, could building dynamics affect how these airborne pathogens were being transmitted? I went from mycotics, which was an airborne exposure, and that's how I got into this flu [influenza] thing, because they had at that point thought it might be an airborne exposure, also. Whether or not it's a fomite, you know, I touch my eyes and then we touch something together. But yeah, they allowed me to go for a couple of months to do the Fulbright Scholar Program in Finland. I really appreciated what they did for me.

Q: A different place in Finland?

Rao: A different place in Finland. This time I was in Helsinki. That was much better. [laughter] Much better.

Q: Back in the city.

Rao: Back in the city. Then after DHQP, I'm Chinese American, and I always had this interest in working in China. An opportunity presented itself. GDD, or at that time it was called the International Emerging Infections Program, had started up an office in China, and they were looking for an infectious disease epidemiologist that was partially going to work on infectious diseases, and half-time tuberculosis. The person that was looking for—that was doing the hiring was really looking for somebody with airborne, knowledge of airborne exposures of pathogens. My thing is not TB [tuberculosis], right. But apparently, when they saw my CV [curriculum vitae] come across their desk, they're like, this is the perfect person. Because I had industrial hygiene background, I have the hospital background. I have worker background, worker safety, because these are healthcare workers, so, respirators. I have all this background because I'm an industrial hygienist, and I've done mycotics and DHQP, I have all of this background. And I'm Chinese American. Even though they didn't know that my Chinese is so bad. [laughs] So yeah, I got hired, and I have to say, when I—I do this all the time. I talk to that new boss and I'm like, "Why did you hire me?" [laughs] I don't know why I do this, but I do this. I asked them, "Why did you hire me?" Because I know the other person, the last two people that were the finalists. The other person was a TB expert, done international TB, spent several years in that program, that was paying for half of this position in China. I said, "Why did you select me?" This is why I really appreciate Jay [K.] Varma. Jay Varma is also an infectious disease epidemiologist, MD [medical doctor], spent many years doing TB in Thailand. A TB expert. He's like, "I'm already a medical epidemiologist with a TB background. I don't need another me," which is what that person was. "I needed somebody to complement me." He just felt like my background as

a PhD, industrial hygienist, exposure assessment, healthcare worker safety, that I have the qualifications to say that I'm an infection control expert. That's why they hired me. I really appreciated his forethought in that. That he looked at his entire program and decided that he didn't need another med-epi [medical epidemiologist], that he needed somebody with my type of background.

Q: Did that end up being the case? Did you complement each other?

Rao: We complemented each other very well, yes. I became an infection control expert. I worked on HAIs [healthcare-associated infections], I started an HAI program in China with our office and with China CDC. After six years there—actually, what happens I think in these international settings is—so the group that you're working with, your partner has certain priorities and we have certain priorities. A lot of times, our priorities are what our backgrounds are. I'm not going to start a program of foodborne diseases because I know nothing about foodborne diseases, and I'm supposed to be there as a technical expert. Of course, I'm going to work on things and try and work on things that I'm the technical expert on, like infection control and healthcare-associated infections. After a couple of years, they started to say, healthcare infections are important, healthcare-associated infections, we need to start working on that. We need to start controlling that. We need to improve infection control. We've done a couple of projects to show that their infection rates among healthcare workers, latent TB infection rates among healthcare workers, were some of the highest ever reported. Also gathering little

bits of evidence that show them why it's important. By the time I left, HAIs are one of their most important programs that they want to work on.

Q: Was it, the first couple years, were they asking you to do foodborne kind of stuff? Or—

Rao: Luckily, we had—luckily, Jay was a foodborne person, so he started that program and he was doing that. I really focused on HAIs, tuberculosis and other types of infectious diseases, not foodborne because we had other epidemiologists that were working on that.

Q: Gotcha. You were there for five?

Rao: Six years.

Q: Six years.

Rao: I maxed out there. We're allowed six years in one location overseas.

Q: And it was Beijing?

Rao: It was Beijing, so I was in Beijing the entire time.

Q: How did you find Beijing?

Rao: I loved it. Because I'm a city person, right. One of the reasons I was able to—I'll say "survive" my time in Morgantown and agreed to go to Morgantown is Morgantown was a big city compared to Kuopio, Finland, where I was most recently, where I did my Fulbright student was in Kuopio, Finland. I come to Morgantown, I'm like, oh, this is great, and people speak English. [laughs] So I go to Morgantown, and then from Morgantown I go to Atlanta. I'm like oh, this is great, this is a big city. Then I go to Beijing and I'm like, this is the life I was meant to lead. [laughter] This is what I want, living in the capital of the most populous country on the planet and where—this was at a time in 2009 when it was like exponentially expanding because it was right after the Olympics. They'd done so much infrastructure building after the Olympics. They had basically made a name for themselves, trying to make a name for themselves to the world with the Olympics in 2008. It was just massive expansion, and I was there during that time. It was amazing. I loved my time in Beijing.

Q: You're there from, what is it, 2009 to 2014?

Rao: To 2015, end of 2015.

Q: Twenty-fifteen, end of 2015. Gotcha. Do you remember what you were working on immediately before you got involved in Ebola?

Rao: I don't. Because what happened was, we had a lot of transition in our office right before Ebola. Normally we have twelve US direct hires—so that's Americans, these are CDC people like me that are placed overseas—in Beijing, eleven. For about six months before Ebola, six to eight months, we had two [Americans]. I ended up being country director, GAP [Global AIDS Program] director, GDD director, DGHP [Division of Global Health Protection] director. I also didn't have a deputy, so I was doing deputy work. I didn't have time to do anything other than keep the office afloat for six months. For six months or more. We also had a non-communicable diseases section that their lead also had left. We had a fifty-something-person office with two US direct hires, and one of the US direct hires was an FETP [Field Epidemiology Training Program] advisor who was offsite at another building. So it was basically me, running this entire thing and making decisions, funding decisions and things. CDC did send TDYers [staff on temporary duty assignment] out, but—I don't know if you'd heard with Ebola—sending TDYers out for six to eight weeks, sometimes not all that helpful because it takes them a while to learn the program. And none of them spoke Chinese.

After that—you asked me what I did. I have no idea. All I did was I felt like going to meetings, talked to people. I would say to people, "You have five minutes." People, "I need to talk to you, Carol, I need to talk to you about this project." "You have five minutes." I got really good at firing off answers. Like, they'd tell me something, "This is what you're going to do." They tell me something, "This is what you're going to do." I got really good at that because I only had five minutes literally with each staff member that had a problem. Because I tend to be a problem solver. They would come to me and—

so I was very good at just making a decision and being done with it, make a decision and be done with it.

Q: Were you a little bit more distanced from the science still?

Rao: I was very distanced from the science. That's also a little bit the way that US-CDC and China CDC work together, compared to other sites. China does not like US government doing research on, experimenting on their people. We would collaborate, meaning that we would have meetings, we would talk about the science, we might or might not be involved with writing the protocol, and then they would implement it. Then we would go out and do site visits. We would monitor to see what the data looked like and how they were implementing the study, but we, ourselves, did not interact with any of the participants. We did not do any of the interviews. All we did was monitor and provide technical assistance. For China, we are always separate. We do not implement any studies in China because the Chinese government does not like that.

Q: What was your relationship like with China CDC people?

Rao: It was very strange because they don't normally have people that speak Chinese. As much as I say I spoke Chinese, I didn't really speak Chinese. [laughs] I didn't. The funny thing is, when I got the job I said I spoke Chinese. When I went to China I realized, I do not speak Chinese. The Chinese I speak is, "What's for dinner?" "It's time for your homework now." Things like that. I don't know the Chinese word for "evaluation" and

"cooperative agreement" and "tuberculosis," [laughs] I don't know any of those Chinese words.

A little digression now. I remember one of the first meetings I had, and I was convinced that my Chinese was actually okay. We're sitting through this hour-long meeting and they're saying, "When we do X, this is what's going to happen. X should do this. X is this, and we can't complete X until Y is done." I go, I have no idea what X is. Finally, I turn to one of my locally-engaged staff and I said, "What is X?" and they're like, "Evaluation," and I'm like, oh, now I understand this entire meeting. [laughter] I mean, I understand all the words in between, but you don't understand that one technical term. I sat through like twenty minutes of this meeting not knowing what was going on. [laughs] The expectation of me I think was slightly higher. Like I would speak Chinese, again I got, "Why are you retarded?" [laughs]

Q: Back to this, huh?

Rao: I can't read. I'm illiterate, right? Because I don't know how to read Chinese characters. I would get handed a menu and I'd ask, "Can I have an English"—I would ask in Chinese—"Can I have an English menu?" Or I would say, if it's a small place, "I can't read this. What is there good to eat?" They're like, "What do you mean you can't read this?" I can see them on their eyes, like in their face, are you retarded? [laughs] I can't read, I can't read. But I think because I had my parents, my accent was quite good. They just thought that maybe I was from the South or maybe I was from Guangzhou or

something, I didn't have a Beijing accent, but they all assumed I was a native Chinese speaker. I think that was very weird for them. Then also when I would sit in meetings with China CDC, they would have their sidebars, and usually, in the very beginning, I could hear them point to me and say, "She understands Chinese." So don't say anything too bad. [laughter]

Working with China CDC was good. China, China is an amazing country, I'll have to say. I think the way that they grew up or the way that they were, that their country grew, they just had different values than some of the other countries that we normally work in, such as in Africa. They're very target-driven. One time we did this project and I said, "Our sample size enrollment is five hundred. How many people do you have in this"—no, I think I said seven hundred. I said, "I target seven hundred," because they told me that they have about seven hundred healthcare workers in this one city. I'm like, "Okay, our target's going to be about seven hundred." We're trying to do a cohort study. Then, when we go back to do the evaluation or to do the monitoring, I see they have seven hundred, and then I see that they actually enrolled in two cities, like the adjacent city. I go, "Why did you pick that city? I thought we were just going to do it in this one, City One. Why did you pick City Two?" "Well, you said that the sample size was seven hundred and we only had five hundred in City One, so we had to go to City Two." I said, "I wish you had talked to me because the reason why I picked seven hundred was not because of any special number, it's because I had needed a number for the protocol and you told me there were seven hundred in City One. [laughs] And now that you've gone to City Two, you've enrolled thirty percent of City Two in a non-random manner. So now I

don't know what to do with these two hundred extra people." They're like, "Oh. But look, the rate in this city is higher than this city." "But you have a hundred percent of City One and thirty percent of City Two, that was selected in a non-random way." Trying to explain these things to them. This is the level that I was trying to explain, the level of interpretation of their data. Because they met the target. As far as they're concerned, they met the target. And they're very good at doing the tables, like help with the demographics. But when it came to interpreting the data and what it meant, I think that was much more difficult for them.

Q: That's interesting that that was kind of widespread.

Rao: Yes. Because they're used to—their government sets this decree that they need to do, for example, they need to vaccinate sixty percent of their population. They'll meet it. But sixty percent's it. If they need to fudge the denominator, they will fudge it. [laughs] It's because they'll get punished if they don't. They work very much on a punishment system and you could even see that. We'd be in a meeting and well, why didn't you reach the target? You should have reached the target. I'm like hey, let's discuss why the target wasn't reached. Was it because there was not enough people in the city? If there's not enough people in the city, there's not enough people in the city. You know? That's okay. We routinely would get eighty, no, over ninety percent participation rate in our voluntary surveys. Do you know in general what a good epi study can get is usually about fifty to sixty percent.

Q: Oh my goodness.

Rao: We routinely got ninety-five percent participation rate, in voluntary. Not "involuntary." For voluntary studies.

[break]

Q: How did you get involved in Ebola?

Rao: Ebola started, and we started hearing about all these cases in the summer of 2014. I know that part of Ebola is always infection control, and I've always been interested in infectious diseases and in outbreaks and in Ebola, because so much of Ebola is also healthcare worker transmission. Every time I would volunteer for Ebola before, it had always been generally a very small outbreak. They would only send maybe two or three or four people out as a team, and a lot of them were lab [laboratory] people, so they wouldn't send very many epis [epidemiologists]. Viral Special Pathogens [Branch] tended to send out a big lab team, and maybe two epis.

Q: You had done Ebola before?

Rao: I'd never done Ebola before. But I had a friend who after EIS was in that group, and when there was an Ebola outbreak, I would beg her, can I go? Can I go? And then I went to China. They're not going to deploy me from China. So when I heard about this

outbreak again, like this is—I would really love to do this, but I'm in China. They don't deploy people from China to Africa, or from these international sites that CDC sets up. It's very expensive for them to send me to China. They're not going to send me somewhere else when they should just pull somebody from Atlanta.

But then in August, Dr. [Thomas R.] Frieden had—WHO [World Health Organization] declared this as a public health emergency of international concern. Dr. Frieden came out and said, we are going to put all of our resources to try and control this. It was a massive undertaking by CDC, where they did start pulling from everywhere, from chronic diseases, from international settings. At that time, by that summer in September, the country director, the deputy country director, the GAP director, the flu assignee all arrived in-country. I basically handed over the reins and said, I am out of here, [laughs] and I volunteered. I said, I have carried this office for eight months. I deserve to go. [laughs] "I deserve to go on this outbreak." That's literally what I said. "I deserve to go on this outbreak."

Q: Not that it's a vacation or anything.

Rao: I know. [laughs] But yes. The country director agreed that I deserved to go, and I put my name in, I volunteered. Within a day or two I think, I got an email saying, we would love to have Carol on the infection control team for Sierra Leone. I thought I was volunteering for Liberia, and I ended up being picked up for Sierra Leone within a day for infection control. Because they knew my background. I think somebody on the group

was actually working at DHQP at the time, so they knew who I was. I think two weeks, I was out, I was already out there.

I remember trying to get all my clearances and everything in order for this. They gave you instructions to get your will in order and to talk to people about what would happen if something really awful happens. Got all my vaccines, and I remember, I had to get a Chinese vaccine. If you know much about China, there are food and drug safety issues. There's quality control issues. I try not to eat too much Chinese things. I try not to take too many Chinese drugs. Certainly, I do not like to take Chinese vaccines. But I really had no choice. I had to take the yellow fever vaccine.

It was very different getting the vaccine in China versus getting the vaccine here. Here, they talk to you about it, they talk to you about the side effects. You get that sheet. There's all this consent, all this explanation. I don't even want that stuff. There, they literally like pulled my arm through a window, gave me the shot and told me to go away. [laughs]

Q: Really? Like you didn't actually sit next to them?

Rao: No. It was like, it's like this. There's a window. I put my arm on the thing. She literally pulls it through the—and like they're, okay, I'm done. Yeah. That's it. I didn't get sick, so [laughs]—

Q: Good. Maybe it worked.

Rao: I was a little concerned because I'd also seen with our previous work, I was concerned about needle reuse, syringe reuse, multi-vial dosage, all this stuff. Because I do infection control at hospitals. [laughs]

Q: You know a little too much.

Rao: I know, [laughs] I know. I did see her open all the new things, and it was a single dose vial. I'm like, okay. I saw her crack the vial, so I'm like, okay. I'm just going to have to accept that I'm not going to get yellow fever from this vaccine. [laughter] Then I ended up going.

Q: Tell me about like arriving in country and what all that was like.

Rao: Wait. Okay, I'm sorry. I've got to go back to one more thing that's really funny.

Q: Please do.

Rao: When I was preparing for all this stuff, I'd also decided not to tell my parents. Because I have Chinese parents who partially do not understand the work that I do and also would not appreciate why I would be going to this country. Why would I volunteer? Why would I put myself at risk? Why would I do this to help people I don't even know? I

should need to protect myself, and all these things. I decided not to tell my parents, but I did tell my sister. In case anything did happen to me, I wanted her to know where I was. I sent her my will and all these things like where my bank accounts were, everything, like who was paying my mortgage, everything. So she would know.

Q: And she didn't spill the word.

Rao: She did not spill for the longest time. People ask, how did you get away with not telling your parents for so long? It's like, I live in China, they live in the United States. We're already on a twelve-to-fifteen-hour time difference. It's not like I talk to them every day. I send them emails, I send them texts, one a day. Sometimes I send them pictures of things. But I actually don't talk to them too much on the phone anymore. Just because of the time difference. They're used to not hearing from me for months on end, on a phone. But there was apparently at some point where my sister just—they said, "We haven't heard from Carol in a while," and so [my sister] did just have to tell. I could have called from Sierra Leone, too, but when you're working that long, I just want to go to sleep. I actually didn't call them from Sierra Leone at all.

Q: What date did you deploy?

Rao: I deployed in late September of 2014. I can't remember the exact date, but I think it was either the third or the fourth week of September.

Q: What did you believe you were going to do?

Rao: I knew I was going to do infection control, but I wasn't clear what it was. I wasn't clear, was it working with the Ebola care units or things like that? All I knew it was infection control and training healthcare workers. I had to go from Germany to Belgium, yes, Germany to Belgium to Sierra Leone. I got food poisoning when I did the stopover in—I think Germany or Belgium, I had a one-night stopover and I got food poisoning. I was vomiting and I felt so sick. I didn't know if I was going to make it on the plane. But at that time, they were already—Sierra Leone was already doing temperature checks of people entering the country, because people are entering from Liberia and Guinea. I did not want to be caught with a fever and vomiting [laughs] going through. I just took some Tylenol and they said, "Please report yourself if you have these symptoms." But I know I don't have Ebola, right? I just like, I've just got to make it through, I'm just going to make it through. So yes, no problem, made it through.

Q: Once you get there, what happens?

Rao: We get on this—you've probably heard this from other people about getting on this boat in the middle of the night and not—it's like, alright, we'll get on this boat, this jam-packed boat with all of our luggage, there are like a gazillion people, and they hand me this old life vest that doesn't tie or anything like that, and it's pitch dark. I'm like, this is not a good sign. If something happens to this boat, I'm dead, I'm going to die. [laughs]

Q: Do you have a debriefing that first day? Or is it the next day?

Rao: We have a de—I think we have a briefing—do we even have a briefing? Because I was one of the first groups there, there was always—since I think the outbreak had started, there was always a couple of people there, the way that Viral Special Pathogens always does these type of outbreaks. But I was in the first slew of people that went over, that was a big group. I think there were maybe like ten people on our team, was there with the lab team. We didn't get it [a briefing]. It wasn't very organized at that time. It was still like, I would say "cowboy time," and you just came in, it was amazing. There was no bureaucracy. You wanted something, you went out and did it. You bought it, you got reimbursed. You needed a car, you just went out and got it, you didn't need to reserve anything. It was like, you just did whatever you want, wherever you want, almost. We were told not to go into Ebola holding centers. We were told never to go into there. If it needed to be done, it needed to be done. It was really great.

Q: Wow. Tell me about your work.

Rao: The first time I went, at that time I was working on infection control in peripheral healthcare units. This is different than an Ebola care unit. Like I said, when I came in, it wasn't clear where I was working. But CDC had set up a project with UNICEF and a consortium of NGOs [nongovernmental organizations] in Sierra Leone. NGOs have been in Sierra Leone doing health and water sanitation, all of these things, for many, many years. CDC did not have any presence in Sierra Leone when the outbreak started. All

these disparate NGOs around the country banded together to form a consortium to work on Ebola. NGOs tended to concentrate in certain areas. They had good coverage of the entire country because even though—I can't remember if there's thirteen provinces. Like, an NGO would have these two provinces, an NGO would have these three provinces. The goal would be to train healthcare workers at these peripheral healthcare units. These are not major hospitals. They're not trauma centers. They're not anything like that. They're local healthcare facilities. Somebody has a cold, they would go in, see not even a doctor but a community healthcare worker. Or it would be where they would go get their childhood vaccines. Or where they would go to give birth. It's not really—not that Sierra Leone had high-level hospitals, but it's like a local clinic. It's like a village clinic. But you know, if you think, if you start having symptoms of Ebola and you can't get to an Ebola care center to get tested or things like that, where do you go? You think you might have malaria. You maybe have some food poisoning. You wanted to go and get some Tylenol or whatever, and you go to these peripheral healthcare units.

These are people—these healthcare workers had no training at all. No PPE [personal protective equipment], nothing on how to protect themselves from a suspect Ebola case. Not even how to identify suspect Ebola cases. The goal was to do this training in a short period of time among all peripheral healthcare units—I think there were like thirteen hundred in the country—in a short period of time. The way that this is planned was that CDC would be the technical expertise and design the training, and we did a master-level training in Freetown of the NGOs and their staff and also of the national Ministry of Health [and Sanitation]. That would be the master trainer. We trained the master trainers,

and the master trainers went to each of the provinces to train the provinces, the province ministries of health or their local health department, and then those local health departments trained all of their peripheral healthcare units. I think when we started, we did the training in like early October. By the time I went back, when I went back the second time in January, all of the healthcare workers, all of the PHUs [peripheral healthcare units] had been trained by then. The huge advantage was we had the technical expertise of CDC, we had the reach of the NGOs and the commitment of the NGOs, and they'd been used to doing training. They do lots of training, and they work with it, and because they do a lot of health, they also knew a lot of these peripheral healthcare units already. They'd already done a lot of work with them, so they had personal connections with them. And then UNICEF, also. UNICEF did all the procurement of the PPE. What good is teaching somebody how to wear PPE if they don't have any PPE? We got them gloves, masks, gowns—"we" meaning UNICEF. They did all the procurement and all the distribution throughout the country. Yeah. I felt like it was an amazing project.

Q: Wow. Were you involved in designing the program?

Rao: I was not involved with designing the training. When I got there, there was a team already out there that did the major designing of the training. When I got out there, within a couple of days we did the training. The advantage that I had, though, was I was actually the only one with infection control experience on the team [laughs] and so they would ask me things. They were told, okay, this is the way you need—for example, this is the way you need to remove your glove. Okay. I could tell them why you need to remove it

that way. This is the way you wear the mask, and I would tell them, this is why you have to wear the mask this way, and what you're doing now is wrong. Things like that. I had the expertise, I could support the infection control training.

Q: Aha. Because otherwise it's just a command, and if you don't know why, you're maybe less likely to follow through.

Rao: That's right. It's very important for me, and this is what we went through all the time, was to teach people why they're doing it. Because if they don't understand why they're doing it, then they're most likely not going to do it. They'll be like, oh, I don't need to do this. If they understand why, then most likely they'll do it and then they can teach it further on.

When I came on, I traversed two teams. There was a team that went out that did the training, then it was me, and then another team came out. It was me traversing the two teams.

One of the other things we had committed to was for the provincial-level training, that we would send a technical expert out. Someone CDC to do oversight, to basically do what I did for the master training. You have the national Ministry of Health, you have the NGOs, but none of them are health experts in infection control. So we committed to sending a CDCer out to do it. I spent a portion of my time training our new staff coming in, because they're also not infection control people. EIS officers or whatever. They do

foodborne, but they're not hospital infection control, so I'm training them. I've got to tell you this story. [laughs]

Q: Please do.

Rao: Very smart people. I'm training them on this thing that we've already done. We've already trained the national-level people, and now I'm training these people [CDC experts] to go out into the field to support what we've already done. We've printed everything, thousands and thousands of materials, like flip books, job aids, all this stuff, and—

Q: These are CDCers?

Rao: What?

Q: And these are CDCers?

Rao: These are CDCers, have come out on this new crop of people coming out that will support this project. I don't know if you know much about what happened back here, too, but there was a training, they did an infection control training down out in Anniston, which was more for Ebola care units. They trained, but a lot of CDCers went to that training also. I would say, for example, when we want them to practice their handwashing at this training, we just need them to pretend that there's water in this

bucket and that they need to do it for their—I think it was twenty seconds or something. Everything was a little bit pretend. The guy that just came from Atlanta that went to that Anniston training said, "Why can't we use real water?" We're trying to get through fifty people of training. Not only that, this is not—we're in places that don't have running water. Where are we going to get the water? It means that somebody has to go to the well, get the water, bring it back. Or if there is a faucet, it's not in the facility, it is somewhere far away. He's like, "Well, we did that in Anniston." I'm like Anniston, you go to the bathroom. [laughs] It was so frustrating because these people that were trained at Anniston, but we're talking about America versus Sierra Leone and we're talking about a training facility. I don't know if you've been to the Anniston training facility—it's pretty modern. Versus a hut, [laughs] with no air conditioning and no running water. People are sweating. We're making them put on all these gowns and things that, yes.

And we didn't have enough. Because what was also happening was there was so much training going on, a lot of the PPE was being used for training, and so they didn't have enough for people that were actually caring for Ebola patients. They were all used for this training, because we wanted to actually physically learn how to do this. Right? When you tear off your gown, this is how you would want to do it. You need practice. Everything, taking off gloves right, you need practice. That was part of the issue, that we didn't have enough. So people had to practice, pretend. Sometimes they had to share, like okay, I'm going to do this. Now you put it on and you try taking it off. All this stuff because we had limited PPE for practice.

Q: Sure. When you think about it, the places they're going to go do these trainings, will they have running water? Will they have all the supplies that they need?

Rao: No, they don't. No.

Q: So maybe it's better to practice without these things.

Rao: That's right. That's what I was trying to say. He just kept quizzing me. "Why are you recommending this? Why are you recommending this?" I said, "I did not design this program. I am just teaching you what it is for when you guys go out to do the technical assessment. If you are asked these questions, you can answer them. But I did not design this program. I agree, there are issues with this training." I remember saying, "But this train has left the station. This cannot be changed anymore. We have already done the master-level training. We are now doing provincial-level training. We've trained all of these NGOs. We've given them all of this equipment to do the training. It is too late." Then they finally quieted down. But it was literally an hour of quizzing me. "Why are we doing this? Why are we doing that?" Finally I'm like, "This train has left the station." [laughs] The funny thing is, the guy who was leading all of these questions, I heard him use that term in another meeting. [laughs] So. That's okay.

Q: It sank in.

Rao: You know, it's okay. In the end, we trained everybody we needed to train. Some of the things that I felt—and this is why I also do this type of work. We did the Freetown training first, and I worked very closely with the NGO that was in Freetown called Concern Worldwide, and they were amazing. I'd never worked with an NGO before because I don't normally do this type of work. I don't do aid work. We work in China where there are no such things as NGOs. So we worked very closely in Freetown because we wanted to see, we wanted to actually do the cascade training of Freetown to see how it actually went. Then she [Laura Hastings from Concern Worldwide] would train the rest of the NGOs and give her experiences to the rest of the NGOs, because they're working in consortium. Because we didn't want to roll it out to the entire country if we hadn't actually done the first cascade yet.

I was there for the first cascade. We did the national training, then they did the provincial-level training in Freetown. I worked very closely with them, and it was great. I also did the one level training below. They went out to one of the PHUs to do the training, so I attended that training also.

Q: What made them good to work with?

Rao: Incredibly dedicated, and just wanting to do very high quality work. Trying to understand why, what was going on, why they were teaching it the way they were teaching it. Going out to see their training and the rapport that they had with the people and the passion that they had in training people, it wasn't just them standing up there and

doing a dry lecture. They incorporated their culture. They were singing, there was a lot of singing involved in Sierra Leone. A lot of singing. I actually think I have a video. If I could find the video I'll send you the video.

Q: I would love that.

Rao: They made a handwashing song. She wrote a—one of the women wrote a handwashing song, so people knew how long to hand-wash for. It's just the commitment to improving quality of life and to improving the health of Sierra Leoneans. I think that's what I found just absolutely amazing. And they're living in pretty austere conditions. Sierra Leone's not highly developed, and they're committing this one to two years of their life or longer. When something wasn't going right or something, they were also so open to learning. They would just ask me questions, and they would ask me to go out with them to work on their infection control. Because they also had a component that was doing burials. Sierra Leone had a lot of issues with how they were doing things and how they were burying people and how they were treating their patients. In the end, a lot of these NGOs and/or international organizations just took control. Or they ceded control. The minister of health always had control, oversight, but for these certain aspects it would be that international organization had oversight over that specific thing. So they were doing burials. I went out with a burial team to look at their infection control and how they were gowning and taking off their PPE.

Q: What do you remember from that?

Rao: I went out with the burial team, and they also did not have enough PPE. It was—have you talked to anybody that's done the burials yet?

Q: I need to talk to more.

Rao: Okay. It is not a pleasant job. I felt awful. I felt awful for them, for the people doing the job. They often didn't have the proper training. They didn't have the proper equipment or the proper PPE. They're pretty much despised by the population because one of the reasons that Ebola was being transmitted during funerals is that they have these cultural norms that they must, must do to bury somebody who's died. And there are these people dressed in blue garb, all made up, coming to take away their loved one, and sometimes not doing a great job explaining where this loved one was going, how they could—where this loved one was going to be buried, what they were going to do with the body. It also announced to the rest of the villagers that there was a suspect Ebola—or there was a confirmed, at that time, because they were confirming that there was an Ebola patient in that house. So they would get screamed at. They would get spit on. People would take pictures of them and post them on social media. These people just did not want to have their faces shown. It was bad. And it was hard work because it's not like they could drive the car up the hill. Sometimes it's like a half-hour trek up the hill to where this body is. Shrouding the body, spraying everything down, because they had to carry all their equipment up with them, all of the bleach water to do the spray and the de-

conning [decontaminating]. They de-con as they come down, they de-con the path on the way down, too, they're de-conning where the body was, de-conning the way down and—

Q: They're carrying this body?

Rao: Carrying the body. I'm dying, and all I'm carrying is my backpack. I'm like sweating buckets. I'm like, I'm not going to make it. [laughs] They're carrying a body in full PPE garb. I don't know how they do it. And they're totally unappreciated. I just felt really—it was a hard job, and it was definitely unappreciated, they were definitely unappreciated. But it was necessary. That was one of the ways that they were able to control the outbreak, was to stop these burial practices and to do safe and medical burials.

Q: Did you come away with that with some larger recommendations, or—

Rao: One of the things that—they need to do better monitoring. That's the one thing I keep saying to them is you do the training once, it doesn't mean you're done. You need to keep going out and doing the monitoring, because they were not. I would be like, how are you putting together your bleach solution? They were just dumping a little bit in and putting some water in. I'm like, how do you know that that's the right concentration? It was too concentrated— people were washing their bare hands, like the burial team, washing their bare hands—some of them are washing their faces with it because they were so sweaty. It's just, it's not safe. Because they're also terrified of getting Ebola, right? So they were dousing themselves with concentrated bleach water at least five, six

times a day. Because they're terrified of getting Ebola, which I understand. So teaching them to do the training, to do monitoring. These are big guys, these are big guys. They only had small gloves. They would try and get the gloves on, they were ripping and things. I would bring gloves for them. The next thing I know, where are the gloves? Oh, well that went with the lab tech. Why did you give it to the lab tech? I was like, aren't you guys a team? They're like, no, he's not part of our team. Can you all work together, please? No. Lab tech took all the gloves. Because a lab tech is a technician, and he has different status and he gets more money. There was also this thing about status. Oh, you are a burial worker. You are a lab technician. You are this. There's also a lot of money to be made. People want different titles. Anyway, we don't need to talk about that. I don't want to talk about that. [laughs]

Q: Sure, we don't have to. But that is a very interesting part of the response, is like how that, those power dynamics of the money involved influenced everything. Wow. So how long were you there for that first deployment?

Rao: First time it was, I think I was there for six weeks. I tend to extend, I always extend. Because there's always too much work to be done and I try and do it like, I extend to a point where if I get it to this point, then I can go. But if I've spent that much time working on a program or a project, I tend not to like to leave it, in the middle of it where I don't think it can get to a certain place. I try to get—I've always extended, I'm usually last man standing. I'm actually almost always the last man standing for an outbreak. Because I'm not married, I don't have kids and things. Other people, they have other

commitments. I'm like, oh, whatever, I'll stay. But I think for this Ebola outbreak, clearly this has been a multi-year response. I could not be the last man standing. But that's okay. I needed to go.

Q: Was it while you were over there during that first appointment that your parents learned that you were over there?

Rao: No, they didn't learn until after the second deployment.

Q: After the second deployment.

Rao: Yeah. The funny thing is, my sister told my dad, and then my dad told my mom finally, because I think he just—he just had to tell her. I was talking to my mom after my second deployment, and I said, "I've just come back from Africa." She's like, "I know. Are you okay? Is everything okay?" I'm like, "I'm fine, everything is fine. I'm not sick, nothing's happened," and she's like, "I was so scared for you." I'm like, "It's fine, everything, it's okay." "I was so scared you were going to get kidnapped by ISIS [Islamic State of Iraq and Syria]." I was like, out of all the things you'd be scared about for me going to Ebola-affected countries, is that I would be kidnapped by ISIS? Part of me is, I think she wasn't clear where I was going. She just knew I was in Africa. As far as she knew, I could have been in Nigeria. Alright, I could have been kidnapped by ISIS. And then I thought at that point, probably not, not needed to tell her actually where I was and what I was doing. [laughs] Because everything was okay by then.

Q: So your first deployment, you go back to Beijing?

Rao: Yes. One more thing I wanted to talk about which I forgot for the first deployment was interacting with the Chinese. That was in my first deployment was when I interacted with the Chinese. I landed about the same time as a seventy-one-person Chinese contingent landed in Sierra Leone. We just ended up being at the same time at the same location. I always thought I was going to Liberia. They were planning on sending a team to Sierra Leone to set up a laboratory, a testing laboratory, diagnostic laboratory, and a hospital to care for Ebola patients or suspect Ebola patients. This was the first time that they had ever—this is the Chinese, had never participated in an international outbreak like this. They'd always gone as part of a WHO team or as part of a CDC team, like they had participated in STOP [Stop Transmission of Polio], but they had never gone on their own where they were leading their own effort. I was there with them. One of the things that we also tried to do for US-CDC in China, working with China CDC, was to provide guidance on being a national public health institute and also promoting China's involvement with international endeavors with public health. Because China is no longer a recipient country. USAID closed their offices as far as—to provide aid to China. The Clinton Foundation also closed. China doesn't need our aid anymore. What's the other one? The Global Fund [to Fight AIDS, Tuberculosis and Malaria] also stopped funding projects in China. They really shouldn't be taking our money anymore for aid. What is the next step? How to make them into a donor country. Right? One of the ways is, how does an international country or—I don't want to call it a developed country—whether or

not China's developed yet is another debate. But these countries that have gone from developing to developed—how do they make their way into this world of—making this transition? A lot of talk about what BRICS [Brazil, Russia, India, China and South Africa] countries do. They decided that this was their—this was going to be their thing. That they were going to do this. But they actually don't have much experience in how to interact and how you should be involved with an international outbreak and how to work with international partners, how to work with the country. We're very sensitive when we get—CDC, the US-CDC is very sensitive when we get invited to a country. We realize we are invited to the country. Right? And that the Ministry of Health are the people that are leading the outbreak and we are providing technical assistance, we are providing goods, maybe providing diagnostics, things like that. They are running their outbreak and we are providing support. We do this with states, we do this with foreign countries. This is the way CDC runs, the US-CDC. But China CDC and China, I think, weren't really clear on what their roles were.

The other thing with China is they tend—the Chinese people are—it might be because of a language barrier, but they tend to keep to themselves. Like when I visited their laboratory and their hospital, they would serve me water. It was literally Chinese water. It was a bottle of Nongfu [Spring] water that they brought from China. [laughter] They brought food from China. They brought everything from China. They brought all of their staff, like drivers. They very rarely interact with the local community, and they do this even with their businesses. One of the reasons—people also ask, why did they go to Sierra Leone? China has a lot of business interests and development interest in Africa.

The way that we support China, China supports Africa. There's also a reason like, why are we still doing this with China? Why are we providing this [technical] aid to China when China's now providing this [technical] aid to Africa? Let's just cut out the middleman here and everyone just go to Africa. [laughter] One of the reasons they do this is because there's so many business interests in Africa and because it's also a communist country, all the business interests tend to be state-owned enterprises. The government of China has a lot of business interests in Africa, particularly in Sierra Leone, where there's a lot of mining. The Chinese built their bridge. The Chinese built a massive highway that cut two hours out of the road time going out of Freetown to the rest of the country. They built all of that. But they tend to be very insulated. They bring all of their workers in from China, and they bring their food in from China, all their equipment. They purchase almost nothing in-country, other than your other consumables, like food and things like that, that they can't bring in. Otherwise they bring everything in. And they keep to their little thing. They don't interact with the community, they don't give back to the community. No sense of charity, I think. Their sense of charity is a different way than what we would think of charity or development. Yes, they built this road, but the road wasn't for Africa, the road was so they could get their mine, their ore, out of the country. Things like that. When this Chinese contingent went over, the public health contingent, I think they had a little bit of the same mentality: we're just going to be our little insular thing. We're going to do our thing and not really integrate very well with the international response. Because I think they just didn't know. English is still not that prevalent in a lot of the places in China, or a lot of the people that went over, their English just wasn't very good. They usually sent at least one good English speaker, but

still, that's like sending me to China to be the Chinese translator. We talked about how great my Chinese is. [laughter] They go to these meetings, but they also had never worked on a multinational outbreak. What's the role of WHO? They go to these meetings, these pillar meetings. What's their role there? What are people doing? Also, people that have done this for a long time, or even who haven't done it for a long time, yes, you're supposed to attend this meeting, but it's not like every time a new person comes to the meeting they go through what this meeting is, who they are, what they're doing, what the purpose—they don't go through that. You just attend the meeting and hopefully figure it out.

These Chinese people, staff, English not so great. Talking to Sierra Leoneans who have relatively strong accents, or the British, who, if they're used to American English, may not be able to understand the British. I know I had a conversation with a Scotsman and I was like, I have no idea what you're talking—[laughter] "Can you speak English?" My friend, my English friend said, "He is speaking English." [laughter] Half the time the Chinese had no idea what was going on because you also had people from WHO that spoke with a French accent or an Italian accent, and if you've learned English in a specific, pure way and you hear another word for that, or you hear it another accented way, you're not going to understand what that word is.

One of the things that started happening was, well, what's happening out at this site? The samples are going out there, but we're not getting—the Ministry of Health are not getting the tests in a timely manner. They're sending patients out. What's happening to them? All

of these things. We had a CDC liaison to part of the response, the overall response. I was asked to contact the Chinese contingent and be a liaison, basically. That was part of my job, was to be a liaison. Luckily, I had worked with some of the people that were there in China. The lead for the lab was somebody I'd worked with in China, and so we knew each other, so I just called them up. I literally just called them up and said, "Can I come for a visit?" Second day, literally, second day I was in-country, I was with our lab team because I flew in with the changeover lab team. I was with our CDC lab team, and they were flying out to—they were going to go drive out to the lab site, which was out of Freetown. It was further away, it was like out, like a couple, it was many—I can't remember where it was. Was it already in Bo? Or were they moving it? I can't remember. Wherever it was, it was outside of Freetown and they were going to leave the next day. I said, "Should we go and try and see the Chinese lab?" We had just gotten on the ground and I don't know what was happening, so I was hanging out with them [the CDC lab team]. I had breakfast with them because we all flew in together, and they were like, "We're going to go do this today. Do you want to come with us?" I'm like oh, okay. So we went to go see the South African lab. Because they knew the South Africans because they had worked together on several outbreaks in Africa before. We were talking through the window with the South Africans and their lab setup, and then afterwards I was like, you want to go see the Chinese lab? They're like, sure. I call up my Chinese counterpart, said, "We'd like to come and see the lab," and they're like, "Okay, come on out." So we get a tour of the lab. It was unbelievable. I think I sent you some pictures of their lab. It was crazy. They were also so scared of Ebola. Everybody was scared of Ebola. I was scared of Ebola. I had never worked on an Ebola outbreak before. This was massive. Was

there something different about this outbreak? Was there something different about this strain? Why was this particular outbreak so massive compared to the previous ones? I was scared when I went. The Chinese, they were doing it in a way that was—they triple-checked everything. Like triple, everything was like—if something needed to be disinfected, they did it three times. If they went in with their suit, they had three layers on. When they come out and they do the decon, they decon three times. They decon their outside suit, take it off, then decon again, take it off, and then they have their inner suit. Because they were just so terrified, which I understand. We went through the whole process. They explained what they're processing—because they developed their own test. They didn't use one of the US-CDC tests or this or that. They developed their own test, their own primers, which CDC did the quality control for, and it was sensitive and specific, so it worked well.

I spent the day translating, and I do not have technical Chinese. Even I was shocked at how I did. I used so much Chinese during my time in Sierra Leone, probably more than I ever did in my time in China, because I have a locally engaged staff in China that are Chinese speakers and so I normally don't speak in Chinese to my Chinese counterparts.

Q: They're English speakers? Mm-hmm.

Rao: Because they speak—the people that work in the CDC office, in the US-CDC office, are fluent English speakers. They're Chinese nationals but fluent English speakers. So I generally don't speak in Chinese in China. Well, there's a lot of reasons. Partly it's

because [laughs] I don't want people to think I'm retarded. [laughs] It would be interesting. We'd go around the table, everyone introduced themselves, and all the white people around the table that I work with would do it in their Chinese, in their broken Chinese. Everyone was like, "Your Chinese is so good, you're so smart." Come to me. "My name is Carol Rao and I speak in English." I need everybody in that room to understand that I am a native English speaker and not a—because they look at my face and if I said my name in Chinese and what I did in Chinese, they would be like, what is wrong with her? [laughs] So I always speak in English when I'm in China.

One more little divergent story about that, because one of the first—one of the first speeches or trainings—there was a speech, a presentation that I had to make in China. I remember the head of the WHO TB group said—I said, "I might be able to do this in Chinese." This is when I was, at the very beginning, I was much more confident about my Chinese, before I realized how bad it was. And he's like, "No, Carol, I need you to speak in your technical English and not your child Chinese," like okay [laughs] and ever since then—because I realize, I am—he's like, "Because you're supposed to be the expert. You are the expert," and if I speak in my childlike Chinese, they're never going to take me seriously as an expert. I need to speak in my technical English and have the fluent English and Chinese speaker do the translation.

The advantage for me was I always knew what they were saying. I may not have been able to say it in their way, but I could always tell if something wasn't quite right or not what I meant. That was a huge advantage for me. But that is my issue with Chinese and

why I never speak Chinese in China. But now I'm in Sierra Leone and I'm literally the only person that can speak, spoke both Chinese and English in a fluent enough way to do it. So I'm doing all these translations and I'm like, I don't know that word. [laughs] I remember trying to explain what, say, "When they put it in the centrifuge," and not knowing what a centrifuge, how to say "centrifuge." So I said in Chinese, "It's that machine where you put the tubes in that spin really fast," and they're like, okay, we know what that is. So I did that.

Also, it was so difficult, [laughs] I don't know if I can like talk about how difficult it was. Because the Chinese are very proud. They don't want to usually admit that they don't know what's going on, and I was so blunt with them. I was so blunt. Like this, you cannot do this. The way that you are holding onto this or doing that, or the way that you are attending this meeting or not reporting this or doing it this way. Because the other thing I figured out is, yes, they sent a seventy-person team, but it was very siloed. Like, their lab team was their public health lab team. Their hospital was run by their military, military hospital people. Because China CDC, like US-CDC, we don't have medical doctors that can man a hospital. Right? So the China CDC don't have medical doctors like that, that do clinical care, so they sent out the military. The military and China CDC do not, [laughs] do not talk to each other very well. Not all that different than when US-CDC was deployed to Hurricane Katrina and working with the National Guard. Not that, you know—

Q: Not that much communication around.

Rao: Not much communication. The China CDC and the military hospital, same facility, they're on the same grounds, practically no communication between the two. I would go through their data and I'd be like, what does this mean? Because they got a form, a reporting form from the Ministry of Health. What does this mean? What does this mean? They're like, oh, this is what we think it means. It's a positive, negative, indeterminate, things like that. I'm like, they never received training on how to fill out that form, so they were basically interpreting what this checkmark was supposed to be, would turn out to be the opposite of what MOH [Ministry of Health] thought it was supposed to be. One of the other complaints is people were handing in handwritten forms, with names and ages and things like that. The Chinese couldn't read them because they're used to reading very perfect, perfect things. I started learning Chinese characters—I could only read when it's typewritten. When I see handwritten Chinese characters, I cannot read that at all. It's the same with them. If you got very used to reading typewritten text and people don't write neatly, they can't read it. They were missing people because their names weren't correct, or everybody's name, blah blah blah, it's as if everybody's—half the population is named Smith over there, or whatever the name is. Then you had to match name, age, city, gender, all these things, and so people, they're like, we sent the sample there in Chinese. I can't find them. Because they weren't being entered correctly, because they couldn't read them. All these startup issues. Nobody trained them on how to fill out the form.

I'm sitting with them, okay, this is what this means, and I'm trying to call back to the control center. Well, what does this mean? Because I actually don't know what this

means. They're trying to explain to me, I'm trying to explain to them, I'm still not very clear on how this is supposed to be reported. The other thing I find out is the way that they're reporting it to the hospital is they're providing no interpretation. Because there's usually an area around the threshold, which it's like, indeterminate. Is it positive? Is it negative? It's not usually a very strict cutoff. There's a buffer area, and in that time they—if you get that, either you get a second sample and you do another test, but you call it "indeterminate"—they were not explaining to their own hospital what that meant. The hospital thought that that was negative and letting people go. But what that usually meant was if there—what the other thing was also meaning was if they took the sample too close to their onset, they might not have been viremic. They need to hold them for another maybe two to three days until potentially they became viremic, and then take another sample. But they were letting these people go.

The other thing that was happening is we think that people were showing up, oh my God, random people were just showing up to the hospital because they wanted an Ebola test. Because they wanted the certificate to say that they were negative, so they could go back to their job or go back to their home or things like that. But in order to be negative, they should have had a symptom in order to be tested. And they need to be tested three days after the symptom onset, at least three days after. If you test within the three days, I think it's three days, you had to then wait. Date of onset was really important.

But the lab people are like, all we do is run the test. We don't know interpretation. While other people, other labs were looking at the onset date, saying tell me the lab's okay,

telling the hospital we need another sample before we can say this person's completely negative, but the China lab just reporting it, no interpretation. I was running between their hospital and their lab, trying to explain to them what the interpretation of this was. Me. [laugh] In Chinese.

Q: How do you even uncover that problem in the first place?

Rao: This is also how I do work in other places in China. When you go out to do the monitoring of the factory, okay, sample comes in. What happens? I follow the sample. I literally follow the sample. When I would do these trainings in China for tuberculosis infection control, I'd be like, I'm the patient. I walk into your hospital. What happens? I'm coughing. Oh, well, you wait here. You mean with all these other people that don't have TB? [laughs] And I just follow the patient. Okay, I'm waiting here. I've gone to go get my things and now I'm waiting here. Now what happens? I follow the patient. After the sample's taken, now I follow the specimen and what happens with that, and that's exactly what I did. I just followed the sample. The sample arrives at your door. What happens? A person who thinks they have Ebola arrives at your hospital. What happens? Basically, I follow both things, and that's how I figured out this was happening.

[break]

Rao: In the end, I think I did [aid the Chinese in their response] because when we came back, I know that they were very, very thankful and grateful for my assistance on the

ground. They told me that and they told the country office and they told the embassy that. Oh my God, I was so blunt. [laughter] Because I get really frustrated and I just want everyone to all work together, and we're all just trying to do the same thing and yes, we want China to do well, yes, we want China to save face, but these are also people's lives.

Q: Wow. How did you see people receive you at various moments? I mean, when you came back they were thankful for the—

Rao: You mean in China? Or—

Q: Yes, the China CDC people.

Rao: Yes. They were great. They were really great to me coming back, and you know—

Q: Despite the bluntness.

Rao: Oh, despite the bluntness. Oh, yes. I think they appreciated it, and I think being there and working, having had worked with them for nearly five years at that point, yes, nearly five years at that point, they know what I'm doing there. It's not like they don't know me at all. I've been trying for five years to help them [laughs] and to make them into a public health institute, to educate them on what CDC does. Because a lot of the questions I used to answer was, well, how does US-CDC do this? How does America do this? I would answer a lot. I'm still doing that in Sierra Leone. Well, this is what we do,

this is what the US does. I took them on the tour. We actually did a field visit out to the Bo laboratory, so they could see how the US-CDC lab ran their hot lab, and I think I sent you this picture of the comparison between their hot lab and our hot lab, which is basically a tent with Tyvek walls [laughs] and their hot lab, which is almost like a BSL [biosafety level]-3 plus, that they basically had a trailer that they picked up from China, put it onto a charter, a Russian charter plane, flew it over here and dropped it in the middle of Sierra Leone. That was the only way they were going to do Ebola testing. Compared to the US-CDC's hot lab, which is a tent, [laughs] with no air conditioning. Yes. So anyway.

Q: So trying to get the message across that you don't need all of this huge stuff.

Rao: We tried. That's another thing we tried to do is we tried to, working with the US-CDC lab, and looking through their protocols, their throughput was actually quite low. About a quarter to a third of what US-CDC lab was doing, and we're trying to figure out why, and it's because they had these steps in there, these neutralization steps that were unnecessary. These things about doing everything three times. It was really unnecessary for them to do, but they were so terrified of getting Ebola before they even cracked open the vial or whatever the sample is, they had deconned that thing. They had deconned the outside once. Then they put it into a hot bath, in order to de-nature the virus, because they just needed to make sure that everything was dead before they opened the tube. And that took a lot of time. That step took, like it was an overnight, it was an overnight thing. It decreased their throughput and it increased their testing time.

Q: Right. Is that something that changed over the course of their deployment?

Rao: No. So we tried, so I tried to talk to them a lot about it and in the end I finally thought I understood, with my limited Chinese. They had protocols in place, too. Just like we cannot just say, okay, we're going to change the protocol, their protocol had been tested and tested to be safe. They were handed a protocol, an SOP [standard operating procedures] that their scientists and their experts had developed, and in order to change that they had to run their own quality control to make sure that it was fine. That wasn't going to be done within the outbreak, so they ended up not changing it. Which I totally understand.

Q: When does your first deployment end?

Rao: It ended in early November. Then I went back directly to China. At that time, I would have been—I was the first US diplomat to enter China directly from an Ebola-affected country. There was a lot of consternation at the embassy about how, what was going to happen to me once I landed. Because everybody else was going back to, going back to—

Q: Atlanta?

Rao: Atlanta. Or if they had been deployed from somewhere else. A lot of them had come from Africa, and Africa at that time, it was not easy either. Most flights had been canceled, so there were no direct flights from Africa, so even people in Kenya or Uganda or Zambia had to go up to Europe and back down to wherever they were. That's the way it was. I had to go through Europe, too, because there's no direct flight in general, even before Ebola.

It wasn't clear how I was going to be treated. As a US diplomat with a black passport, there was so much handwringing in the embassy in Beijing. What would they do? Would it cause a diplomatic incident if I get quarantined? Or they take me to the Ebola hospital? Because they sent us—they had these SARS hospitals. When SARS happened, they built these special hospitals to quarantine people. It had special infection control things and things like that. Then they turned those into suspect Ebola hospitals, and I toured one when I came back. If I had to spend three weeks in this place I think I'd go insane. [laughs] It's so depressing.

I remember my boss asking me at the time, when they weren't sure what was going to happen—and a lot of them didn't want to deal with it either, because they didn't want to deal with a diplomatic incident. With China at this time, with Ebola. They asked, would I be interested in going back to Atlanta first and spending three weeks in Atlanta, and then going back to China? I remember at this time, this was when we had heard people returning [to Atlanta], about their children being pulled from school. Even people at CDC asking returnees not to come to work. These are CDCers that—so people that—even our

own colleagues were asking people not to come into work for three weeks and do telework. This is the time when the person from Liberia was put in a tent in New Jersey for having a slight fever and even tested negative, all these things. It's like, I am taking my risks with China because I do not—I am not coming back to this crazy—I was going to swear, but I'm not going to swear. [laughs] The people were insane. I remember, we had a thing—they were insane. It was as if people here were at higher risk of acquiring Ebola than I was in Sierra Leone. That's the feeling that we were all getting in Sierra Leone. I remember at breakfast one morning I was sitting with one of my colleagues, and at that time it was reporting, it was reported that the second nurse from Texas was infected and she had flown to Ohio or wherever. We were swearing up and down like, oh, this is it, we're never getting back in the country. [laughter] We were so convinced that this was going to be the end of returning to the United States and having a regular life and all these things. We were so angry at that woman. Why did she get on the plane? [laughs] Yes. So I chose to go back to China.

Q: Chose to go back to China.

Rao: I chose to go back to China.

Q: Wow. How were you privy to that, to the wrangling that was going on about whether you should be quarantined or whatever?

Rao: When I came back, that's what I was told, that that had happened, and all this behind-the-scenes talk. Apparently, I was a lot of the talk during some of the country team meetings. None of that was conveyed to me at the time, but it was conveyed to me afterwards. They would talk about like where I would live, if I came back to Atlanta, would CDC pay for my housing here for three weeks? All this stuff. But it actually, it really hit me when I came back, when I went to Sierra Leone the second time and came back, it was actually even harder then.

President Obama was coming for a visit during that time. It was probably, was it February, March of 2015? He was coming to China, and when these dignitaries come they usually do a walk-through or a meet-and-greet at the embassy. I was asked not to attend that meet-and-greet. Yeah. I think, yeah, I was asked not to attend that meeting, and I was really upset. It was within the twenty-one days, I have to say. But the second time I went was for STRIVE, so I was working on the Sierra Leone Trial [to Introduce a] Vaccine against Ebola. I spent the majority of my time at the hotel in Freetown on the phone with Atlanta, with DC, because I was a regulatory officer, working on the protocol. I was not in the field at all. And I'm a responsible person. [laughs] If I think I have a risk, if I'd been exposed, if I had any sort of health symptom, there's no way I would put anybody at risk. Which there's another story later. I just remember being asked to have a meeting with the DCM, which is the deputy chief of mission. It's the person right under the ambassador, the second-in-command under the ambassador. We had this talk, and he—and I know they were just—the embassy was saying, "Can she just choose not to go?" Because they didn't want to ban me. They did not want to make the decision to ban

me. They just wanted me to just choose not to go. Can't you just not go? Can't she just say she's not going to go? I basically said no, you're going to have to ban me [laughs] because I have none of the risk factors, I have no symptoms. No. And I said, "What if I promise not to spit, vomit or kiss the president, [laughter] would I be allowed to attend?" Because we're in a group of people. It's not like I'm on a one-on-one with him. It's a mass of people, which they probably also were not that happy about. There's a mass of people listening to the president speak. And I'll just—I'm kind of good at this guilt thing, too, with all this guilt. I said, "I understand if you want to ban me. I will not take offense at it, but I will not make it"—I didn't say I will not make it, I just, "I will not recuse myself from this. You will have to tell me I can't go, but I will accept whatever you tell me. I made the decision to go to Sierra Leone. I made the decision to volunteer. I understand there's repercussions for that and if this is one of the repercussions, I will accept it." Apparently, I was told that he was quite shaken after my meeting with him, and so I was allowed to go, but I had to show up at the medical unit about an hour beforehand, where the doctor had to check me out, take my temperature and make sure I didn't have any symptoms, before I'd be allowed to attend. Yes.

Q: Did you attend?

Rao: I attended. Yes. But of course, the president's really far away. Even if I wanted to spit on him, I could not reach him. [laughter] I was a little curious whether or not there would be a ring of like [laughs] a space surrounding me. But there wasn't. Because everybody, they all squeeze up. It was fine. But it didn't make me feel good to come back

to the embassy and to be treated that way. The Chinese had no problems with me. I have to tell you that right now. No problems. My Chinese staff, no problems. The only people that had problems with me were the Americans, the Americans at the embassy. Because they—you know, we get AFN [American Forces Network] overseas, so they get the Fox News and CNN and NBC, they get all the news channels. They watch, and they get a twenty-four-hour feed on Ebola's going to come to the country and kill us all. They got all the hype that the Americans got back in the United States, and a lot of them believed it. I don't know if it was more that they didn't trust my judgment, that I would put them at risk, or that they just really didn't understand. Yeah.

Q: I guess that's a hard thing to pull apart. Because there's part of it that seems personally insulting.

Rao: That's—I think that was it. There was part of it that was very personally insulting to me. I am a professional. I'm a responsible person. If I really believed that I was at risk of being infected with Ebola and/or had symptoms of Ebola, even minor, I would report it and recuse myself. I would not be going out to touch people, talk to them, eat dinner with people, things like that.

Q: We don't have a ton of time left, unfortunately, but can we talk a little bit about the second deployment?

Rao: Sure.

Q: Were you deployed a third time?

Rao: No, just twice. After the—so this is the other thing I notice. A lot of people that like this type of work, the first time they go, especially if they went early on, you feel a lot of commitment. You feel a lot of passion. You see all the need. You see all these people and you know, this is a developing country, and the work is never done. I knew I was coming back. When I left in November of 2014, I knew I was coming back, and when I left the second time in I think February of 2015, I knew I was never coming back. Yes.

Q: Tell me about that.

Rao: I don't know. It was just a different type of feeling, and the outbreak was waning. I think it was also at a time in my life where it was also that was my last year in China. Twenty-fifteen was my last year in China, so I would have no opportunity to come back because I needed to clean out my stuff in China and clean out my projects, make sure they were going well. Moving back after six years. That's why I kind of knew I was not coming back. I thought about it in the summer. I actually emailed and said, "I want to come back," but then I looked at all the things I needed to do, there's no way.

Q: But there was also a different feeling.

Rao: There was definitely a different feeling. I think what also happened was what my role was with STRIVE, was I was the regulatory liaison. When I arrived, there was a lot of grandiose ideas—I don't want to say "grandiose ideas" is the right thing, but people thought the project would move a lot faster than it did. When they recruited me to come in, in January of 2015, it was to be the team lead, field team lead for Freetown to start the vaccination trial. To oversee the clinic, to do the enrollment, you know, work with the participants, recruit participants, all those things.

I arrive, none of that's ready. We don't even have our protocol yet. [laughs] Nothing. All these people arrived, and I felt so bad for the team lead because everybody was recruited to do the startup of the project. A ton of people arrive and there's no—the projects, we don't even have a protocol that's completed yet. What are we going to do with all these people? The people just continually show up because they were scheduled two months ago. Right? The team lead looks at everybody's CV and decides that with my background, with my international experience, with my mid-level to senior experience, especially my experience with international settings, I became the regulatory liaison. I, know nothing about FDA [Food and Drug Administration] rules, I do not know how to do any—I'm not a policy person, none of this. But I was the only person that had experience, more than other people did, in order to do this. I'm working with the Sierra Leone FDA. I cannot remember what it's called now. I can't remember, I used to know this like the back of my hand. I can't remember, whatever it is, the Sierra Leone FDA. Because it's an investigational new drug trial and to get it through our FDA, to get it through the Sierra Leone FDA, to get it through CDC's institutional review board for

human subjects, to get it through Sierra Leone's human subjects review board, so basically I handled everything on the Sierra Leone side, with their people in Atlanta and DC handling everything on this, on the US end, to get all the approvals on the US end. Because we needed approval from both ends.

Trying to interpret the Sierra Leonean laws and rules on investigational new drug approvals was so difficult, because they'd never done one before. Half the time I'm asking their regulatory officer and they'd be like, well, they would pull out the regs [regulations] and read it to me, because they'd never actually done it before. They would say one thing, then I would pull out their own regs and say, "This is what your regs say," they're like, oh yes, we can do that. Working with them, helping them interpret it, them helping me interpret it, pushing the timeline. We were under a lot of pressure to start because the outbreak was waning. Working with them, interpreting them, keeping everything on track, there were so many moving parts because all these pieces that needed to be done in order to submit a full packet. A lot of discussion on do we need, do we need clinical trial insurance? Oh my God, that was a long conversation.

Also, being in the field and having people in Atlanta saying, "Can you ask them this? Can they do this? We want them to do this." I remember, I think it was like the second to the last week, I'd already been there for a while. To this point where I'm dealing with these Sierra Leoneans on a daily basis, right. Finally, I say to the PI—I get to these points [laughs] at some point, like I am not a mind reader. I cannot read their minds. I can tell you what I think is going to happen. You've asked me the same question every day for

the past two weeks. I have told you what they have told me. My recommendation is that we do what they ask. Because I cannot read their minds.

That probably was not a smart thing [laughs] to say to the PI, but I needed them to know that they can ask me this, but I don't know what's going to happen once the packet is fully put together and submitted to them and they review it. They have no precedent. They've never done this before. I don't know what they're going to do. They don't know what they're going to do. It depends on the packet we're going to give them. When I got there and by the time I left we had changed the study design. We had changed the vaccine. We had changed the timing of the vaccine. So many things had changed. So that was very frustrating. But the one thing I do have to say is, I also felt very good at the end. I always like to feel like I'm contributing. I felt like I contributed the first time I went, by getting this project off the ground and getting it basically, when I went to do the peripheral health units, I got it to a level where it could just go on its own, especially because the NGOs were so vested and really, we were only providing oversight at that time, like technical oversight. Basically the NGOs, I'd already done enough that the NGOs could run with it. The NGOs and UNICEF. This time I'd gotten to the point where they were right about ready to submit the pre-clearance for their IND [investigational new drug] FDA approval. I had put the whole packet together. We were missing one thing. They just need to stick that one thing in and they could put the packet in. I thought about extending one more time and I'm like, I've got to go home. Because I got to the point where they just needed to stick that one thing in, literally one piece of paper, they could send the packet.

[break]

Q: I apologize, we only have a few minutes left.

Rao: That's okay. I've been talking for a long time. [laughs]

Q: It's all been really valuable, and I'm so glad we have it to preserve. Is there anything that we haven't talked about that you'd like to mention?

Rao: I don't think so. I think we covered—I think we covered everything. We talked a long, long time. Yeah, so—

Q: I appreciate it.

Rao: I guess one of the things I do say a lot is every time I'm in an outbreak, especially the first part—and when I went back that first week—my first week of the second time I went back, so this is January of 2015. I do this for every outbreak—why did I agree to do this? Why did I volunteer? First week back in Sierra Leone, and that time I was like, why? Why am I doing this again? I don't understand why I do this to myself. It probably is because in that first week, usually it's overwhelming because all this information's coming at you. This has happened to me so many times. Someone else is transferring all their work to me. We have twenty-four to forty-eight hours to do it. She's on her way out,

and she's trying to shed everything, her ten weeks of knowledge, onto me in twenty-four hours. It happens for every outbreak. It's like, why do I put myself through this every time? I know I'm going to be working long hours, I know it's going to be frustrating. Why? But then at the end, like when I did the PHU training, to know that that project was going to go on and being able to train over thirteen hundred peripheral health units in Sierra Leone. To have gotten that letter, that IRB letter on that last day that I was working on the STRIVE protocol vaccine trial, makes it all worth it. That I made a contribution, and that either the project can go on or that people are being trained or that people's lives are being saved, all these things. But I have this love/hate relationship with outbreaks.

Q: [laughs] Well, Dr. Carol Rao, I very much appreciate you spending your time and your energy on this. This is going to be a really valuable addition to our record, so thank you so much for being here.

Rao: Thank you for inviting me.

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