

CDC Ebola Response Oral History Project

The Reminiscences of

Karlyn D. Beer

David J. Sencer CDC Museum

Centers for Disease Control and Prevention

2016

Karlyn D. Beer

Interviewed by Lola Weaver

July 13th, 2016

Atlanta, Georgia

Interview 1 of 1

CDC Ebola Response Oral History Project

Q: This is Lola Weaver here with Karlyn Beer. Today's date is July 13th, and we're in the audio recording studio at CDC's [United States Centers for Disease Control and Prevention] Roybal Campus in Atlanta, Georgia. I'm interviewing Karlyn today as part of the [CDC] Ebola [Response] Oral History Project. We'll be discussing her life and career, especially focusing in on her response to the 2014 Ebola epidemic in West Africa. Karlyn, thanks for being here today.

Beer: Thank you. I'm happy to be here.

Q: Of course. For the record, could you state your full name and current position at the CDC?

Beer: My name is Karlyn Beer, and I'm an epidemiologist in the Mycotic Diseases Branch.

Q: Great, thank you. Can you tell me when and where you were born?

Beer: I was born in Columbus, Mississippi, actually, in 1984.

Q: Can you tell me about growing up in Columbus, Mississippi?

Beer: I was born on a [United States] Air Force base, and so I didn't live there very long, and I don't remember it. But we moved shortly after to San Antonio, Texas, and I lived there until I was five. I have a few memories of San Antonio. I remember it was really hot, like being in Atlanta. I remember having a kiddie pool and waking up in the morning and there being June bugs in it. That was really frustrating. I moved to Minnesota when I was five, so I consider myself from Minnesota.

Q: Do you have any memories from living in Minnesota?

Beer: Yes, I mean, that was where I consider that I grew up, and my whole childhood is from there.

Q: Did you have any siblings growing up?

Beer: Yes. I have a little sister. She's two years younger than me, so we both went to the same school and grew up in a town that was about an hour northwest of the Twin Cities, so it wasn't an urban area. At the time, it was pretty rural. I think now it's solidly considered a suburb.

Q: What was your household like? What did your parents do?

Beer: We lived in a neighborhood on the side of a highway, and my dad is a pilot, and my mom stayed at home. We had kind of a cool growing up that was really unique.

Compared to myself and having a nine-to-five job, my mom stayed at home, and my dad would work for four days and then he'd be home for four days, so they were around a lot and volunteered at our school, and that was a lot of fun. My mom was always home. We had pets. My parents split up when I was fifteen and my sister was thirteen, but up until then it was a pretty sweet childhood, not a whole lot of hardship.

Q: What sort of things caught your interest when you were growing up, when you were in high school?

Beer: I was always interested in the natural world. I was always kind of a science nerd. I'd pick up the frogs outside and bring them in, and my mom was always cool. She loved animals, too, so that wasn't—I don't think that was super weird. In high school, I got really into disease and the biology of disease. I was just really fascinated by these tiny things that could bring down a whole human or animal or even a population. I did all my projects on a different disease whenever I could.

Q: Did you have any teachers in school that influenced you?

Beer: Yes, I certainly did. I feel like I had a lot of really great teachers. My biology teacher in high school, he was kind of a quirky, eccentric dude, and we didn't have

regular tests. Our exams were—we'd have ten pieces of paper, and we could tape them together however we wanted, and we had to draw diagrams that showed how all of the biology concepts we had learned were related. It was really a unique way to learn science. We had experiments we had to do that we didn't actually know the answers to, going in. He, I think, first introduced the John Snow story about cholera and the pump handle, and that was my first foray into epidemiology as a formal science.

Q: At the end of high school, what were you imagining for your future?

Beer: At the end of high school? I knew pretty well that I wanted to go into science. I started looking at undergrad [undergraduate] programs in biology and microbiology. I don't know how I—when you're so young, how are you so sure? How do you know what you want to do without knowing hardly anything about what else is out there in the world? But I knew. I knew that I wanted to be in touch with biology, but also those population-level disease phenomena. I remember writing in my college application that I wanted to have the population as my patient. I don't think I really knew at that—because I had never done epidemiology. I didn't really know what it meant to do a case control study or to be an epidemiologist, but I just had this idea that I didn't want to be a medical doctor for individuals. I wanted it to be at the population level. So I applied to undergrad programs in microbiology and looked out for opportunities to do public health.

Q: Right after high school, you go to college where?

Beer: I went right to college. Because my parents had just gotten divorced a couple of years earlier, I think I was especially excited to go out-of-state. [laughs] I wanted to get the heck out of Minnesota and just be on my own, and I was ready to be done with that. I felt like I needed to be away from my family for a while, and it was great.

Q: Where did you go to college?

Beer: I went to Cornell University in upstate New York, and that was—it's in a rural area kind of reminiscent of where I grew up, so I didn't feel like, oh, there's nothing to do here because it wasn't in a big city. It was a fine place to be, lots of stuff to do. And then, I think after you leave a place, you realize what you miss about it. I think it was a good thing for me to leave Minnesota, but it helped me to realize what I really appreciated and missed about my family and about where I grew up.

Q: After college, what did you do after college?

Beer: I went to college. I got my microbiology degree. I worked a lot in the lab [laboratory] on foodborne pathogens. I worked on *Listeria*. During junior year, I studied abroad in South Africa, because I just felt like I had lost—I wasn't really connected to the health of it when you're looking at microbes and pipetting small volumes of clear liquid every day. That really helped me see the human side of the diseases that I was so fascinated by on the scientific side.

After college, I applied to grad [graduate] school. I knew I needed to get a PhD or I needed to do something beyond undergrad, and I had been thinking about, down the road, coming to work here at CDC or being an EIS [Epidemic Intelligence Service] officer. I applied to grad school, but I wasn't really ready to go yet. [laughs] I'm like, this has been a lot of school and I need a bit of a break. I applied, got into a couple of different places, and accepted a spot at the University of Washington in a PhD program. But I said, I want to come here, but I don't want to come here for a year. So I bought myself a year's worth of time, and I didn't really know what I would do at that point, but they said, sure, that's fine.

I applied to a few things after undergrad to do something with that year and ended up getting a fellowship job at the Colorado state health department [Colorado Department of Public Health and Environment]. Finally, the chance to see what it's like to do public health, because it's one of those things where you don't see it when it's working. You hear about it in the news when there's an outbreak, but you don't really see what it's like on a daily basis, so that was really a cool opportunity.

Q: What kind of things did you work on at the Colorado state health department?

Beer: Lots of different things. I was primarily in the molecular lab. It was a laboratory fellowship through the Association of Public Health Laboratories, APHL. I worked on a cool way to detect flu [influenza] viruses where you could take one sample and not only test it for flu, but you could test it for a dozen other respiratory viruses all in one go. It

was a real good bang for your buck, efficient lab test, and it was pretty new at the time, so we were just getting it up and going. I worked on routine testing, I did pertussis testing. I learned how to do rabies necropsy, where I would receive plastic bags in the mail, and they would have animal heads in them, and that was a hard thing for me to get used to—I don't think you ever get used to it, but to get a sense of, hey, this is my job. Because someone's dog might bite someone, or an animal might be acting strange. They take it in, and the animal is euthanized, and in order to test for rabies, you need pieces of the brain. So they would decapitate the animal and send the head to the health department. One of my hardest moments at that job was—nobody else was working, and I was really still new at this. They said, "Can you help us out?" I said, "Absolutely, I want to help." I want to really learn this and help out the department when there were a lot of people who were gone. It was a big rabies day that day, and we had a bunch of bats. We had a Rottweiler—those guys have really thick skulls, and there were so, so many to do, and it was just me, and I was not very fast. It was about noon, and I still had several that I had to necropsy to get the brain sample, and I was up to my elbows in blood, and my boss walked in. I must have looked really bad [laughter] because he walked in and just looked at me, and he was like, "You need to get out of there," like, you need to take a break. I scrubbed off, and I got out of there and made some phone calls and had some people come in and help me. But it was so stressful because I just—there was a kid who had been bitten and we didn't know if these animals had rabies, so I just felt really responsible, like, we need to figure this out today. I'm really grateful for the help and the chance to at least have the sense that this work was really meaningful.

Q: Wow, that's very intense.

Beer: Yes, it was.

Q: What did you do after working at the state health department?

Beer: I spent a year at the state health department, learned a lot of stuff, really felt a renewed excitement and motivation to stay on the path to public health. I just feel like it's—it is such a noble—it is so important, and anywhere you go, public health is ever-present and something that is scientifically fascinating but intensely important to everyone in the country and in the world. I had accepted that position at the University of Washington, and so I went and decided that I would do a dissertation that would keep me on that track.

Q: What was your focus for your dissertation?

Beer: Sometimes, things in your life don't go to plan. [laughs] When you're doing a PhD, you often get a chance to choose who you work with, and you can rotate, and you can test out a few different research groups before you decide where you're going to work for six years of your life, and I rotated in a bunch of great places. You want to choose a project you like, but you also want to choose people that you really like and get along with and can learn from. I found that the people that I liked the most and felt like I could learn the most from, they didn't happen to be working on a pathogen. I thought, oh. It just broke

my heart that I would spend six years either working with people I just didn't feel a connection with but who were studying a cool topic, versus people who I felt like I really could learn some great tools from, even if I'm studying an organism that really isn't of public health importance.

I made that decision and I thought, I'm going to learn my tools, and I'm just going to keep my eye the whole time on how these tools can be used for applications and for health the way that I'd like to. I ended up studying a halophilic organism, which means it lives in extremely salty water, like the Great Salt Lake in Utah. They're cool bugs because they live in these environments that nothing else, nearly nothing else can live in. We learned a lot about how they respond to environmental stress, and that really is applicable to a lot of different disease processes, whether it's a bacterium, like a pathogen responding to antibiotic treatment, or an environmental organism that is affected by climate change. To me, it became really fascinating to see all of the parallels between this model organism that I was working on and pathogens that were of public health importance.

Q: Do you remember any notable professors or people you worked with while you were getting your PhD?

Beer: Yes. My advisor, Nitin S. Baliga. He's a great scientist, and he's a really great thinker, and I think I wanted to come out of my PhD with a clarity of thought that I didn't come in with, just the ability to take a lot of complicated information and ask questions

about it that let you break it down and answer an unanswered question and then be able to present that back. He's really good at that, and I feel like I learned a lot from him. I also learned a lot from the organizers of my program and the people who sponsored the epidemiology master's training grant I did. I did a master's in epi [epidemiology] at the same time, which was the way that I kept in touch with public health. It was hard to explain to people that I was doing a PhD in molecular biology and a master's in epi, in two completely different fields of research. It was nutritional epidemiology, and I saw lots of cool links between the two. There were a few other people who saw those links, and those people helped me to stay with it and not be too discouraged.

Q: How was that, balancing a PhD and a master's degree at the same time?

Beer: It was odd. It was hard, but I think it taught me some important time-management lessons. I had a year, basically. I did my PhD for one year, and then this program mandated that I take a break from the PhD and do the master's. I had one year to do it. It was totally funded, so I didn't have to have a separate job, which let me work full-time on the master's. I got nearly finished. I had written the paper, and then I had to go back to my PhD, and in order to keep working on it, I said I have to take one day a week. And one day a week, I did it, and I marched on to the end.

During my master's, I did a little experiment to see how well I could do in my classes and still work normal hours, because I was still trying to figure out that work-life balance and how do you be a good student and how do you do good work but also maintain a piece of

yourself as a person with other interests and relationships. My little experiment was, I said, I want to know how good I could keep my grades, because you have to take classes during the master's. I said, how good can I keep my grades if I let myself work as long as I need to during the week, but not on weekends? Who knows? If things had started going downhill real fast, I would have modified it, but I thought, let's see if I can do this. Sometimes, I'd work late in the evenings, but I found that I kept a 3.7 or something like that, 3.8 [grade point average], without working on the weekends. That taught me that it is possible to be efficient and to make that a part of your work style. I've played with different balances like that throughout my career, but that was an important lesson.

Q: What happened after your PhD?

Beer: After my PhD, I wanted to take a little break. I decided, after talking with a bunch of people throughout my degree, that I did want to come and be an EIS officer, and I thought that this would be a chance for me to learn the field components of epidemiology that I had never learned before and to combine my interest in laboratory science and epi in a place where people are really doing good, applied public health work.

Before that, though, I applied for this fellowship at the University of Washington. It's not really a normal fellowship—it's a grant from a guy who graduated years and years ago, and he decided that he wanted to give back to the university, and he wanted to do that by giving students the opportunity to travel, solo, in an unrestricted way. If you apply and you get it, you get twenty thousand dollars and the rules are you travel for eight months,

you have to travel alone, you have to travel to at least six different countries in two regions of the world. It's called the Bonderman [Travel] Fellowship, and I thought, what the heck, I'll throw my name in the ring, and I'll apply for EIS at the same time and see where the cards fall. I was actually here in Atlanta for the EIS conference the year that I applied, and I got the phone call asking if I'd like to be a Bonderman fellow, and I said, "Yes, I would." I packed up my bicycle and bought a one-way ticket to Cartagena, Columbia, and I got on my bike and rode through Columbia and Ecuador, and spent the next eight months around South America and Southeast Asia, India, and Turkey.

Q: What were you doing in the countries, the six different countries?

Beer: Part of the fellowship was that you—this wasn't about work. It wasn't an opportunity for you to fund an international part of your research or to take classes or to join a tour group. You had to be alone. You could certainly meet people, but you couldn't do any organized activities. I used it as a time to really explore, what am I like, who am I outside the context of my work? You're a student for so long, and you really start to identify with the things that you're doing and being a scientist or being a student or whatever it is that you do. I just found a lot of joy in meeting people and taking my time, not having a plan. I'm a real planner, you know. I like to have a path and work toward that and meet goals, and it was really cool to get on my bike and look at a town on the map and say, I'll try to get there tonight and then see what happens. I worked my way like that from Quito, Ecuador, over to the Amazon in the eastern part of the country, and it was great. I rode my bike twenty to forty miles every day and learned, asked questions.

I said I wanted to go camp in the Amazon. What should I do? When you talk to forty people about camping in the Amazon, you start to get a sense of what it is, what you can do, the best people to connect with to go with, and you collect that information. I didn't have a timeline, so I could wait if I needed to. I have a lot of really cool memories from that trip. It was like winning the lottery.

Q: Wow. That's amazing. So tell me about joining EIS. When did you find out that you were accepted to EIS?

Beer: I applied to EIS, and I interviewed, actually, during my fellowship. I found out I got into EIS actually when I got a voicemail and an email when I got off the boat from a trip to Galapagos. I had ridden my bike to Guayaquil, Ecuador, and I went to the Galapagos Islands. You're on a boat for a week, and there was no internet, and there was no phone, but I knew that was about the time that they were going to write back to us and let us know how—did we get in. The week in Galapagos was amazing, and I got off the boat, and I saw an email, and it was pretty cool. It was a pretty good week. From then on, that process, there was a lot of emails, a lot of information, and it was a lot of preparation for that first EIS conference in April, where you meet all the people in different branches here and figure out who you would like to match with.

Q: Who did you match with?

Beer: I, fortunately, matched with the Waterborne Disease Prevention Branch. I was on the domestic team, and it couldn't have gone any better. It's like being a kid in a candy store. You get a bunch of people from CDC, they're all in one room. Have you been to the EIS conference?

Q: No, I haven't.

Beer: It's free. If you ever get a chance, you should go. It's free to the public, and you can register and check it out, and there's a lot of great talks. You're talking to a lot of people and hearing all sorts of cool things, and it's like you can't really go wrong here no matter where you end up. I matched with domestic water, and I started there in July. It would have been 2014.

Q: What projects did you work on when you were an EIS officer?

Beer: Ebola was actually the very first thing I did. At the beginning of EIS, we have a summer course. From July 1st to August 1st, it's a crash course in epidemiology to get people all on the same page. On day two or three of the summer course, we knew something was going on because one of the EIS program directors came in. We were having a session maybe with HR [human resources], and he's like, "Sorry to interrupt. Does anyone speak French?" I don't speak French. A couple of people raised their hands, and I didn't think anything more about it. As that month of training went on, we heard more and more about Ebola and how things in West Africa were changing really quickly.

I finished out the course. I didn't have any special experience in West Africa. I didn't speak French, and so I was never pulled out early by name or anything. But by the time August and September rolled around, it was very clear that more and more people would be needed over there. Within my group, we talked about how we would schedule that. How do you send people over to deploy and still maintain enough of a capacity to respond to a waterborne issue here? And I went September 3rd to Liberia.

Q: Tell me about when you got the call to deploy, what your thoughts were. How did you feel about that?

Beer: Toward the end of summer course, it became clear that people were probably going to go, and so I had a little time to get used to the idea and think about what that might mean. I had just come back from this solo bike trip around the world, and so I'm like, heck yeah, I'll go. I definitely want to do this. I remember I was in the grocery store, and I just casually mentioned it to my dad. I was like, "I might be going to West Africa next month," and he's like, "Whoa, whoa, what?" My parents are pretty cool, and they were concerned about me, but they've never said no, you can't do anything, not that I'm a kid anymore or anything.

I think it was—at the time, to me, it was more exciting, and it was more—I felt more anxious about preparing to be able to be as effective as I possibly could than afraid. Because our mandate is not clinical, and I don't have a clinical background. So I didn't feel like I was at risk of being in a clinical situation where I would have an exposure

before I went. It was definitely more like, what do we need to do? Just trying to figure out the logistics of deployment, which I had never done through CDC before.

Q: Tell me about getting there, your first few days, what that was like.

Beer: I was really relieved that another woman in my class, Miwako Kobayashi, was—we were deployed at the same time. I didn't realize how comforting that was to have someone who at least I knew a little bit going into this experience with me. We went to the airport at 11:00 pm or so on a Friday. That particular trip was really long because you've got a layover in Paris and in Casablanca, and you arrive in Monrovia at like, I don't know, six or seven in the morning. I just didn't know what to expect. I didn't know what kind of work it would be. I hadn't done fieldwork before, and certainly nothing with Ebola.

We got there at six thirty in the morning, and I don't know where I got this, but in my head I thought I would put my stuff down in my hotel room. I hadn't slept in forty hours, and so maybe I'd sleep for a little bit. [laughs] No, not so. No, because by the time we got to the hotel, the teams were—it was eight in the morning, and all the vans were ready, and they were getting ready to go out to the Ministry [of Health and Social Welfare]. They were working with the data teams, they were going to their meetings. These people had been there for weeks or months, and we were just coming in to fit in with the response, and of course, that's what we would do. But I remember trying so, so hard just to stay awake and to be ready and engaged on that first day. I was coming in and

someone else was coming out, and I needed to learn how the laboratory data report forms were being entered and how do we keep track of those. I just remember that first day being like a real—just a real shellshock in terms of, okay, I will probably never catch up from feeling down like that.

Q: What sorts of things were you involved in at the beginning of your deployment?

Beer: At the beginning, it was unclear. Before you leave, at least in this point in the epidemic, we had a briefing before we left, and I knew I would be on the epi team. I knew who I would be working with. Actually, Jonathan [S.] Yoder, in my domestic water group, who was the team lead, he went to be the epi team lead during this time in Liberia, too, and I knew I would be working with him. That was really great to know that he would be there, too. But beyond that, I had no idea what the specific activities would be. I think that's common for a lot of people during this time. We knew, roughly, we would go and see what was needed and learn from there.

The first couple of days, I was feeling a gap between people whose role was to work in the Ministry of Health data room where you got—it's a room in a big Ministry of Health building, a bunch of tables with computers wired up, and they were running Epi Info. They had a bunch of volunteers with computers open entering paper case report forms, and they needed a CDC Epi Info liaison to help the volunteers to enter those forms. Laboratory data were also coming in, and they needed a way to link that laboratory data with those case report forms. I came in and was trying to learn everything about it myself

and then help out the volunteers. I worked on that during the day, and then in the evenings we would sit together as a team at the embassy and debrief the day and hear what everyone else was working on. There were people in the field, people working with WHO [World Health Organization]. About a week, I believe, I spent in Monrovia working with the data team.

At this point in the outbreak, the epi curve was still—the slope was still positive. We didn't know if cases would start to slow down. This was a couple of weeks before Martin [I.] Meltzer's paper came out that was predicting twenty million cases if nothing else happened. The country was gearing up for more cases, and the conversation shifted from, "let's focus everything here in Monrovia where all the cases are," to "we need to start thinking about the outlying counties that might have more cases." That's when I and a couple of other epidemiologists and EIS officers were told that we'd be sent out to different counties. That we needed to have people out there to help with preparedness and see where these county health teams were because a lot of the counties had had at least a couple of cases. They were expecting more, and we just had no idea how much capacity they had.

Q: So did you get sent out to anywhere?

Beer: I did. After that week, the team lead—Jonathan was there, but Frank [J.] Mahoney and Pierre Rollin were the overall leads at that time, and Frank said, "We need to make some surveys." He said, "We need some KAP [knowledge, attitudes, and practices]

surveys. We need some healthcare worker surveys. We need a needs assessment. We need a burial team assessment. We need a county health team assessment. We need a systematic way to know what resources people have and what they don't have, what they are able to do, how are they handling case report forms right now. We need a baseline assessment of what's going on." So four of us went out to different regions. I was out in Maryland County and Grand Kru County, which are in the far southeast of the country, and Adam Bjork and Kevin Chatham-Stephens were also in neighboring counties. We all took off in cars at about the same time. This was before they were helicoptering people out. You'd get in a car and you'd drive for three days. We spent two nights on the road getting out to these places, because it was the wet season, and there's one road, and it's full of mud. We caravanned out there until we reached our spots, and then we peeled off. Kevin peeled off on the road that went to Sinoe County, and Adam stopped in River Gee County, and I continued on to Maryland, which was the farthest away.

Q: Do you recall any particular events that happened during these road trips? What were the road trips like?

Beer: Man, it was—the whole road trip was an event. [laughter] The cars were driven by professional embassy drivers who were Liberian, and my driver's name was George Momolu, but he went by Sorsor, and he was fantastic. He could handle those roads like nobody else. He was helping other dudes get their cars out of the mud. There were checkpoints along the road, and we—just because everyone knew about Ebola and every county wanted to keep it out of their county, and so you'd have to get out and get your

temperature taken. I'm sure you've heard these stories, right? It was the thermal scanner gun. These all came from China. The writing on the gun wasn't in English. The gun would tell you your temperature was, like, thirty-two degrees. You just really get a sense of what is the context of this disease. I became more and more worried for this country that I had never been to before, but I'm like, how is this disease in this place that is so ill-equipped to handle it after so many years of war? It's like, why here? Why now?

Along the road, we'd stop at places, and there would be hand-wash buckets. I would stop, and I would look in the hand-wash buckets, and I would talk to people and say, "What do you got in your bucket?" Some people would just say it's water. Some people would say, "It's chlorine," and you'd open up that bucket, and it would knock you out because it was so strong. Some people would say, "It's the soap." People—they knew they had to wash their hands, but they didn't always have the same thing in the bucket. We had packed a couple of gallons of bleach, and we had a bunch of water bottles, and so wherever one was needed—this was, obviously, a completely temporary solution that didn't feel—it was a drop in a huge, huge bucket. But I'd put a little bit of concentrated bleach in the water bottle, and I'd write them out some instructions for how do you make hand-wash water, so at least they had some bleach for that moment, and they were able to mix it the right way. Because if the bleach is too strong it's going to hurt your hands, and if it's too weak, then it won't kill any pathogens.

Q: What happens when you get to Maryland?

Beer: We got there, and I just had the most wonderful hospitality. There was one other EIS officer who had been out that far before, and he had stayed in Maryland for a couple of days, Joe [Joseph D.] Forrester. He did a whirlwind visit through a bunch of counties, and he had made some contacts when he was there, and he had sent me information about people who were in Maryland, and there's a university there. I am, embarrassingly, not going to remember the name of the university right now. It will come to me.

Q: We can add it to the transcript later on. [note: William V.S. Tubman University]

Beer: Yes, okay. I was welcomed by the president of the university and a professor of nursing there, and I was able to stay in university housing, which was super lucky. I had a little apartment to stay in for that month, and that was really—there was one room at the university where you could get internet sometimes, and that was really important for keeping in touch with everyone back in Monrovia. I had a place to stay, and I just went to—I knew the name of the hospital where the county health team met, and I just showed up. “I’m here, and I’m here to help you guys. Just consider me a direct line to Monrovia. I’m here from CDC to offer technical assistance and to communicate back to Monrovia what your needs are and what the situation is.”

I think this is probably a common experience, and I don’t know if it’s a combination of being from CDC or non-Liberian, or being a woman, or being white, or any combination of those, but it was hard to break into that group and to really convince them that I’m not here to tell you what to do. I’m not coming in to run your show. I wouldn’t know how to

do that. I would meet with them every day. They were doing some trainings—they were training people, their burial teams. They were training their epi folks on how to conduct a case report. I would meet with individuals on the team to try to get the answers to my surveys and to report those messages back to Monrovia, but also I just talked to everyone. I just tried to learn what they were doing.

Q: Are there any notable people that you worked with in Maryland at the hospital that come to mind?

Beer: Yes, so many. Everyone just was really—I was really impressed with—they were working so hard. They weren't on a deployment. This was their life. This is their job, and now suddenly, in addition to dealing with everyday healthcare, public health in Maryland County, now they've got this, they've got Ebola. And they were clearly tired. They were clearly trying to deal with the acute problems they had on their hands, which were—now they have a bunch of staff that aren't coming, and there's one hospital in the county. That's where we were, and that hospital had this huge list of things that they didn't have, and that was part of my assessment. I'm like, do you have gloves? Do you have PPE [personal protective equipment]? Are people getting paid? Do you have a burial team? Do you have an ambulance? Do you have bleach? Do you have a way to disinfect that ambulance? Is the ambulance—does it work? Can you drive it?

I was in Grand Kru County. I left Maryland for a few days, went to Grand Kru, and asked some of these same questions, and they had ambulances, but those ambulances were

stuck eighty kilometers out in the mud. Coming back to Maryland County, a couple of days before I had gotten there, they had had some of their first cases. They had had not only some of their first cases, but they had a case in a member of their health team, and that was my first—that was kind of a reality shock for me, that I was in a meeting a couple of days before with someone who was exposed and then became symptomatic. There was nothing I could do, and I didn't touch—I didn't have any exposure myself, but to have been in the same room with someone whom I knew was now in Monrovia at an ETU [Ebola treatment unit], that was very real.

I have just a lot of memories that are coming in and I—there's one story that kind of unfolded as I was there, even though I didn't meet a lot of these people personally. What's the best way to introduce this? There was a big transmission chain that was unfolding at the same time, but when I got there I didn't know that this was happening because they didn't invite me to all their meetings. I would be there, and I didn't talk to the people who were there at that moment, but they would decide that they're going to meet at 8:00 pm that night, and I would just hear about it. It was frustrating to be there and not be included, although you're trying to do your best to tell people that you're here to help and you're not here to interfere or to take over.

What I learned later, over the course of the next couple of weeks from talking with people and going to neighboring counties, was that there were some really rural villages where they were a lot of cases. Someone had come from Monrovia a couple of weeks back. She died. She had been treated by a doctor who did not have a license—they called

him a quack doctor—so there was this family cluster of Ebola brewing in a really rural area. From that cluster, one of those people was related to a county health team member in Monrovia, and they got in a taxi, basically, and drove all around this area. The county health team member got in that taxi. They tried to drive to Monrovia. They had gotten a taxi because the old man who was the quack doctor became sick. His family member, who was on the county health team, came and met him and said, “Hey, Dad, I’ll take you to”—he was his dad. He said, “I’ll take you to Monrovia.” They got in this taxi, but those checkpoints turned them around. They couldn’t get that far. So, you’ve got a guy who is symptomatic. You’ve got a five-year-old kid. You’ve got the guy’s wife. You’ve got another family member. You’ve got the county health team member. You’ve got five or six people in this taxi, one of them symptomatic, another one becomes symptomatic during the taxi ride—this is over the span of a few days. They try to drive to Monrovia, they get turned around, and they end up having to come back to Maryland County. Along the way, the symptomatic—the man, he dies in the taxi, and so they’re pulled back to Maryland County where, essentially, the taxi stopped. They say, “We have one little clinic. It’s newly built. There’s nobody there. There’s nobody working on it, but you should go there.” This taxi with, now, two dead people in it and other people who were clearly exposed are told, “Hang here in this car overnight at this clinic that doesn’t have any people in it, and we’ll come see you in the morning.”

This story, I learned as I was there in meetings every day with the people who went out and met that taxi, with the people who buried them, with the people who had to talk with the family members who survived and who did not become symptomatic, with the people

who drove again to Monrovia to take the county team health member, because he did become symptomatic. This story is feeling very convoluted, but the point is I didn't show up in Maryland County and get this briefing on the first day. If that had happened, I could have been more effective, and I think a lot about what could I have done to become more plugged in more quickly and to have helped with that investigation. Thankfully, the county health team member who was in the taxi whose dad passed away, who became symptomatic, went to Monrovia. He lived, and he was able to come back to his job. But there was this very deeply personal experience happening in this community of public health workers, and I didn't know how to be more effective.

Q: How did your work change over time as you worked there in Maryland County?

Beer: I think I made—you make friends. The longer you're there—I mean, you can't expect to be best friends with someone on the first day, and I think that's maybe the newbie's mistake, [laughter] perception, where you're like, alright, I'm ready to work. We're going to make a line list. You've got the skills, you got the tools, you know what needs to happen, but the people don't know you. They don't know why they should like you. After a few weeks of showing up and just trying to walk the talk, then you're able to learn a bit more.

I got connected with the university where they were really involved with outreach in the community, so holding community meetings and having question-and-answer sessions. We had a big county meeting with university people and with district and village-level

religious and political leaders, and they said, you're here. You're from the CDC. Can you hold this session and give us a talk on Ebola and answer questions? So I did several of those. People had really great questions. You could tell they were thinking a lot about this. They had all sorts of questions I had never thought of. "What if I'm at the clinic and I see blood on the bench, and it's dry? Can I get Ebola from that?" I would have a zillion of these questions, and I had to do my best with the science that I knew.

Q: Other than answering questions, what else did you do at these county meetings and working with the community?

Beer: It really was a big Q&A [question and answer] session. and it felt like a Q&A plus pep talk, where, because of what I had begun to learn with this—I call it the taxi transmission chain, the taxi cluster—so much of what fueled that taxi cluster was fear, lack of communication, and local leadership not being open to their constituents having Ebola and getting the proper care for it. Like I said, there was a big family cluster in a small, rural village, and that's where the taxi ride started. In that village, you'd have political leaders that would say things like, "There's no Ebola here. I don't want to hear about it. Don't talk about it." Or, if you have it, they wouldn't visit anyone, so someone would be sick in their home, and people were so afraid—I mean, of course you're afraid—and these people wouldn't get food, and people would either hide in their homes or they would leave.

The pep talk part of these sessions was really to try to empower local and community leaders that this really starts with them. Nobody is going to change what they're doing if the people they are closest to and respect the most aren't saying the right things. So I really tried to say, "Look, Ebola is a disease that punishes everyone for doing things that are the most human things that can be done, caring for your loved ones, touching them, feeding them. Ebola punishes you for doing all of these core human things." I said, "Your role is the most important one because people aren't going to listen to someone like me. They're going to listen to you because they know you, and they respect you." I tried to pass on actionable messages, accurate information to people in these leadership positions.

Q: Do you recall the name of the village where the taxi transmission thing happened?

Beer: Parluken.

Q: Parluken.

Beer: And that was in Grand Kru County.

Q: So did you see any changes being implemented as a result of the Q&A sessions, or did you notice any differences?

Beer: I didn't—I wasn't able to go to all of these different villages because so many of them were not even accessible. We held the session in Harper, Maryland, which is the

capital of the county, and people traveled really far to get there. The feedback I got was really immediate from the community leaders that were there, and at least what they said to me was—they said, “We’re really glad you’re here, and we want you to know that we will take these messages back.” I couldn’t go back to their villages to know what they did and what was said, but the tenor of the meeting was curiosity and care, and it didn’t become adversarial. I know in a lot of other places these meetings could become that way, and I was afraid of that and just tried to stick with what I knew and what could be immediately useful for them. Thankfully, this one was very—people seemed really receptive.

Q: Between Maryland and Grand Kru, did you stay there until the end of your deployment, or did you move anywhere else?

Beer: I stayed in Maryland until nearly the end. I think I came back to Monrovia a few days before I had to fly out. Another thing I did there—borders were an issue, and the border between Maryland County and Ivory Coast is a river, and one question that we got from Monrovia was, what’s happening at these borders? Are people crossing? Are there posters at least? Is there any indication that Ebola response is happening there? George and I went out in a car, and we went to a few of these borders and met with the local law enforcement that would sit and make sure that barges didn’t cross. But what you learned was that the borders were technically closed, but this was the way that people got food. A lot of stuff came from Monrovia, but that’s a three-day drive. Stuff from the Ivory Coast comes a lot quicker. You can get a little—you can put a truck on a barge, and you can get

a lot of rice across the river that way. What you found was that the borders were closed, but people still needed food, and so the local leadership in the villages on neighboring sides of the river would—they were talking, and they were making sure that they could get at least some food, and that was a tough position to be in. I felt like I had the confidence of the county leadership that I had grown to know over the time that I was there. I had to be careful what I said so that I didn't rat them out. That's how it felt, at least. I communicated this, obviously, in confidence with my team in Monrovia. But I said, I don't want the hammer to come down on these guys because this is the situation. There's really nothing in the grocery stores. People aren't bringing their stuff to market. The prices of food have gone so far up.

Q: Do you remember any particularly stressful moments, working under so much pressure? Can you describe what your mood was like?

Beer: Yes. It was stressful because I always felt like, there's got to be more to do. There's got to be more to do. What can I be doing now? There's got to be something else. There would be moments where you're like, what am I doing now? What am I doing in this moment that is stopping Ebola? Sometimes it wasn't clear, and so those moments were stressful. One of the really hard times was—so the health center where the taxi stopped, it was a new building that was going to be a satellite to a clinic, and there's one guy who was tasked with caring for the people who were there. The situation was the taxi stopped there. The two who had passed were buried, but there were a few others who had been clearly exposed, and they were required to stay at the clinic because if they became

symptomatic, they needed care right away. There was one guy who was tasked with caring for four contacts, and this guy was—I went to that clinic when he was working and to visit the people who were still there, because even though they weren't symptomatic, they were being held there. According to recommendations, you're not supposed to keep contacts in quarantine. I'm sure you've heard of contact tracing. The idea is that you have contact tracers who go visit people in their homes and they say, hey, how are you, are you symptomatic? And they say no, and you walk away. But because these people had come into Maryland—they didn't live in Maryland. They came in in a taxi. Where were they going to go, and what if they did become symptomatic? In fact, a couple of them did. The solution that the health team came up with was, you guys are going to stay here at this clinic, and there's one dude that's going to bring you food, that's going to bleach your area, and I think other people would come and help. The health team would come and bring food, and there were other people that contributed.

Q: Do you remember his name?

Beer: Neufville. He and I talked a lot. He was on the edge of it. He was ready to quit. He hadn't been paid. He thought he should have extra hardship pay, and he was so, so angry that he was the only person here and he didn't have a lot of PPE. Another example of feeling helpless trying to do something. CDC sends us with like three sets of PPE, so you probably heard that story. Beforehand, CDC gave us three sets of PPE and said, you shouldn't have to use this, but here it is anyway if you have to get yourself out of a dangerous situation, and here's how you put it on. I didn't need this, so I'm like,

“Neufville, this is really embarrassing, but here are three sets of PPE. Please use what you can.”

Standing there with these four people—I was on one side of the clinic and they were on another part—we were on a cement patio. I was on one side and there was some grass, and there was another side, and one woman was the wife of the man who died in the taxi. That, I think, was the hardest moment for me, was imagining what she had gone through. She watched her husband die of Ebola in a car and then had to sleep overnight next to him. The five-year-old son, he also died in that car. I know a lot of my colleagues were in horrible situations. They were in ETUs, and they watched people die and they saw some horrible, horrible things, and I feel extremely lucky that I wasn't in that situation. But this, for me, I think was as close as I got to that.

This woman—I didn't know how to interpret this, but she was singing and chanting and kind of running around. She had her arms stretched out. I don't know if she was dancing or if she was mentally ill. I didn't even know how to interpret it. She had her arms stretched out, and she was chanting and running around and running backwards in her little area. There are three other people standing there, and she's just kind of doing her thing, dancing around, and I just wanted to understand. There was so much to feel at that moment, and I'm standing next to Neufville, who's at his wits' end having to care for these people. For him, it's like, oh my God, this is my job, and I can hardly handle it. That was a hard thing.

One other thing that was also difficult that I didn't mention was that also in Maryland County there's a rubber plantation. Have you talked with people about the plantations out there?

Q: No.

Beer: There are rubber trees where they literally harvest the sap from the rubber trees to make tires. There would be a huge plantation of rubber trees, and the workers will live there, so it's like a compound. If you work on the plantation, you do the work. Your food is there. You get a stipend, but you don't make a whole lot of money because your housing, your food, your medical care, everything is paid for, your family, your schools, everything is on the rubber plantation.

I got asked by the plantation, the manager, to come in and consult on their hospital. Could they be prepared to have an Ebola case? This place—this guy, he was French, and he ran it. He basically said straight up to me, he's like, "I don't want any Ebola patients here." He's like, "If someone in my plantation gets Ebola, I want a plan to get them out as quickly as possible," and "out" meant this hospital that I had spent the last month at, which was not prepared. They had no—the people weren't working, and so what do you—I had to either say, no, that's ridiculous, or try to explain to him the situation, because he had a beautiful hospital on campus at that rubber—that was the best hospital I had seen. They had a ton of supplies. They had a lot of different rooms. They had an isolation facility—they had an OB [obstetrics] ward. I'm not a clinician, and I'm

not an expert in judging hospital quality or preparedness, but this was like nothing I had seen in Maryland County, nothing compared to the cement clinic that the people were kept in after the taxi ride. I wanted to say, “You have such an opportunity here.” I wanted to say, “Shame on you. How could you? These people work for you, and all you want to do is send them out.” And so I said, “I’m going to tell you what are your options out there. There’s J. J. Dossen Hospital, and here’s what they have and what they don’t have. They are not prepared for an Ebola patient. Your employees would not do well. They would have to go to Monrovia. That’s where the ETUs are, and so you’d have to get them to Monrovia.” I said, “Let’s go look at your hospital and see, and we’ll do a walkthrough and we’ll see how it’s set up.

Q: Wait, I have a question. The ETUs were in Monrovia, but people who were sick weren’t allowed to come into Monrovia. How did that work?

Beer: Yes, you mean because they would get stopped at the checkpoints.

Q: Mm-hmm.

Beer: If you had already contacted—my understanding was if you had contacted the county health team, they could get you through, or you could be escorted. The taxi got stopped because they didn’t have a county health team escort. They were people in a taxi who were sick, and that’s what the checkpoint guys were trying to catch. But if you were

escorted with another car by someone in a health team capacity, then you would be able to get through. So, exactly.

There were a few ETUs at the time. There were the ones in Monrovia, and there were a couple of outlying ones. There was one that was just being built in Bong County, but still, it's like two days' drive away. So really, your options, if you're in Maryland County, are to take a two-day drive to close to Monrovia.

With this rubber plantation manager, the way I went about it was, you need to be prepared enough to have someone here for triage. I basically said, "You have to be able to keep someone here for a few hours until you can get them transportation." He seemed amenable to that, and in that way, I was able to say, "Here's how you can be prepared. You need to have a place where the person's temperature gets taken, a triage zone where you can figure out if they're high risk, medium, or low. And then, if they're high risk, you need a place where they can go and be isolated." I tried to give him advice on where in their hospital someone could go who is suspected of having Ebola, and then said, "If this person had to stay here longer, here's what you could do." Trying to make him feel like I was on board with his plan to get people out as quickly as possible, but to let him know that his hospital had the capacity to at least monitor a person for a little bit of time.

Q: Tell me about coming back to Atlanta and adjusting.

Beer: Yes, so we drove back from Maryland. I went back to Monrovia, and, at the time, a lot of people were extending their deployment, and I just remember feeling so torn. I just felt like—I was ready to go. I was tired and ready to go home. I didn't feel effective, and I kept feeling like I should have done more and I could have done this. So I called Doug [Douglas H.] Hamilton and I'm like, "Should I extend?" I checked to be sure that I had medical clearance because sometimes, you can't extend if you don't have clearance. I had the clearance that I needed, if I could. I don't know if he could hear something in my voice, but he was like, "It's okay to come home." I said, "Okay," and I did. But I just—you always feel like, or I did—I felt like I could have done more and better when I was there. I could have stayed longer. I mean, I think it was the right decision to take some time.

Q: Going back a bit, what was communication like with your family back home? What was that like? Was it easy to communicate with them or did you have—

Beer: It was pretty easy. Internet was intermittent, but you could send an email at least every day. There wasn't Skype. The internet wasn't strong enough to have a phone call or to Skype from Maryland County, but that was fine. I had just been—so my boyfriend, Ed, we've been together like eight years, and we had just spent eight months apart when I was out on my bicycle trip, and so we were used to the being-apart thing. Not that it was easy, but I wasn't worried about him. We kept in touch. But it was more like I felt like I was running out of—my capacity to help the response, I could feel, had diminished, and I thought, well—I made myself feel a little better by thinking that I could come back if

needed or continue to work from Atlanta. But you still feel guilty because nobody else gets to leave. The Maryland County health team, they don't get to leave.

Q: That's true. What was it like when you got back to Atlanta, adjusting back to being here?

Beer: It was okay. I think, at the same time, I was kind of learning what EIS was all about. I didn't really understand that EIS wasn't about Ebola. I thought that that was your full-time gig, was responding to these outbreaks. What I didn't know was that you match with a group and your primary work is with that group. And then, something like Ebola comes on, and it's not a foregone conclusion that you go and work on that. I remember feeling like, oh, now I'm done with Ebola, and I need to jump right back into my waterborne work, because Ebola really wasn't—that was an extra thing, and I think I didn't really fully understand how that worked when I first started.

It was hard because you're trying to stay connected with this world, and you're still working on—you want to pass on the things that you learned. I had created a line list of the cases in Parluken where that taxi cluster started. They had a bunch of handwritten notes, and I think probably the biggest thing I did for them, which was super simple, was turning those handwritten notes into a list of people so that we could—so that they could keep track of their cases, and making sure that that information got to the next person who was going to be out there and that the county health team was supported. It definitely feels like you're doing double duty when you get back here. You are still in the

Ebola world, and you need to make sure that the findings get to the people who can use them. You're writing a paper, if that's what is happening, making sure that you aren't leaving the response—making sure that you were as effective as you could be in the response and not holding anything that you needed to pass on. And getting started again in your work, which I learned—I'm like, oh, this is really my fulltime job, and I need to jump back into this one hundred percent.

Q: The waterborne, what does that entail? What did you do?

Beer: We have a lot of different pathogens. I mainly worked on *Giardia*. We have *Giardia* and *Cryptosporidium*. We've got the brain-eating amoeba, *Naegleria*, *Balamuthia*, *Acanthamoeba*. It's really cool—we've had a lot of different pathogens. I had some analytic epi, a lot of data analysis to do. One of the projects you do for EIS is evaluating a surveillance system, and so I learned a lot about the *Vibrio* surveillance system. I was able to present some work from Liberia. We did a survey of members of the public, on whether, if they became symptomatic, if they would seek treatment. We did a knowledge/attitudes/practices survey to give results to the county health teams so that they knew, if they had more cases, did their constituents know about Ebola? Did they know how it was transmitted? Were they afraid? If they became symptomatic and if an ETU were available, would they even go? We made sure to write those up and present those results back to the team. After we did that, we wrote an abstract, and so I worked on doing that for a conference.

Q: Alright, so bring me up to now. What are you working on these days?

Beer: I just finished EIS.

Q: Yay.

Beer: [laughter] I know, two years feels so—yes, I can't believe it's two years ago, almost, that I was in Liberia. I'm wrapping up a paper from EIS on *Giardia*. We looked at diagnostic and treatment patterns among people in the US who get *Giardia*. I just started a cool new position in mycotic diseases, and it's really cool. I don't know a whole lot about fungal diseases yet, but I'm learning a lot. I love the people that I'm working with so far. I got a chance to meet them while I was in EIS, because we were on similar floors and were in the same division, so I didn't feel like I was going that far. Today, I worked on a survey of nurses who were caring for infants during an outbreak in a neonatal intensive care unit in San Diego recently. It's like a skin yeast infection that these infants got. But incidentally, people's pets, like their dogs, can also get this yeast infection. Tom [Thomas R.] Frieden said on NPR [National Public Radio] that it's his favorite pathogen. [laughter] That's on the record, *Malassezia furfur*. He says he likes it because it's a skin infection that doesn't cause any harm. But in infants, it can cause some harm, especially if it's a systemic infection, and so what we wanted to know was, were the people taking care of these infants, were they more likely to have a dog? Or were they more likely to wear clothes that they had worn from home? Is there something about the healthcare workers' activities and the infants' risk of getting this infection?

Q: Looking back on Ebola and anything else we've talked about, do you have any final reflections or anything that you want to talk about that we didn't get to?

Beer: Just that it was—I was simultaneously grateful for the chance to help out and that I was available to go at that moment and that I could help out. But also just—I wish I had been more competent. [laughs] There are so many things now, after two years—I think a lot about it when I'm doing unrelated projects and I think, oh man, I should have done that in Liberia. Oh man, I could have done that, and then this would have happened. That's not a hugely productive thought process because you can't go back there, but that's where I go. I still keep in touch with George. When you work for the embassy for, I think it's fifteen years, you get a visa, and so he's been working for the embassy for fourteen years. I said, "When you get your visa, you let me know, and you come over here, and we'll keep in touch." My mom and her husband recently started a dump truck business. I know that sounds random, but I'm really proud of them, and they started this, and they've got two or three dump trucks now. I told George, I'm like, "You are an amazing driver, and so if you get here and you want a job driving, you let me know. I'll see if I can hook you up." I said, "It's in Minnesota, and so it gets really cold. You probably won't want to go there." [laughs] Hopefully, I'll see him again someday.

Q: Okay, anything else?

Beer: I don't think so, unless you have any other questions.

Q: Okay, I guess that's it then. Thank you so much. It was a pleasure having you here.

Beer: Yes, thank you. It was really good to go back through and remember.

END