CDC Ebola Response Oral History Project

The Reminiscences of

Julie I. Thwing

David J. Sencer CDC Museum

Centers for Disease Control and Prevention

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Julie I. Thwing

Interviewed by Samuel Robson
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Interview 1 of 1

CDC Ebola Response Oral History Project

Q: This is Sam Robson here today with Julie Thwing. Today's date is November 29th, 2016, and we're here in the audio recording studio at the CDC [United States Centers for Disease Control and Prevention] Roybal Campus in Atlanta, Georgia. I'm interviewing Julie as part of the CDC Ebola Response Oral History Project, and Julie, thank you so much for being here with me this morning.

Thwing: My pleasure.

Q: For the record, could you please state your full name and your current position with CDC?

Thwing: My name is Julie Irene Thwing. I'm a medical epidemiologist with the malaria branch.

Q: Thank you. And, if you were to give someone like a capsule description of what you did during the Ebola response, your part in it or your vantage point on it, what would you say?

Thwing: I was the malaria advisor for CDC in Senegal. I was the only CDC person who was permanently stationed there, so while my focus was anything but Ebola at the beginning, once we had a case, I played a role really facilitating the CDC TDYers [staff on temporary duty assignment] who came, and making sure that there was some sort of continuity in what CDC was doing with the successive generations of TDYers.

Q: Thank you very much. Backing up a bit, can you tell me where and when you were born?

Thwing: In Seattle, Washington, on July 29th, 1975.

Q: Did you grow up in Seattle?

Thwing: No. That's the long story. [laughter] I was actually raised in Cameroon until I was ten, in West Africa. My parents took me back when I was a little under a year old.

Q: This is obviously a ridiculously broad question, [laughter] but tell me, what's it like growing up in Cameroon?

Thwing: I had a wonderful childhood. The first five years or so, we lived in a village with a population—it was a large village, about three thousand. I played outside a lot with one little Norwegian girl, and a lot of little girls from the village, and we played in a mixture of four different languages. My memories include rescuing the chickens from the chicken

coop from an approaching brush fire, watching my dad hack the head off of an eight-foot-long viper, playing down in the fish pond and bringing home tadpoles—it was pretty idyllic. Then we moved to the capital city for school, but again, amazing situation with an international school of, I think, 125 kids and twenty-five nationalities. I can't say what an American childhood would have been like, but I'm really grateful for mine.

Q: Why were you in Cameroon in the first place?

Thwing: My parents are Bible translators, and both trained as linguists.

Q: So, in the capital—let's see—

Thwing: Yaoundé.

Q: Yaoundé, until you were about ten years old. Did you start developing affinities for certain academic subjects?

Thwing: I was a bird nut, from about the age of eight years old on. Cameroon has amazing wildlife, at least in the birds—I think before they had a lot of mammal wildlife too, but it's mostly been hunted out and hard to find. But amazing, amazing birds. I would get up at six o'clock in the morning and go watch birds on my weekends.

Q: What brought you back—do you go from Cameroon—where did you go from Cameroon?

Thwing: We went back to the US, and this was Dallas—that's the world headquarters of the organization my parents were with. It was originally a family health issue that we came back for, but then just ended up staying. My parents had home assignments teaching linguists and working to provide resources for translators. So I did junior high and high school in Dallas.

Q: How do your interests continue to develop in junior high and high school?

Q: I remained interested in birds somewhat, although America has less interesting birds [laughs] than Cameroon did. I was interested in psychology for a while in junior high. I lost my left hand in a car accident, actually when we were back in the US, when I was six, so my interest during high school was prosthetics. I thought I was going to do an MD-PhD [doctor of medicine-doctor of philosophy] and do biomedical engineering and work in prosthetics.

Q: Did you think that up through graduation from high school?

Thwing: I did. That was part of my application essays for university, was what I wanted to do as far as prosthetics. I went to a math and science academy for the last two years of high school, and really enjoyed it.

Q: And then where did you go from there?

Thwing: Well, that's another of my random stories. I was planning to go to the University of Texas at Austin. I didn't want to graduate with much debt. As missionaries, my parents had minimal income. One of my good friends and a guy that I had a crush on had applied to Harvard [University] and gotten in early, and he said, "Come on, apply!" So I followed a guy to Harvard, [laughter] which most people don't do. That didn't work out, but Harvard did, and I really enjoyed it. They made a financial aid package that was way more generous than I could have imagined and made it possible for me to be there.

Q: Did you start out majoring in a certain subject?

Thwing: I majored in biology, so stayed with that, that biology trajectory, and planning to still do the MD-PhD route and do prosthetic work. Finished all my pre-med [pre-medical] prerequisites after my sophomore year, and then didn't know—I don't know if it was burnout, but I needed something. So I took a year off. At Harvard, you actually have to apply for a year off, and you have to give them your plans. The other thing about Harvard is everything's administered through the dorms, which are called houses. Each house—it's modeled on the [University of] Oxford and [University of] Cambridge system—each house is an academic community, so I had to submit my plans to my house committee. Unbeknownst to me, they had a travel fellowship. I had, up until then, while I really appreciated my childhood as far as what it gave me in terms of experience, I didn't enjoy

the financial insecurity. My thought was I was going to do a lot of good things, but I was going to make a lot of money, and I was not going back to the developing world, [laughs] which is funny in hindsight. I realized over the course of my sophomore year that I did need to go back as an adult, so I decided that I was going to stay in the US for the first semester, work and earn money, and then go back to Cameroon and work in a medical setting during the second semester.

I handed in my plans, and several weeks later, got a call to come to the house master, which is the person in charge, to their residence that afternoon. I thought, oh my gosh, what have I done? I don't think I've done anything wrong. And they told me that I was the recipient of a rather substantial travel fellowship. It was by design something you can't apply for, but something that's just—and it's not advertised—was amazing. I did, because I'd already made the plans, and committed to a job, stay in the US that fall and work, which was really good work experience. But then, because I had the money for a travel fellowship, I got to extend my travel plans. So I visited friends in med school in California, friends doing a one-year project in the slums in Manila, [the Philippines]; lived with an aunt and uncle who were missionaries in Japan for two months, tried to learn some Japanese, and just sort of immerse myself in the culture; visited friends that I'd grown up with in Cameroon who were living in England; a college friend who was also taking a year off whose family lived in Madrid; and then I went back to Cameroon. I was back in Cameroon for about five months. It really did let me get a much broader experience.

I worked with a public health outreach program, a network of, at that point, about forty village health clinics, and some advanced practice nurses who would visit each clinic on a circuit and provide vaccination services, referral visits. In some of the villages, especially when they were just introducing a clinic, we did a baseline survey, where we would assess blood pressure in people older than fifteen, feel for spleens—it was a basic survey. It was kind of funny that I ended up at CDC so much later. So, I participated in a number of those. There was a maternal and child health survey questionnaire that I administered, so I got a lot of public health experience there without even realizing that public health was an interest. But then, based on that experience, I decided that I needed to change trajectory, and I was going to go back to the developing world.

Q: You had said before that you made a realization that you needed to go back to Cameroon. Can you tell me more about that?

Thwing: The funny thing is, it was sort of spurred—things have to sort of get into my consciousness by the back door. The friends that I ultimately visited in the Philippines had been seniors when I was a sophomore, and they had decided to do some sort of public service project somewhere in the world, and they were looking at several sites in Africa. And I thought, well, they need somebody who's been there and can kind of help them adjust, so I was thinking I should join them. That's not how it worked out in the end, but realizing that I had a desire to join them made me realize that I had some going back to do.

Q: And now, this other realization, when you're in Cameroon, that this is going to alter your career trajectory.

Thwing: Yeah, absolutely. I can't explain exactly what it was. There are things that just catch your heart, and you realize that that's what's going to provide meaning, and you can do a lot more good in the world in certain situations than in others, and that's where I was supposed to be.

Q: When you look back, is there something especially that you remember from that time that caught your heart?

Thwing: I think it's the totality of the experience. In part, because I had spent my early childhood in Africa, I'm one of those third culture kids that's not fully American and not fully African. You don't actually fit in anywhere very well. But there was something that was so deeply part of me about being in Cameroon, and there are things that translate to West Africa in general from the Cameroonian experience.

Q: So what happens then?

Thwing: I went back to school. I tried to take as many classes as possible at the Harvard School of Public Health that would count for my biology degree, so I took a lot of parasitology—pretty much every parasitology course that the School of Public Health would offer. I think I took a human physiology course there too. Anyway, I tried to get as

much of my biology degree as possible at the Harvard School of Public Health, and they were generous about letting me do that.

Q: Parasitology, because that would fit under a biology requirement?

Thwing: Right, and parasites were pretty cool.

Q: Yeah, there's that. [laughter] Were there any specific ones that you remember studying?

Thwing: I think the most genetically fascinating parasites [are schistosomes]. I won't go into the details here, but it blew my mind. Obviously, malaria was a huge problem in Cameroon, is still a huge problem in Cameroon, and it was something that I was interested in as well, so I took a class that was just on malaria that was really an amazing experience.

Q: Also, I guess I probably should have asked this before. You grew up in Cameroon. Do you speak French, at this point?

Thwing: I do, right. While I never went to a French school—it was a one-hour-a-day class—but until I was five, I was more or less in an immersion setting. I say I speak Cameroonian Village French, [laughter] but it's maybe a little better than that now. I wish it were better, but it works. It lets me function well, even in a French professional setting.

Q: So, taking the classes in parasitology, and in some human—what did you say?

Thwing: Human physiology.

Q: Human physiology, thank you. What happens then?

Thwing: The other thing that was rekindled was my interest in medicine. Although I had since hit calculus-based physics and decided engineering was not for me. [laughs] Fortunately, you don't really need calculus-based physics to be a doctor, or to do tropical medicine. So, I went to—well, I applied for medical school. That's also an interesting story. I was, again, going on the same trajectory—I didn't want to get too much debt. I was actually coming out of Harvard with mercifully little. But I still wanted to be careful if I knew that I was headed for the developing world, and not a lucrative career. At that point, my heart was sort of set on Baylor [University]. Because I was still a Texas resident, I'd get in-state tuition, and a private school education. I applied to a number of places and interviewed a number of places. My first interview was Vanderbilt [University]. I thought, great. I'm not particularly interested in going, but this is good practice. And I had a really fun interview with the head of general surgery. I didn't know enough to be terrified.

While I was waiting for him to come in, because he was late from a case in the OR [operating room], this man walks in with this wild head of graying, mostly white hair,

and says, "Hi, neighbor." And it turns out—so he was the director of the general surgery residency program, and had run a missionary hospital in Nigeria for years and years before he joined the Vanderbilt faculty. I had made some connections, I forget through whom, to let people know I was coming, but he realized that his boss was interviewing somebody who'd grown up in Cameroon, right next door. So we talked for a while until his boss got there to interview me. Just a wonderful [person]. John [L.] Tarpley is—most people who are familiar with surgery in the developing world know his name, he's one of the greats. Anyway, so Dr. Tarpley talked to me until his boss, my interviewer, got there, and then picked me up afterwards, gave me a tour, gave me some materials he put together, and then later, was just really instrumental in helping me make my decision. But even then, I wanted Baylor. Later on, I had gotten an acceptance to Vanderbilt, hadn't committed, got a phone call—or, a housemate took the message saying Vanderbilt called. So I called back, and they were offering a full ride. [laughter] Like, what? But when you get your head set in a groove, it stays there. I said, "Well, I'm really interested in Baylor." I realize you can't see in an interview, the—[laughter]

Q: The gun to the head?

Thwing: —the gun-to-the-head motion. [laughter] So I called Baylor and told them what Vanderbilt had offered, and they said, "Let us see what we can do," and their offer wasn't anywhere comparable. So I went to Vanderbilt, and Dr. Tarpley continued to be one of my mentors, and I found an amazing community there. Vanderbilt is just an incredible institution. It's both excellent and congenial, very collegial. It's both excellent and happy,

which I think is rare. I had a really great experience there—great faculty and wonderful learning. I'm grateful for everything that I got at Vanderbilt.

I did my four years of medical school there, really enjoyed it, and co-chaired the international committee in the medical school that—we did a fair amount of hosting of events oriented toward international health. Tried to bring in some speakers, also tried to help people coordinate trips abroad as part of their medical rotations. After my first and second years of med school, I took classmates back to Cameroon to work with the mission hospital that I have connections with there, really enjoyed that, and that all solidified this—and, I really thought my trajectory at that point was—I mean, the only paradigm I had for health in the developing world was a mission hospital. So I thought that I would just find a mission hospital that I could live with [laughs] and just settle down into that kind of life. I chose internal medicine and pediatrics as a residency so that I could be trained both to see adults and kids and anything that walked in the door.

Q: You laugh a little bit when you say "find a mission hospital that you could live with."

Thwing: Policies-wise. I'm not exceptionally conservative, so [laughter] there are certain things that would have been a challenge, others that would have been less of a challenge.

Q: So, tell me what happens then.

Thwing: Four wonderful years of med school at Vanderbilt. I absolutely loved the internal medicine and pediatrics program there, and the faculty that ran it. They're still some of my idols. I told them, I just really want to stay here. Do I really need to interview anywhere else? And they said, you at least need to see other places to be happy with your decision. So I interviewed a few other places, and I ranked Vanderbilt first, and I stayed at Vanderbilt for internal medicine and pediatrics and was very happy with that choice. Even as a resident, I got to do a few rotations abroad. I went to—did I go back to Cameroon? I think I went back to Cameroon once. I also went to Costa Rica because I had taken advanced Spanish in college and really hadn't had a chance to use it—a little bit in the clinics when I had a Spanish-speaking patient. But got to do a rotation in Costa Rica that was a lot of fun. So, sort of continued on that trajectory, became a little more interested in the HIV [human immunodeficiency virus] side at that point. I worked with a faculty member one afternoon a week in his clinic for HIV patients and really enjoyed that. Although, for my senior presentation in pediatrics, I gave it on the efforts toward a malaria vaccine. So, you see some of the interests continuing all the way through.

Q: Absolutely, and a diversity, a growing diversity of interests. Was there something that drew you to HIV?

Thwing: Partly, again, because I had seen—I had been, I forget what year it was that I was back in Cameroon. I think it was—I was back in '95, and I was seeing that it was going to explode, and there was very little—but that was when I was in the middle of college. I felt like, what can I do as a college student? I'm not Paul [E.] Farmer. Then

when I went back in medical school, you could see it evolving, and thinking I was going to be back in Cameroon, I felt like being able to take care of HIV patients was really important. Oh, actually, that was the rotation I did back in Cameroon during residency. I spent a month with a Cameroonian pediatrician who had, even before the days of PEPFAR [President's Emergency Plan For AIDS Relief], had a panel of patients on ART [antiretroviral therapy].

Q: Neat. So, you finish your residency—

Thwing: Finish my residency—well, so, loved internal medicine and pediatrics, loved both sides of it, pretty much evenly. Some people really like the peds [pediatrics] better, some people like the internal medicine better. I really liked both. I was trying to figure out what the next steps were. I had some loans to pay back—not very much, but I had some loans, so I was looking, and I was really still very interested in infectious diseases. I was trying to figure out if I wanted to do an infectious diseases fellowship, if I wanted to do it on the medicine side, on the pediatric side, or be really masochistic and try to do both. [laughter] There was one guy who was doing both at Vanderbilt when I was there. I talked to him a fair amount. But I really wasn't sure what I wanted to do. I was also considering taking a hospitalist position to pay off loans, and also be good training for then being a med-peds hospitalist, basically, in the developing world. I was talking to a good friend and mentor, who was a more senior physician who practiced in the same suite, and she said, "You know what? You and my husband need to talk." It turns out he had done Epidemic Intelligence Service as a young physician, and he had done it in the

state of Tennessee, where Vanderbilt is, and at that point was the deputy state epidemiologist. We all met up for breakfast, I think the next Saturday morning, and he told me about EIS [Epidemic Intelligence Service], and I thought, that sounds really interesting. There were a lot of countries you could go to in public health that you're not going to go to as a missionary. I thought it would open a lot of doors, and it would also give me time to stall and figure out if I actually wanted to do infectious disease, and which side. So I applied to EIS and got in. You've probably heard this before, but they have a week in the spring for everybody who's gotten in that's sort of a rush week. It's EIS conference week. You get a chance to meet with all of the different branches and divisions offering positions, and for an extrovert such as myself, it is heaven, because you are talking to fascinating people doing amazing work all day long, and there's a chance that you—or you will—be doing this with somebody. I really looked at the HIV and malaria positions most strongly—I looked at a number of other ones. But the HIV positions that year were not what I was looking for, and I really, really clicked with the primary supervisor for the malaria position, and with pretty much everybody in the malaria branch, and thought they were just a phenomenal group of people. So, my charmed life once again—I got the malaria position that year for EIS.

Q: Who was the primary supervisor?

Thwing: Rob [Robert D.] Newman. He is now the CDC country director in Cambodia, but went from where he was with us in CDC to the head of the WHO [World Health Organization] Global Malaria Programme, and then has moved around a little bit, and

then came back to CDC to be the Cambodia country director. But yeah, but really had a chance to work with so many different people in the malaria branch, and didn't really develop one focus, but worked on vector control and case management and sort of across the board, got a really good, deep exposure. Got to do work in Niger and Angola and Kenya and Tanzania and Madagascar—just really all over, and had a great experience in EIS.

Q: Were there any experiences of those that, when you look back, are some of the strongest in your memory? One or two?

Thwing: Oh, gosh. I think the one that was the most visually arresting, or stunning, was Niger. It was my first one. I did the July summer course. I was in the malaria branch for maybe three weeks when I left for Niger, fortunately with somebody else from the malaria branch who had been there and been involved in a survey there before. But we were doing a nationwide survey to assess the coverage of the long-lasting insecticide-treated nets that had been distributed in a recent campaign.

This was back in the days when we used PDAs [personal digital assistants] for data collection, so worked on programming the PDAs with the person I went with, and trained—my French was better, so my first real thing in CDC was training a roomful of fifty Nigeriens for a week, in French, on how to administer this PDA-based survey. Then we divided the survey teams into three groups, and I took the group that went up north. I think we had three teams, so we had a Red Cross logistician vehicle and a sat [satellite]

phone. And we went up past Tahoua, which is sort of central Niger, but then up to places that you can't go anymore. We went up to Agadez, which is sort of the Nigerien Timbuktu, so to speak, and then up to Arlit, which is a mining town right on the edge of the desert, and then across a fringe of desert up into the Aïr mountains, which sort of straddle the Niger-Algerian border. It was beautiful. It was in, I think, a window of relative stability, so we did have some—a little group of four Nigerien soldiers who were with us in the far north. But it was stark, and beautiful, and very barren. We would sleep outside every night on the porch of either the—they call the maison d'état, which is sort of a house in each town that the state owns and uses for visiting guests or a health post. Bucket baths. I would string up my mosquito net under a tree and tuck it under my mat and be very thankful in the morning with all the dead creepy-crawlies on top of the mosquito net. Just some amazing experiences in terms of really seeing that life, and a life that hasn't changed a whole lot for the past few thousand years. Being welcomed into Tuareg tents and being given a bowl of fresh milk that you'd take a few sips of, and hope desperately you're not going to get sick from, [laughter] and I was lucky I never got sick. But yeah, just an amazing experience.

Q: At the end of your two years, what happens then?

Thwing: The longer that I stayed in public health, the more I liked it, and the more I liked being in bed at seven o'clock in the morning, rather than in the hospital at seven o'clock in the morning. So I kept putting off and putting off and putting off applying for an infectious disease fellowship until I decided, I'm not going to go. I was trying to think

about what kind of positions I might be interested in in CDC—briefly considered applying for HIV positions, but talked to my malaria branch folks and said, “Do you think you can keep me?” They figured out a way, and I’ve been in the malaria branch ever since. I’ve been in the malaria branch ten years now, including my EIS time.

Q: Gotcha, so, since 2006, about.

Thwing: Yep, since July 2006.

Q: Can you take me through those ten years?

Thwing: I finished EIS in June 2008, and had already been brought on board, so there wasn’t a huge transition from being EIS to being a full-time staff. But one thing that I did as part of that transition is, they wanted me to take on the support of a President’s Malaria Initiative country. I had participated in an assessment, visited Madagascar, and loved Madagascar, and said, “Can I do Madagascar?” I guess other people loved Madagascar too, so my supervisor said, “No, I think that the Senegal team would be good for you, and I think you’d like Senegal.”

Part of the story I didn’t tell you is there was a brief period after we left Cameroon that we went to Senegal, and it was fifth grade, and then—because things bounced around a little bit—part of seventh grade. That’s a wretched time in any child’s life. That much transition was—I really didn’t like Senegal at all. So I thought, oh, my gosh, I can’t

believe they're making me go back to Senegal. But I wanted the job, and I said, "Alright." So I started supporting the Senegal team. Along with some of the more research-oriented projects that I was involved in, I was backstopping the President's Malaria Initiative team for Senegal and serving as their medical epidemiologist. My first few visits, I spent a lot of time in the USAID [United States Agency for International Development] offices and didn't particularly like it.

Q: What do you mean?

Thwing: Just bored, or—anyway, I didn't have a chance to have my preconceptions, or my previous notions challenged. But in 2009, Senegal did its first mass distribution of long-lasting insecticide-treated nets to children under five. Given my experience with a nationwide post-distribution coverage survey, I was asked to do one in Senegal. Once again, I programmed the surveys onto PDAs and got ready to do this again, and went back, and there was a really wonderful Senegalese implementing partner that was brought on board to do it, very competent. I really enjoyed working with them. So, worked with them to finalize the questionnaire. They recruited the interviewers, who were just top-notch, just a pleasure to train them. Then, as we did in Niger, we each took an axis and followed the teams and supervised the teams that were doing the clusters that were selected along there. Got to travel through southern Senegal, all the way out to the far east on the border with Mali, and fell in love. Again, I guess it's a heart thing. But really, really enjoyed the Senegalese that I worked with, and the dynamism, and the work ethic, and just—once you get out of the city, seeing the countryside, and the people, and the

work that they're doing was just really inspiring. I went back every chance that I got, along with the other work I was doing in the malaria branch. Then, when the resident advisor in Senegal decided in 2011 that he had done his four years and it was time to move on to another job, I told them that I wanted to be the resident advisor. Once again, they said alright. [laughter] It worked out because I knew the country, and I could hit the ground running, and I wouldn't have to have a huge learning curve. At that point, I already knew a number of people in the National Malaria Control Programme, and so it was a fairly easy transition.

Q: Can you tell me what the resident advisor in Senegal does?

Thwing: The way the President's Malaria Initiative works is, it's co-run by CDC and USAID. USAID runs all the money, CDC gets a little bit, mostly for salaries and a few visits. In each country, it sort of functions through the USAID system, so through the USAID health team. But there's a CDC resident advisor, and a USAID resident advisor, and between the two of you, you function as co-equals to run the program. There's not a specific way the tasks are divvied up—you sort of look at all the different aspects of the control program and you divide up the work between you, as far as what people's interests are, and strengths are, etcetera. There's also a number of foreign service nationals, so nationals from the country who are usually doctors or PhDs who work on the team and help everything function smoothly. One of the really awesome things about the way PMI is set up is that you're supposed to spend half of your time with the Ministry of Health [and Social Action], with the National Malaria Control Programme, and half

the time with USAID, at USAID offices or in the embassy. Rather than just being boots on the ground, or just being money, you're both. You can bring the resources to bear, but then you're actually with them every day, participating in the meetings, participating in the discussion, learning, mentoring where it's needed. In Senegal, they had such a fantastically good NMCP [National Malaria Control Programme] that there wasn't a lot of mentoring needed, but you're still—you're there doing life with them, and I think it's an incredibly effective model.

What's the other thing that I found really compelling about the PMI model that I was going to bring up? Oh, the other thing that's really—they're not there with, "This is our program, we're going to do this." It's in concert with the National Malaria Control Programme, looking at the resources they have, looking at their goals, and figuring out where the gaps are. Do you need long-lasting nets? Do you need malaria medicines? Do you need malaria tests? Do you need training? Etcetera. Then you work with them, and it's really, in Senegal, evolved to the point where members of the National Malaria Control Programme sit in with us on budget discussions every year, as we're planning the budget, and help us decide how much money to allocate to each thing. I think it lets us be a really effective partner, and it's really satisfying.

Q: Absolutely. I have a couple questions here. I'm really interested in that combination of having the dual role of you get to be the boots on the ground, and the person with the money. Were there times where that experience on the ground, talking with people,

understanding what the situation was like, the conversations you were having, affected that other role of yours?

Thwing: I would say absolutely. To clarify, as a resident advisor, you don't have any real power because it all has to be approved at headquarters. I can't say, "Oh, you want to do this. Well, I'll give you $150,000 for that." It all has to go through a central planning process. On the other hand, you have influence. When you're talking, when you're seeing needs, you're looking at what needs to happen—you bring that to the planning process. I could never unilaterally say, "Oh yeah, let's spend that for that," but you can take that experience and what you see on the ground and the ideas you're generating with your colleagues, and you can translate that into budget.

Q: Are there any times when you look back and you can say, "Having that experience really helped me say this particular thing?"

Thwing: We did one thing in Senegal that I still think is the best thing I did there, and it was with Peace Corps. One of the things that President's Malaria Initiative has worked on is a good collaboration with Peace Corps, because they're even more boots on the ground—not very much money, but they're boots on the ground, and they're in the villages, they're seeing what's really happening, and they're also working really closely with local counterparts. So, not long after I got to Senegal, there was a Peace Corps volunteer who submitted a small projects grant. PMI would give Peace Corps a few thousand dollars a year so that Peace Corps volunteers could apply for little project grants

for malaria, and one of my roles was to review these grant applications and make sure that they pass muster. He had—his close counterpart that he worked with in his village was a volunteer community health worker, and they shared a hut and were best buds. And they had a really traumatic experience where that community health worker's niece died of malaria, even though he was in the village a few doors away, and had the malaria tests and medicine. They just didn't, for whatever reason, seek care.

This got them to thinking, and they thought, let's try a program where we visit every house every week and find people with fever and test them and treat them. A much more proactive stance than the usual community health worker model where they're there, but people have to approach them. This Peace Corps volunteer wrote this application, and had grand ideas that it would interrupt transmission. Peace Corps volunteers are idealistic and want to make a difference. I thought, even if it doesn't do what he wants it to do, it could help some people get treated more promptly. I think it's worth the money. They started this, and it was the tiny, remote health post on the border of Guinea. I think they had six villages under them total—very, very small population—and each village was maybe two hundred, three hundred people. This was a pretty small place to try it in. So, they were going to try to do it in all of the villages. They had community health volunteers in most of the villages. So, they got the malaria tests and the treatment from the district, because it's a trickle-down system, etcetera. I won't explain the whole system.

They start out in all the villages. They find that in a lot of the villages, they can't even finish visiting the whole village before they run out of their box of twenty-five malaria tests, and they're only testing people with fever. But, every week, they go back, fewer and fewer people had fever, and by the end of the season, there were maybe three or four people in that village that had fever.

The other part of the story was, even with a small population, the district, given the weakness of the supply chain, wasn't able to get enough malaria meds and tests, even for the people who had symptoms, which tells us something. We had a lot of work to do on the supply chain. But at the end of the season, they were able to get another big supply of tests and meds in, and they were able to do this in all the villages. In the meantime, they had—because there wasn't enough to do in all the villages, there was one village where the community health worker had decided that he wanted to make money doing artisanal gold mining, so he left. This village was seventeen kilometers away from the health post—about a two-hour bike trip. It was pretty rough. They decided that this was the village that they would target every week, so that's the village that the one—so, we didn't mean to do a study, but it set itself up that way naturally, so we had a baseline and end-line in all the villages, and there was one where they were able to do it. So, we looked at that information—how many people they tested in what became the intervention and comparison villages, and there was six times less malaria by the end of the season in the intervention village, and, through these sweeps, they had managed to treat way more people than had been seen at the health post the whole preceding year. So, we thought,

you know what, this is actually really effective. It's shown us the problems that we have in our community health system, but it's also—this isn't really Ebola, is it?

Q: No, it's okay. Yeah, but it's—this is what I want.

Thwing: But it's what I'm most excited about. Again, through Peace Corps, working now with the district health medical—I have a hard time translating things from French to English—with the District Health Management Team, the district medical officer was actually getting his PhD at the time at London School, and so he was very interested in research and very supportive. So, using PMI-provided Peace Corps funds, we set up a study to do fifteen intervention villages, and then fifteen villages where they had a community health worker, but just not going door to door. There was yet another amazing Peace Corps volunteer who coordinated this trial, and they found sixteen times less malaria at the end. And by that time, the health post nurses were enthusiastic—the District Health Management Team was just really thrilled about the program, and really enthusiastic, because although we weren't powered to measure it, they were saying that they were seeing fewer severe malaria cases, fewer deaths, so the National Malaria Control Programme adopted the strategy. PMI funded it, now that we'd shown that it worked, and it's now scaled up to the four high-transmission regions in Senegal. So, that's an example of just that whole chain where it's not something PMI would ever have supported at the beginning, just an experimental idea, but because we were able to have somebody out there—and I went out to visit the projects both of the first two years, and really follow along with the Peace Corps volunteers and the community health workers

and see what they were doing. But you could take that back and advocate for it, and then see it expand on a much bigger scale.

Q: Wow. What are the names of some of those influential Peace Corps volunteers who got that off the ground and kind of got it working?

Thwing: So, the one who had the first idea with his counterpart is Ian Hennessee, who actually recently completed his MPH at Emory, did his work-study in the malaria branch, and now works for GHSA, so he's now at CDC. Annē Linn is the one who did the study the next year, and she now works for ICF International—also just a phenomenal person. The community health worker that partnered with Ian is named Cheikh Tandian, and he's still really involved in the project, and making it work, and serving as a mentor. The district medical officer is now a regional medical officer, and his name is Youssoupha Ndiaye. And there's a lot more names out there. There's a lot of people who worked together to make it happen, and they're still doing great work.

Q: Yeah, that is a story. Wow.

Thwing: It's one of my favorites.

Q: Can I ask, were there some Senegalese who were part of the National Malaria Control Programme who you worked with most closely who you could describe for me just a little bit?

Thwing: Oh, goodness. The hardest thing about leaving Senegal after four years was leaving the members of NMCP. They all became really close friends and really valued colleagues. It's almost impossible to pick just one because I spent so much time with each of them. For the sake of continuity, I'm going to describe Seynabou Gaye, because she's the one who was the coordinator for the community health malaria program. She's a medical doctor by training—lovely, lovely person, beautiful. Her husband is also a public health researcher, and they met in medical school. She has—I don't even know what all her training is.[1] She does have infectious diseases training. She was a district medical officer when they were first piloting the community—they call it PECADOM, Prise en charge à domicile—the home-based malaria management program that was involved in one of the original pilots. She has been incredibly supportive, incredibly open-minded and approachable, and willing to try new things, works her tail off—they all do, so when I'm describing her, I'm pretty much describing them all. They all work their tails off, they're all incredibly passionate and committed. It was definitely a pleasure to work with them.

Q: Are you still the resident advisor when you start hearing about Ebola in 2014?

Thwing: Yes. So, 2014, I've been in Senegal two and a half years. We're hearing about it from Guinea, people are getting nervous. I remember we start talking about it on the USAID health team. There's a lot of assumptions, or not even assumptions, but ideas,

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[1] Note from J. Thwing, December 2017: I was trying to say she's extremely well trained.

concerns—how would Senegal handle it? There's a huge amount of traffic between Senegal and Guinea—very, very porous, almost nonexistent borders. How would Senegal manage a case? I was pretty confident in Senegal's health system, having worked with the Ministry of Health. I realize the Malaria Control Programme is probably one of the most functional arms, but in general, as part of my work with the Malaria Control Programme, because they were investing so much in training the district medical health teams in malaria management, that also included program management in general, and monitoring and evaluation. They were investing in the capacity for malaria, but it was also strengthening [in general]—and I'd gotten to interact with a lot of district health officers and was generally impressed. I felt fairly confident in their ability to handle an introduction, even though there hadn't been, actually, well, very much if any CDC involvement.

I think that was one of the things, even before Ebola, that I felt was a loss for CDC, that there wasn't a CDC country office. I was it. I worked under the USAID health team. But there—again, the dynamism, the work ethic. There is a really high-quality professional cadre of public health professionals there, and I really felt CDC was losing out by not having more of a presence there. Because Senegalese public health experts serve as resources throughout the region in West Africa, and for me, it just would have been a natural place. I realize the language is tough.

But anyway, so people are starting to talk about it. The Ministry of Health was definitely gearing up, they were doing some trainings. They had issued some directives about how

to—based on WHO guidelines—about how to try to manage an introduction, what needed to happen. There were, I think, six directives that were maybe a page long each. They were talking about closing the borders. I think they actually had just closed them before the case, which was ironic. Interestingly enough, maybe a few weeks before the case, there was a staff del [delegation]. I'm not going to be able to remember all three of the senators, but it was aides for Senators [Barbara L.] Boxer and [John H. "Johnny"] Isakson and one other who came for a visit, and we decided—because some of my backstopping team in Atlanta for PMI, from the malaria branch, were planning a supervisor visit anyway about the same time—that we would just combine, so we had one big supervisory visit, and we dragged them all around.

But wrapping that up, we had an audience with the minister of health. David [M.] Gittelman from the malaria branch, who's the deputy for PMI in the malaria branch, towards the end—I don't even remember exactly the question he asked the minister of health, but I think it was something along the lines of, "Is there any way CDC can better support you?" And her name is Awa [Marie] Coll Seck. She's very well-regarded, especially in the malaria community. She was the head of the Roll Back Malaria program for a while—but, really, really excellent public health professional and infectious disease doctor. Anyway, she said, "You know what, I would like more CDC engagement in this country. I think I'm going to go ahead and write Tom [Thomas R.] Frieden a letter." So, David dutifully goes back to his hotel that night, and writes a letter to the head of our branch to pass up the chain, letting him know. I think before he even was able to send that email, she had already sent off her letter to Tom Frieden asking CDC for

engagement. I think there was already talk from the Unaffected Countries Team about sending a team out to Senegal, and we'd had one conference call to help with preparation efforts. So that was sort of setting the stage.

Q: So you're already on the Unaffected Countries Team.

Thwing: Or on their radar screen, because the Unaffected Countries Team sort of looked at the surrounding countries, and looked at the countries that could be at high risk for introduction.

One night, I had—for whatever reason, I was exhausted, and I'd gone to sleep along with my child, who was three at the time, so probably at eight o'clock. I woke up at two o'clock in the morning and realized that I'd missed a slew of phone calls, and had this inbox full of emails from people trying to get a hold of me, because they were about to announce a case in Senegal the next day, and the Guinea team already knew about it. I had, I think, a 4:00 am my time conference call with Fred [Frederick J.] Angulo and Ben [Benjamin A.] Dahl, and I'm not sure who else. But that was midnight Atlanta time, so they were working pretty hard. Then, we had—and I don't remember too many details about the call. I do remember waking up to that slew of messages.

We had actually already planned a health team retreat at the health team lead's house for the following day to review all of the quarterly reports from all the implementing partners. But I had told her that this was coming down the pike, and so right about the

time we wrapped up our meeting was when the Ministry of Health made the announcement. It was really odd because they'd sent a press officer to her house to get a statement from her, as the USAID health team lead, so that's how that kicked off. The two of us sort of looked at each other and said, okay, we want the rest of the health team to be able to continue to focus on the rest of our portfolio, and realized that this was going to become a really big deal. We decided, okay, she'd take the USAID side, I'd take the CDC side, and we would make this a good interagency coordination, and so that's how it started. That was a Friday. It was August 31st, if I'm not mistaken. Yeah, check what that last Friday in August was for 2014 [note: August 29th]. We had a little bit of a hard time getting a sense of the situation over the weekend, because things were moving rapidly and it was a weekend. But one of the Senegalese leaders on the health team was working closely with the Ministry of Health during that time, and he was the one who sort of helped us all get connected.

But, so began a meeting starting at seven o'clock every morning at the Ministry of Health with the entire Ebola committee, and then wrapping up with a meeting that started at 5:00 pm, and often went until eight or nine, although I usually would have to step out at seven thirty, of the surveillance team that was following the case. Then going home and checking email, and doing the rest of my job until midnight. That was an exhausting month. But from a CDC TDY perspective, they were already starting to line up a visit. Then, once the case was announced, because they were already working on it, they got a team of an EIS officer and somebody else out probably a couple days later. They had basic French. It was a little hard for them to keep up in meetings, but they had a little bit

of French, so we sort of jumped into it altogether and attended all the meetings and tried to figure out what we could. We realized very early on that the directives were useless, and I think that—it was really funny watching the US get a case later, because nobody realized—everybody thinks they're prepared until they get a case. They think, well, we have directives. But they're not procedures.

Q: Are these the six directives that the Ministry of Health had put out?

Thwing: Yeah. We did the same thing, basically. CDC had our own, that was about the same length.

Q: And what were the directives?

Thwing: Basically on what to do with a suspect case, what to do with a body—like, I forget what all they were, but they were specific directives that each addressed a different part of dealing with an Ebola case. But directives aren't procedures or protocols, and so we realized very quickly that everybody was interpreting them differently, nobody really knew how to get from A to B to C. The other thing that we realized very early on too was that—so, I'll tell you from my perspective. They had put together this huge Ebola commission with ten different subcommittees, each addressing a different thing. One was the surveillance, one was care and treatment, one was logistics, one was security, one was communications. They had all these different sub-commissions. They would meet all together at 7:00 am, but then the different commissions were supposed to do their work

during the day and meet up. It was just an unbelievably unwieldy structure, and the minister of health, very early on, said, "We need an EOC [Emergency Operations Center]," and really focused on the creation of an EOC. But this caused a lot of political friction because there were people and power structures in that big Ebola committee that did not want to give up their power. So a few weeks of this incredibly unwieldy, hard to coordinate structure, and I went, where in the world did they get this idea? Then I was looking through the WHO manual on management of [hemorrhagic] febrile illnesses—I went, bless their hearts, they're doing it by the book. [laughs] Like, they did exactly what was in that manual.

Q: What's in the manual?

Thwing: Those exact sub-commissions, that exact structure.

Q: That structure is right there?

Thwing: Absolutely, they were doing it by the book. Good for them. [laughter]

Q: Is it that much different than the EOC structure?

Thwing: It's not an EOC structure, it's a committee with ten sub-commissions structure, or however—nine to eleven, but I think it was ten sub-commissions. That was sort of a real eye-opener for me.

I should probably tell you—do you want any details about the case itself?

Q: Yeah, sure.

Thwing: As we came to know it?

Q: Yes.

Thwing: What had happened was there was a college student, a Guinean college student, who had attended his brother's funeral in Guinea, and he had, I think, held the head during the ceremony. That case I don't think was on the radar initially of the team in Guinea, which was much better established, and there were a lot of CDC folks already there on the ground. Shortly thereafter, for whatever reason, he decides he wants to take a vacation—and it's during school break, because school doesn't start until later, like September, October. So he decides that he wants to take a break and visit his family in Senegal. His family in Senegal doesn't particularly want him to come up, and I don't know if they even knew him that well, but he decided to go to Senegal. He took public transportation up to the border, and then took another public transportation from the border to Dakar, and then was picked up by his uncle from the huge bus station in a taxi. We first hear this story, we think, oh my gosh, was he symptomatic all the way up? How in the world would you be able to trace all those contacts? It was a rather terrifying time. We thought, this could explode. He was in contact with so many people all along that

route. We learned later that he wasn't symptomatic at the time, so that was a big relief, but the first week or so, that was pretty nerve-wracking. When he developed symptoms, he had sought care at a local health post. It's not clear exactly how many days he went, who else was in the health post with him—I don't think we were ever able to trace all those contacts. He'd been there maybe four or five days, getting IV [intravenous] fluids, getting whatever else.

Q: And this is outside of Dakar?

Thwing: This is in Dakar now. Then he stayed with his extended family—there were about thirty people in the house, who were all from Guinea, in a neighborhood in Dakar. But he's getting treatment as an outpatient. During the time, there are family members who share a bed with him, prepare food for him, as he's sick, helping him get bathed, etcetera. So, he finally—he's not getting well. One of his family members took him to the Fann University hospital, which is the big teaching hospital on the west side of Dakar. Interestingly enough, that was also the hospital where they had set up their provisional Ebola treatment unit, and he was hospitalized in the infectious diseases unit on that unit.

The case definition included hemorrhage. He was not bleeding. He was febrile and vomiting and diarrhea and all that. He was not bleeding. So, he was not in isolation. Now he's probably on day seven, eight of illness. The day that he was hospitalized in that unit, his sister and mother were hospitalized in an Ebola treatment unit in Guinea. The team starts interviewing them and getting all their contact history, and realized, oh my gosh,

the brother went to Dakar. One of the physicians in Guinea, who was actually Senegalese, working on the Ebola team, who had a friend who was a doctor at Fann, called his friend and said, "You have an Ebola suspect case." I think the mother and sister knew he'd been hospitalized at Fann. They're getting this information that says, you have an Ebola suspect case. And the guy goes, "No way." And his friend says, "No, you need to test him." They tested him at Institut Pasteur, and the first result came back negative. There's another conversation, and the guy goes, "Test him." And that one came back indeterminate. I think they finally got a positive test, but again, it was a lucky, lucky, lucky hit. But I think he was one of those lucky ones that wasn't as sick as the ones who would go on to die. He was probably already recovering by the time he was hospitalized, and I imagine his viral load was low. That's conjecture on my part.

But, here he is now, and all of a sudden, ack! They had something like thirty-plus household members, forty-plus healthcare providers that they followed as contacts through the twenty-one-day period. They really tried—actually, the family they kept on in-house quarantine. Most of the healthcare providers they tried to, but some of them were not going to put up with that, so that was the focus of a lot of the meetings for the surveillance group and the case follow-up group, was how to deal with these recalcitrant physicians that wanted to go spend the weekend in a resort town rather than staying in their house under quarantine.

But anyway, as far as the case goes, he recovered. He had numerous negative viral loads. They didn't know what to do with him because there was so much—at this point, now,

there has been messaging about Ebola, and they sort of just imported all the Guinea messaging. I think we learned a lot of lessons about communication, but there's still—a primary part of communication is, don't eat bush meat. This is a human-to-human epidemic. It doesn't make any sense really to have the "don't eat bush meat" message, but nobody really paid attention, they just grabbed the material that had been used in DRC [Democratic Republic of Congo] in previous epidemics. There's wash your hands, don't eat bush meat, and this is a fatal disease, which doesn't really inspire anybody to seek care. Senegal is a ninety-five percent Muslim country. It's very moderate, but very devout. Especially with eating animals, you eat sheep and you eat cows and you eat chickens. There are animals you don't touch, and monkeys and bats are some of those. There's already this huge stigma. Guineans are sort of like Mexicans to some Americans, so there's [another] huge [stigma]—it's the whole south of the border, poor people coming up idea. There's already this huge stigma against Guineans, and there's a huge Guinean population in Senegal. Now, there's more stigma because of the whole eating bush meat. Now they've got a guy who's introduced Ebola, and his life was really going to be at risk if they let him go. There were conversations between the physicians and the Senegalese government and the Guinean government. The Guinean government wasn't ready to take him back, and they were having these debates—so he was sort of stateless. This is a twenty-year-old kid. Over the time that he was in the hospital well, he made friends with his doctors, and I think they became, really, his support network. I think they finally arranged for a Senegalese government plane to fly him back to Guinea, but then the Guinean government wouldn't let them land, so they eventually ended up flying him close to the Senegal-Guinea border and letting him hop on public transportation to get

back home. [laughter] I think during that time he became friends with his physicians, he decided he really wanted to do something positive and he wanted to go into the medical field, but I don't know what became of him in the end.

Q: Were you involved in any of these discussions about where he was going to go?

Thwing: This was all talked about during the Ebola meetings, every morning at seven, because every team would have a chance to give an update to the larger community.

Q: Was it those meetings that got you up to date with all of that history in the first place?

Thwing: That, and the smaller case follow-up meetings.

Q: So, for the record, there's no record of him transmitting to anybody else in Senegal, is that right?

Thwing: Right, thank you for bringing that up—so, despite all of these contacts, he didn't transmit to anyone. In hindsight, had we never even detected him, we would have had the same outcome. [laughter] I do think they did a good job. But if we'd done nothing, we'd have the same outcome. So success—and one of the things—we were talking about messaging, and there was so much pressure on the minister of health, huge pressure. It was really interesting to watch the same thing happen in the US. But, anyway, a huge amount of pressure, a huge amount of fear. They had closed their borders for quite a

while. We're like, you know, that's only making people come in the edges. You can't actually close a border. It's actually making it harder to control if you close it. But we had the exact same argument here in the US. Anyway, I realized the message we need to be giving out is that success is not zero cases, because you can't guarantee zero cases. Success is—and it's not necessarily even that case not transmitting, but it's stopping it after that wave, and that's where Nigeria was spectacular because they had a really bad case that transmitted, and then they [snaps]—there's very few cases beyond that first wave. That's success for your public health system. I had this little paragraph—like a three-sentence SOCO [single overriding communication objective], like, "This is what success is. It's stopping it once it's started." And, I forget—I think I sent it to Fred Angulo, and I'm like, "This is the message Frieden needs to be giving." I doubt that it ever got to him, but I think it might have helped.

Q: I mean, he's been stressing Nigeria and the lessons of Nigeria for the last year at least.

Thwing: Yeah, but the message was so, before we had the case, that we were going to not have any. You have to reframe success, and I think if we had reframed success that way—anyway.

Q: Were you in contact with these other—I forget what the acronyms stand for, HUAC, is the highly—with the other surrounding countries, aside from the highly affected ones? You were talking with Fred Angulo, for instance.

Thwing: Yeah.

Q: What was Fred?

Thwing: Fred was the head of the Unaffected Countries Team.

Q: Right. What kinds of communications are you having with him throughout this?

Thwing: We were doing probably weekly conference calls. So now, we'll back up to the CDC part of things. Very early on, we got a team of four. There was the epi side, so Mary [Reynolds] and Kelsey Mirkovic—

Q: Are they EIS?

Thwing: They're both—Kelsey was the EIS officer, Mary is staff, or—I don't know what the appropriate word for full-time—anyway, but they came out, and then we had a team from border that were also really, really, really good. We sort of split, so Mary and Kelsey were with me, and then the regional medical officer and the TSA rep [Transportation Security Administration representative], and there were a few others that were really working already with the airport, and they worked on the border side. It ended up scaling back from having four CDC TDYers at a time. During this whole time, we're having, with them, weekly calls with Fred. I don't know if they were doing daily sit-reps [situation reports] back, or if they were a little less frequently than daily, but

since I was trying to keep up with the meetings and other stuff, they were taking care of more of the sit-rep side of things, and eventually, more of the conference call side of things as well. I was making sure that they followed what was going on in meetings. During that first part, on the border team side, the big thing was that—who was the spearheading group? I forget which—it was a UN [United Nations] agency that wanted to make the Dakar—well, we'll just say Dakar, because it was the military base rather than the main airport. But, they wanted to make it a hub for dissemination of stuff to the highly affected countries. They basically wanted to set up a space for—I think it was UNDP [United Nations Development Programme]. Anyway, I'm not going to be absolutely sure on which UN agency it was. The idea was, set up a facility in Dakar where planes could go back and forth with material to the other countries—Guinea, Liberia, Sierra Leone. They [the border team] actually were really helpful in developing some of the policies and procedures and training the staff to do screening that would make the Senegalese government comfortable with allowing planes to go back and forth. There was also, when the American military got really involved with Liberia, we actually had for a number of months an American military base on the Senegalese air force—or, anyway, airport base, that—it was pretty sizable—where they were shipping material down to Liberia and doing flights between Senegal and Liberia. So, Senegal played an important role there, but we had to make the Senegalese government comfortable with that, and our border folks were helpful there. They also participated in some WHO activities with International Health Regulations, and a trip down to the border with Guinea to sort of assess the level of border preparation. The border team focused on those areas, and I think really were able to contribute a fair amount.

Q: This is bringing to mind a lot of what Ben Dahl has talked to me about regarding Guinea. Was he involved in some of that conversation about having a hub from Senegal, to which you could go to—

Thwing: I can't tell you from the Senegal side. He might have been involved from the Guinea side.

Q: Yeah, I think he was involved from the Guinea side. Okay, future listeners, there is another interview with Ben Dahl if you're interested in this—[laughter] this little section of logistics stuff.

Thwing: So then on the epi side, there was great interest—because we only had one case, who had fairly clearly defined contacts—in doing an epi [epidemiologic] study on this. The protocol that they had put together was to, on day twenty-one of the in-house quarantine, to do a survey of all of the contacts, do blood for serology, and then a more in-depth questionnaire about exactly what kind of exposure they had and what their experience of in-house quarantine was, to really learn more about both doing it that way, and to understand more—in case there actually was any transmission—about what degree of contact would actually lead to transmission. We decided that we would write a protocol, and not just make it CDC, but really invite the physicians at the university hospital and the Institut Pasteur and the communications folks—like, really try to broaden this out and make this a very participatory thing. We write up this skeletal

protocol, send it out, and say, we'd love to invite you to participate, would you like to collaborate, etcetera. Heard nothing back. I had talked to the head of the [Senegal Ministry of Health] IRB [Institutional Review Board—in this case, Le Comité National d'Ethique pour la Recherche Scientifique], he said yes, there are emergency procedures, here's what you do, send me the protocol, etcetera.

We didn't hear back, we didn't hear back, it was close to the last week of that period, and I was trying to follow up with the IRB, trying to follow up with people. Really wasn't getting anywhere, and finally—and then we were like, you know what, we just have to hire our interviewers, get them on board, get them trained, even if we don't know if we have approval yet. So we did that the day before their last day [of quarantine], and we still hadn't heard anything from the IRB, and had a meeting with—finally got to meet with the deputy head, because the head was out of the country at that point. She said, "You know, it's funny—the group from Pasteur, the university hospital, has submitted the same protocol." And I'm like, "Well, we're happy to collaborate with them." So we discussed how we'd share data, we discussed collaboration, etcetera, and we agreed to meet on the morning of that last day, so they would have to do the survey that afternoon. So we set up the morning. Basically, what took place at that table in the Ministry of Health was one of the key people from Institut Pasteur and the head of the IRB lecturing us for forty-five minutes on not following the protocol. The other thing we were trying to do simultaneously is, Senegal needs a success story. Ebola needs a success story. This would be an amazing *MMWR* [*Morbidity and Mortality Weekly Report*] to write.

So we wrote up an *MMWR*. Usually those reports from the field have three or four authors. We're like, again, let's make this inclusive, and we put a representative from most of the different sub-commissions on it, trying to be as inclusive as possible—I think I had twenty-plus authors. I sent out an email saying, "We'd really like to submit this as an *MMWR*, we really want to communicate Senegal's success, we'd really like to include you all as authors. If I've missed anybody, let me know, we can add you." And the next morning, in the meeting, the head of the Institut Pasteur stood up, at the end of the meeting, and announced in this really angry voice that CDC had done something terrible—but there wasn't time to talk about it, they'd talk about it later. [laughs] Alright. So, I went up to him afterwards, and I said, "I'm so sorry. What have we done? Can we make it right?" And he was furious. But, in hindsight, he thought that his virologists at the Institut Pasteur should be the first author, and that all of the virologists on the team—that it was really about that. He didn't like the fact that—anyway.

Q: It's about credit.

Thwing: Yeah, and it was really feeling like—I got the sense that they felt they owned it, that it was their thing, and how dare CDC come in and try to—so anyway, went back and forth, and I ended up talking to one of the chief councilors in the Ministry of Health who sort of was assigned to be a liaison, and I said, "I think it's important to publish this. We need to communicate the success story as soon as possible. Help me figure out how to make this happen, because I want the Ministry of Health to get credit for this." Eventually, we just published it with the CDC authors and with the director-general of

the Ministry of Health as the representative. All those other people didn't get any credit, even though we tried to bring in everybody, and tons of WHO people, etcetera. So that was fairly bruising.

The other thing that was really, I guess, sad for me—given that Senegal has so much capacity—so, the Institut Pasteur was the game in town as far as testing the Ebola samples. And they really—what's the right way to put it? They were very possessive of the samples and any information about them. They wouldn't even give the samples to the Ministry of Health. The Ministry of Health had a really hard time getting any information other than positive or negative, and then this is—sorry, this is from all the suspect Ebola cases. Because now that everybody's radar is on high, and all the district medical officers are being trained, and the messages are going out, there's a lot of "has fever, travelled from Guinea" popping up that they're having to test and treat, isolate, triage, etcetera. They [Institut Pasteur] would throw a temper tantrum if a sample arrived after 4:00 pm, outside hours. Anyway. I felt bad for the way they berated their Senegalese Ministry of Health colleagues. I didn't feel like it was very respectful. Anyway, that made it challenging.

There were lots of external WHO people coming, and many of whom we worked really well with. We had a really tough time with communication with the country office. There were a lot of times when—it's happened on multiple occasions, where we would say, okay, we need to do this assessment visit, and then learn that [local] WHO [staff were] planning the same thing for the week later or the week earlier. Can we please coordinate,

so these poor people out in the regions don't have to host all these multiple teams coming in? Can we do this together? But they ended up being really tough to plan with. Another thing that was going on during this time was that the minister of health—we were actually having almost—how often were we meeting with her? In the beginning, it was almost weekly, and then it went out. But I remember her—we were talking about just communication and what was happening, and she said, "You mean you're not hearing from WHO?" She said, "I have a meeting with the representative every Monday, and I assumed that she was communicating to all the partners everything I was communicating to her." So the minister of health felt like if she told WHO, that WHO would then spread the message. I don't know if she ever acted on this, but she said, "Maybe I need to start expanding that meeting to other partners." Anyway, I think that this was a problem across the region, as far as WHO not stepping up to the leadership role or not including other partners in what was going on. That made it a little more challenging, and I think in general, even though Senegal doesn't have a lot of donors compared to a place like Kenya, there's enough people in the mix that it was really hard to coordinate all the donors and get everybody together. That was my USAID counterpart's job, was trying to manage that part of the monster, in terms of donor coordination and messaging, etcetera.

The other thing that was really challenging is you didn't know what you needed. The donors, they're very happy to pony up, but we couldn't get a really straight answer, despite everybody's best attempts, from the Ministry of Health, as far as what was needed. How many Ebola treatment units did they want to set up? They had put together a huge budgeted plan, but because it was a moving target, we didn't know what cases we

needed. You would get a plan with all the needs and the budget, and then you'd go, "Hmm, that doesn't—" So you'd go back and forth, and then by the time you finally get a request through and a donor funds it, and the funds get there, you didn't need it anymore. That part of things was pretty challenging. There were a number that finally came through. We actually were privileged to have the head of CDC's EOC, and his name is very hard to say—I used to be able to say it, and now it's vanished. [note: Peter Rzeszotarski] But anyway. Anyway, he came in and didn't have to be there for very long, but really helped us think about what we needed for an EOC, and helped make sure we were on the right trajectory. I think other countries also experienced this too that were working closely with the Defense Threat Reduction Agency, who said that they could build it out. So we were saying, in October, all right, we can have an EOC up in three months. That was October 2014. They just completed it. October 2016. [laughs] That was hard because we were being led to make promises based on things that other agencies that we were working with were saying they could do, and then you just feel like a schmuck because they had—part of this—I'm sorry, this is going to be incredibly non-linear—

Q: That's okay.

Thwing: —but I'm not a very linear person. Looping back to what CDC was doing, after that first team, and after that twenty-one-day follow-up was over, then it was less about following up cases than making sure we were prepared. It was clear on the ground that what they really needed was a strong EOC. The minister of health was really strongly

behind a strong EOC. I felt like the number one priority as far as CDC and what we could offer was making sure they had a strong EOC, making sure they had a strong set of policies and procedures, like the SOPs [standard operating procedures], that were clear, that the district medical officers could be trained on.

Headquarters had some other ideas. They wanted more epi studies and more assessment studies. I'm like, Senegal's been assessed to death. They need preparation at this time. I think you could just see the assessment fatigue and frustration in the Ministry of Health. They're like, come on, bring some resources already. You keep telling us we're not ready. Come on. But [the Bill & Melinda] Gates [Foundation] had sent in some McKinsey [& Company] consultants, and our team, the CDC TDYers, worked closely with the head of PATH [Program for Appropriate Technology in Health] in-country and the McKinsey consultants from Gates and the very skeleton crew that had been brought on already, because EOC needed official approval above the Ministry of Health. That took a while, so they couldn't really hire on a full staff. But we sat in a room for a number of weeks and worked out the design of the treatment centers, and all the steps of—like the whole huge algorithm for what to do with a suspect case, etcetera. But, in my opinion, the public health education that CDC gave the McKinsey consultants who were tasked with setting a lot of stuff up, and the contribution that we made to making sure they had operational protocols for how to deal with suspect cases, for the confirmed cases, etcetera, was really key, and I think really helpful. Looking back at what we were able to do, at least in that timeframe that I was really involved, I think that that was

probably the most important, was to make sure that we had all the right procedures in place to train the district teams on.

Q: When you think about all of this work with multiple partners, with WHO and Institut Pasteur, are there lessons that come to mind for you, or for CDC working in the future?

Thwing: [laughs] I think having a broader presence is important. What was really challenging—I knew the National Malaria Control Programme, and I knew them well, and I knew a few other people in the Ministry of Health. But even though I was the only CDC person in country, and I suppose, in some imaginations, the CDC country director, I worked way down in the health structure as kind of a nobody. Which is fine, I like being a nobody. But all of a sudden, I had to function like an acting country director, and then tell headquarters, who really wanted to send money, "You can't send money. I don't have any mechanisms. I don't have any support staff. We can't do that." I couldn't get that through to headquarters here. Then, in-country, I had to all of a sudden develop relationships on a much higher level, with the WHO representative, with the Ministry of Health, with all these partners, with Institut Pasteur, who wanted us not in the picture. [laughs] It was probably one of the more challenging things I've done, and keeping a positive attitude was hard. I ate a lot of junk food and gained some weight. But it was good to have some good TDYers that came. I think they made that—and I'll talk a little bit more about some of the really good ones that came. But that was challenging. So I think having a CDC presence in countries is really important, even if it's small, so that

you already have a structure there, so that if something like that happens, you're not starting from zero.

Q: And I see how that definitely benefits CDC in its own planning. How would it benefit Senegal? How would it have benefited Senegal?

Thwing: I think better coordination from the get-go would have—because as the minister of health said, "This is no longer a Ministry of Health, this is a Ministry of Ebola." Everybody got sucked in. There wasn't—and the other thing is, because we didn't have good coordination, like a command and coordination structure, it was so unwieldy. You didn't have to have meetings that went all day. The surveillance team didn't have to meet for three hours every night. [laughs] It could have been run much better, and because we didn't have this set up, because we didn't have a lot of field-trained epidemiologists, people were learning on the fly, and it just took way more time and a lot of frustration. We might not have been assessed to death if we'd only known where we were. Yeah, I think that those were some of the things that might have helped. I mean, in the end, we had one case and it didn't go anywhere, so, whatever. But the process, I think, would have been much better, and enabled the health system to actually function as a health system.

Q: Sure. I try not to editorialize in these things, but I'm thinking a little bit about Nigeria, and the difference that having that EOC structure for polio created for them.

Thwing: Absolutely. Absolutely. I think, yeah, having an EOC structure in place is pretty critical.

Q: Right, because in the beginning, when they were working without that, they had these extremely long meetings, which seemed to go nowhere, and meanwhile, they had a lot of cases, or more cases than Senegal—meanwhile, those are going untraced. But then they bring it in.

Thwing: And then that worked. Yeah. So yeah, I think the presence of field-trained epidemiologists, and already an operational structure is really important. That's why I was so strongly behind CDC really focusing on getting the EOC set up. I felt like that was the longest lasting thing that we really had a clear technical advantage in, as far as being able to provide.

I was going to say more about some of the TDYers that came out that were really helpful. We had a hard time getting anybody who spoke French. CDC started really sort of scraping around, and reached out to the CSTE, the—I don't know if I even know what the acronym stands for.

Q: Something [Council] of State and—

Thwing: Territorial Epidemiologists. But we were fortunate to be sent an amazing French epidemiologist who works in North Carolina. Well, I think he's American now, but

originally French. Working in a state department of public health, [he] was both a public health practitioner, which a lot of CDC headquarters people aren't, and a really good epidemiologist. Plus, the French. I didn't have to hold his hand or babysit him at all. [laughs] He freed me up to be able to do other stuff, and did a fabulous job, and he did that—because they couldn't work out payment, or whatever, he did that on his break. And used his own annual leave to do that. And we were ever so grateful that he came out, I was really grateful for him. [note: Jean-Marie Maillard]

The other person who came out who was one of the last ones is Rene [Arrazola], I think—but confirm him too. He was from [the Global] Tobacco [Control Branch], fluent Spanish speaker, but no French. He got there, and I really thought EOC had made a mistake sending him out. I thought, seriously, Rene, if you want to cut this short, I will support you all the way. And he figured it out.

At that point, we already knew that we were most likely going to get a CDC country office—this is November, December now. They knew that Senegal was a first round GHSA [Global Health Security Agenda] country, so they were working on writing a co-ag [cooperative agreement]—that's the way I remember it. Anyway, it was far enough along in the process that we were applying for GHSA funds, and they needed to write the application for the co-ag—I forget exactly what all the acronyms were. The Ministry of Health, which had never had a co-ag with CDC before, all of a sudden needed to write an application. Rene's job, basically, was to help them put together this application. And he was awesome. He figured out what needed to happen. He's one of these people that can

figure out a system and make it work, so even though his French was minimal, he really wasn't—he had the knowledge and the tenacity to figure out what he needed to do, and I hear he's doing well. I'm sure he'll go far. But he did a phenomenal job helping them put together the co-ag that's the basis of the funding now.

Q: I have a couple questions, if you don't mind me taking a look at my notes really quickly. Thanks.

Thwing: I think I've tried to tell you all the various little pieces that fit better thematically than chronologically.

Q: Yeah, and I do appreciate that, because I think memory sometimes works a lot better that way. I don't know if this is a question that you feel like you can address, but I'm noticing—and this comes from a total place of ignorance—that Institut Pasteur is in Senegal, and have they been in Dakar for a long time?

Thwing: Yeah.

Q: I'm wondering about how different post-colonial relationships between France and Senegal, versus France and Guinea, impacted international support for the Ebola response.

Thwing: That's an interesting question. I don't know that I know enough about the difference. I think Senegal has enjoyed a fairly—okay, this is going to be potentially conjecture, but I think I read an article—I'm not going to get all the details right, but I did read the article. When France was giving its colonies independence, there was a tax that the former colonies still have to pay them for infrastructure because France said that they made an investment in those countries, so you have to continue to pay us for the roads, and the railroads, etcetera. Guinea said uh-uh, and Conakry was almost destroyed. A lot of the infrastructure was devastated. Senegal said okay, and they still had the infrastructure. I don't know how that impacts the relationships now, but that's my understanding about sort of the French-Guinea relationship, or some of the things that have happened, versus Senegal.

Q: Thank you, thank you. I don't have much of a historical knowledge base, really any on West Africa.

Thwing: That might be something to look up and see if you can find the information.

Q: I think so. Thank you. I think maybe my last question is, what's going on—how does this big response to Ebola and all this attention affect your malaria work while you're over there?

Thwing: [laughs] There was the USAID counterpart, and because I had agreed with the USAID health team lead that we would jointly take this, I sort of quit doing malaria work

for four months. August 31st to end of December, I was doing Ebola and wasn't available to do malaria. I tried to keep up with emails a little bit, but that work all pretty much went on hold. That was during malaria transmission season, so I sort of missed the [rollout of the] big, home-based, proactive community treatment program that I described to you. That was the first year of scale-up when they did it in one region, and I really wanted to get out there and see how they were doing, and I just wasn't able to because I was stuck in Dakar, helping CDC TDYers. The funny thing was, though, it was so all-consuming that I sort of forgot that I had a management structure back here at headquarters to report to, and didn't bother informing them. So when we published the *MMWR*, I got a note from the CDC head for PMI in the malaria branch saying, "Congratulations! Might have been nice to know about it." I was like, oh, shit! [laughs] But, finally, given that if you're PMI, your salary is actually paid from PMI, through an interagency agreement with USAID, the coordinator of the PMI program finally was like, "Okay, either you leave Ebola and come back to malaria, or your salary needs to get switched over," which is fair. I was actually—I think it took me a while to adjust to that for a few days, but it was also a good liberation, because at that point, it was much more political, and paperwork. It didn't require my skills or my time, and malaria did, so I got to say, "You know what? The big boss says no." People would say, "Oh, we miss you." "I'm so sorry, the big boss says no." Which was nice. So I scrambled and scrambled and scrambled to try to catch up on the malaria side.

Q: Do you have any idea of how Ebola, or the response to that, or the disproportionate—I don't know if it's disproportionate, but all the attention on Ebola might have had on malaria transmission, or any kind of long-term effects?

Thwing: I think we had it less bad in Senegal than, say, in Guinea. 2014 was actually a really dry year. I was just finishing looking at all our surveillance data this morning before I came in, and we actually had far less malaria in 2014. I think that was lucky, but you can't, by looking at our surveillance data, say that it had a negative impact.

Q: Sure. And what about treatment?

Thwing: I think once again, for the most part, the suspected Ebola cases were—because it had to be the people who had recently traveled from Guinea, and so that didn't impact as much, for the most part, on malaria. In the places that bordered Guinea, they closed down weekly markets. There's a huge trade between Senegal and Guinea, these massive markets, and they closed those down, so I think that had a really adverse impact on nutrition in children. It definitely adversely impacted families' incomes. Down there, I think at that point, also, there was a big boom in the artisanal gold mining, so there was a lot of movement across the borders anyway. So there may have been some disruption, as far as—I'm trying to think of—I think in that southeast region that borders both Mali and Guinea, they did have maybe some more adverse health outcomes, but hard to pinpoint. I don't think we had quite the challenges that they had in Guinea.

Q: Julie, can you tell me how your experience during Ebola and your participation in making sure Senegal was prepared and dealing with it, how that affected you?

Thwing: [laughs] It's probably why I'm back here now. The other bit of that—so, there was four months of absolute craziness from September through December, and I was scrambling to catch up, and then my USAID counterpart left, and it took eight months to replace her. About midway into those eight months, I was done. I had just been too exhausted for too long. Four years was up at the end of 2015, which is an acceptable, very respectable term, I think. I would have loved to try to stay on for another two years, because I really love Senegal. But it was time to come back and take that six-month leave of absence, and regroup.

Q: Is there anything that we haven't talked about—any memory, or any final reflection that you'd like to give?

Thwing: I think as far as Senegal, with all the challenges, overall, I was just so impressed with the Ministry of Health. It was definitely a stressful time, and definitely a lot of challenges, but there are some really strong leaders. The current head of the EOC—I haven't mentioned him, Dr. Abdoulaye Bousso. He was the number two technical counselor to the Ministry of Health at the time, and then he was tapped to head the EOC. Really, really sharp. A really good guy. The guy that they tapped to be the deputy, who's also the focal point for the FETP [Field Epidemiology Training Program] program also. Really, really sharp, really committed. I think Senegal is just really blessed with a really

strong minister of health—sorry, not very close to the microphone—a really strong minister of health, some very strong individuals and programs. I think everybody has room to grow, but I think my initial confidence in their ability to handle it was well-placed.

Q: Thank you so much for being here. I really appreciate it.

Thwing: Thank you.

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