CDC Ebola Response Oral History Project

The Reminiscences of

Karen Wong

David J. Sencer CDC Museum

Centers for Disease Control and Prevention

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Karen Wong

Interviewed by Sam Robson
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Interview 1 of 1

CDC Ebola Response Oral History Project

Q: This is Sam Robson, here today with [Dr.] Karen Wong. Today's date is March 29th, 2016, and we're here in the audio recording studio at CDC's [Centers for Disease Control and Prevention] Roybal Campus in Atlanta, Georgia. I'm interviewing Karen as part of the Ebola [Response] Oral History Project. Karen, thanks for being here with me today.

Wong: Thanks for having me.

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

Wong: My name is Karen Wong, and I am a medical officer with the Division of Foodborne, Waterborne, and Environmental Diseases.

Q: Thank you. And you hold some other positions currently, I believe. Is that right?

Wong: I am a lieutenant commander in the US Public Health Service. That's probably what you were looking for.

Q: Yeah, that was what I was—sorry. [laughs] That was vague. Can you tell me where and when you were born?

Wong: Nineteen eighty-two, in Los Angeles.

Q: Is that also where you grew up?

Wong: Not really, I kind of grew up all over the place.

Q: Tell me about that.

Wong: I started in LA [Los Angeles], and then when I was little I moved to outside Chicago and lived there for a few years. Moved to Dallas, Texas, then to Lubbock, Texas, and then I went off to college. That was in New Haven, at Yale [University]. So New Haven, then New York City for med [medical] school at Columbia [University], and then San Francisco for residency, then here. So, all over the place. [laughter] Big cities, small cities.

Q: Who comprised your household growing up?

Wong: My mom, my dad, and then I've got a younger brother, four years younger, named Chris.

Q: What do your parents do?

Wong: They are physicists, they are medical physicists, so they design the radiation treatment plans for cancer patients.

Q: That's amazing.

Wong: Yeah, I don't understand it at all. [laughter] They were in a science and medicine field.

Q: Did that influence you growing up, would you say?

Wong: I mean, probably, yes, most likely, yes. They never pushed me to go into science and math or anything like that, or medicine. I sort of came to that on my own.

Q: Tell me about the process of coming to it. Actually, I don't know if it's before or after—so, high school. What did you start getting interested in, like in middle school, high school?

Wong: I think interest in medicine started really early for me—actually, as far back as I can remember. I really liked the idea of being able to do something service related, and I really liked science, and I really liked the idea of medicine, and so I was always really interested in it, ever since I was a kid, actually.

Q: How did you express that interest as a kid?

Wong: I think I would read stories related to doctors or nurses, and I really liked watching medical shows, and things like that, and reading books about medicine when I was younger, even if it were fiction.

Q: What age were you when you went to Texas?

Wong: Let's see, I was in junior high, so around sixth grade—what's that, thirteen, something like that?

Q: Yeah, something like that. So finishing up through high school, probably, in Texas, then?

Wong: Yeah. I had an unusual academic experience, I'd say. I transferred from a Dallas high school to a Lubbock high school in the middle, and then skipped a year in that transition. I went through high school pretty fast and graduated pretty young.

Q: How young?

Wong: I think I was sixteen when I graduated.

Q: Wow. Was it straight from there to Yale?

Wong: Yeah. And then Yale, I actually went through in three years, so up until med school, I'd been younger than all of my class peers.

Q: Tell me just a bit more about that.

Wong: I don't know if it was a great decision, it just sort of happened. I don't know if it's the right one, but it was interesting being at that age in that setting, because at that age, a year or two of difference is a huge difference, not like now. When you're just trying to figure out who you are, and doing a lot of moving around as well, I think it's—I don't know exactly what to say about it, but it was definitely—I maybe had it a little harder to relate to some of my peers when I was going through school.

Q: I hear that. When you were to the point where you were graduating from high school, did you know what you wanted to—I mean, were you pretty set on the pre-med path for undergrad?

Wong: Yes. I was totally set. Actually, in terms of the type of medicine, where I saw myself going in medicine, that varied a lot. I thought I would be really interested in doing international, clinical work, and actually treating patients abroad. When I was in high school, I was very inspired by these ideas, by the stories of people like Albert Schweitzer and others who had practiced medicine in places of great need.

Q: Tell me about arriving at Yale, and what it was like there.

Wong: Yale was a whole new world, I think, coming from Lubbock High School, a place where—I think there were a lot of very bright, very talented kids, but there were also kids who didn't go to college, and that was totally normal, and then to be thrown into an environment where I think a lot of kids are coming from these very diverse backgrounds. Some of them had gone to these college preparatory programs, and that was something I was totally unfamiliar with, but it was fascinating, actually, to be surrounded by people who were sort of similarly driven and ambitious and had big dreams about their futures. It was interesting to be that young, and then also be fairly independent for the first time. I worked really hard at Yale. In addition to pre-med, I studied a lot of art history and writing and things that were outside of the usual pre-med track, and worked multiple jobs there.

Q: What kind of jobs?

Wong: I worked in a cafe for a while, and I also did research assistant-type jobs. Stuff to make money, and also stuff to gain experience.

Q: Can you tell me about a friend who sticks out in your memory from that time?

Wong: I sang in a jazz group when I was at Yale. It was an all-female singing group, so I think I formed a lot of close bonds with other college-age women during that time and also really cultivated a love of music, jazz and swing music.

Q: Had you been doing music before then?

Wong: Yeah, I'd always done classical music, mostly. I grew up playing piano and violin—never sang before, until I got to Yale, and then discovered I loved singing, and really enjoyed being able to sing with other people and have that be a social thing.

Q: Is this like an a cappella group?

Wong: Mm-hmm. Yeah.

Q: Who were some professors who started to influence you in college?

Wong: One that sticks out really clearly in my mind was actually a writing, an English professor. I took a nonfiction and a fiction writing class, I think, with her. I don't think I'd written that much creatively before that—mostly book reports and papers and literary criticism, things like that. But I really enjoyed doing the writing part, thinking about how to write a carefully crafted nonfiction essay and how to think about fiction for the first time. It also, I think, with some of the nonfiction things, we had to write very personal

stories, or things about ourselves, about our families, and I think that was a new experience, opening up in a setting like that.

Q: Do you still write?

Wong: I do, not like before. I journal and stuff like that.

Q: Anyone in the sciences that might have influenced you?

Wong: I have to say the science classes were a bit of a blur. I think I sort of kept my head down and did my book learning, and that's what I did. [laughs]

Q: Gotcha. Let's see, from Yale to Columbia Medical School, is that just an immediate transition too?

Wong: I spent a year doing research in an immunology lab in between. Somehow, the timing of having to apply the year before, and I would have been only in my second year at Yale, it made sense to delay for a year. So yeah, I was in New Haven doing research, and then I went off to Columbia.

Q: Tell me about going to Columbia.

Wong: Columbia was very exciting. I thought it would be really cool to be in New York, and I pretty much loved it from the moment I started. I really embraced my pre-clinical years. I loved gross anatomy, I loved my immunology classes. I was just really into it. This was the stuff that I was so interested in learning, that I had been so interested in learning for so long. Once I hit my clinical years and got to actually interact with patients, I loved that part, too. I was really interested in the process of diagnosis, and making the right one, and being able to communicate well with patients. I think all of that felt like really good detective work to me, and it was really exciting.

Q: Was there a branch of medicine that in particular interested you?

Wong: I went in thinking that I wanted to do pediatric neurology, or pediatric oncology, and when I went through, I realized that I actually loved everything. [laughs] Usually, people narrow, like either the surgical fields or the nonsurgical fields, or they like everything except psychiatry. There's usually something. I loved everything. I loved OB-GYN [obstetrics and gynecology], I loved peds [pediatrics], I loved psychiatry, I loved, loved, loved surgery, so making the decision about what to actually go into for residency was really difficult because I really liked everything.

Q: You chose to go to San Francisco, is that right?

Wong: Mm-hmm.

Q: How did you make that choice?

Wong: I think partway through medical school, I heard about EIS [Epidemic Intelligence Service]. Since what I love so much about clinical medicine, one of the big things I loved was that diagnosis detective work, that investigative component, I just thought EIS was the coolest thing I had ever heard of. Part of actually why I picked internal medicine as my residency was because I felt like it was general, but it required a lot of critical thinking and a lot of detective work. The reason that I picked UCSF [University of California, San Francisco] as my top-choice residency was because UCSF had such a strong record of sending its alumni to EIS. There was a really strong public health connection there.

Q: Tell me about residency.

Wong: Residency was also very enjoyable overall. I think it started out with complete terror, I would say. [laughs] My first day, I was on the inpatient ward. I got assigned to the inpatient ward for my first day, and I remember that first day I was so stressed, and running around, and feeling like, oh my gosh, I can't possibly be a doctor and be responsible for these patients. As I was running around between floors, I actually fell down the stairs on my first day. [laughs] I was like, this is a great start to my first day of being a real doctor. But it got better from there, and I think that throughout residency, I enjoyed most parts of residency. I really liked the intense demands of call. I think I did okay with them. I seemed to do okay with periodic sleep deprivation. I really enjoyed, for

the first time, being able to lead a team and do that kind of teaching as a resident, and making the rounds on the patients, and thinking critically through all their problems, both medical and nonmedical. I think that was, overall, a really enjoyable period—this idea of leading a team towards this goal of being able to take care of people.

Q: When you say "both medical and nonmedical," what do you mean?

Wong: I think that dealing with the medical problems, and thinking through how to prioritize this huge mess of medical problems was an important skill that I gained in residency, and thinking through how to prioritize the one hundred things on your list that you had to do by the end of the day. That applied to both the pneumonia and the bloodstream infection, as much as it did to the patient's social situation and the fact that the patient was feeling really depressed because they were in the hospital or they couldn't get in touch with their son, or something. There were sort of non-body-organ associated problems that were important to think through too. Thinking of them all in the same list, and realizing that all of them needed to be prioritized, and it wasn't just, there's a medical list and then there's all this other stuff.

Q: Thank you for that. What happens after residency?

Wong: Well, during residency, I did some research. Actually, can I back up for a second?

Q: Please do!

Wong: Because I never mentioned public health school, and that's actually really important.

Q: Oh! You also got your MPH in? Cool.

Wong: I did that at Columbia. I did a dual-degree program.

Q: What is it called at Columbia, Mailman [School of Public Health]?

Wong: Yeah, Mailman. During my second year, I had the opportunity to either spend a year doing research or enroll in the dual-degree MPH program, and so I did that. So that turned my four years of medical school into five years, so now I'm totally caught up age-wise. [laughs] I decided to do the epidemiology track of the MPH program, and for my thesis, I actually worked on the—looking at lung disease and other diseases in World Trade Center responders. Because 9/11 had happened when I was in college. By the time I was in public health school, there was this cohort of first responders and others who had been affected, directly affected by the World Trade Center disaster. My introduction to public health, or my first hands-on experience in public health, was actually noninfectious—it was occupational/environmental.

Q: Did anything come from your research, or what did you find?

Wong: There appeared to be an increased occurrence of this disease, sarcoidosis, a lung disease, among first responders. The number of cases of sarcoidosis that we were finding among our cohort was higher than you would expect by chance, so it did seem that there were lung diseases. But there were other things, and I wasn't directly involved in these other studies, but there were other things that I would notice in the surveillance data, like certain cancers. I don't know if those were more than would be expected, but there would be cancers, there would be PTSD, there would be any number of complaints. It was a good chance to start thinking about surveillance, what does surveillance mean and how do you interpret surveillance data.

Q: Okay, and you remembered the MPH when you were thinking about what you did after residency, is that right?

Wong: Yes, I guess so. [laughs]

Q: Okay, why did you remember it then?

Wong: I think because I was thinking of San Francisco, and then I was thinking of Berkeley, and Berkeley's public health. But I was also thinking about when I was in residency, I really wanted to be able to keep up this research and analytic skills that I gained during my public health coursework, so I did an elective in Kenya where I looked at their surveillance data for flu [influenza].

Q: Tell me about that.

Wong: I knew that I wanted to come to CDC, I knew that I wanted to do EIS, and I was looking for ways to gain more public health experience, specifically international experience. I had never done any international work up until that point, I never thought that I had anything to offer really. But at that point, I felt like, okay, I've got skills, I have this literacy in medicine, I have epi [epidemiology], quantitative skills. Those are things that I can actually bring and have that be useful. That's when I decided to go for the international experience. I worked with their flu surveillance people in analyzing and summarizing their data in Kenya.

Q: Was it your first time in Africa?

Wong: It was.

Q: How was your first time in Africa?

Wong: Well, it was actually fairly similar to several subsequent times in Africa, I would say. I was in Nairobi, so I was still in a city. It was interesting being out of my element a little bit, but I had traveled in Asia and things like that before, so it wasn't like it was the first time out of the States, or something like that. But it was nice to feel like I was doing something useful for this group there.

Q: Right. Now, excuse my ignorance about the medical field. Was Kenya technically part of your residency, or afterwards?

Wong: It was—I basically got like a one-month rotation where, we had sort of these free elective blocks, and you could choose to do different things with them—you could do clinical stuff, you could do another research project, and I think I applied to be able to use that time to go to Kenya.

Q: Tell me what happens after residency.

Wong: After residency, I applied to EIS and got in and came to Atlanta. I wasn't sure exactly what I wanted to do for EIS, but I ended up going to the flu division, and it was nice because I had some familiarity with flu based on my work in Kenya, and I really liked the group. I thought that the mentorship was really strong and the opportunities are really strong. I spent two years with flu, and I really enjoyed my experience there. I guess when I came to EIS, that's also when I—I came in as a public health service officer, too. That's where that started.

Q: When you said the mentorship was really strong, was there anyone who was especially filling that role for you in EIS?

Wong: My primary supervisor, her name's Seema Jain, and she, I thought—she had a lot of experience with EIS, and with CDC. She was also a clinician, and I think I related

really well to her. Also, the surveillance team lead, Lyn Finelli, she had mentored so many EIS officers and was known by reputation to be a great teacher and great mentor.

Q: Can you tell me about one or two cases that you were a detective for that were especially notable?

Wong: Yeah. Pretty soon after I started, at a time when I didn't know anything about anything, really, there was an outbreak related to a county fair of a new influenza virus. They said, we're sending you, and you're going to go and investigate this outbreak. So I went off to Pennsylvania. I think I went in wide-eyed and terrified because I didn't know, what am I supposed to do? Here I am representing the federal government, and I don't know anything. [laughs] But I think all of our training kicked in, and I think some of those team leadership skills that I had to develop during residency also kicked in. That was a really interesting experience because I got to interview all these kids from an agricultural club, and think about the study design and how to design the questionnaires and how to analyze the data. It was very exciting to actually be investigating a novel flu outbreak and thinking about, is this a virus that has pandemic potential? Interestingly, at the same time, that was the time when *Contagion* came out. I took the team to see it one Saturday night or something when we needed a break from data entry. In it, the EIS officer is examining this flu-like outbreak, and they ended up tracing it back to pigs, which is what we were looking at in our case too. Then the EIS officer dies, [laughs] and so I actually sent an email to Doug [Douglas H.] Hamilton, the EIS program director, and

I asked him if he would airlift me out if this was going to be a pandemic, [laughs] or if he would just abandon me like they did for Kate Winslet.

Q: And his answer was purely negative, I'm sure.

Wong: He said he might send me a bus ticket and some aspirin, [laughter] and let me find my way home.

Q: That's pretty good. After EIS, what happens then?

Wong: After EIS, I went to DGMQ, [Division of] Global Migration and Quarantine, and worked in a unit that looks at non-pharmaceutical interventions for pandemic mitigation. I spent some time doing these epi studies about school closures for pandemic mitigation.

Q: Then what?

Wong: Then I ended up taking a position in my current division. This is all—it's just a bit of a blur because I was with DGMQ, and I had taken a position with Food[borne] and Water[borne], and I think somewhere in between that was Ebola. [laughs] I think I'd actually accepted the position with Food and Water, and—I'm trying to think. I was slated to go and work with Martin [I.] Meltzer, the Modeling Task Force, and I did, but in the middle of that came the call to deploy with PHS [United States Public Health Service].

Q: Martin is actually one of the people who suggested I contact you for the project.

Wong: Oh, perfect.

Q: What kind of stuff were you doing with him?

Wong: I was helping out with modeling activities. I'd gotten really interested in mathematical modeling, and it's actually one of the reasons I went to flu for my EIS experience. Martin had asked if I could come on to the task force and work on some modeling in Guinea and help tweak and refine their models.

Q: Okay, neat. How do you get involved in Ebola, and the Ebola response?

Wong: After modeling, you mean?

Q: After modeling, I mean. I'm sorry.

Wong: For Liberia?

Q: Yeah.

Wong: I remember, I was in my office in DGMQ, actually, and I got the email saying, "You are under consideration for deployment for this mission," and a blurb about the mission. It was October or something, and it was at the end of the day. It was dark, and I was in my little office, my little, windowless office, and I got the email. I was really confused and sent it to a couple of my other physician friends in PHS, and was like, "Did you get something like this? What is this about, is this for real?" One by one the emails kept coming back. They were like, nope, did not get that. My anxiety level started rising and rising. I sent it to my—I think he was my fiancé at the time, and I remember when I was reading that email in my office, my hands were shaking because I was like, this is actually happening. I think there had been some realization that PHS may do something like this, that we may be called on to deploy in a clinical capacity. When I got that email, and then I realized, uh, I'm the only one I know who got this email, then I realized, this is for real. This is for real, they actually want me to go and take care of Ebola patients, and it was terrifying. I was just terrified when I got that first email.

Q: I'm sorry, I think I rather crudely skipped over a little bit of the Guinea modeling. Can you tell me a little bit more about that?

Wong: I think that was after Martin had first published that initial model. We were working on running and updating the model and making projections for the different affected countries. I was assigned to Guinea to sort of create these projections. But another thing that I did while I was there is I also did some critical thinking about the

model, and uncertainties in the model, and we spent some time as a team talking about that.

Q: Like what kind of things?

Wong: I think that the model is not really meant to predict the future, it's more to illustrate possibilities. Depending on the different parameters that you put into the model, you come up with very different possibilities, and being able to explore that range of possibilities and show, what are the highs and lows, show how big that range is, is really important. I think especially with some of the reaction to the model being this huge number, being able to characterize the uncertainty was really important.

Q: Yeah, you must have had quite a few discussions about that.

Wong: We did.

Q: Because that's something that—I mean, correct me if I'm wrong, but that did get misinterpreted afterwards, as people assumed that the model was predicting things, when it in fact was, as you said, showing possibilities.

Wong: Right, right, and I think that's always a danger with those models. You never know how people are going to take it, and I think the taking it as prediction is maybe what you might expect. [laughs]

Q: Okay, cool. Also, you mentioned your fiancé. How did you meet?

Wong: We met in flu. He was also a medical officer there.

Q: Can you describe him a little bit?

Wong: [laughs] I guess so. His name is Mike [Michael A. Jhung], and he is also a physician, also in the Public Health Service, and he's from Michigan. He was, interestingly, designing the Anniston, [Alabama], course when I got called to deploy.

Q: That's pretty crazy. Tell me about what happens after you received the email, and your anxiety level is spiking.

Wong: Right. Mike and I had several talks about, what does this mean, and what is this going to look like, what will this mean for both of us. We had just bought a house, and we were planning to move into this house, and it was hard. It was really hard to think about this because at that time, the epidemic was still very active in Liberia, and this was the first time that the US government was going to attempt—to my knowledge, it was the first time. PHS, they do a lot of deployments for disasters, but I didn't think that they had done something quite like this. I don't think they had. To be able to work with such a high-consequence pathogen clinically, directly. I just wasn't sure—was this going to be safe? How much danger was I going to be in? How long was I going to be gone? Is it a

possibility—like if they say two months, do they mean four? [laughs] I just didn't know, and I thought it's one thing maybe to be on the third or fourth team out, where the kinks have been worked out, but I knew on the first team out that I was going to be the one working out the kinks, and the stakes were high to be working out kinks.

Q: Tell me about what happens as far as training.

Wong: Training. Before we went into training, there was so much uncertainty about whether this was actually going to happen. I didn't know if they had sent that email to two hundred people, and they needed sixty of us, or if they needed sixty of us, and they sent sixty emails. I had no idea. People were really busy, and so it was really hard to figure out what was going on. But, for the training—at that point, we knew that we were going for sure, I guess. There were several trips to REI before that, and the training in Anniston was excellent. There was the CDC part, and then there was an extra component that PHS had designed. The CDC part was really focused on infection control, and how do you do things clinically in that environment? How do you wear your PPE [personal protective equipment] correctly? How do you turn a patient, and move a patient, and things like that? I don't think it was scary because the instructors did such a good job of being so thorough that it wasn't really scary in that sense. I think it would have been a lot more terrifying if the course had not been as well designed as it was. One really nice thing about the course was that they brought in returned responders, these people who had worked with MSF [Médecins Sans Frontières] and these other organizations who

had, the previous month, been over there caring for Ebola patients. We really got to pick their brain about how they were doing things.

At the same time, though, the MMU [Monrovia Medical Unit] was, I think, unlike any other ETU [Ebola treatment unit] in West Africa at that point. It was going to be air conditioned, which was not something that was happening at any other ETU. It was going to have fancier equipment, a better—a higher staff-to-patient ratio. Some of the things that the MSF providers could tell us, we knew were not going to be applicable in our situation. There was still some path-finding and pioneering to be done, and kinks to be worked out.

Q: Can you tell me a little bit more about that?

Wong: For one thing, we knew that our equipment was going to be different. For instance, we didn't know exactly what we might have available, but central lines were a possibility. These are like the big IVs that go into a big, big vein. It's a special procedure and requires special training to be able to put in. But they weren't doing that in MSF ETUs at that time. There were ETUs in West Africa where they weren't even putting in simple, regular IVs. So there was nobody to tell us, is it safe to put in a central line in these conditions? Because it's not quite these other ETUs, and it's not Emory [University Hospital], it's somewhere in between, and so it was uncharted territory.

Q: Is this something that you're considering, even during training?

Wong: Mm-hmm, definitely.

Q: And how, just in this specific example, what do you learn?

Wong: You probably learn a little bit of best practices in terms of infection control. People have put in central lines, probably, for other pathogens that are bloodborne, so you do the same thing, or you have a discussion about whether your staff have the right training and skills to be able to do something like that in that environment.

Q: Throughout training, are you going through it alongside people who you end up working with?

Wong: Yes, yes. The MMU Team One, we were all together, and [laughs] it's interesting, they split us into two groups in the beginning, and they put all the physicians and physician assistants in one group, and I think nurses in that group, and then they put a bunch of the safety, sort of logistics and engineers and things like that in the other group. But they had to switch one person, and that person was me, and so I did not get cohorted with all the clinical staff, I got cohorted with everyone else. That was also anxiety provoking, I would say, because I knew that all the physicians and nurses were asking these questions in this other room, and I wasn't hearing them, and was I getting the same training or getting the same experience as the clinical group? I didn't know. [laughs]

Q: Did you know people who were in Team One as well?

Wong: Yes, actually, I knew one person [note: Gregory A. Raczniak]. He was my EIS classmate, and I was so relieved when I saw his name on the list, on the roster, when we finally got to see the roster, that at least I would have one friend. [laughs]

Q: And the training lasts how long?

Wong: How long was it? I think it was a week.

Q: A week.

Wong: Yeah.

Q: Okay, and then what happens?

Wong: So then we get on the plane, we get to Liberia, and as we walk off the plane—we're on our own plane, by the way [laughs]—I guess there were seventy-ish of us. We're exhausted, and it's hot and humid as we step off the plane, and then we get into these buses, and we're—well, I don't know about anyone else, but I am afraid to touch anything because I just don't know anything about, where did this bus come from, and have there been other people sitting on this bus? In a time where I'm thinking so much about infection control and contact, I remember being really nervous on the bus, just

because it's a local bus. [laughs] But yeah, we get to our compound, Compound Lomax, where we were housed with the Marines. Marines had half the compound and we had the other half. At that point, we had bonded a little bit, after the week in Anniston. We settled in, twelve women to a house, a tiny house. This first living place that we were at was these folding army cots, and we hung up our mosquito nets, and we were—in a room this size [note: recording suite is approximately nine feet long by eleven feet wide], there might have been three cots. That's how crammed we were. We were so crammed together, and then all of us had these huge packs, so there was stuff everywhere. It was a chaotic living situation. And then there was an outbreak of GI [gastrointestinal] illness in our first week, which was terrifying, but I think the way in which it happened, and the pace of it, it seemed like this was traveler's diarrhea and not anything worse than that, hopefully.

Q: Good. I can imagine that would be pretty scary.

Wong: Yeah.

Q: You're really close with the Marines—the US Marines, I'm assuming?

Wong: Yeah.

Q: What were the Marines there doing?

Wong: I'm not sure if I'm going to get this right, but my impression of what they were doing, I would say, is that they were there doing a lot of logistical support, like transport of resources in and out. They were transporting us around sometimes. And security. But they weren't interacting with patients. I think some of the other DoD [Department of Defense] services were doing things like building ETUs, and so there were engineers and logisticians and things like that.

Q: So, tell me about your first few days in Monrovia—or just outside, I don't remember.

Wong: The MMU was located very close to the airport. Actually, when we came off the bus, we went straight there to see it for the first time, and we got sort of a pep talk by the admiral, and we sort of looked around. This is before there were any patients, obviously, so we could kind of walk freely throughout the facility. That was nerve-wracking, actually, because I remember I walked into a patient room, like a patient ward, and there were these beds—these facilities are sort of designed for trauma. They're sort of combat hospitals. Everything, all the equipment and stuff, is designed for soldiers. So these beds, they were several feet off the ground, and they had no bed rails, and they were really close together, and there were metal components that could be sharp or that you could catch a gown on, or a glove on, and rip your PPE. There were IV pump machines with cords, and these cords were hanging. It seemed like when I walked in there and I saw the layout of the beds, and the height of the beds, and the cords, and the metal pieces, and the hooks and stuff, I was just like, this is an obstacle course. It is going to be so hard to navigate this for real when we're in PPE and we can't see anything, we can't feel

anything, can't hear anything, and you're not supposed to have anything touch you. That was really concerning. I was concerned also about—like, in the MSF ETUs, and these other ETUs, they'll have cots on the ground and buckets right next to the cots. Here, I was thinking, we're four feet or I don't know how high off the ground, and no rails. Are the patients going to fall off the beds? How are we going to get a fallen patient back up on this thing? And if they're vomiting over the side of it into a bucket, there's going to be a splash. It's not like they're right there. How are they even going to get off this thing to go to the bathroom, when they have frequent diarrhea? So, concern. [laughs] I was nervous. When I first saw the wards, I was really nervous.

Q: I'm interested to see how your worries met reality, as we go along. So, you visited the MMU, and then you were taken to the housing compound, is that right?

Wong: Yeah.

Q: Okay, and I remember from my interview with Abraham Marrero, those weren't right next to the MMU, were they?

Wong: No, it was forty-five minutes or an hour away by bus. When we started, we went right into our rhythm of—we had planned for these day shift, night shift, twelve hours each. That was all we had the staff for. But it was twelve hours, plus tack on an hour for each side, so they were fourteen-hour days. Getting up before light and returning after

dark, and never seeing [laughs]—sort of being in the ETU during the whole day. Yeah, the commute was pretty hard.

Q: In the first few days that you were there, are you immediately taking on shifts? Or what's happening?

Wong: We did a lot of training and drills initially. We had to figure out things like when a patient comes in, who's going to go out there, how are they going to go out there, what is the path that they're going to take, what are the entrances that they go through, how are they going to come back? What about when we discharge a patient, like how are they going to get in and out? We've got to drill it, so we've got to run this—we practiced putting on and taking off our PPE many, many times, practice all of the disinfection protocols. We even did things like a man-down drill. If one of us passed out in the ETU, how were we going to deal with that? How do we deal with combative patients? We role-played all of it, and we practiced, with ourselves as volunteers, things like drawing blood. The lab [laboratory] people practiced running their lab stuff, so we had to try to work out as much of that as possible. We also talked about the treatment, and what we knew about the treatment and what we didn't know, what we thought our best practices would be in places where we didn't have enough data to make an informed decision. It was a lot of training, and we didn't know when or if we would actually get a patient. We didn't know if we were just going to be there for support. Because people thought that having the MMU there would actually bring more volunteers to West Africa, because we were going

to be able to treat somebody right away if a volunteer or healthcare provider got sick. So we didn't actually know if that was actually going to happen.

Pretty early, I don't know if it was my first or second week or something like that, I got to go to the ETU in Bong. One of the things that they tried to have us do was get real experience in a real, live ETU before we saw patients of our own. There was an ETU run by IMC [International Medical Corps] in Bong, where I got to go and learn from physicians who were seeing patients there. That was really eye-opening because they were very high-volume, there were kids there. I'm an adult doctor, I don't see kids usually, so getting to see children was something I hadn't done since medical school. But yeah, that was actually my first experience with Ebola patients, was there.

Q: Any stick out in your memory?

Wong: Several, I would say, but one in particular. There was a little girl who—she was maybe six years old, and she had been in the ETU for a while, and I got to see her after she had sort of recovered from her illness but her tests were still positive, so they couldn't release her yet. She had come in with some family, and I think there was a member of her family who had died. She was in the room with that family member, and so was in the room with her deceased family member for a while before somebody came through on their rounds and found her. I think it was really disturbing how quiet she was. I mean, she was quiet. Her face was so flat of emotion, so devoid of emotion. A six-year-old girl who was just sitting in a chair with her little feet propped up, because her feet were swollen,

because the kids—their feet will get swollen. Her feet were propped up, and she would just sort of stare out into space, and you could not get her to smile. You could barely get her to interact. She was really just kind of traumatized. I think she was also, at that point, recovering strength. She would really fixate on food. She would talk to the nurses and ask for particular foods, and I think we all really tried to bring her anything that she wanted. We would save cookies and cakes out of our MREs [meals ready to eat] to give to her. I did get to see her discharged, which was actually really great, and we were so excited, we were so happy—everybody was smiling, and she's just there kind of stone-faced in the middle of all of it, getting toys and blankets and things heaped on to her, and just not reacting. It's really disturbing.

Q: Do you have any inkling of whether she appreciated it?

Wong: I don't know. I don't know. I remember, she got this pretty little backpack that had all these flaps. There were little animals that popped out from under the flaps, and it was like new, and pretty. She didn't react. She wore the backpack around, and was wearing it, but she didn't interact with it at all. The expression on her face never changed, really. But she did have family who came and picked her up. When I think about my experience there, I think about her a lot. When I was there was actually when they had first put up a survivor wall, where survivors could leave a handprint. She was the first or second person to get to put a handprint on there, and so there was one big handprint and then her tiny little hand, Christine's hand.

Q: This is a wall of—this is paint? People are—

Wong: Mm-hmm, they would dip their hand in paint and put a handprint.

Q: And put it on the wall, gotcha. And this was all in Bong County?

Wong: Mm-hmm.

Q: Gotcha. You mentioned that it was really useful talking to workers there. Do you remember anything that any of them told you that really stuck with you when you did your own work?

Wong: I feel like they were such veterans at that point that for them to go in and out of the ETU just seemed like, it's just medicine, we're just going on rounds. I think that confidence, or that realization, that behind all of this, it's just medicine, it's still medicine. You think about the medical and the nonmedical problems, and you think about relating to your patients, even through all these layers. I remember this one guy, great doctor, Dr. Steven Hatch. He'd go in there, he'd be loud and cheerful—he'd have to be loud so that patients could hear him through all these layers, but you just saw them light up and respond to him. He just had that awesome, engaging bedside manner. I was like, this is like being in med school and watching one of my really great pediatrics attendings go through their rounds. It's what you do, and you just do it.

Q: How long are you in Bong County?

Wong: Just a couple days. I think it was a little under a week.

Q: And then you come back to Monrovia?

Wong: Mm-hmm.

Q: And then what happens?

Wong: At that point, we still hadn't received any patients. So it was continuing with the drills and thinking through clinical protocols and safety protocols and things like that. But then we finally got our first patient. I'd been very involved in the creation of the clinical protocols. I was also one of the attendings on the day shift, and I was going to be the admitting physician for that first patient. There was a team of, I don't know, six of us who were part of that admitting team. We were buddied up, so that it was me and another physician, and there were two nurses, and there were two safety guys. I don't remember being nervous or scared, actually. I guess at that point I had been in Bong, so I had seen some patients already, and I had also thought so intensely about our protocols. I think up until that point I had been seeing patients at Emory, so I was fairly used to admitting a patient. It's kind of what I do for every single Emory shift, just admit lots of patients. I felt like I could slip into my usual role of being an admitting physician.

The man who came in was pretty weak. He was able to walk, but he was quiet, and I remember, I wonder what he was thinking. This is so different—it's just so different from the place where he works, because he was a physician assistant in a clinic and he had probably had some familiarity with what the ETUs looked like. He wasn't actually working in one of the big ETUs, but those big, open-air, cots on the ground, dirt floor. Then coming into this place where it looks like a spaceship—it's lit, it's air conditioned, it's white, there's all this generator noise, there's people in spacesuits. He knows what Ebola is, he's a healthcare provider, he knows what he's in for, and he's just walking into the hands of the American government as the first one to walk into that facility. I did my usual thing, and I asked him about his medical history and his recent symptoms, and did a physical exam on him, and that was just medicine, just me interacting with a patient.

Q: Now, when you're interacting with him, are you in full PPE?

Wong: Mm-hmm, yeah. All of us were. We walked from the outside and sort of took him in. Outside was really hot, and then there's this blast of AC [air conditioning] as we come in. He stripped his clothes off and showered, there was like a chlorine shower outside, and walked in, and then settled into one of our beds. Then I asked him a bunch of questions to get his medical history while the other physician scribed. We came up with this system where, because if I was going to be the one touching him, then we minimized contamination of his chart. It's just harder to—like if you're not supposed to hold things against your body, then you can't hold something against your body while you're talking to him and then examining him. Everything went really smoothly. We were surprised, we

were elated, I would say, that things seemed to be going really smoothly. We didn't have any problems, we sort of anticipated everything—it went all according to the way we had practiced.

Q: So you admit the first patient, and what happens then?

Wong: In this process, his blood gets drawn, it goes to the lab. I think there was a process of like, the chart that was on the inside, which was contaminated, because it was on the hot side, it would get held up to the fence, and then somebody on the other side of the fence, the clean side, would take a picture, and then we'd leave the chart by the patient's bed. Then we went through the doffing tent, where we got sprayed down, and came back around, and then I wrote that admission note. Writing notes is something that internists are great at because we love to write, [laughs] we love to describe in a lot of detail our clinical findings and our impressions and our interpretations. I wrote the note in his chart, outlined his treatment plan, communicated back to the nursing team, and that evening, at change of shift—well actually, right after that, we reviewed everything and were like, was there anything we missed? Were you okay? Did everything go the way—was there anything we could have done better? We did sort of a hotwash after it, and then when we had change of shift—at every change of shift there's a signup process where you brief the next team on what the situation is. That was exciting. At the same time, it was just medicine. It was just taking care of patients, it was just admitting a patient, and me being an internist, figuring out what someone's problems were and outlining a treatment plan.

Q: Kind of this familiar and the strange mixed together.

Wong: Yeah, yeah.

Q: What was I going to say? Was it intentional that you had just one patient coming in, and could all just focus on this one at first, and it wasn't an immediate flood?

Wong: I don't know. Maybe. [laughs] I wasn't part of that decision, I would say. Since we were there, and we were supposed to be there for healthcare providers and other response workers, we knew that that was only a fraction of the whole range of patients. I know that the other ETUs also needed to know about us, and I think our leaders went around to these other ETUs and told them, hey, we're here, this is what we do, we're open, we're ready, send us your people if you want. Making ourselves known was part of the process.

Q: Did you go around and do some of that?

Wong: I did not. I mean, when I was in the Bong ETU, I told people. I think they were aware. [laughs]

Q: After the first patient is processed, tell me what happens then.

Wong: We get more patients. They just start coming in. Our first patient, we were able to stabilize him. He wasn't critically ill when he came in, but we got others who were much more concerning. I think they were sicker when they came in. Then there was a period where our first patient—he got a little bit better, and then he got a little bit worse, and we were all really nervous, like how is this going to go? I remember with that first patient—I'm going to go on a tangent here, but that first patient, as a healthcare provider, he knew that if he got dehydrated, if he wasn't able to drink and to eat, that he was going to die. So he tried so hard to keep things down. I think he may have tried too hard. [laughs] Because he would take juice, and just like chug it [laughs], because your stomach's kind of a mess, you're feeling nauseated, you just chug all this stuff, and of course you're going to vomit. He would chug juice and immediately vomit, and we were like, "Dude, slow down." For some reason, we just couldn't get him to take smaller sips, like don't drink so much at once. One of the things that I learned when I was in medical school and working in the pediatric ER [emergency room] was that when kids are puking and you can't control whether they are chugging their juice boxes or not, you can make them popsicles. So we took the rehydration solution and told the team to mix the oral rehydration solution with a little bit of flavoring packet from our MREs, and we made popsicles. I'm pretty sure we're the only ETU that was using popsicles for rehydration, but it worked so well, he just sucked those popsicles down. We would bring him all these popsicles, and then we could control his rate of intake and make sure that he wasn't chugging this solution. Actually, he started to do a lot better. He was finally able to get some hydration, and then was able to slowly work up to keeping down food. I think it really turned his mood around, his spirits around, because prior to the popsicles, I think

he was losing hope, he was starting to despair. There was this one time where he wanted to get up to see his family, and on his way from walking to the ward to try to go to the family visiting area, he had diarrhea, and I think it broke something in him. He was so hopeless at that point. After that, he didn't want to go up and see his family anymore. He wasn't even trying to chug juice anymore, and I think we were starting to worry that he was getting really depressed and hopeless. But I think after that point, he started to turn around. I think he started to feel better, medically and non-medically.

Q: I know that obviously the main problem was Ebola, but were there mental health assessments going on, or treatments of any kind?

Wong: Yes. I think that the providers would do mental assessment as part of our exams. But it was hard to be able to talk to them for any significant period of time because the PPE was hot, you couldn't hear anything, they couldn't hear you. So it was really hard to have a conversation with them when they were really sick and they couldn't move around too much. When they were able to get up and move, they could walk over to the fence and we could have a conversation across the fence, without all of our garb on. But that was only after they started to get better.

Q: When you're wearing all the PPE, and your conversation is limited, are you talking about things that are not just medical, though?

Wong: Yeah, sometimes. They had families, some of them had kids, so we talked to them about things like that. A lot of them were very religious, and so some of the staff would talk to them about spiritual concerns or issues. So there was more than the "have you had diarrhea today" conversation.

Q: Yeah, I'm considering—oh, one quick thing before I get into that. Were there translators, or did you understand everyone just fine?

Wong: I think we could understand people well enough. All of our patients spoke English, so it seemed to work out okay.

Q: Gotcha. But, yeah, this broader theme that I think is coming through with what you're saying is, being a provider and being human, and not having those be separate. I remember in the [*Road to Zero: CDC's Response to the West African Ebola Epidemic, 2014–2015*] book, there's a big picture of you, with your photo without PPE taped onto your torso. Can you tell me about that?

Wong: Yeah, that was something I was really concerned about, was this idea of being these faceless spacesuits, especially for somebody coming into the US government hospital. I thought it was really important that they could see our faces. Before we had patients, I asked one of the other officers to get pictures of everybody and print out several for the clinical staff so that we could tape our faces to our chests and they could see who we were. We later moved to a face sheet, and we would point like, I'm this

person on this sheet. But I think the idea was always there, that we wanted them to know that we are here to take care of you, we are human behind all of this.

Q: Did you ever hear any feedback about the photos, specifically?

Wong: You mean aside from you, or [laughs]—

Q: No, I mean from the patients.

Wong: Not really. It was nice when they started to get better and they could see us across the fence, they actually knew who we were. I had heard about experiences of nurses forming these great relationships with patients, and then when the patient gets discharged and walks out of the ETU, the nurse comes up and gives him a big hug, and the patient doesn't know who she is because he doesn't recognize her. They recognized us, and they knew who we were.

Q: What do you talk about with people across the fence?

Wong: Usually just kind of like, how are you doing? How's your family? Were you able to spend some time with your family today? Do you need anything? It still was sort of yelling across the fence, so it wasn't great for having long conversations. But we talked to them about—they'd always want to know, how many tests do I have? Do I have two

negatives yet? When you do think I can go home, and who's going to come pick me up? Those kind of things.

Q: Getting back to the timeline, you had the first patient, you started getting more and more. What further developments take place?

Wong: I think we started to get busier and busier, and I think when we talk about having ten patients in our ETU, and then we compare it to a place like the MSF, ELWA [Eternal Love Winning Africa Hospital] ETUs, where they have hundreds, it seems like peanuts. How could we be running ourselves ragged taking care of ten patients? Ten patients was super busy for us. Think about a place like Emory having ten patients. That would be so overwhelming because of the level of care that they're giving. For us to be able to take care of ten patients, or in that range, it required a shift in several of our protocols. Because anything works when you've got one patient—everything works. But I think when we had to start thinking about scalability, and efficiency, there were things that we would do differently. Maybe instead of two physicians going in at once—you rarely need two physicians for anything, really, so it was more useful to send in a physician paired with a nurse and do it that way. I think when you're starting to go in and out of the ETU multiple times, you have to put limits on how often people can go in because it's exhausting. Every single time, it's exhausting. It's like taking a Bikram Yoga class, just the heat and the endurance and the dehydration—you can't physically do it more than maybe three times a day. As we got some critically ill patients, we did things that we had never done before. There was one time where there was a woman who was so dehydrated

that it was really difficult to get blood from her anywhere, and so I did this ultrasound-guided deep brachial stick, where you're going for a big vein that's really deep in the arm, and it requires you to hold the ultrasound probe with one hand and then this big needle with the other hand. It was something that we definitely rehearsed, and it's so choreographed—I mean, I knew exactly like, okay, John, you're going to stand here, and then you're going to be on this side of me, and then I'm going to turn this way and I'm going to reach with my left hand and hold it on this side, and you're going to hand me this thing from this side, and you're going to announce yourself before you make any moves. Every piece—it's like a play.

As I moved to more advanced procedures, or new procedures, then we had to figure those things out. I think we did some creative diagnostics there too. There were certain things you could do in the lab, and certain things that you can't really do safely, like there's a centrifuge machine, but it wasn't really something—actually, I don't know if they actually had a centrifuge machine, but it wasn't something that you could use to make the blood settle. This is getting on a big tangent, but there are these old-school bedside diagnostic tests that you only learn about through your older professors in medical school, and no one uses them anymore because you have fancy machines who can do that for you. But we had to resurrect some of this knowledge. I remember, over the poor internet connection, searching Google Books of these older bedside medical tests that we could do. There was one thing where I wanted to look at the serum color to make a diagnosis, and so we came up with this plan to draw the blood and let it sit in these conditions for this many hours, and then reexamine it, and measure—like, things you

don't need fancy machines for because we didn't have them. I think we had to come up with creative procedures to be able to use some of the fancy equipment that we had. To get an electrocardiogram, to be able to look at the electrical activity in the heart, we hooked up the machine and we printed it out, and we placed that printout in a plastic Ziploc bag and then sprayed that Ziploc bag down with bleach so that we could actually move it out of the room and then take a picture of it across the fence. [laughs] We came up with things that no one taught us in Anniston, and no one taught us anywhere else, but it was just like, okay, here's the problem, and here's the hot side, and here's the cold side, and how do we—I mean, it's like a puzzle, trying to figure it out. There were some creative solutions that we had to come up with. With the communication, because it was so hard to hear, and because you couldn't reach out and tap somebody if you were trying to get their attention, because you're not supposed to have contact. We had these floors, and we would stomp on the floor because it would make a much louder noise than we could actually shout, and if you couldn't hear it, then you could feel it. Those are all things that we just sort of figured out, and no one told us how to do those things.

Q: Wow. Any other interactions with patients that come to mind?

Wong: There's this one story that I've told before about a nurse, a young nurse. She came in, she walked in—she was like twenty-something—she walked in, and she was weak, but she was talkative, and she could tell us about herself, and about the work that she had done. She was actually a nurse in an ETU, and she was trying to place an IV on a patient, and she slipped and she stuck herself. She was able to describe that, and she told us about

her family, and she told us about her little boy, and I think—she looked pretty good when she came in, but when we got her blood work back, we saw that the amount of virus in her body was really high. I think we were just, we were really worried, because even though she was walking and talking and seemed to have a decent strength now, we knew that a viral load that high was probably not going to be good. We pulled out all the stops for her. We really tried to aggressively treat her, resuscitate her, but she just kept getting worse and worse and worse, and she was one where I was by the bedside, and had just given her some pain medication, and I was there, and I saw her stop breathing, and I was actually there at the moment that she died. I remember, I walked out, and I went through my doffing steps, and at this point, this is a decent ways into my deployment, so I'd done this a lot before. It was very good that it was all so automatic, because I just went on autopilot. I went through all the steps in the right order, and the hand washing, and all of that, and I came around back to the cold side, the clean side, and I wrote her death note. I was looking at that death note a few months ago. It's short. Just, went in because the nurse said that she was having more distress, and gave her some pain medication, and respiration ceased, and time of death was whenever it was. She's one that I really remember because it was so vivid for me, being there for her death.

I'm going to skip ahead for just a second. We came back in December, and I went back to my job. My cubicle, Building 24 job. I think it was, I want to say March or something—I mean, it was a while after I'd come back, and I hadn't been thinking about Ebola very much anymore. But I was in my cubicle, and I came across this story, and I clicked on it. It was about Ebola, and there was this man in this photograph who looked really familiar.

They gave his name, and he described his sister, this young nurse, and said her name, and I knew that that was my patient. I was in there in my cubicle, and I realized, all of a sudden, she just came back to me. I started shaking, like my whole body was just shaking. It was suddenly so vivid again, and I feel like even now that I'm telling it, it's vivid again. Realizing that I had been away from it, but it was still just barely under the surface, and this young man—I was so overwhelmed by emotion, because I saw her in my mind again, and I remembered that day, and I wished that there were things that I could tell him about her and about how much she impressed us, and about how hard we had tried for her, because she was a nurse, she was one of us, she was an ETU nurse. I remember I wanted him to know that I saw his sister die, and that she was in a bed, and it was clean, and the room was cool, and there was sunlight coming in through the window, and her face had been peaceful, and I treated her pain in her last moments, and that she hadn't been one of the patients who died on the floor of a dirt ETU, unattended and untreated for pain and anxiety and things like that. I really wanted him to know that his sister had a good death, if that makes sense. I told the team at sign-out, at change of shift that night—I had the day shift and the night shift in front of me. And I talked to them—I remember this because it was a fair ways into our deployment. I was like, "She stuck herself with an IV, with a needle, as she was trying to place an IV, and this needs to be a reminder to all of us of where we are and how dangerous our work is and how important our work is and how important our safety is." Because I think once you're that far in, you start to get comfortable, you start to get confident. And I said, "She died doing what you are doing right now." I wanted him to know that. I wanted him to know how much impact she had had on all of us. It was a real wake-up call to everybody to see how fast

she died, given how young she was. We held a memorial service for her. We did this for all of our patients. There were a couple other women in MMU Team One who sing either in the PHS choir, or other choirs. This group of four of us, we sang for her memorial. We sang "Amazing Grace" in four-part harmony for her. I wanted to be able to tell the man that I was seeing on my computer screen. I wanted him to know that she left a big impact, and we think about her, and we honored her death, and she taught us so much.

We had discussions about this. After this, I sent the article to a few of the people whom I had deployed with and we had all these discussions about, should we try to contact him? Can we contact him? Are we allowed to? And as of yet, we haven't. I think we're still not quite resolved on that issue. I still don't know if we should contact him. I don't know. It's a hard story to tell in any kind of setting, because—and I don't know what you're going to do about this, but it could potentially identify the patient—if you knew which article it was, then it probably wouldn't be too hard to figure out. But yeah, I think that experience just makes me feel like there's, like it's never far away, like that—Liberia, and the ETU, and the MMU, and those patients are never far away.

Q: Thank you. Yeah, very powerful. Let me know what you decide about reaching out, because, yeah, I came in assuming I'm going to take out identifying information, right, of patients that comes up, all that kind of stuff. I want to follow your example, in taking all due precautions in that, but it's such a powerful story that, to the degree we can, it would be great to get that out.

Wong: Yeah, I think it illustrates so many aspects of the response, and what it was like to be a responder in the moment afterwards, for months afterwards—impact on families.

Q: Yeah, absolutely. I know that doing services for everyone who died in the MMU was probably therapeutic, to some degree, for you guys who were in there. Can you talk about that, or can you talk about other aspects of self-care that you did?

Wong: I'll talk for a second about the memorials. We also had a survivor wall. We had a blue tarp, and these yellow handprints, and it was very cheerful, and [unclear]. I remember partway through, as we had a couple patients die, we realized there isn't anything for those who passed away. We've got this outward-facing, public-facing survivor wall, but we don't have anything for the patients that we lost. Interestingly, on Team One, we had a team chaplain who deployed with us, and we talked to the chaplain about this, and we came up with this idea to have this mural. My physician bestie, [laughs] my best buddy, Suzette [Peng] and I, we drew and painted this large mural of the MMU. I can send you a picture of this at some point. It's a depiction of the MMU, and above the MMU there are these stars, and each star is for a patient, and some of the patients are—this allows us to recognize all of our patients, not just the survivors. Not even just the Ebola patients, because we took care of patients who ended up not having Ebola. But this way of commemorating everyone. I think that was really important to us to do it in a way that felt respectful, and not like a score sheet. And beautiful. I think that that was something that was really good for us.

I mentioned the singing. That group of us, we would get together and we would sing after shifts, like on the porch of our little house. Sometimes we would sing for patients too, if we could, across the fence, and so that was really good for my morale. And I think as much as possible, reaching out back home. It was hard to communicate with people back home. I felt like I was experiencing all these really intense things, and do I really just want to spew all of that back to the people at home? Some of the things that I was experiencing were really bad, they were really bad, but I didn't want people to worry. I didn't want to raise their anxiety levels and make them feel like they were helpless to do anything about it. So it was really hard to know whom to talk to about things like that, about the bad things. On the team, we talked to each other. I've tried to think if I've been in a situation like that, where I've been with a group of people for such a long time, living literally so close together, like practically—in fact, literally at some times on top of each other because we would bunk. And then going through something that was dangerous, and scary, and emotional like that, together. I think after that experience, it helped me better understand what soldiers go through, actually, when they form these really tight bonds within their unit. I know it's not the same thing, but there's something about that baptism by fire as a group that is very intense and forges a really strong bond. I had two of my Ebola buddies at my wedding, actually.

Q: When was your wedding?

Wong: It was New Year's Eve the year after I came back.

Q: Right, so this last New Year's Eve?

Wong: Yeah.

Q: Congratulations.

Wong: Thank you.

Q: Wow. I wanted to go back to, when you were talking about training—or not training, I'm sorry. Well, yeah, partially training. Your first visit to the MMU and all of these questions you had looking around, like what happens if someone vomits from this height and it splatters all over, everything is so close, and there's so many places where you can catch your PPE. How did that turn out?

Wong: We had some engineers, and we also did some engineering on our own. We unscrewed things, we disconnected things. We decided that for really sick patients, we're going to leave them on a stretcher on the floor, basically, because it was going to be safer. We always tried to do the minimum, have the minimum amount of stuff in the room, so anything that didn't absolutely need to be in the room—and there's very few things that absolutely need to be in the room—we took out. We got rid of them.

Q: What's an example of something that is extraneous, and you don't need it lying around, like in the MMU?

Wong: If we could attach something to the ribs of the tent, and get rid of a pole that was attached to the bed, then we did that. I think originally, there were a lot of towels and gowns and vomit buckets and things like that, stashed in a supply corner of the ward. We took all of that out, if we could, as much as we could. And just removing a number of beds. There were twelve beds in this ward, and it wasn't ever going to be safe to have twelve patients that close together. We just took a couple of them out. I think our rhythm was that patients always came during the day. We only admitted patients during the day, and so the night shift, their responsibility was to keep things going, but they didn't have to take in new patients. It was often quieter at night, I hope, because patients are sleeping, so sometimes the night shift would help us out, and if we knew that we needed to set up a bed, or take out a bed, then they could do that during the quieter hours.

Q: Were you always day shift?

Wong: Mm-hmm, yeah.

Q: You were talking about the people you formed close bonds with there in such a traumatic and crazy and emotional environment, high stakes. Can you describe some of those people?

Wong: Sure. We have this group of physicians that was really close. My bestie, Suzette, who was sort of my buddy in everything, we were roommates—we were ETU-mates. She

was the other internist in the group, and super smart. As the two internists, we would think through the problems, the plan, the clinical protocols, and that was fantastic. In addition to internal medicine, she specializes in rheumatology, which is also interesting. She could examine joints, both of us and of our patients. I think a lot of people had—you know, young people carrying lots of stuff, carrying crates of water bottles and things, end up with joint problems. So she could be a bit of a staff physician for us as well. Then two of the guys on night shift, one of whom is a CDC physician, we spent a lot of time talking about clinical problems, talking about team problems, confiding in each other that we were worried about this or that, and commiserating, celebrating. We just got really close.

Q: Who were they?

Wong: One guy, his name's Christopher Perdue, and the CDC guy is Greg Raczniak. I think he's been featured in a couple CDC stories.

Q: I'm just reviewing little notes that I've written to myself while we've talked. Were you journaling while you were there?

Wong: Some, yeah. I tried to. It was hard because fourteen-hour days, you just don't have a lot of time, but I tried to keep a little bit of that. Some of it was my emails back home, where I would summarize—censor and then summarize [laughs] my experience for the people back home.

Q: Coming around again to the medical and nonmedical things that you're keeping in mind, it seems—I'll just editorialize for just a second—it sounds like one thing that was so powerful about the one patient you described who passed away was connecting in both of those terms, and learning about her life in ways that are not just the body, like you were saying. It sounds like—correct me if I'm wrong, but the nonmedical that you were describing is also—it's like the environment in which a person lives, right? It's all of these contributing factors?

Wong: Yeah.

Q: How did you think about the nonmedical? Or could you, while in the MMU?

Wong: It was hard. Just being able to communicate with families, and for the patients to be able to have that connection back to their families, was really important, and it wasn't always easy to do. Some of our patients just brought their cell phones in with them, so they were able to call out to their families. We were able to call the patients, actually, if we just wanted to check something and didn't need to suit up for it. We had really amazing clinical staff that were able to engage with the patients and show sympathy and empathy without touching, which was something that was a challenge initially because when somebody is crying their heart out, then your impulse is to put your hand on their hand, or put your hand on their shoulder. But lots of ways to listen and show that you care, show that you're listening, without touching somebody. I may have gotten off track a little bit.

Q: Well, my question was ridiculously broad.

Wong: Sometimes the patients were really too sick, too delirious to be able to do much, and it wasn't a time to really dawdle in there. The minute you put all that stuff on, the countdown has begun. You need to be as efficient as possible, and as careful as possible, and that doesn't leave a lot of time to stand around by the bedside and talk, necessarily. But we tried to do little things. There was one patient who was having a really hard time, and I made her a little card with a little drawing on it, and then I just brought it in there to give it to her, and she could sort of read it at her leisure. We'd try to do things like that. Every time someone went in there, even if it was just to deliver food, then you always check and see how the patients are doing and talk to them a little bit so that they don't feel like they're in this lonely spaceship all the time.

Q: Tell me about any developments as you're wrapping up your service.

Wong: As we were wrapping up, we were thinking about training the next group. We had to—a lot of the practices, like the stomp your foot on the floor if you can't get someone's attention, we had to think about all those things and think about how to teach them. At the same time, I think with the deployment—I think it's for operational security reasons that they don't tell you exactly when you're going home, and so it's really hard to plan. It's really hard for the families because it's like, I think I'm coming home Saturday, but I'm not totally sure, so I'll let you know. There was a lot of uncertainty around it.

It was a few days before Christmas that we finally came home. I remember we spent Thanksgiving there, and we did a mini-Thanksgiving dinner as much as we could out of our vacuum-sealed bags—which, by the way, we had MREs basically the whole time, so I got super skinny when I was there. But yeah, thinking about, how are we going to teach the next team about this, and then how are we going to also teach the world what we've learned here? How are we going to communicate everything that we've learned? We're in such an unusual environment, and I think it would be really important to be able to describe things like how we used the ultrasound machine, because no one else was doing that, or how we used the popsicles, because no one else was doing that either. Towards the end, we started writing up certain patients' protocols, and we ended up publishing, actually, a report on two of our patients. But yeah, thinking about how do we share what we learned.

Q: Right. What was it like coming home?

Wong: It's just kind of a blur. The plane ride back was, I think, bittersweet. I think the end of it all was bittersweet, handing over this place that we felt like we had sort of stood it up and made it operational, and come up with the systems. Handing it over to the next team, and knowing, okay, you guys are going to do great, but feeling a little bit sad that we were leaving behind this thing. It was mixed. Then coming home, it was—I remember for a while after coming home—first of all, I was in direct active monitoring, which is something that I think not that many CDC people did because most of them didn't have

direct patient contact, or weren't caring for patients. I was in a different level of monitoring. Coming home, I was very nervous about getting flu, because it was flu season, and there was flu at CDC at the time. My fiancé then was working in the building where there were flu cases, so I think we were pretty worried. Neither of us was concerned about me transmitting Ebola to anybody. It was very much like, I don't want to get flu and then have to be admitted to Emory and get tested and ruled out for Ebola. I remember being fairly paranoid about human contact, and about social contact, which is hard because it was Christmas and it was New Year's and I couldn't see my family. It was hard. But I remember coming back, actually, on the plane, and eating fruit, and it blew my mind. It blew my mind [laughs] that I was eating, like, fruit, and like a little thing of cheese, and it was the best thing I'd ever had. Like, all of us were like, this airplane food is so good.

Q: What kind of fruit?

Wong: I don't even know. I think there was maybe some chicken, and some pasta, and then a little salad, and the salad was just amazing. [laughs] It was just amazing to have lettuce, and a tomato. It's really mind blowing. Then, once I got home, just realizing, oh my gosh, I can eat all of these things. I can have a hot shower, and sleep in a bed—sleep in an actual bed. [laughs] It's really incredible—and wear something other than this blue thing that I'm wearing now. I was just so grateful, so grateful.

Let's see, what else? But there were some other hard parts about it. So much of my time had been spent thinking about my safety, and I remember coming back, and aside from like the flu, and the germaphobia, I remember I would just get really uneasy if I felt like I was in a situation where I was not safe, and I was always really concerned about my safety. I think that took me a while to mellow out from, actually. Like, I'm sure I still have some heightened awareness at this point. I'm much more infection control conscious than I've ever been. And then I remember coming back to work, and it was really—I think this is probably pretty common with the responders, but when I first came back, and I was in my cubicle, and I was staring at a computer screen, and thinking about analyzing epi data, I was just, like, what am I doing? What am I doing here? I've been so hands-on, so active—this marathon sprint for the last two months, and now I'm sitting in a cubicle and attending meetings and just doing statistical analysis. What am I doing? I actually ended up going back to the EOC [Emergency Operations Center] for a little while to work on the clinical team, being one of the only clinicians who had actually taken care of patients. I was able to do that for a while, and I think that actually probably helped ease me back in.

Q: Can you describe that work, and how long did you do it?

Wong: How long did I do it? I feel like it was maybe forty-five days, or something like that. I was the deputy lead of the clinical guidance team. We provided the technical, clinical expertise for the response. Clinical questions would come through us, and it was great to be able to use that, use what I had learned in the MMU to answer those questions.

Because I was in this sort of gray zone between fancy, high-resource, Emory-type setting, and your bare-bones ETU. I had worked in a bare-bones ETU in Bong, and I had also worked, not in the Ebola unit at Emory, but I'd worked in ICU [intensive care unit] settings for my other work in Emory. I felt like I could bridge those worlds okay. Then I got to help train all of the subsequent MMU teams. For Team Three—well, Team Two I trained in Liberia, Team Three I trained here. I think I met them out in Kennesaw or something like that. Then Team Four I went to Anniston and was with them in Anniston.

Q: How was that?

Wong: Surreal. [laughs] Yeah. It was great. I think we were a unique team because we were first, and they were unique because they were last, and were going to be doing things like handing over the ETU to the Liberian government. So they were also in uncharted territory and were going to be doing very new things. But it was always surreal, I think, seeing one of the new teams and talking to them about what it's like. The general medicine stuff, but also, these are the weird tricks, that if you stand under this particular air vent, then you'll unfog your glasses when you can't see anymore.

Q: That's pretty good. So take me up to today.

Wong: Let me think. There are moments where it comes to the surface very acutely. I remember at some point, I was watching the movie *Outbreak*, and it was fine—I was doing fine, and then there was this one scene where they were zipping up a body bag, and

all of a sudden, I just lost it. I just burst into tears, because it suddenly, I remembered zipping up body bags, and it just became very real to me all of a sudden. This was months after. But I think aside from that, I feel like the experience—I feel like I'm not the same person in some respects, or maybe I'm just like a more intensified version, or some other—

Q: Concentrated?

Wong: Maybe. Yeah, maybe—maybe it's concentrated, distilled—I don't know. And yet I think I'm a much more careful person than I ever was before. My husband may disagree, [laughs] but I think that experience forced me to be even more careful and precise than I was before. I also feel like—I think about—so, Zika's happening now, and I don't know if there will be responses like this in the future where PHS is called again to work in a clinical setting, maybe in a dangerous or somewhat unknown clinical setting. I think about, would I do it again? And I don't know. Part of me says absolutely. Absolutely I'd do it again. I think we did really good work, you know? I think we made a big difference. It's a certain number of patients, but for each one of those patients, I think that we either contributed to their survival, or we helped them die, or we ruled them out and were with them in a very scary time of their lives. To be able to do that kind of work and have that dual perspective, as a physician and as a public health epidemiologist who looks at populations, is really powerful. I think each one makes me better at the other. To have that perspective as an epidemiologist of having touched patients, having hugged them when they walked out, and having zipped them into body bags, that full range, I feel

like when I see stories, when I see news articles about Ebola, when I see scientific papers about Ebola, when I see numbers about Ebola, I see people. I remember people, and I remember places and experiences, and it's so much more real to me. It's not just numbers and colors and figures. Then, being on the physician side, and knowing the context in which I'm working, knowing about the increased risk that healthcare providers are at, and knowing about risk factors, knowing about transmission. I think that made me better at doing the technical aspects of medicine, but also knowing how to talk to the patients about their lives, how they might have gotten exposed and things like that.

Q: Is there anything else that you'd like to talk about regarding your experience responding to Ebola, or anything outside of that?

Wong: Let's see. I don't know. I mean, there's so much—like, I feel like there's still days of material left that I haven't told you, all these experiences and stories, and I really only told you about two patients. There were so many others, and all of them are so vivid. Maybe I've hit the high points, I don't know if there's anything specific that I need to add.

Q: Well, I have funding to do this through fall of 2018, which is great. Should you want to come back, we can absolutely do another session, or two, or three, if you want. It would be a pleasure for me. So, thank you for being here.

Wong: Thank you.

END