Peter Kilmarx, M.D.

June 17, 2024

Barr: Good afternoon. Today is June 17, 2024. My name is Gabrielle Barr, and I'm the Archivist at the Office of NIH History and Stetten Museum. Today I have the pleasure of speaking with Dr. Peter Kilmarx. Dr. Kilmarx is currently the Deputy Director at the Fogarty International Center. Today, he will be talking about the trajectory of his career, as well as his experiences during the COVID-19 pandemic. Thank you very much for being with me.

Kilmarx: Absolutely. I'm delighted to be here and to have this opportunity,

Barr: Definitely. Will you please share a little bit about your upbringing, including where you grew up, your home life, and your early education? Were you interested in science or medicine at a young age?

Kilmarx: Sure. I grew up in Barrington, Rhode Island. We lived on Narragansett Bay. My father was an attorney, and my mother was a homemaker. Then she became involved in state politics and ended up as the Energy Utilities Commissioner for Rhode Island—so I had a history of government service in my family. I certainly did very well in science classes from an early age. I said I wanted to either be a doctor or a farmer when I grew up, and no one in my family had been a doctor before. I learned in the last several years that I was actually donor conceived. I was able to track down and have some phone conversations with the sperm donor, and he was a physician, so I now believe in genetic determinism and that that's where my interest in medicine actually came from.

Barr: You have a brother and a sister. Were they also donor conceived, or no?

Kilmarx: Well, we don't really know. Neither one of them went into medicine, but we don't really know.

Barr: Are you the youngest of the three of you?

Kilmarx: I'm the middle child.

Barr: That's so interesting. Will you speak a little bit about your undergraduate experience at Dartmouth College, where you graduated with a degree in biology in 1983? What made you go to Dartmouth?

Kilmarx: Well, that's easy. My mother's father was the Dean at Dartmouth, and my father's father also went to Dartmouth. One was the star football player; one was the football manager. My father went to Dartmouth, and he married the Dean's daughter. That was very much in my family background. I spent a lot of time there, and thought it was a wonderful place. I loved being in the north and outdoors a lot and had a very strong educational undergraduate experience. They had a lot of foreign study programs, so I spent time in France, Costa Rica, Jamaica, and, actually, in San Diego as part of my undergraduate experience.

Barr: What were you doing in all those different places?

Kilmarx: Oh my. France was language study, and there was an exchange program between Dartmouth and UC San Diego. I spent a semester there. I was interested in ecology and in oceanography. I took a took a course on pelagic ecology at the Scripps Institute in San Diego, which I really liked. Then there was a terrestrial ecology and

marine ecology foreign study in Costa Rica and in Jamaica. That was one semester with both of those. But I was a pre-med, so I was taking the pre-med courses, but I guess, even then, I was more interested in population biology and ecology. I took the premed courses, and then the rest of my biology major was forest ecology and pelagic ecology and other ecology courses. I didn't know it at the time, but it actually was good preparation for my interest in public health and population health.

Barr: Definitely. That's so interesting. What inspired you to serve in the Peace Corps in the Democratic Republic of Congo as a fisheries volunteer after college? And why were you particularly interested in an aquaculture? That's such an interesting avenue.

Kilmarx: Well, I had taken the pre-med courses, but I didn't really feel like I was sufficiently motivated or mature enough to start medical school. I knew about the Peace Corps and spoke with a recruiter and thought that would be a good way to get some more experience and international experience—and some service opportunities. And really to decide if I wanted to go to medical school or not. And I think because I spoke French, the Peace Corps slotted me to go to a Francophone country. I did a lot of fishing, and actually worked on a mussel farm raising mussels when I was in high school. But aquaculture was just the program that they identified for me to to work in. And it turned out to be a wonderful experience. I was in a very remote, rural part of the Congo. I was the first and only westerner to be living there in the area where I was. I was working with subsistence farmers and their families in digging and maintaining these fishponds. I ended up working over the two years I was there with about twenty families, and each of them had one or two or three fishponds and was quite successful. There was a lot of protein malnutrition in that area, and so it was worth it to them to do the work of raising the fish and be able to either sell it or use it to feed their families. There were two other volunteers for two years each after me, and I'm still in touch with some of the people there. I can look on Google Earth and see the fishponds and see if they're still productive and have a good plankton bloom and keep in touch with that. For a Peace Corps experience, it was actually remarkably effective that it now, decades later, is still going on.

Barr: What was your training like to go so far away, especially at that time, and then to do what you did?

Kilmarx: The aquaculture training was in Fort Pierce, Florida, just learning about the basics of the water and the dams and dikes to build the ponds, and the fish life cycle and that kind of thing. But the tilapia, it was very simple—it was kind of like gardening with fish. There was no special fertilizers or feed or anything like that. The fish are very hardy and reproduced very easily. You just put in one little fingerling per square meter and try to get a plankton bloom in the pond, just using household waste and compost. And six months later, the fish are hand sized, and there's thousands of little fish. It was pretty easy technically. Then after the ten weeks in Florida, we had more time in the Congo for orientation to the fish farming there, but mostly the language training. I already spoke French, so I did four more weeks of French language training, which was really more cultural training, and a very nice opportunity for me just to learn more about the country in the language—and then four weeks of the regional language Tshiluba training. I had a basic understanding of that, and that was mostly what I worked in, the Tshiluba language.

Barr: What were some of the challenges you encountered during these two years, and what surprised you most about this time abroad?

Kilmarx: Well, it was it was lonely. There were no telecommunications. I would write letters to my family and get letters back, but that was like a month in either direction. I read every *Newsweek* that I would get from cover to cover, usually months after they came out. I had some contacts and colleagues and friends in the village, but

there was a very strong cultural difference, and I missed my family and my friends. And then there were health challenges—there was no running water, no electricity, and I had malaria and filaria and intestinal diseases, and I lost about 30 lbs. over the course of the two years. It was an incredible experience, very motivating to me. I realized, yes, I'm actually willing to work hard and be really dedicated to a career. During that time, some of the farmers named their male sons after me so there were these baby Pierre's. One of the baby Pierres died of measles about a year after I was there. That was just very sad that that had happened—this baby named after me dying of measles. But also, I was kind of puzzled. We have a measles vaccine. We've gotten measles boosters as part of our Peace Corps preparation. So, how could you die of measles when we have a measles vaccine? I was learning a lot more about public health and preventive medicine and program implementation. That experience has just motivated me to learn medicine and learn public health—and try to improve the health of people like that around the world.

Barr: It's a very, very unique experience. Will you discuss your decision to pursue the combined program with the Geisel School of Medicine at Dartmouth and Brown Medical School, and what both of these institutions offered you as a student?

Kilmarx: Yeah, well, it was perfect for me. Basically, it's the combined program between Dartmouth and Brown. Dartmouth has one of the oldest medical schools in the country, and very strong preclinical training in the first two years. Brown, at the time, was a relatively new medical school, but had eight different hospitals and a much more diverse urban patient population. For the two schools, it made sense to collaborate. There were 80 students that started at Dartmouth every year, and then after two years, 20 of them went off to Brown to join the class of 60 students that was at Brown. And especially for people who'd already been four years at Dartmouth, to spend a couple more years, but then to go off to someplace else, made a lot of sense. For me, I wanted that really strong preclinical training at Dartmouth, but then to have the more diverse patient population experience at Brown—so it worked well for me. Our family has a place in near Dartmouth, where I stayed for two years, and then I lived with my parents at home in Rhode Island for two years, so that made particular sense, for me to be able to do that.

Barr: Definitely. Following graduation from medical school in 1990, you went on to do your internship and residency in internal medicine at Johns Hopkins, as well as a clinical fellowship in infectious diseases. Why did you choose to specialize in infectious diseases? Are there any particular cases or ways of teaching that really stand out for you, and did you have any mentors that really helped shape the trajectory of your career when you were at Johns Hopkins?

Kilmarx: Well, you know, Hopkins is really one of the premier medical training programs in the country. I was very motivated to try to go there. One of my mentors was Charles Chuck Carpenter at Brown, who came from Hopkins and trained at Hopkins. I actually invented an outpatient infectious disease course at Brown just so I could spend time with him and learn. Just a wonderful man. But then he was able to write a recommendation for me to be able to go to Hopkins, which was successful, and I matched there. It was this very rigorous training. The call was every third night, except when it was every other night. There were many nights that I would just go in the hospital at 7 in the morning and work all day, work all night, get no sleep, work through the next day, and go home at 5 or 6 in the evening, and then get some rest and go back in the next day. But boy, what an incredible training. All the other trainees and the faculty were so terrific and just had incredibly strong background training in clinical medicine that I took away from that. That was not public health oriented. There were wonderful people that I learned from, but they weren't really career mentors for me in that sense.

There were a few patients that I really remember. One of them was a relatively young man who came from another regional hospital. An outside hospital referred him to Johns Hopkins to the emergency room, and he was admitted to just the regular medical floor. I was the intern and brought him up to the hospital bed at Hopkins. I realized that he had fungal endocarditis. This fungal infection on his heart valve. Just in the time, that day, he clearly had an embolism to his brain and was having a stroke and an embolism to his leg, and so his leg was cold and pulseless. This is just this incredibly severe multiple medical, surgical, neurologic emergency just on the regular hospital floor. Luckily, I was near the end of my internship, so I knew exactly. First, I said, "I can't believe you're sending this person to the regular medical floor and not to the ICU." They said, "No, this is what's happening." And I wasn't in a position to push back. But I called neurology, vascular surgery, cardiac surgery, neurosurgery, and they're like, "Well, you've got to get a cardiology consult before we'll come." I said, "This is a Friday afternoon. You can go home and come back into the hospital, or you can just come see him now, because I guarantee you're going to have to take this blood clot off this guy's heart valve and take this clot out of his brain and out of his leg tonight." That's what happened. The guy, miraculously, did really well. That was kind of my greatest success story as an intern.

Then the other two were much more humbling. There was an older man with dementia, and his ventricles, the spaces in his brain, were expanded. Some people were saying, "Well, maybe he's got something called normal pressure hydrocephalus, that actually fluid is building up in his brain, which will improve if we just do a lumbar puncture." I was a senior resident by then, and I said, "No, no, his brain is just shrunk, and so the fluid spaces get bigger." And so, the team ended up doing a lumbar puncture, and he got much better. We put in a shunt to relieve the pressure. He wasn't perfect, but he was much better. I remember at one point him saying, "Never forget about me." Not that he knew this story about me dismissing the diagnosis. But I still remember him many years later. You think you know what you're seeing and doing, but you never know. The other was a man with very severe cardiac disease, cardiovascular coronary artery disease. Clearly was indicated to have a coronary artery bypass, and he didn't want to do it. He was afraid of getting the surgery, didn't want to do it. The senior resident and I really leaned on him and pushed him to do it and talked him into doing it. He did it, and he died from the surgery. Just devastating. Medically that was the right thing to do—on average, the risks outweigh the benefits. But in his individual case, his premonition or feeling that he shouldn't do it was right. I realized you give people the information, you give them your recommendation, but they have to make their own decision. You really can't pressure people or push people to do something that they don't want to do, because you never know. There's one experience where I was the star and two where I was humbled.

Barr: Very sad. What encouraged you to join the CDC [Centers for Disease Control and Prevention] as an Epidemic Intelligence Service Officer within the Division of STD Prevention, and what were some of the diseases and populations you've handled in that role?

Kilmarx: After my first year of medical school, I went back to the Congo to do a study of knowledge, attitudes, and practices about HIV among Congolese fish farmers. I basically went back and talked to the fish farmers I'd worked with. I knew them really well, so I felt like I could ask them about male-male sex, sex during menses, anal sex, and all of these things that normally you couldn't just go and start talking to people about. But because of the relationship that we had, I was able to do that. Just before going, I went to the Third International AIDS Conference in Washington, D.C. in 1987. There was a guy from CDC. He'd been seconded to WHO [World Health Organization] Afro in Brazzaville and was giving this presentation about the statistics of HIV in Africa, which was still quite new in 1987. I said, "That's what I want to do when I grow up. I want to be one of those CDC guys that works in Africa and gets to give presentations at international meetings." That was 1987, and it was seven years later, in 1994, that I basically got to fulfill that hope—that dream to be able to go and do that. I'd set my sights on that, and that's what I wanted to do.

I wrote my paper about the study that I'd done, and it got rejected from a journal. I shared it with Tom Quinn, who works at NIAID [National Institute of Allergy and Infectious Diseases] and also at Johns Hopkins, and he was incredibly helpful. I found the letter the other day. He'd written this long reply about how he is encouraging me to try to get this paper published, and what a unique research opportunity it was, and that kind of thing—which was incredible that he had done that. Anyway, I ended up at Hopkins, and then ended up getting accepted to the CDC program. There are about 80 incoming EIS [Epidemic Intelligence Service] officers, and about 120 different positions at CDC that they're trying to fill, so you have your choice of which of the positions are most interesting. I read through the book and found about 10 of them that I thought looked interesting, and shared it with Tom Quinn, who's at Hopkins. He looked through and said, "Oh, these guys, Tom Peterman and Mike St. Louis, and the STD division, you'll have the best experience and get the best mentoring working with them." Which I thought was such great advice. Something my father always said is that if you think you're interested in English, don't just take the Shakespeare course, find out who is the best English language professor and take their course no matter what it is. I think similarly at CDC, Tom Quinn was saying, never mind your interest in tuberculosis, these guys are going to give you the best mentoring and the best experience. I was interested in TB, and not especially interested in STD, but because of Tom Quinn's advice, I went ahead and worked with Tom and Mike. It gave me this great experience looking at drug resistant gonorrhea, this new phenomenon of quinolone resistant gonorrhea in Ohio—I went to investigate that. We did an analysis of syphilis infection rates by county in the U.S., identifying a kind of ecologic study of the county characteristics that had the most syphilis. Then another study interviewing people who'd been diagnosed with HIV in an STD clinic, going back, and talking to them a year later to see what their experiences had been with this new diagnosis, and about whether they'd been able to access medical care in the year following their HIV diagnosis. Very different kinds of research, which was exactly what Tom thought I would get working in that STD division. That worked out quite well.

Barr: Definitely. For the next six years, you were the Chief of the Sexual Transmission Research Section, where you did a lot of different things. You focused a lot on Thailand. You worked on issues looking at the incidence of HIV-1 infection, and effective clinic-based counseling on HIV preventative behaviors amongst married women in Northern Thailand. You looked at the prevalence of and risk factors for methamphetamine use in Northern Thai youth. You looked at different behaviors and health risk of homosexual and bisexual young adults and a whole variety of subjects. Can you speak a little bit about some of the different studies you did in this role and the trends you witnessed? What were some of your accomplishments, and what were some of the obstacles you and your team faced?

Kilmarx: Yeah, well, it was a very productive time. The CDC had a research site mostly based in the capital in Bangkok, starting in about 1990. While I was at the STD division in Atlanta, the Director, Tim Mastro, came and asked if I wanted to help with the analysis of the cohort data that they had from a study going on up in the northern part of the country, in Chiang Rai. And on a Friday afternoon! "I said, No, I'm too busy with these other studies that I'm doing." And then all weekend I thought, "What a stupid answer." First thing Monday morning, I said, "Of course, I want to go analyze data from this cohort study going on in Northern Thailand." I went back and forth a couple of times and that ended up with them offering me a job. The main CDC office was in Bangkok, or Nonthaburi just outside Bangkok, and I was the only American up at this office in the northernmost part of the country, in Chiang Rai, with just a handful of a half dozen Thai staff that I was working with. Over the six years that I was there, we kept growing and growing. The main reason we were there in the north is because the rates of HIV infection were much higher in the north of the country than in the rest of the country. We were preparing to do studies of sexual transmission of HIV and preventing sexual transmission of HIV. The focus of doing those incident studies was just to see what the rate of transmission is and what the risk factors are for transmission. Then we were looking at using topical microbicides, which are products that women can apply

before having sex, especially if a man's not using a condom, that would kill the virus or block the virus and block transmission. We did phase one studies and phase two studies, and studies of couples with both of them enrolled in the study, studies of HIV-infected women to see if it was safe for them to use these products, and really geared up to be able to do a phase three study with large numbers of women enrolled, to compare the microbicide with the placebo to see if it would prevent transmission. But fortunately for northern Thailand, they were very successful with the "100% Condom" campaign and reducing the rates of HIV infection. By the time that the other studies were completed, the incidence of HIV was so low that we were not able to do those phase three studies.

But we did, as you mentioned, a lot of other work looking at other sexually transmitted diseases in the schools, doing studies of the of the school age youth and their risk factors, and substance use and those kinds of things. The main challenge was just me, as the rate-limiting step of keeping up with my team, putting together the next study, analyzing the data, and getting the papers written. But we had some really fine trainees from CDC come and help with some of the work, giving them opportunities to do the analyses and publish the papers. That was also a nice aspect of it, and we had very strong support from the from the Thai authorities. Whatever we wanted to do next, they were supportive and helping us working in the sexually transmitted disease clinic or in the hospital or in the schools to do that research. It was a very productive time.

Barr: Yes, definitely. Will you discuss the usage of audio computer-assisted interviews and later Palm-assisted interviews to conduct much of this research?

Kilmarx: Yeah. There's often a sense of social desirability bias. If you can imagine, an older woman research nurse talking to a schoolboy, a high school student, about his sex practices and does he smoke or drink or have oral sex? It's very hard for him to answer those kinds of questions—for a young man or a young woman. But having it be with the computer, or in the second study, we had it just on these Palms—now everyone has an iPhone, but at the time, it was a Palm Pilot—and so they could just click to answer "yes" without someone looking over their shoulder. We tell them, and it's true, that the data is basically anonymous, that no one from the research team or from the school is going to know what their answers were. We compared different interview methods. We asked them if they smoked, and then we were testing their urine for tobacco metabolites, and basically showed that we were getting much more accurate responses using the ACASI [Audio Computer-Assisted Self Interview] or the Palm-assisted interview methods.

Barr: Interesting. What was your focus as the Country Director of Botswana for the CDC? Will you discuss some of your research and work including the introduction of routine opt-out HIV testing in antenatal care in Botswana, early diagnosis of HIV in infants using polymerase chain reaction on dried blood spots in Botswana's national program for prevention of mother-to-child transmission, and the success of Botswana's Tebelopele Voluntary HIV Counseling and Testing Network? You also worked very hard at providing clinical care in the public HIV clinic in Botswana—so many different experiences while you were there.

Kilmarx: Yes, so I thought I would never leave Thailand, but after six years, I was asked to come lead the CDC Botswana program, which, when I went in 2002, was primarily focused on tuberculosis research. But then we had planned to do the microbicide study in Thailand, but because of the changing HIV epidemiology there, we were then going to actually do it in Botswana. I moved from Bangkok to Gaborone in 2002 and started with this more research-focused CDC program, and then there was what they called the LIFE Initiative, providing some more resources for actual HIV program implementation, and then more resources for prevention of mother to child transmission. Then the PEPFAR program actually started while I was there—the President's Emergency Plan for AIDS Relief. During the time I was there, our budget went from 10 million per year in the first year to $20

million to $40 million to $80 million per year. It was doubling year over year. I was working really hard. I would put in a full day in the office, and then a couple of nights a week, or one or two nights a week, I would come home and have dinner and put my kids to bed and go back into the office until 3 or 4 in the morning, just trying to get all these programs started and address the epidemic.

Botswana was really one of the most affected countries in the world. The prevalence was about 25% of the adult population had HIV infection. In some of the districts of Botswana, in pregnant women in their late 20s and early 30s, 70% of them had HIV infection, which is just unthinkable—just incredibly high rate of HIV infection. And the President, Festus Mogae, had very strong political leadership for the response in Botswana. We had this money coming in from PEPFAR, but then they'd already had support from the Gates Foundation and the Merck Foundation. The population was under 2 million people. We had this very high HIV prevalence, but all this political support, all these resources, so it was kind of our proof-of-concept country. If we couldn't have an adequate response and effective response in Botswana, I couldn't imagine how we could ever have an impact in Nigeria or South Africa—much bigger countries and a much more complicated working environment. It was a fatal epidemic. It was very motivating to try to do something about it.

At the beginning, even the HIV testing was not widely available and was kind of stigmatized and only much less than half of the pregnant women were getting HIV testing. The nurses were saying, “You could get this test but there could be stigma, and we're not sure if you want to do it.” We were in Francistown, in the northern part of the country, with colleagues Nathan Shaffer and Tracy Creek from from CDC, working with Loeto Mazhani and the health authorities there, and had a sort of an Implementation Research Center with about a dozen of the clinics around Francistown, putting in a much more robust opt-out testing that really expected almost every pregnant woman to get HIV tested, and provided training to the nurses and the laboratory support and all that. We were able to really increase the rate of HIV testing to 95% and beyond, making sure they were getting the antiretrovirals to prevent mother-to-infant transmission, and really demonstrated that. And that was rolled out to the rest of the country. The other paper you mentioned about testing the newborn babies, so to have testing for them to see if they were HIV infected, involves a PCR test and is a little more complicated than just the usual serologic testing. That was also an important demonstration project, which is now used around the world. But to really implement that as a public health program was an important step.

Barr: Is it still such a high success rate in Botswana in terms of testing and reducing the number of cases?

Kilmarx: Oh, my God. Absolutely. They've really gone on with great ongoing support from PEPFAR, incredible leadership in the country. The goals for HIV prevention and control for 2025, is to get 95% of people with HIV diagnosed, and 95% of them started on treatment, and 95% of the people on treatment having a suppressed viral load. It was supposed to be 90%/90%/90% by 2020, and then 95%/95%/95% by 2025. When this first came out, I thought it was incredibly ambitious, kind of a “pie in the sky.” I couldn't imagine we were going to get there. Botswana is one of the very first countries that now has actually already exceeded that 2025 goal that they've—they've gone to 95%/95%/95% and beyond. It really is our proof-of-concept country. With the right leadership and resources there, they were able to do it.

Barr: That's really great. Will you discuss your role as the Epidemiology Branch Chief and Senior Advisor for Health Reform in the Division of HIV-AIDS prevention, which was also part of CDC?

Kilmarx: Then, after three years in Botswana, it was time to come back to Atlanta—back to the mothership. I was fortunate that I was able to be the Branch Chief for the Division of HIV-AIDS Prevention at CDC. We had a number of epidemiologic studies in the U.S. and around the world. Some of it was this use of antiretrovirals for

pre-exposure prophylaxis. That was the study that was still ongoing in Botswana that was successful and showed that use of antiretrovirals for HIV-uninfected people prevented HIV infection—but then also similar studies with injection drug users in Bangkok and with discordant couples in East Africa. That was also a gratifying, productive time leading a big group of epidemiologists doing some really important research. That was also around that time that it was shown that male circumcision prevented transmission of HIV from women to men. We worked on how to interpret that in the U.S. context, doing some more studies and writing recommendations around that. Then, I guess it was 2010 when the Affordable Care Act was passed – Obamacare. The division Director, Jono Mermin, came to me and said, "I want you to be the advisor on health reform. How do we really embrace this at CDC for our HIV programs?" I said, "Jono, I don't really know anything about health reform." He said, "I'd rather have someone who knows HIV learning about health reform than someone who knows about health reform learning about HIV." In the year, we really helped put together some of the ways that we could really strengthen the HIV prevention and HIV care and treatment aspects of the medical care system in the U.S. One of the things that I helped to put through was called "Prevention with People Living with HIV"—so how do you actually provide care and counseling to people with HIV infection to minimize the risk of transmission to other people without HIV? That was around the time that we learned that treatment really is very effective as prevention and really implemented that, shifting the focus for the division from just behavior change and condom promotion, to thinking about the testing, treatment, circumcision, and pre-exposure prophylaxis and microbicides and some of the more biomedical aspects of HIV prevention. It was just a year, and I think I was able to contribute and learned learn quite a bit about health reform and policy and some of those aspects.

Barr: What was it like to be stationed in Harare, Zimbabwe for nearly four years as part of CDC, and what were some of your main objectives and initiatives in this position? You also worked [on] AIDS in association with some PEPFAR programs, so can you talk about that?

Kilmarx: Yes. After six years in Atlanta, I got itchy feet and wanted to get back in the international field again, back overseas. My older son was graduating from high school and going off to college, so it seemed like a good time to to get out of there. I wanted to go back to being a CDC Country Director. There were about a half dozen different vacancies that were coming open in 2011, but I had been in Botswana and knew about Zimbabwe. It was one of the smaller country programs because of some of the political issues between us and Zimbabwe, but I knew that, if I were there, I could really help to strengthen the program and increase the resources and have an impact. People were scratching their heads—why did I want to go to Zimbabwe? They'd had all these political challenges and the hyperinflation that had gone on, but by the time I was there, it was actually a really rewarding place to live and work. We really focused on trying to get the information about this 90%/90%/90% and what percent of people actually knew their HIV status, how could we expand the testing, and how could we expand the treatment. Our colleagues in the Ministry of Health and Child Welfare were very competent, very well trained, and very thoughtful about what programs to implement, and then rolling out a program and getting all of the health staff to implement that and follow new guidelines. Making the resources available actually went very well. At that time, there was this "Ending the HIV Epidemic" initiative from President Obama and Secretary Clinton. And we were able to say, "Look, if you've got new resources, if we bring them to Zimbabwe, they're so good at what they're doing, and their resources are so relatively low that, per dollar, we're going to have much bigger impact than if you send it here." We were able to significantly increase the budget and the resources. One time, while I was there, the program was starting 10,000 people a month on lifesaving HIV treatment. It was really gratifying and exciting to be part of that—really ramping up the testing, the treatment, the circumcision program, getting tens of thousands of men circumcised to significantly reduce their risk of HIV infection. It was a good time to be there.

Barr: I know you spent part of your career in Atlanta, but what was it like raising a family in all these different international locations, and what were their experiences like?

Kilmarx: Well, you could talk to them. One son is in Atlanta, he considers that home, and one is in Oregon, but they both very much think of themselves as world citizens and explain to their peers about what it means when there's some news from Asia or from Africa. I think it was actually a very positive experience for the family to have those experiences. We would go camping out in the bush in Botswana and Zimbabwe and really a lot of adventures and a lot of nice experiences.

Barr: For nearly 24 years, you've also been a part of the Public Health Service, even serving as Assistant Surgeon General. Will you discuss your efforts leading household surveillance in the Ebola outbreak in Kikwit, Democratic Republic of Congo, in 1995; initiating the CDC response to the Ebola outbreak in Kasai Occidental, DRC, in 2007; serving as the CDC Ebola Response Team Leader in Sierra Leone in September-October 2014; and as Principal Deputy Team Leader in Guinea in January-February 2015? What were some of the comparisons and differences in the response as well as the health infrastructures of these different places?

Kilmarx: Sure, so in 1995 there hadn't been an Ebola outbreak since the initial first one in the 1970s in a different part of the Congo. And so when the 1995 outbreak happened, which was a fairly large outbreak in Kikwit, I was a trainee. I was an EIS officer at CDC in Atlanta, and they knew I'd just been there in the Peace Corps and knew the country and spoke French. They asked me to go be part of the CDC response pretty early on in that response. And so I went, and my role was working out in the community with the medical students, doing the household surveillance. If there had been an Ebola case in a household, they were under quarantine and being monitored to see if there was a new case that came out of that. I was there for about a month and was also able to help with some of the data analysis identifying “superspreaders,” a concept that we'd had from the syphilis and HIV world. Most people don't transmit the disease, but then some people, for a combination of biologic and behavioral reasons, will transmit to a lot of people. I saw that also in the Ebola transmission data. I highlighted that in one of the publications that we put out. I was a trainee. I had a quite sort of focused role in the Kikwit response.

Then in 2007 I was still corresponding with the village chief in the village where I had been as a Peace Corps volunteer 20 years earlier. In about June of that year, one of the letters that he sent me had cell phone numbers in the letter. I never had telecommunications with that part of the country before, and so I called him and texted him, and then in September, a few months later, he texted me in Tshiluba that there had been Ebola in the village, and I should come and build a hospital. He doesn't know anything about Ebola—what is this all about? I contacted the CDC Ebola experts, and I said, “Do you know about an Ebola outbreak in the Congo?” And they said, “No, we don't know anything about that.” I texted Shamba, the village chief, back. I said, “Go back to the hospital and call us.” A couple days later, he called, and we talked to the hospital director, and they described what was happening. We said, “Oh, this really does sound like Ebola.” I was then sent there a few days later, and just as I was on my way there, they'd gotten some specimens tested and found out that it actually was Ebola. And so, I went and was there for about a month helping them to set up the laboratory and epidemiology for the CDC response. It was actually quite helpful that I'd been there as a volunteer and know the geography and the culture. The outbreak was in one district, so they wanted to set up at the district center, but it was actually in the very southern part of that district, much closer to another district center. I said, “No, we should actually be in Luebo, only a few kilometers away, and not in Mweka, which is about 50 kilometers away from where from where the outbreak was. Then we also went out to the very first village where the cases came from, and really helped to identify some of the field epidemiology—the forest epidemiology factors. But as I was leaving, I was saying goodbye to Shamba, and I said, “How did you know this was Ebola? You're a village chief, you're not a

medical person." He reminded me that I'd written him a letter in 1995 after the Kikwit outbreak. And I said, "Shamba, here's the clinical epidemiology and manifestations of Ebola. And if you ever see that, you should get in touch with me." Twelve years later, in 2007, he texted me, and he said, "Here it is. Ebola has come here." That's an amazing, pretty remarkable story.

There wasn't that much Ebola activity in Congo. There was some in East Africa and Uganda, and there hadn't been any in West Africa, but then in 2014 there was this really large outbreak in West Africa. I was the CDC Country Director in Zimbabwe, but had been there for a few years, and felt like I could step away for a while and help with the response. I was the team lead in Sierra Leone in the fall of 2014 and that was a time when the case rate was doubling every month. It was really on the upward part of the curve. That was another very busy time where I would just sleep for a few hours every night and then wake up in the morning, totally motivated by this fatal epidemic. It's like the HIV epidemic, but the response that we needed was compressed into weeks instead of years. It was really striking that in West Africa, they have a very low rate of HIV infection, so there wasn't a PEPFAR program in those countries. In Zimbabwe, we had all these systems for data management, and every clinic had a cell phone that they could report diseases or their HIV statistics with. We had a laboratory specimen transport system for the HIV testing and tuberculosis specimens and all these systems set up with the PEPFAR funding but had none of that in Sierra Leone. When I got there, we had 30 people as part of the CDC response, and over the course of the month, we had 60 people that were setting up all these new programs on public health laboratories and informatics and behavioral change. It was a really incredible time of launching and ramping up that Ebola response in Sierra Leone. Basically, in the months following that, the case numbers peaked and started to come down again, which they did in all the countries. It's hard to know what you did and how much of an impact that really had, but it was certainly a very exciting and gratifying time to really build all these public health systems over such a short period of time to try to get those things going.

Barr: Did you do any other deployments over the years that you were in the Public Health Service, and what were some of the issues you tackled as Assistant Surgeon General?

Kilmarx: Then after that time in Sierra Leone, I went to Guinea in 2015, and it was interesting. I was sort of the deputy team lead in Guinea. And as I said, Sierra Leone was really one of the most gratifying things I ever did. And Guinea—just a few months later, same outbreak—was the most frustrating experience I'd ever had. I wrote a trip report, memo explaining it all. But it was partly that the country is much bigger, and we were in Conakry, and the outbreak was really in the remote, forested part of the country. There was kind of a cultural and political disconnect from where we were in the capital to where most of the cases were in the eastern part of the country. And then everything was in French. My French skills weren't as great. The people we were getting from CDC, they spoke French, but they weren't necessarily the most qualified, appropriate people. We were sort of limited in who we could get because they had to speak French. And then I was the deputy and not the lead, so I couldn't just do what I wanted, I had to sort of negotiate things. And also, because in Liberia, the U.S. military and U.S. Embassy was totally engaged in Sierra Leone, and the British military and high commission was totally engaged. Someone said, "Oh, well, in Guinea, it will be the French," but the French got kicked out of Guinea in the 1960s and they had a very poor relationship between the French government and in Guinea. And so, there wasn't that kind of a strong bilateral relationship that the other countries had. But for whatever reason, the Ebola went away, in all the countries in 2015. Again, we felt very good about what we were doing, but it's hard to know what the actual impact was and what the changes were.

The other real deployment experience that I had was with Hurricane Katrina in 2005. I was the team lead in New Orleans in the fall of 2005. There were about 10 different teams. That was really interesting for me to learn about. You think about a hurricane, and there's so much impact. But we had teams working on all the mental

health issues. We had teams following up all the people with tuberculosis and HIV and people sent from public health clinics. They're now dispersed all over, they've gone to Houston and Atlanta, tracking people, and making sure that they're able to continue their treatment, so they don't get sick, and so they're not transmitting the TB or the HIV to others. We had a team working on surveillance, looking for if there's going to be an outbreak of infectious disease or vector borne disease or something like that, and a team working on infant diagnosis—all the babies that get dried blood spots to check them for genetic diseases or diseases of metabolism, getting that system back up and running. It was really an interesting time, and an interesting time to be in New Orleans and to be leading that kind of an effort.

Barr: What are your expectations going into working on an American health disaster versus an international health situation? What were some of the differences?

Kilmarx: That's a great question. I guess the work we did in Thailand was so different from the work in Botswana, which was so different from the situation in Zimbabwe. Just another context and having to learn if it's the city or the parish or the state or the feds, and what are all the different roles and what are people's expectations? I didn't think of it as U.S. versus non-U.S. It was just one more context to learn about how things work. I remember I was trying to lead all these different teams and trying to think about what our longer-term strategy is. By now it was October. People were saying we're going to build the system back better than ever and have this model public health program. And I was saying that the Army Corps of Engineers are building the dikes back to where they were. They're not going to necessarily build them bigger and better than ever. I haven't heard about any big appropriation that there's now all these new resources for public health. So realistically, what are our goals and what were we going to accomplish? CDC will be here for a while, but we're not going to be here in the numbers that we are forever. Our sustainability plan was something that we thought about.

Barr: Definitely. What was your transition like from the CDC to becoming Deputy Director of the Fogarty International Center in July of 2015, and what were some of your initial responsibilities? What was your vision for Fogarty early on?

Kilmarx: It's funny. After four years in Zimbabwe, it was time to come home again, time to come back to the U.S. I had one year left before I reached twenty years in the Public Health Service, and I didn't really want to stay in Atlanta over the longer term. I'm more of a more of a northerner, more of a Yankee. And I had dinner with Roger Glass, the Fogarty Director, the year before, when he came to Zimbabwe. One of my colleagues from Hopkins, Emily Erbelding, was at NIAID [the National Institute of Allergy and Infectious Diseases], and she sent me this announcement that they were looking for a Deputy at Fogarty. And I thought that it would be interesting to be in the [Washington] DC area, and the mission of Fogarty—the training and capacity building—is really something that I was quite passionate about. It sounded like it would be a great role, but I tell people that I had more culture shock going from CDC to NIH than I had going from Harare, Zimbabwe to Bethesda, Maryland. I was used to going back and forth from one country to another, but to go from CDC, which has a very… They're both part of the Department of Health and Human Services, but their mission is just so different, focusing on public health, versus NIH, focusing on science and research. And the cultures are quite different. Even things like computer security and the way that we do the performance evaluations was really strikingly different. After nine years, I've learned the culture of Fogarty at least. I know that every NIH Institute also has a somewhat different culture, so that was actually a big transition. People also asked me which I like better—CDC or NIH? And I say, "Well, I've got two children, and they're very different, and I love them both very much. And similarly, CDC and NIH are very different, but they're two great, great organizations, and I really, really like both of them."

It's really the Director that mainly sets the vision for a Center. But there were a lot of things that I was able to really help with at Fogarty—just some of the kinds of management things that we had. We have four divisions, and three of them had Acting Directors. Actually, getting those positions filled was some of it. The way we were doing PMAPs [Performance Management Appraisal Program], wasn't really how one was supposed to be doing them—getting the performance evaluations done in a way that everyone agreed with and following the actual guidance of how to do that. My predecessor Deputy had left about five years earlier, so just being there as a constant presence in all of the senior staff meetings and making sure everybody was getting all of their needs responded to [was important]. And supporting the Director was a lot of it. Again, I'm really very passionate about the mission of supporting Fogarty and the global partnerships for NIH and doing a number of analyses. We found that over a third of the NIH-funded publications have a non-U.S. co-author, so really being able to demonstrate that NIH overall is a very global enterprise, and how Fogarty's role in supporting that and promoting that was important. I enjoyed doing all that and working with our different divisions and our mission around the world. And Roger Glass was a great, great boss, recognizing the important kind of management things that needed to get done, but also letting me do a number of different analyses and partnerships and activities around the world. It's been great.

Barr: Yes, we're going to speak about some of those partnerships. Can you define what implementation science is and describe the Fogarty-led Adolescent HIV Prevention and Treatment Implementation Science Alliance (AHISA) that creates a platform for bidirectional learning between researchers and the users of research evidence that promotes the use of implementation science to strengthen adolescent HIV prevention and care across Africa? That's a very big Fogarty program.

Kilmarx: Yes. I mean, I'm not the real lead on that, but I'm quite familiar with it, and implementation research is one of our main goals in our strategic plan at Fogarty. Across different areas, infectious diseases and noncommunicable diseases, we support implementation research. It's actually Rachel Sturke at Fogarty who's really leading on that. This alliance, with some resources, initially from PEPFAR and now from the Office of AIDS Research, is providing supplemental funding to NIH grantees working in PEPFAR countries, actually in Africa, and recognizing some of the challenges around adolescent HIV treatment and prevention. For these 90%/90%/90% goals, adolescents are often really lagging behind in terms of getting tested or getting treated. By providing some additional resources to the NIH grantees, having the researchers working together with the PEPFAR agencies in the country—so CDC and USAID [U.S. Agency for International Development]—and then also bringing in the Ministry of Health in that country and the implementing partners who are actually implementing the programs in that country and really having them work together, and having the policy makers and implementers articulate what are the barriers to having better adolescent testing or better adolescent treatment, and staying on treatment, then the researchers can actually then do the research that the policymakers and implementers are asking for. Then they're happy because their research findings actually get implemented and put into practice. Just having that dialog and ecosystem where they're not working in isolation but actually having that virtuous circle and feedback is the role of that. It's been quite successful in a number of countries, and they've really taken it on. They've actually developed their own local implementation science alliances in the country, and in some countries, they're actually now branching out beyond adolescent HIV to some of the other issues in the country. It's been very positive, and we're really looking to actually expand it and replicate it more in new partnerships with PEPFAR.

Barr: Another major initiative Fogarty supports is the Medical Education partnership. Will you introduce this program and why it's so important?

Kilmarx: Yeah, so that started years ago and was really from Eric Goosby, who was the PEPFAR leader and the Global AIDS Coordinator in about 2010 when it was first getting started. It was recognizing that medical education could be strengthened to really improve the numbers of doctors being trained in Africa PEPFAR countries, give them better quality education, and to help to try to retain them, staying in the posts in the rural areas where they were needed. It was a really nice partnership with a dozen different countries with funding from PEPFAR to provide that work with those countries and really strengthen their medical schools. [There were] a number of innovations [such as] rather than getting textbooks to actually have all the students having tablets like iPads where they could have all the information at their fingertips and get that updated as it was needed. And building labs where they were working with mannequins and training materials to have more relevant hands on training that the students could do. It was quite effective, quite well received, in terms of actually increasing the numbers of students being trained and their retention and quality of their education for the HIV response. That went on for five years. Then there was also, at the same time, something called NEPI, the Nursing Education Partnership Initiative. In the current iteration they were combined, essentially to have HEPI, which is the Health Professional Education Partnership Initiative. That's combining the education for the nurses and the doctors and pharmacists and others by having interprofessional training, so that they're working together. That's actually now also coming to an end, but it's been a really nice run of programs, working with the PEPFAR funding and with these partners in these countries implementing these programs.

Barr: The Fogarty puts a lot of emphasis on its training programs. Will you discuss your participation in trying to promote diversity, equity, and inclusion? It's been a really big thing that you've done in the past couple of years—a mission for you and others at Fogarty.

Kilmarx: Yes, so this is something that I was quite interested in doing for some time. Having lived and worked in some of these countries, I realized that we think we're funding a country and it's a lower income country, and so good for us, our work is done. But if you live there, you realize that within these countries, there's also a lot of disparities, and even some kind of discrimination and marginalization of people. And so, what we did as I was the Acting Director over the last year, and we had some new resources for health disparities, we came up with a program for supplemental funding. We said that any of our training programs around the world, if the grantee wants some additional resources to try to bring in new trainees that are members of groups that are not usually part of training programs or part of researchers in those countries, that we would provide some supplemental funding. We didn't know if this is just an American concept, and would the rest of the world respond? We had a very robust response, a lot of applications, all over the world, in all our regions—the Americas and Africa and Asia. It's in all disease areas. It's infectious disease, it's HIV, it's noncommunicable diseases. It includes Quechua speaking Amerindians in Latin America getting trained as researchers. It includes Turkana pastoralists in East Africa that are a marginalized group getting trained as researchers. There are religious and ethnic minority women in Asia getting trained as researchers. It's been really gratifying, and we just launched again on Friday—we're doing this again for this year, providing resources to have this kind of a program.

Barr: What were some of your other duties, experiences, and priorities when you were Acting Director this past year at Fogarty?

Kilmarx: We've always said our goal is capacity building, and if you give us more resources, we'll do more capacity building, but it's not a very clear vision or motivating argument. For several years, I've been working with funding partners around the world in really coming up with metrics for research capacity and looking at the numbers of clinical trials and publications in the country, in being able to differentiate a South Africa or Uganda that has very robust research capacity from someplace like Laos or Paraguay that has much lower research capacity. Then we can actually say, "Here are some resources that are focused on these countries with lower

capacity to try to build that." We're not USAID. It's not development work. It's really scientific research, for if there's an outbreak in those countries. If we'd looked a decade ago at West Africa, we would have said, "Oh, if there's an Ebola outbreak there, we're not going to have the capacity to respond, to have the research response." It's really trying to come up with these metrics. I was able to hire an additional contractor to build that capacity to have that. Then we've been actually working on a new program to have some more of our resources. We did this in West Africa in 2015. We said, "Here's a new program. Only Sierra Leone, Liberia, and Guinea are going to be eligible to apply, and to think about replicating that in the rest of the world"—to say, here's some additional resources. Usually, we say it's for any low-income country. It's good to have these centers of excellence around the world. But also, to have resources for the countries with lower capacity to try to bring them along, developing the data, and then using the data for that purpose, is something that we've also gotten the ball rolling on.

Barr: During your time as Acting Director, you had the opportunity to travel to all the different locales and meet many of the trainees and grantees that Folger support. What was that experience like and what did you learn from meeting these people in their own environment?

Kilmarx: I always traveled in the earlier years, but that was more to where our big meetings were, and the same places where we had a lot already going on. In the past year, as I was Acting Director, I wanted to try to go to new places, places where NIH didn't have as much activity, and to really try to encourage that. I went to Jamaica; I went to Peru—there is quite a bit of work there—but I'd never been to South America before. I went to Warsaw and met with our grantees from Ukraine and from elsewhere in Eastern Europe and Central Asia and got to meet with them, and Rwanda and in Thailand. I really got to go to some new places that I hadn't been to before. Senegal was another. Benin I just went to last month.

Some of these countries have less NIH-funded research. I came up with my own informal system, like an airline system. I would tell them, "Now you are like a silver-level partner. You've got twenty grants in this country from six different Institutes, but this other country has got 400 grants from twenty different Institutes. We don't just have a budget for your country. You've got to partner with other researchers and apply for more funding, but you can do that and here's the pathway to do that." They say, "Yes, we're a silver, but we want to get to gold level." It's kind of a motivating way for them to think about it. But since those trips, we've seen more activity in Jamaica. Even Benin, since I was there last month, they're motivated to apply for an infectious disease research training program. It's really interesting to see in Warsaw all of our grantees—it's a half dozen from Fogarty that came to Warsaw from Ukraine. I'm wondering, "There's a war going on, and aren't you too busy, or aren't things too disrupted?" And they said no. For them and for their staff and patients, it's actually very motivating to have this ongoing research activity. There's even an HIV treatment study, and the patients are all over the place—they've all gone to Poland and all over Europe, but they still have their cell phones and are still able to track their medication use, and the study is still going on. But they said for all of them that it's still very important for them as a motivating factor and a mental health factor to have this research still continuing in this vision—that eventually the war will be over, and they still need to get this medical knowledge and build this research capacity in their country. That was pretty gratifying to see that.

Barr: That's very interesting. COVID-19 was a very big deal. Will you speak a little bit about how the COVID-19 pandemic impacted the Fogarty staff at NIH as well as all the trainees and grantees in locales across the world?

Kilmarx: One of our divisions is the Division of International Epidemiology and Population Studies, and they're an in-house research group. It's not a formal intramural program, but they are an in-house research group, and they have for years done research on influenza and respiratory diseases and mathematical modeling—and also

the pathogen genomic sequencing and fingerprinting of the viruses to see how they were spreading. They were very well poised with the capacity and the knowledge and the partnerships to be able to really be of service. They shifted from flu to SARS-CoV-2 and COVID, and were very involved with modeling in the U.S., working with CDC, working with the White House, and having a very prominent role in that modeling, but then also working in Africa and helping training and capacity building for the pathogen genomic sequencing, and then with some specific partnerships in China and in South Africa, they were really getting very nice data and doing some very impactful publications about COVID epidemiology and COVID transmission and immunity. That was one very productive area.

In terms of our grantees, we've been doing this training and capacity building for decades, and so many of the real senior leaders in the COVID response at the national, regional, and global levels were former Fogarty trainees. Just seeing some of the successes that they had and knowing that a lot of that was because of the training they had from Fogarty in previous years, was very gratifying to see. But one of our amazing trainees in particular was in Botswana. His name is Sikhulile Moyo. He's from Zimbabwe. He was working in Botswana, where they developed, with the PEPFAR HIV resources, this very comprehensive HIV surveillance system. They were getting HIV isolates from all over the country and sequencing them in a very detailed picture of HIV transmission in the country. They basically pivoted to looking at COVID and SARS-CoV-2 and getting those isolates from all over the country. And it was Sikhulile, who's one of our Fogarty trainees, who first identified Omicron when that came out, because they had this very strong surveillance system, and he'd had the training and the connections—he was connected with with folks in South Africa who also identified Omicron around the same time. That was the best, but we had those kinds of stories around the world of our former trainees and grantees really having important roles in the COVID response.

Barr: Will you mention some of the COVID research you were a part of such as looking at lessons learned as well as the challenges in contact tracing in Nigeria, Rwanda, South Africa, and Uganda and ensuring that there is requisite medical manpower?

Kilmarx: Absolutely. I became very focused on the contact tracing. This was back in March of 2020. All of the Peace Corps volunteers from around the world got evacuated. I thought that actually made sense because of COVID, since they weren't going to be able to come back and get the medical care. But some people were very critical of Peace Corps for doing that. Here are these Peace Corps volunteers, 7,000 of them from around the world, coming back to the U.S. in the middle of this pandemic, and having to find jobs and all of that. Then meanwhile, we had this incredible public health need with COVID where we needed people to do the counseling and the contact tracing, especially. So, I said, “Why don't we start a COVID Response Corps?” FEMA [Federal Emergency Management Agency] usually has this kind of a program when there's an emergency. They had like 30,000 people after Hurricane Harvey in Texas working for FEMA. I talked to the head of human resources for FEMA, who is a returned Peace Corps volunteer. He said, “We can get people in a week, get them started in this program, and be able to do this.” I talked to the Peace Corps Director, talked to the people at FEMA, and basically behind the scenes was working with some of the congressional leaders, with letters written and legislation proposed, to basically stand up a COVID Response Corps in the U.S., with any of the Peace Corps volunteers that wanted to join it, but then also anybody else. There was quite a bit of enthusiasm, which ultimately ended up as frustration that it did not happen at the scope and the skill that was needed. Eventually many returned Peace Corps volunteers did take up those kinds of roles, but we never really had the capacity that we needed for the contact tracing in this country. Some of the jurisdictions, like New York and San Francisco, were successful and had a real impact on the COVID transmission, but for most of the country, there was just never the kind of staffing that we needed.

There were some countries that were more successful in their contact tracing in Africa, so we had a webinar where those country representatives talked about the contact tracing and what they were doing in their countries. We wrote an article about that as kind of a model of an actual successful contact tracing program and what that could look like. Taiwan was very successful, and really credit the work that they had done on contact tracing as a big factor in their success. When someone's exposed to COVID, they should be quarantined, and then if they fall ill, they're not going to actually transmit to someone else. I worked on that for a couple of years. I actually had over 100 people that were really interested. I had a kind of a listserv where I would send out an email, initially a couple times a week, of the news on contact tracing, and what was happening in other countries and some of the emerging scientific data on contact tracing. That sort of became weekly, and then monthly, and then very occasionally. Then eventually I stopped as COVID evolved, and with Omicron, it was just so highly transmissible that it was really beyond what could be accomplished. We had the vaccine at that point. But that was a lot of what I focused on during the initial couple of years of COVID—those human resources issue and contact tracing especially.

Barr: Will you discuss the importance of building research capacity in low- and middle-income countries, and the importance of decolonizing public health from the vantage point of the pandemic?

Kilmarx: Yes. We really, for years, have thought that having research capacity is a critical part of pandemic preparedness, and we really saw that in West Africa. As I mentioned, the research capacity was quite low. Even in Guinea, from the time, they said, “Okay, let's do an Ebola vaccine study,” it took them four months before they were able to start the study and start randomization of people to getting the Ebola vaccine or a placebo. Now we say from the time of an outbreak, we should have a vaccine within 100 days—so if it takes you four months to actually even start a study, there's no way you're going to get a vaccine in 100 days. With COVID, it was all over the world, so we could do the vaccine study in this country. But you can imagine, if you know the avian influenza, if it really emerges in some country with low capacity, it could be very challenging to try to learn what we need to learn about the virus and about the disease threat. I was part of a World Bank and another organization study of post-Ebola. The study was called “Money and Microbes.” That was launched in 2018, really making the case that we have to have research capacity as part of pandemic preparedness. There's a lot more traction around that, and agreement around that—WHO now has a resolution and is working on that, that Fogarty and NIAID are part of, coming up with metrics for capacity, coming back to if we say it's important, what is it? And how do you measure it? And how do you know if the country is making progress towards that goal? That's a really important part of what we do and part of the preparedness.

Barr: Definitely, in addition to having a leadership role at NIH during the pandemic, you're also an individual who lived through the pandemic. What were some of the personal opportunities and challenges for you during this period? If you’re willing to share, what were some of the ways that you coped during the pandemic? You shared that your wife made a lot of masks, which she donated to our office. I saw in the Record that you spent a lot of time with your pet.

Kilmarx: Yeah. Our office really shut down. I live just a mile away from NIH, so it's very easy for me to go back and forth. But we are also, because of the nature of the work that we do, able to work remotely very easily. We continued to be very productive. Our staff—all of the grants management and funding and the research work that the group was doing—was all very productive. I would go into the office once every eight weeks to donate blood. That was my main reason to go in. My wife is a Montessori teacher, but then that wasn't happening, so she learned a lot of sewing and made a lot of very colorful masks. This is back when we were making cloth masks, and I had a lot of fabric from around the world, from Africa and elsewhere, that she was able to make into these very beautiful masks, including those that got into the NIH [Stetten] Museum. As far as that went, it

was relatively easy for us in terms of working remotely and doing that but challenging just not being able to meet with people and actually have the face-to-face meetings. Resuming that and getting back into having those interactions in the office, and then also with these international partners and having those relationships, has been important. I think we've learned you can be very effective working remotely, having Zoom meetings, having virtual meetings, and that's better for people's mental health. And with not having to commute and the carbon impact of driving back and forth to work or flying around the world to international meetings, we're being more thoughtful about about that, but it's kind of a middle path between full remote and having some interactions. I worked with a trainee—well, she graduated with an MPH [Master of Public Health] degree—and I worked with her for almost two years. She was based in Baltimore, and I kept saying, "You know, you can come in anytime, and we can meet together, and you can meet other people in the office." For the whole time, we were very productive, finished two papers that got published, but never met face-to-face. I just think about for me, it's easy that I know all these people and I'm able to function that way, but for someone early in their career to just learn the culture of a workplace and some of the some of the emotional intelligence about working with people—how challenging that is working remotely.

Barr: Definitely. We're nearing the end of our interview, so in addition to learning the science, much of your work has also incorporated becoming familiar with behavior and culture. What would your recommendations be to those entering the field on how to master both parts of being a public health professional?

Kilmarx: Wow, that is a very good one. I think it's important to have a number of different life experiences and put yourself out into new situations and new cultures—whether it's going into the sexually transmitted disease program in Tuskegee, Alabama, to talk to them about syphilis programs there, or going into the Ebola Response Program Ministry forum in Kinshasa and the Congo. I've had so many experiences personally where I'm the only person with my background in Thailand or Africa or something like that, and just having to learn. How do they make decisions here? How do they communicate here? Who's in charge of these things, and how do you interact with these people to get the outcomes that you want? Or what experiences do they bring, and what can you learn from them? I think just putting yourself into new situations and listening and learning is so important.

One of the other factors we talked about was reciprocal innovation, and we're really emphasizing that at Fogarty—about how much we can learn from other countries' experiences in contact tracing, and how much better other countries were doing. We just shared a story at Fogarty last week about a community nursing program that was implemented in Costa Rica, and some of the investigators who are from Baltimore are taking that experience and implementing that in Baltimore. There's just so many experiences and things that we're learning from our colleagues around the world. And to have the respect for their knowledge and their innovation and have it been that kind of bidirectional learning is really an important part of our philosophy, and what actually makes a difference.

Barr: Well, we covered a lot about your career in your time at Fogarty, but is there anything else that you'd like to share?

Kilmarx: No, thanks, Gabrielle, we've gone a long time. You've been very patient and a very good interviewer. I just encourage anybody who sees this or listens to this to think about a career in medicine, in public health, or in global health. It's been incredibly gratifying. I wake up every morning very motivated for the day. Burnout has not been an issue in the work that I do. I would strongly encourage anyone considering this kind of work. It's a great career.

Barr: Thank you very, very much.

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