

CDC Ebola Response Oral History Project

The Reminiscences of

Kevin M. De Cock

David J. Sencer CDC Museum

Centers for Disease Control and Prevention

2016

Kevin M. De Cock

Interviewed by Samuel Robson

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Interview 1 of 1

CDC Ebola Response Oral History Project

Q: This is Sam Robson, here today with Dr. Kevin De Cock. Today's date is June 8th, 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 Dr. De Cock as part of our CDC Ebola [Response] Oral History Project. So, Dr. De Cock, thanks so much for being here, really happy to see you. For the record, could you please state your full name and your current position with CDC?

De Cock: Yes, pleasure to be here. So I'm Kevin De Cock and I'm the country director for CDC Kenya—that's CDC's office in the Republic of Kenya.

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

De Cock: I was born in Belgium in a town called Aalst, which is between Brussels and Ghent, in 1952.

Q: Did you grow up in Belgium?

De Cock: Yes I did, but at the age of seven I was sent to boarding school in England. My father was Belgian and my mother was American, so I'm a dual citizen, Belgian American, and was educated in the United Kingdom in England.

Q: What did your parents do?

De Cock: My father was a surgeon, a general surgeon of the old school who did everything pretty much except cardiac surgery and neurosurgery; pretty much did everything else. My mother was a home carer.

Q: How did you find school in the UK [United Kingdom]?

De Cock: [laughs] In 1959, going to England from Belgium to boarding school was difficult, not speaking English initially. England was changing, it certainly was not as harsh as you read about fifty, a hundred years ago, seventy-five, a hundred years ago, but it was difficult, it was harsh.

Q: Referring to their education system especially?

De Cock: The boarding school. Cold showers every day, that sort of stuff. Discipline, physical punishment. [laughs] No actually, of which I had very little I must say.

Q: So what kinds of things were you interested in growing up?

De Cock: I always for a very long time I thought I wanted to study medicine. I think I decided that from a very early age. A few things happened that undoubtedly influenced my future life. One is that my father died when I was quite young. He got sick when I was eleven and stopped working and died two years later when I was still thirteen. For a number of reasons—for some sort of structural organizational reasons and nothing to do with my own intelligence—I ended up being pushed ahead in school, changing schools, being pushed ahead a couple of years. So I actually finished the equivalent of high school when I was sixteen. Then took a year off—I already had my place at university to study medicine. In the UK, in most of Europe and in the UK, medicine is an undergraduate degree, so you go straight from school to medical school. I had a year off, so I was sixteen and a half, went to university when I was seventeen and a half, and that year off was eye opening.

I traveled around Europe hitchhiking and doing some voluntary work camps in Switzerland, France, Sweden, Holland, and got exposed to a lot of stuff that I really had not thought about that much before, including for example, why some countries are rich and some are poor. Just being exposed more to social conditions as well and I was already interested in politics anyway, but it was an awakening in a way that I guess probably influenced my choice of medical career because I was then always interested in the problems of the South. From a very early age, said that I would go and work in—as we then referred to them—in a developing country at some stage. I'm very glad I stuck with medicine because this year off had such an influence on me that I thought, I'm not

going to do medicine, I'm going to do politics and economics, but then I kept sort of switching backwards and forwards and I thank the Lord that I stuck with medicine, so I'm very grateful for that.

I settled on doing internal medicine after medical school and then internship—were obviously very formative and it was difficult deciding what to do. But I again was very glad I settled on internal medicine and decided, well, once I had done my specialist training, I would go to work in a developing country. But there was an additional reason for doing it actually was that in Belgium there was still a military service, obligatory military service, but if you work in a developing country for two years that counted instead of going into the Army. For me, this was the win-win thing to do because I wanted to do this anyway and then it met my military obligation. I ended up doing my internal medicine training then deciding at some time okay, I'm going to do this now or I'll never do it. So I quit, went and enrolled in a tropical medicine course at the University of Liverpool in England and ended up getting a job as a lecturer at the University of Nairobi—which is kind of like an assistant professor—at the University of Nairobi, working at Kenyatta National Hospital, which is like the Grady, the hospital in Atlanta; the Grady of Nairobi. I went for two years but stayed three. It was just a remarkable, life-changing experience. I was young. When I went I was twenty-seven, so I left there when I was thirty. You gotta tell me when to stop, by the way, I'll just talk.

[laughs]

Q: No, this is actually going really well.

De Cock: So I had done some work in Nairobi, some research work, in particular a research project on the diagnostic approach to certain tropical diseases, and had a lot of biomedical materials: blood specimens and liver biopsies and so on. And I went back to England with a research grant to actually write this up like a PhD thesis in medicine, which I did. Then I went to—I had already arranged to do a fellowship. I always thought I wanted to work in the United States for some time at least. I was oscillating between a career in liver disease or infectious diseases and settled on doing a fellowship in California in Los Angeles at the University of Southern California on the liver unit in hepatology with a particular interest in infectious aspects, particularly viral hepatitis. I did that. It was a very intense, productive three years actually working as a clinician, but doing research, specialist liver disease. By coincidence I had met people from CDC in Kenya, but I didn't really understand what CDC actually did. But I had some very good friends who—in fact, the first director of CDC's work in Kenya, that was back in 1979, I met these folks and became friends with them. Then again, met people in Los Angeles through my boss, Dr. Allan [G.] Redeker, who's a hepatitis expert. I met various people from the hepatitis branch here. Jim [James E.] Maynard was the then-director. Hal [S.] Margolis was deputy.

Long story short, I got interested in coming to CDC. I probably had the opportunity also to go to NIH [National Institutes of Health], but I settled on CDC. Really again, that was all life-changing. Ended up going into public health, while at heart I still feel very much the clinician, but I haven't done any clinical medicine for quite a while.

Q: Why did you choose CDC over NIH?

De Cock: For several reasons actually. Firstly, NIH would have been lab [laboratory] work, which I did not think was my—I guess I could have learned it, but it wasn't really my natural attraction. There was a funny story about the CDC engagement because Maynard, head of the hepatitis branch, had talked to my boss about a study that they wanted to do, that Maynard wanted to do in Brazil in the Amazon. He wanted to get a boat and he had discussions with the Brazilian Navy. They were going to get a Brazilian Navy boat to sail down the Amazon [River] to do studies in the villages because a particular tropical infection that's in the historical tropical medicine books called Lábrea fever, always unclear what Lábrea fever was and there was suggestions that it was probably yellow fever or a variant. There was now accumulating evidence that Lábrea fever, which caused death from liver failure, probably was hepatitis delta virus, HDV. We had the biggest experience in the United States with this infection in Los Angeles, and it was my particular interest. Maynard asked Redeker, "Have you got anybody on staff who could do this study with us as a hepatologist?" And Redeker said to me, "Do you want to do this?" I said, "Going down the Amazon in a boat? Yes." [laughs] I'm not making this up by the way. I said, if this is the sort of stuff that CDC does, this sounds a lot more interesting than going to the NIH to do lab work. So I applied for EIS, the Epidemic Intelligence Service, thinking I would be doing hepatitis, but that didn't quite work out.

Q: You never went down the Amazon in a boat?

De Cock: What Maynard told me later was that the Brazilians took the protocol that CDC had developed, they did the study themselves and CDC wasn't involved. So I never went down the Amazon, but I did come to CDC expecting actually to do viral hepatitis, but there was no opening in the hepatitis branch when I came. I ended up in Viral Special Pathogens [Branch], which brings us to Ebola because that's the branch that deals with hemorrhagic fever viruses. That's a long story of how I got to CDC.

Q: It's a beautiful story, thank you for sharing. Tell me about some of the work that you did in EIS that was about hemorrhagic fevers or was in West Africa.

De Cock: Well actually, it's interesting. I won't go into the HIV [human immunodeficiency virus] work because I'm talking to your colleague Mary Chamberlain in a couple days. This was 1986. Now if you remember, AIDS [acquired immune deficiency syndrome] was first described in 1981, the virus in '83. Serologic tests only became available in I think it was '85 commercially or '86. So these were still the early days in the AIDS epidemic and at CDC, this sort of entry into Africa was actually through my EIS supervisor Joe [Joseph B.] McCormick, who had initiated and led a very important study in 1983 in Kinshasa in late '83 that led to the establishment of Projet SIDA [French for Project AIDS] in Kinshasa in 1984. I was very interested in this particular branch because by the time I left Los Angeles, I was already more interested in AIDS than in hepatitis, but interested in all of them. The fact that Special Pathogens was

actually the conduit to work in Africa on HIV was what really interested me. I'll talk to your colleague about that.

I was broadly interested in a lot of things and very happy to work on hemorrhagic fevers. Now interestingly, it turned out that in my two-year EIS experience, which was very good and rich, there were no hemorrhagic fever outbreaks at all, so I never went to the field to study hemorrhagic fevers. I wrote some guidelines. I did get involved in two very large outbreaks of yellow fever in Nigeria, and the rest of my work was mainly HIV-related in Africa. Coming to Ebola all that time later in 2014 really sort of felt like coming full circle because never having done Ebola field work, in 2014 you come to the biggest epidemic ever and it was a remarkable conclusion of a lot of years at CDC.

Q: Any particular memories that stand out to you? I think you mentioned there were two big outbreaks of yellow fever in Nigeria?

De Cock: Oh lots of sort of classic EIS experience really of being thrown in the deep end and learning by doing. I had just come back from Zaire, now called the Democratic Republic of Congo. I had come back, it was late November and I got back on a Saturday or a Sunday and I remember going into the office in a building that now doesn't exist anymore. It was a horrible little building and my office was in the sub-sub-basement, so it was two floors underground and felt like you were in a cave. I remember going in and checking for my mail. I had been away for over two months and I saw on the secretary's desk I saw a cable about a request for assistance for an unknown disease in Nigeria and I

thought, I wonder what that is, and how are we involved? This was on a Sunday. On the Tuesday I was told, could you please turn around and go to Nigeria? Having been away in Zaire for at least two months. On the Thursday I left. It was an unknown epidemic, assumed or thought to be possibly yellow fever.

I met up with an epidemiologist from Fort Collins where the vector-borne disease group is based. They're the ones that look after today called the Division of Vector-Borne Diseases. They're the ones who look after arboviruses and other non-parasitic vector-borne infectious diseases. I met up with him in Chicago at the airport, sort of exciting, people looking for you with plaques with your name on it. So we go off to Nigeria. Initially, we land in Nigeria and meet with WHO [World Health Organization] and the [Federal] Ministry of Health. The Ministry of Health, either they didn't know we were coming or they said they didn't know we were coming, and we had to hang around a bit waiting for permission to go to the field. We eventually got that, split into teams. I ended up on a small team of three or four other people. One of them was a Ugandan virologist, who actually I knew. He worked for WHO and I knew him because I had known him in Kenya just from three or four years earlier. A young Nigerian called Nasidi, who was again also a young virologist and a public health advisor from CDC who was assigned to UNICEF [United Nations Children's Emergency Fund] and who was working for the expanded program on immunization. None of us had ever seen yellow fever. Two or three teams split up. That was the team I was on.

We drive to the east of Nigeria to Igboland, where the civil war—the group that had seceded from the federal state, and the capital of the province or the district, [Benue State], was [Makurdi]. We get to the field. We go to eventually where there were reports of disease activity, and this was before e-mail, before cell phones. When you were out, you were out. Nobody knew where you were and so on. So we were on our own in this pretty remote place and obviously had stumbled into a very, very bad situation. A local school, a really dingy facility had been turned into a sort of sick room or a hospital, and we went in there and there were twenty-five, thirty people lying in bed, some of them with jaundice. There were some nearby, we were shown freshly dug graves—people who had died recently. The school had closed and they'd had something like seven deaths over a period of a few weeks whereas the whole year before there had only been one death in the whole school, so it was obvious there was a very bad situation going on. We looked around the area, talked to people, and there was one epidemiologist working for the state who was Filipino if I remember correctly. He had been sort of trying to figure out on his own what was going on and had done his best to describe what obviously was an outbreak.

First question when you arrive in a situation like this, is there an epidemic? Second question, if there is an epidemic, is it due to what you think it is or what you're being told it is? Obviously, there was an outbreak. Was this yellow fever? Well, we looked at patients and so on and came to the conclusion this really probably was, but no diagnostic testing had been done. But it was difficult to come up with any better explanation. Third step in such a situation, describe in time, place and person. Draw an epidemic curve.

Who's affected? Age, sex, etcetera? Where are they? We drew an epidemic curve on a piece of paper—first time I'd ever done this. First time any of us had done this, so we're clutching this piece of paper. We thought, this is impressive. Cases, deaths, obviously something very bad going on. We then had internal discussions saying, this is obviously a disaster. This is yellow fever and the only thing to do here is mass vaccination. Well, how do we do that? The only people who have the logistics, who can assure the logistics to do this, is the military because this was difficult terrain, big geographic areas and Nigeria was pretty much a military state in those days. So we thought well alright, let's go and see the governor, we've got to go and see the governor. He's in charge, he commands the local military; let's go and do this. Let's go and talk to him. We go and talk to him with our epidemic curve saying, this is what's going on. We think this is what it is. We think you should instruct the military to conduct mass vaccination.

Our UNICEF colleague, the CDC public health advisor, was experienced and knew about vaccination programs and knew about yellow fever vaccine and injectors and all of that sort of stuff. We thought we had some technical capacity. Having done all that, we had agreed ahead of time to regroup and meet the rest of the different teams and so on, and we did that and eventually set up a base in the heavily affected area. By this time, as we were getting back to our base, the CDC senior person, Tom [Thomas P.] Monath, Dr. Tom Monath from Colorado—who also just happened to be the world expert on yellow fever—he was there. We drove in and I introduced myself and José Esparza was a WHO virologist, he also had been sent. So Tom and José were there. I introduced myself and [laughs] this I'll never forget. Tom says, "This is bad, isn't it?" I said "Yeah, it's very

bad.” He says “You know, I don’t think this is yellow fever.” [laughs] José will testify to this—interesting, I just saw him last week somewhere. We spent about forty-five minutes debating what this was and Tom Monath would say “Well, it could be hepatitis.” Tom obviously knew infinitely more about yellow fever than I do because I knew nothing, but I did know a lot about liver disease and I knew frankly infinitely more about hepatitis and other things than he did. We had a debate and he would say, well it could be this. I said no, that just doesn’t behave like that. Obviously, it was kind of gut wrenching, but at the same time, intellectually fascinating. By the next day when he sort of looked around a bit more he said yeah, this is yellow fever, and then he had set up a small, mobile lab. I have pictures of him in the kitchen of the house that we’re living in doing enzyme immunoassays on the kitchen table with stuff, portable equipment he had brought along. Sure enough, the tests for acute antibody, IGM [immunoglobulin M] antibody to yellow fever were positive and it was a yellow fever outbreak. We worked together for three or four weeks. Working with Tom Monath in the field was just a most remarkable experience, I mean a real privilege.

We were there for—my total deployment was about a month. It included being there for Christmas. I remember leaving the area on Christmas Day actually. At the end of our investigation we thought that in this local government area of about two hundred thousand people, there had probably been some forty thousand yellow fever infections, twenty thousand cases with jaundice and about five thousand deaths. What was striking was that this went largely unreported in the international media. It really was a far-away place with a terrible epidemic and nobody knew or nobody cared. There were many

interesting side stories to all of this, but also what was medically important was that Monath was aware that he pointed out that with the Christmas coming up, there would likely be a lot of travel and it was not inconceivable that yellow fever would spread to other parts of Nigeria. I left late in December I think to go back to Atlanta. As an aside, I had an interesting time because Tom said to me, “Come and work in the lab on all these specimens we’ve collected.” So in January, February I went out to—late January, February—to a very cold Colorado to work in the lab and do serology on these specimens and that was useful experience and good to meet all these people.

Sure enough in April—this was still my first year of EIS actually. Sure enough in April, we got reports of further possible yellow fever, but now somewhere else in Western Nigeria in a town called Ogbomosho—disease activity in the city. This was the first time there had been urban yellow fever in Africa in forty years or so. So we went back. Some of the same team went back for that. Monath, myself, Nasidi, now much more experienced in yellow fever and again, it was just a remarkable experience working with Monath. Both these epidemics were then well described in the medical literature and again, coming full circle, there is now an ongoing—as we speak today in June 2016—there is an ongoing—it’s been going on for several months—quite very bad epidemic of yellow fever in Angola, which probably CDC would be a lot more involved in, we are involved, but we’d probably be a lot more involved if everybody was not involved in Zika in the Americas.

Monath—and one of the challenges right now is there is a global shortage of yellow fever vaccine. Although, what's interesting about the vaccine is that this vaccine, which was introduced in the late 1930s, is—although the International Health Regulations are that you have to renew it every ten years, actually it's probably effective lifelong. Probably the doses that are used are unnecessarily large and we could actually dilute the vaccine and spread it further. There was a leading article in *The Lancet*, an editorial on this in *The Lancet*, an opinion piece a few weeks ago by Monath and some other colleagues and I was pleased to see that in the references cited were a couple of our papers and the literature from way back when in Nigeria. So again, sort of a full circle story.

Q: I honestly, listening to this, want to stay in Nigeria for a long, long time, but with time constraints we can't. Let's skip ahead a few years, several years to I think in 2000 you become director of the CDC office in Kenya?

De Cock: Yes.

Q: Can you tell me about that, taking that position and going back to Kenya?

De Cock: The CDC had been working in Kenya since 1979, and the reason it first got involved was to initiate malaria research, particularly in the region around Lake Victoria, which is intensely malarious. The CDC presence was really rather small, there were I think two or three direct-hire staff doing malaria research—an epidemiologist, an entomologist, a public health advisor. I went back for personal reasons as much as

anything else, but scientific ones as well. I wanted to get back to fieldwork, so I was pleased to get back to fieldwork. I took the position of ostensibly the head of the malaria research station, but I was living in Nairobi—the research was mainly up by the lake. I traveled up regularly. One of the requirements, really I had negotiated it, but it was necessary for a number of reasons anyway was that we had to get into HIV work and my background by this time was predominantly HIV. Had to get into HIV work firstly because this area around Lake Victoria, the rates of HIV were very high. Prevalence in the adult population of 15%-20%, sort of southern Africa-type levels of prevalence.

Frankly, we hadn't gotten into it enough. There was a reticence to do it. For a number of self-reinforcing reasons: there's a lot of stigma, a lot of discrimination. The population was resistant to the idea of HIV, then there were concerns that HIV would cloud everything else going on and break working relationships if research in HIV was conducted, etcetera. Some low-level things were done and there was work on blood safety and some public health assistance, but we had reached a conclusion that we really have to get serious about this. At the same time, at the end of the Clinton administration in the late nineties, there was an initiative called The LIFE [Leadership and Investment for Fighting an Epidemic] Initiative, which was an early initiative to increase investment in global work on HIV, including and perhaps especially for the prevention of mother-to-child transmission of HIV. So we got programmatically involved in HIV work as well. With LIFE, we had to decide, well, what are the different HIV priorities? And we identified four or five, such as surveillance, voluntary counseling and testing,

tuberculosis, HIV in the military, and we got more programmatically—and prevention—and we got more programmatically involved.

Very quickly, it became somewhat—not only do we do malaria work, but we also were doing HIV stuff. My most useful intervention in the malaria work actually was to help the colleagues who were doing some fantastic work; just help them focus a bit and especially get what was going on finished. What was going on was a very, very large trial of insecticide-impregnated bed nets and that was just a wonderful piece of work. A large cluster randomized trial of bed nets. I think I did play a useful role in just sort of helping them focus down and pushing to get it finished and written up. One of the memories—and actually there's a lesson here because I've seen it at different times—an area of work we don't invest in often enough is data management. Actually, I should come back to that with the Ebola discussion.

There was this mass of data from the malaria studies going back years, and colleagues—I'm thinking particularly of a colleague called Feiko ter Kuile who was a Dutch malariologist and is now a professor of tropical medicine or whatever at the University of Liverpool. He's still involved with us in Kenya actually—excellent person. I remember talking with him and his wife also, Penny Phillips-Howard, was a researcher. There was just this mass of data and yet it was just sort of like a mountain, but the gold is in the middle and the rest I had to persuade Feiko just to hack away at it. [laughter] Actually, it was an early example of cross-disciplinary collaboration because actually one of our HIV colleagues, I got him to work with them on data management, and here we had our HIV

group working with the malaria people to assist with data management. To cut a long story short, that piece of malaria work was a few years later published as a whole supplement to the American Journal of Tropical Medicine and Hygiene and it was just a brilliant piece of work and conclusively showed that the regular use of bed nets resulted in something like a 20%-25% reduction in all-cause mortality in children, a remarkable result.

We grew the Kenya program very substantially between 2000 and 2006. We were very fortunate to have excellent collaboration and support from headquarters. My previous job actually before I went to Kenya was I was director of the Division of HIV Prevention–Surveillance and Epidemiology and my deputy succeeded me. We stayed in touch. He gave us good support and we were able to expand, including some very substantial infrastructure expansion like buildings. Then, of course, history changed with President [George W.] Bush's announcement in 2003 about PEPFAR [President's Emergency Plan for AIDS Relief] and later the President's Malaria Initiative PMI, and in 2004 another infectious disease program, the [International] Emerging Infections Program, was allocated to Kenya. We sort of developed a Field Epidemiology Training Program, so different components expanded and fell into place and have resulted in today a very, very large platform.

Q: So if we were to say briefly where you went from '06 on, after that you go to Geneva, is that right?

De Cock: That's right, yes. I had been in Kenya five, almost six years—six years actually. I shouldn't stay in these places forever and there are rules about this, so I was casting around for what else to do and I was actually invited to become the director of WHO's HIV program, the Department of HIV[/AIDS] in Geneva, which is the global program of WHO for HIV. I was in Geneva from 2006 to the middle of 2009.

Q: And then where do you go from there?

De Cock: Well I went back to Kenya for a short while before coming back to Atlanta as the founding director of the Center for Global Health.

Q: And then where?

De Cock: [laughs] Again, for family reasons—my children actually were in Kenya and they needed my attention and support and I just had to make the human decision that I have to go back to be with them.

Q: How old are they?

De Cock: Well now they're bigger. Then they were still—they're now twenty-one and eighteen, so it's a few years ago and they were sixteen, seventeen and a bit younger.

Q: Spend some more time with family.

De Cock: Yeah. Anyway, that's sort of an irrelevance, but I went back to the field at the end of 2012.

Q: Where were you exactly when you started hearing about the Ebola epidemic in West Africa?

De Cock: Well it was interesting, I was in Kenya. I was in Kenya, it was 2014, so I had been back in Kenya just about fourteen months or so, fifteen months. The person, Joel Montgomery, Dr. Joel [M.] Montgomery, was the head of the infectious disease work, the emerging infections program. We organized ourselves in an organizational structure where I created an umbrella—or just refer to it as health security—and under it we had a series of different programs, including refugee health and the laboratory and human/animal health, one health, emergency preparedness, etcetera. Joel looked after that area of work and in March of 2014, I think it was the 20th of March or so, WHO for the first time reported cases from Guinea and about ten days later from Liberia. Joel was asked by headquarters to go to Liberia for a TDY [temporary duty assignment]. There were cases of Ebola up in Lofa County, which is where the borders of the three countries come together—the Forest Area of Guinea and Guéckédou, Liberia, Lofa County. He went in early April or so. He only went for about two and a half weeks. It appeared that things were under control, that there was no reason to stay, and he was able to come back to Kenya. But weeks later, when I read on-going reports, the infectious disease—the outbreak updates that come out of CDC or the reports elsewhere from WHO and so on, it

seemed to me that this—this is big. This is a lot of cases; not in Liberia at that time, but you were hearing about further cases in Guinea, in the capital city, and then there were cases in May, there were cases in Sierra Leone. I thought, what's going on? What are people doing? Not anybody in particular, just the world. This seemed like a significant event. I happened to be coming back to CDC for meetings and other meetings in late June and was eager to talk to different people, including in my own center, the center of which until a while before I had been the director. I asked questions. How involved are we? What's going on? Is the Emergency Operations Center activated? This was now late June, drifting into early July, and I spoke to a number of people and actually sent a couple of e-mails to fairly senior people saying, just what's going on?

I was then asked by a senior colleague [Inger K. Damon], she reached out and said “Look, do you want to go to Liberia?” Because they had just received—CDC had just received via the embassy in Monrovia a specific request for epidemiologic assistance. So here I am in early July, CDC asking, do you want to go to Liberia? Can you go? I thought well, yes, I should. We have to do this. I talked to some old colleagues or people I knew or knew the name of in Special Pathogens. I'm not an Ebola expert. I mean I had done my EIS in this group, and I knew something about all these infections, but I'm certainly not an expert of the level of colleagues in Special Pathogens. I agreed to go and I remember I went on the 16th of July. I happen to remember the date because it happens to be my sister's birthday. I had talked to the person heading the response. She was on holiday, but I remember having a long conversation with her by phone as she was driving across the other side of the country. I went on the 16th of July and we were a very small

team. I had gone back to Kenya, so I flew to Monrovia from Kenya. The team in total comprised—I think we were seven [ed: eight]. There was myself; [five] EIS officers [including Almea M. Matanock, Jennifer C. Hunter, Joseph D. Forrester, Patrick Ayscue, and M. Allison Arwady]; a colleague [Ilana J. Shafer] who had just finished EIS in Special Pathogens; and another colleague who had finished EIS just a couple of years earlier, Dr. Satish [K.] Pillai. Satish was my senior person apart from myself. We all got there approximately around the same time.

Again, you're back to basics. Is there an epidemic? If there is, is it due to what you think it is, and then can you describe it in time, place and person? Again, it made me think of that yellow fever experience in that you just look around Monrovia and it was clear there was a major, major problem. There was only one Ebola treatment unit in the grounds of a hospital called ELWA, Eternal Love—

Q: Winning Africa?

De Cock: Winning Africa. They had a very small unit and they were expanding it. When I say they, these were staff of Samaritan's Purse, which is a faith-based organization. A rather conservative, politically conservative faith-based organization that had been founded by Billy [William F.] Graham [Jr.]'s son. Very well-connected politically in Washington. I went to see them. I met the doctor, his name was Kent Brantly. I met him. I was very impressed with what they were doing. They said they were not hemorrhagic fever experts, but they had seen the need and had talked with MSF, Médecins Sans

Frontières, who really are, who have worked on many outbreaks and really are experts. MSF had agreed to work with Samaritan's Purse, train them, had trained them and had sort of signed off that they were fit to go. I was impressed with what Samaritan's Purse were trying to do. MSF were terribly stretched. There were now two treatment units in Liberia, one in Monrovia and one up in Lofa County. MSF was in all three countries and just stretched to the limit, so were very happy to hand it over to SP, Samaritan's Purse.

Other things we [realized] early on were there were no data. The data were all over the place. The case counts, we started asking well, how do we know where these case counts are coming from? This goes back to my comment that I think we severely under-invested in data management from the beginning. That was compounded by a problem that there was a rather clever database that was based on the CDC-developed Epi Info application. Epi Info is a database or a package that CDC developed many years ago, has gone through different versions, can do data management, analyses, outputs of reports and so on, tabulating and graphing and so on. A modification had been made of this specifically for hemorrhagic fever outbreaks. It was a difficult tool to use and it was just dwarfed by the magnitude of the problem here and had some technical constraints, but there was a real desire to use it, and understandably.

We spent a lot of time in the beginning trying to figure out, where are the data coming from? Because you have all these reports of cases, but in fact, data were coming into the Ministry [of Health and Social Welfare] by cell phone, by paper report. Lab tests were coming in. There were reports of dead people, ambulance calls of cases in the

community. It was a chaotic data situation and it took us awhile to figure out, to piece out how all this was coming from and trying to assess whether this could be put in some sort of credible description.

We didn't do lab work directly, but one of the first things the Minister asked me to do—and actually it was in that original letter of assistance—was to assist with the lab. There was one laboratory in an institute called the Liberian Institute for Biomedical Research, LIBR, which was outside of—fifty kilometers or so—outside of Monrovia near the airport. Went out there to see what was going on and there was some very commendable work being done by an NIH colleague and folks from the US Army Medical Research Infectious Disease Institute, USAMRIID. I never quite understood how they were there or how they got there. They had a long-term engagement for hemorrhagic fever research, but they were the only show. They were there and they were training Liberian technicians and so on. But so the assistance we provided, although it wasn't at that time direct technical assistance—it wasn't CDC staff doing the lab work—nonetheless, we were able to broker a lot of the relationships that were needed to start getting results to the right places and making sure that somebody was going to replace critical staff when they left the country and stuff like that. So we did play a useful role, obviously always talking with headquarters and so on.

It was a dire situation and those first couple of weeks were stressful and troubling, adrenaline-driven. The situation was terrible. The patients were coming to the hospital, lying in hospital grounds trying to get admitted to the ETU, which didn't have any beds.

Shortage of staff, people dying in their houses, reports of bodies not being collected for several days. A number of dead bodies in the streets and later, jumping ahead a little bit, but later a very unpleasant occurrence, which led to a unique event, which is an order by the President [of Liberia], a decree that dead bodies be cremated in Monrovia. What had happened is that the water table in Monrovia is very high and somewhere, a number of bodies had been buried, but with intense rain just floated up. These bodies just floated up, obviously causing distress and outrage. The order to go to cremation is a remarkable thing actually because it's extremely against the local culture. And actually, was one of the things that was hated the most, but was probably necessary. It was in force for a few months and then was able to be lifted.

Again, just going back to the beginning, so having arrived on the 16th, a number of events happened in the first couple of weeks which were extraordinary themselves and really changed global perceptions of Ebola in a way that was remarkable. On the 20th of July—I think that was the date, around that time—a senior person, well connected to high levels of government, traveled from Monrovia to Lagos by airplane with a stopover in Togo, visibly ill when he got on the plane, collapsed on his arrival in Nigeria. He was immediately hospitalized. The correct diagnosis was made by the attending physician of suspected Ebola, which is what he had. He died. The physician got infected and died and there were a number of secondary and tertiary infections, I think nineteen in total if I recall. That whole event described separately in Nigeria. They did contain it. Many, many lessons from that experience in Nigeria, but this was really everybody's nightmare that somebody gets on an airplane from one of the heavily affected countries, ends up on the

other side of the world or elsewhere in Africa and sets up a secondary epidemic somewhere else—absolute nightmare. Of course, nothing new about this concept. The whole concept of emerging infectious diseases always said with air travel and so on and so forth, but here you actually had it happen with Ebola for the first time.

The second thing that happened very soon afterwards was that I was asked by my Samaritan's Purse colleagues, could we chase up some lab results? They gave me a name, so we did. It took a while because the names didn't quite match. Long story short, this was not just some specimen. This was from Kent Brantly, the Samaritan's Purse physician, who if I remember the days correctly on a Tuesday had woken up feeling unwell and with a fever. He had isolated himself. I think this specimen was from the Thursday and we were trying to find the result on a Saturday and it was over the weekend that we communicated to Samaritan's Purse that this specimen was positive. We learned that actually this is not just whatever name it was given, it was actually the physician. So we got into intense discussions with Samaritan's Purse and obviously, quickly had to mount an investigation as best we could of what had gone on. What happened here? Samaritan's Purse then a short while later had a second infection in Nancy Writebol, who was a nurse. She also was infected. We then learned actually they had a third infection in a Liberian hygienist, who had actually died. We had to investigate that whole situation and also communicate, discuss with, and we were involved in again totally new issues, such as access to experimental medicines. I said to the Samaritan's Purse people, I said "CDC doesn't do this. We're not providing treatment or care. You've got a senior researcher here, [Dr. Lisa Hensley from NIH and USAMRIID], who actually does Ebola

therapeutic studies for a living, maybe you should talk about all of this.” Kent Brantly did end up getting the medicine ZMapp actually. Again, this is totally uncharted territory because you’ve got this raging epidemic. What do you do with expatriates who are infected? Who gets this very scarce product and who doesn’t? As a matter of interest, later on, again, I got involved in calls between our director [Dr. Thomas R. Frieden] and Liberia because the Liberian president, [Ellen] Johnson Sirleaf, had written to President Obama asking for medicine, ZMapp, for infected medical staff, Liberian medical staff. Again, these totally unprecedented sort of situations. Again, never addressed before. What do you with expatriate healthcare workers infected? In the old days, the sort of understanding was you’re on your own. This was not going to be possible in this huge outbreak, but I think very relevant also was that Kent Brantly worked for Samaritan’s Purse and Samaritan’s Purse, very, very highly connected, so we had for the first time ever we saw the medical evacuation from Africa to the United States of people with Ebola infection. Both of them survived, as you know.

This is all playing out over the first ten, fourteen days or so. Another thing that happened in the first week was one of the most useful things we did, was you know sometimes you sort of look at situations and there are key decision moments where you have insight or hopefully have it right and you say, this needs to be done. One of the first things we did when we arrived, myself, these EIS officers and so on, was to go to the Ministry and go to the daily meeting of the so-called Ebola Task Force. Well the Ebola Task Force was an open meeting in a big conference room in the Ministry; not exactly a privileged building. Apparently, open meeting. There were seventy, eighty people there and sometimes very

senior people would show up. The President sometimes came. The discussion, there was an agenda. Anybody could talk; it went on for a couple of hours. Suggestions were made, but then the next day it would sort of be a repeat of the day before. It wasn't quite clear what was being followed up on. The sequencing of all of this was not very clear. I said to my colleague Satish, I said, "This isn't working. We need a structure here." We talked about an incident management system analogous to how our CDC Emergency Operations Center works. Again, neither of us were expert in this, but we quickly consulted some documents and talked to folks at headquarters and wrote up a little suggestion to go to the Minister and say look, we think you need to do this. What we advised was restrict these meetings to a very small size, appoint an incident manager, have key people reporting to him for priority areas like surveillance and case management and laboratory and so on and so forth. A very hierarchal, well-defined system. Daily meetings with notes taken, action points which get reported on within twenty-four hours and so on and so forth.

It was on a Wednesday I think, we go to the Ministry, it was about a week after, this was now seven days after my arrival in country. Having done a lot of work and trying to figure out where the data are coming from in the lab and having witnessed the guy going to Nigeria, we go into the Minister's office, Satish and myself. Sit down, I start speaking and literally my first sentence not finished, the secretary comes in and says, "We have to evacuate the building, there is a fire." The Minister gets up—the Minister is a seventy-five, seventy-seven-year-old surgeon. He was very good, [Walter] Gwenigale was his name. He goes over to his computer, goes over to the window. I start hearing more and more noise from down below because this is several floors up and I say "Minister, can we

accompany you out? We need to go.” “Yeah, I’m coming, I’m coming.” I said to Satish, “We need to go.” We head down the stairs and there’s thick smoke. I start coughing and I think, we’ve got to get out of here. This is not good. Get out of the building. There’s now hundreds of people in the car park. Get all the CDC people together and get our vehicles and leave. I find out later what likely happened was that it was probably a family member of a person with Ebola who died—that’s what I heard—had actually gone into the conference room, piled all the chairs together, poured kerosene over them and tried to set the building on fire. This is all sort of week one. [laughter] You can see, this was a very, very odd experience.

I kept saying to our EIS officers, look, this is unusual. We split up into people doing different things. One person went to the hospitals to get better insight into hospital hygiene and infections in healthcare workers. I sent one EIS officer [Dr. Joe Forrester] to other parts of the country to try and rapidly establish—there’s fifteen counties in Liberia—rapidly establish in places we had not heard of cases, was there any activity suggestive that there was disease transmission going on? He covered thousands of kilometers in very difficult, very, very difficult terrain. He did a very good job. The EIS officers were really splendid. I could give you names of all these people, but I have to look them up.

The political ante in Monrovia just rose and rose to the end of the month. Not enough beds, a dire situation in Lofa County, not enough beds in Monrovia. There’s a problem with burials—just everything dysfunctional and the extent of the outbreak unclear. By

this time there had been hundreds of cases according to the data that we had. By the end of the month, I think over five hundred cases. All sorts of things happening at the same time. The WHO rep pulled out, changed. A new structure called UNMEER [United Nations Mission for Ebola Emergency Response] was created by the Secretary-General of the United Nations, which I guess expressed (a) that he wanted to be more in control and have information and (b) that he didn't have confidence in what WHO was doing. Interactions with the embassy, advising the Ambassador, who then early in August declared an emergency before WHO actually I think if I recall. Just lots of different things at the same time.

I sent one of our EIS officers up to Lofa County, very hot up there. There was some resistance and Samaritan's Purse vehicles were being stoned and actually he had to escape across the border crossing I think by canoe into Guinea, no passports or anything. [laughs] This was just very, very unusual stuff. I ended up leaving in mid-August.

Oh, another thing that happened, which was sort of in retrospect humorous, but at the time concerning. The EIS officer who had gone to—Almea [Matanock] was her name, she'd gone to hospitals. One day she comes in and says she doesn't feel well and I said, "What's the matter?" She said she had diarrhea. I said okay. Then another one, [Jennifer Forrester], says, "I don't feel well either." I said, "Do you have fever?"

"No."

"Where have you been?"

"Well, I've been to the hospital."

“What did you do?”

“Well, I shook hands with a physician.”

“Was he well?”

“He seemed to be.”

“Did you touch any patients?”

“No.”

Okay. You tell yourself this is not Ebola, this is not Ebola, and yet when you lie awake at night—you think the next day, are you any better? Well, no not really. You start saying, I wish these women would just get better. [laughs] You tell yourself this is not Ebola. Of course, this is not possible. Actually, it didn't make any sense because they were sharing a little apartment in the hotel and both of them were sick and the incubation period wouldn't be right and whatever, but obviously it caused concern, but they got better.

There were just many, many events. It was one of the most intense experiences of my life. By the time I left in mid-August we had conveyed to headquarters that this was a disaster and this was a very, very bad situation. I think we were able to convey sensible advice about laboratory need and need for data management, what kind of assistance was required. I was replaced. Dr. Frieden, Tom Frieden, the CDC director, came in late August. Actually, what was interesting also, I remember this very well—it is just so difficult in that situation to sit at the end of a telephone and try and describe to people on the other side of the world what it's really like. The magnitude of this epidemic is totally unprecedented. We've never seen Ebola in capital cities. It was difficult just to describe the difficult conditions of Monrovia with the rains and the Ebola treatment unit that was

bursting to capacity or twice as many patients as could be accounted for. Dead people inside who weren't being collected, and the stress that our MSF colleagues were under. Samaritans Purse pulled all their personnel out. Without really talking to anybody, they just did it. To convey all of this and the unusual atmosphere, it was very difficult and there were people back here who I think, not that they didn't believe it. I think they questioned whether we were staying objective or not and perhaps, were we getting stressed and were we exaggerating? The answer is no, we were not. Was it stressful? Yes it was! Were we objective? Yes, we were. Did we get it right? Yes we did. Actually, when Dr. Frieden came at the end of August, I think he visited all three countries very quickly. I talked to him later before my second deployment and I'll come back to that. He asked to speak to me and he said before our conversation started, he said, "I just want to tell you, I realized when I went in August you were right." Obviously, it was reassuring and good to hear him say that. We did have it right.

When he got back, I remember him telling me or hearing from others when he got back, which I think must have been early September, within hours of arrival he was on the phone to the White House talking with the President, and the President came. President Obama was here in CDC mid-September, which is when he announced the deployment of three thousand troops to Liberia as well as all sorts of other assistance. So this was just an absolutely remarkable experience. I always emphasize to my colleagues, and I did it to the EIS officers, that it's important to write, to document stuff. It's not so you get more papers on your CV [curriculum vitae]. All those things are important, but if you don't document it, nobody will ever know you were there and some of these events are so

important. It's an obligation and it's an obligation to the people that you're doing things to or about. So we did actually write up a paper in *Emerging Infectious Diseases* describing that early experience in Liberia, which I don't think this is going to be the greatest science but I personally felt it remarkably important to be able to document it and I hope my younger colleagues did too.

As I reread that paper, I think yeah, we did do the right stuff. It's a good example of how bad data, limited data, information that isn't necessarily perfect, but it's good enough. It's good enough to draw important public health conclusions, which is what we did and what that first experience, that first deployment actually captured was how Ebola had gone from an obscure African infection that caused some outbreaks once in a while in a remote part of the world, suddenly becomes a priority for global health security and is actually being discussed at the very highest political level as it was discussed on the floor of the United Nations, discussed by the Security Council. Really quite remarkable.

[break]

Q: Dr. Nasidi, you mentioned you spent time with him in Nigeria doing the yellow fever. Is he the same Dr. Nasidi who then initially ran the response in Nigeria?

De Cock: Probably, yeah, I'm sure.

Q: Okay. And did you have a formal position title when you were in Liberia for that first deployment? Were you “CDC lead” or something like that?

De Cock: Team lead. I was the team lead. I eventually had three deployments. I was team lead each time. I went back again, I went back in November 2014, early November, completely different situation. A lot of work had been done between August and November. The CDC team now, from the initial seven, the CDC teams were now of sixty, seventy people. I think our team was about sixty and I was again team lead. It was an extraordinary privilege to do that, I mean it really was. Now, managing sixty people is different from managing seven and the situation was completely different. Fascinatingly, whereas before, the epicenter was Lofa County, which in July, August, Lofa County was 50% of the cases. Monrovia 25%-30% and individual counties the rest. Now, Monrovia seemed to be the epicenter. Lofa was finished, actually. They didn't seem to have more cases. Now the hypothesis was, what we saw and thought, how do we put this together? Monrovia was the epicenter and was sort of seeding different parts of the country by infected travelers, sometimes to very, very remote places. The story we had put together, which I think and what I've just said is correct—and the story we put together back in July, August was Lofa County was the epicenter, had infected Monrovia and then there were just isolated cases or clusters, usually often related to healthcare seeking in some other counties.

It was completely different by the time I was back there in November. Very important work had been done by different groups: the Red Cross and another NGO [non-

governmental organization] picking up dead bodies and just assuring burials. Cremation was still enforced. There was still unsafe burials going on, but things were better. Also, MSF had opened and others actually had opened a number of treatment units, and just getting those treatment beds there and getting patients isolated—really the incidence just dropped precipitously. So now, here I was now with a team of sixty. I think one of the reasons I feel so privileged is that I saw the beginning, the middle and later, my third deployment, the end of this epidemic. So November through up to almost Christmas, excellent work was done by CDC staff dealing with these remote clusters. The more experience we had, the quicker they were extinguished with very rapid response, isolation of patients and judicious use of quarantine. Also, just making sure that even when people are in very difficult geographic situations, that even moving them closer to an Ebola treatment unit and holding them just in case anybody got sick they could be isolated immediately.

I had an interesting experience. I was asked to go to Sierra Leone. Cases in Liberia were getting fewer. Incidence clearly had dropped. There are now very few cases, but they would be in different places and about half in Monrovia, half elsewhere, but they're greatly reduced in number. In Sierra Leone, the epidemic was still very bad and seemed to be increasing. Essentially, what happened in Monrovia happened in Freetown as well, but later. So in early December, I was asked to go to Sierra Leone to I think the embassy, the American Embassy in Freetown had arranged this, but to talk to the government because they were asking, what's happening in Liberia? Why are they doing apparently well, and what's the difference? There was no magic answer. There's no magic bullet.

How do we address Ebola? You isolate the sick. You safely bury the dead, and then contact tracing—which is following the contacts of cases or people who have died—is just to keep them under observation, so that you can very quickly isolate somebody again if they get sick. So, it's all about isolation and the quicker you do it. When we have data now, you talked to my colleague Kim [Kimberly A.] Lindblade earlier, she's written some analyses on this that we have very good data that the quicker you isolate people, the less secondary transmission, the smaller the clusters and so on.

When I went to Freetown, it seemed to me that my impression was that there was a lot of discussion going on about we haven't got enough Ebola treatment units. They were furiously building capacity and so on and the focus was on that rather than, that's fine, but isolate people immediately and you do it with what you got. You do the best you can under [conditions as they are], but get the patients isolated. You may not have ideal Ebola treatment units, but you isolate them where you can. I think that was a difference and one of the reasons it was lagging behind. It was again, these unusual circumstances you get thrown into. How often do you talk to heads of state? I talked repeatedly to the head of state in Liberia and in this visit to Sierra Leone met the head of state. I was rather disappointed. My fourth deployment just a few weeks ago was to Guinea for a short while and I thought, I wonder if I'll meet the Guinean president? I did not. I was very disappointed. [laughs]

Another very important insight actually was in Liberia, was that by the time now, cases were much fewer. It was possible to be much more certain about data and we had many

more people and some very, very—CDC just had wonderful people on the ground. There was much more human capacity to really figure it all out, but one lesson that I learned was in all of this the most reliable data actually came from the lab because one positive for Ebola, that shouldn't happen, that's a case. So actually, although at the beginning we didn't really have a good insight into what proportion of the patients are even being tested. Is there duplicate testing going on? It was chaotic. But by now in November, it was possible to be absolutely certain—okay, the cases are being tested and these are the positives and these are the cases. An epidemic curve now made some kind of sense. That was an insight that if anything like this happened again, the laboratory is a very, very important source even if incomplete, it's a very specific source of data. The best descriptive data, but who are actually the cases? Who is getting sick? Those have to come from the Ebola treatment units.

So again, we were there for six weeks and somebody, it may have been Kim actually, somebody made a remarkable—it summarized what we were saying. “As Monrovia goes, so goes Liberia,” because Monrovia was seeding the rest of the country. Somebody else chimed in and it was absolutely correct because we'd been talking about that as well and whoever it was said “Yes, and as Guinea goes, so goes the region.” It turned out to be true actually, because Guinea—it all started in Guinea and I think Guinea has had the last infections as well. So that was a useful deployment. I was there for six weeks that time.

Q: You said you came in November, is that right?

De Cock: Yeah, early November.

Q: Early November and then departed when?

De Cock: Just before Christmas.

Q: And then when do you make your third deployment?

De Cock: That was in early March. I was asked to go back again. By now, totally different ball game. There were no cases. The last cluster had just finished. That last cluster again, a bizarre series of occurrences, an urban cluster. Very difficult social circumstances: substance use, criminality. People had to be tracing the contacts who ended up being referred to as VIPs [very important persons]. A very difficult series of circumstances and conditions, but successfully managed.

No more cases, and I was with my colleague Athalia [S.] Christie—she may be worth talking to actually. Athalia is definitely worth talking to. We were again asked to go over to Sierra Leone to talk to our colleagues there, which we did. We were there for a couple of days, and lo and behold we get a phone call from Monrovia: there is another case. We go back and the team is trying to take this unfortunate woman's life apart—this one case. No evidence at all of where this woman got infected from. I mean you'd say, we knew that with no cases, we ask two questions. How would we recognize resurgent Ebola, and where would it come from? Well, the likeliest where it would come from would be

presumably importation from another country, from Sierra Leone or from Guinea, or there's transmission going on we don't know about. We just could not find evidence of either of those explanations.

However, this woman had a sex partner who was an Ebola survivor, but what was unusual was that his illness had been more than six months before—it was September or so the year before. We knew there had been isolated reports of virus persisting in semen, but not this long, and the general recommendations were for abstinence or condom use for three months and that was safe and that was the end of it. Here was a man who may have been a source. We worked with others, with WHO colleagues and so on, on trying to work this out. We got a semen specimen, which actually was positive on PCR [polymerase chain reaction] one hundred ninety-nine days or so after his illness onset. And the genetic material in the two cases, in the survivor and the case patient, was genetically sequenced and essentially identical with some identical mutations. This was very strong evidence that here we've got sexual transmission a long time after somebody recovered from Ebola. He's obviously been harboring virus. That was the dominant feature of that particular deployment because we nailed that down, rapid MMWR [*Morbidity and Mortality Weekly Report*]. Global advice with WHO and CDC changed on a dime because of this, so that was again just a remarkable experience. We now know that since then there have been several other clusters initiated by survivors either reactivating their disease, such as the well-known case of the Scottish nurse who didn't transmit to anybody else, but she got sick with meningitis nine months after her initial recovery and had virus in her CSF [cerebrospinal fluid] and in her blood.

So that was very instructive and as I said, there've been other clusters, including a recent one in Guinea, which again initiated by sexual transmission. There's an awful lot that's been learned about this infection that we didn't know before. Just a most unusual story.

Q: You mentioned you went on a fourth deployment to Guinea recently?

De Cock: I was asked to go to Guinea in April. All of these other events were in 2014, but the last deployment was in 2015 to Liberia, so now this is 2016, April. There was a cluster in Guinea which again illustrates what this can do. A case of sexual transmission infecting another person, some other infections and then a woman with Ebola traveling to Monrovia with two of her children. The woman died in Monrovia, the two children were infected, they survived. This cluster seems to be finished now. I was asked to go; it wasn't quite clear what was going on, whether there was more assistance needed, etcetera. I was there for ten days and I came back soon afterwards because other CDC colleagues—Michael [H.] Kinzer was the team lead, well in charge of what was going on, and everything seemed to be under control and there was no virtue in my staying.

It was interesting to see Guinea, a very different country. These three countries are so different and totally different histories and organizations and so on.

[break]

Q: Some of the people you've mentioned like Dr. Joel [M.] Montgomery I've had in here, talking with him. Who are some of the CDC staff who really stand out to you from your multiple deployments you worked with? Can you describe some of them?

De Cock: I'm going to have to get my notes out with names. Frank [J.] Mahoney has done very good work. You should talk to Frank.

Q: I actually just did, it was great.

De Cock: Frank is a real field person and very practical and action-oriented.

Q: What did your work with Frank entail?

De Cock: Well I succeeded him. If you go back to 2014, so I was there July/August. Joel came back, I think Frank came in a bit later, then I succeeded Frank. I think I did that twice actually. I've known Frank—I bumped into Frank in other places. Frank obviously is very, very seasoned. Athalia Christie was very good in the field. Kim Lindblade is outstanding in the field.¹

Q: Continuing with Frank just a second, so did you overlap a little bit?

¹ Note from K. De Cock: But there were numerous colleagues, some of whom I knew from other CDC work or across different deployments—Satish Pillai, Larry Slutsker, and numerous other friends.

De Cock: Yeah, a little bit.

Q: So was that kind of a time when you could share impressions and kind of get an update on what was going on?

De Cock: Yeah. One thing that impresses me about CDC is when CDC works well, people are very collaborative and collegial and I might be senior to you today and tomorrow you might be senior to me and that's just the way it goes and people move around and so on. So there's no sense of ownership. In these formal meetings at the Ministry with all the international partners and WHO and so on, CDC has a seat at the table and the senior person sits at the table. So, when Frank was the team lead and I was just coming in to take over, but he was there for another week or so, I sit behind and when he's gone I sit at the table, and that's fine. That's just how it goes.

By the way, if you're interested, there were two papers that we did write. There's a bunch of MMWRs and so on, but for me there were two papers we did write, which I felt very, very important at least for myself and to make sense of what this all meant. One was the early one describing Liberia at the beginning and then at the end a summary of the whole thing. It may be worth your actually—I could send them to you.

Q: That would be beautiful.

De Cock: I could then give you the names of people that I really want to highlight. Satish Pillai. The first deployment, there were only seven of us. Every person did great. They really were. Joe [Joseph D.] Forrester was an EIS officer. He was actually a surgeon. He was on a surgical residency, which he interrupted to come and do EIS and he's now gone back to finish his surgical residency at Stanford [University]. He was just totally field adapted, you could send him anywhere, did really well under difficult living conditions. Satish Pillai was very reliable, very good. I mentioned Frank. I mentioned Athalia.

Q: Can I ask also some partners who you worked with especially closely from WHO or from the Ministry?

De Cock: Sure. Before I do that though, I think the thing about CDC was when it works well, people really work together and we just had loads of very good people from all kinds of backgrounds just doing their jobs. Terry [Terrance Q.] Lo did excellent work on data management and good diplomatically navigate, and data is always sensitive and navigating everything, so Terry's worth mentioning. There's others, but just people working out in the forest in difficult circumstances, living in tents sometimes. Somebody, José, I can't remember his second name [note: Hagan], had this fantastic transmission chain, which he had done on PowerPoint, which he had done in the forest. [laughs] I have it stuck on my wall in Nairobi because it's so extraordinary—just very, very good work indeed.

Other people, we have to work with WHO. WHO obviously was very heavily criticized and rightly so. This showed great weakness early on. They have done a lot to try and catch up and we had excellent working relationships with the subsequent WHO representative.

Q: Were there difficult moments early on in your experience with WHO that kind of stand out to you?

De Cock: Oh definitely there were. I think in Guinea particularly, but I wasn't there. This was early on in Guinea. I think there was definite territoriality. In Liberia it wasn't too bad. When I went first time in July, it wasn't too bad, but it was a WHO old-timer who was there who definitely wanted to be in charge—I mean be the senior public health person and insisted on that. He actually did have Ebola experience because he'd dealt with outbreaks in the DRC [Democratic Republic of Congo] and was respected, but he was moved by WHO itself and his successor was much more easy to work with. We worked together very closely actually, Alex [N.] Gasasira, and we knew Alex because of other collaborations in immunizations and so on.

I had one advantage in that, but I tell you, one strange experience though—I think it was still Dr. Nestor [Ndayimirije] was his name, I think it was still Nestor who was there and the regional director Dr. [Luis G.] Sambo came through. Now the WHO regional director, this is a big figure. WHO RD in the WHO hierarchy, this is way up there. There's only six of them, they're sort of like barons of a medieval court. So he came

through. Now I knew him because I worked for WHO. I knew him, so I know the WHO system.

When I left WHO, the deputy director general at my going away function made a joke saying once WHO, always WHO. So, I often use that line when I'm talking to them.

[laughter] But I remember a very strange scene that just shows the difficulty of all of this.

WHO was supposed to coordinate putting together a request to USAID [United States Agency for International Development] I think for money to support the response. I was asked to go and lend a hand and passed by their office, and at nine o' clock at night, there was the RD, the regional director, trying to put together a request for a response and it wasn't going well and I thought, this just shows there's nothing there. That's again, kind of unusual.

We worked well with all organizations. MSF, I'm very impressed with. Again, person-to-person contact. The first coordinator who was there back in July, my first visit, she was just outstanding. MSF were good, but the heroic work being done by other civil society organizations, International Medical Corps, IMC, and others. Eventually, the US Public Health Service did provide staff because there was an ETU that was built by the troops in Monrovia and that was going to be used for healthcare workers who got infected and so on, but the trouble is one of the things that happened is the response inevitably lags behind the epidemic.

What was very impressive epidemiologically was initially, the exponential rise in cases is very dramatic, but it fell in the same way. The decline is exponential also. Inevitably, the response lags behind, so ETUs were being built as cases were declining. So there is a divergence in bed availability and numbers of new cases and the machinery of international assistance is not easy to redirect. That was kind of interesting. I always felt eventually, US Public Health Service did provide clinicians and there weren't any patients anymore, very, very few. As a physician myself, as a clinician by training, I always felt—you know, the folks who really put skin in the game are the ones who looked after the patients. What I did was stressful sometimes, but it was the people that looked after the patients that I really take my hat off to. I always felt slightly guilty actually that we weren't doing it. We did have CDC staff working in the lab and setting up a lab and I felt very proud that they were doing that, including one of the things I also felt proud about was we had a lot of people from Kenya, from my office in Kenya coming. We had over twenty-five people who deployed in total, which I think was more than any other office outside of CDC headquarters.

Q: Anyone in particular who you remember?

De Cock: Who deployed?

Q: Yeah, from Kenya.

De Cock: Oh sure. All of them. Barry [S.] Fields was our lab person, very good lab person, he's now here. Not a hemorrhagic fever person, but he deployed. They set up a lab. Clayton Onyango, one of our lab directors in Kisumu for our health security work, and others. I mean just great work. Some of our admin staff who have deployed—our Kenyan staff. Some of our admin staff have gone to all of the three countries. IT [information technology] people, all kinds of folks.

Q: And did you say many of these are FETP [Field Epidemiology Training Program] grads?

De Cock: No, these aren't. None of those were, but there are FETP grads from other countries who've been, like the Congolese for example played an important role in Guinea.

Q: I want to ask—the task of setting up an entirely new system for dealing with the epidemic, a new incident management system, and bringing just that whole paradigm shift in sounds extremely difficult with the number of partners that you were dealing with and the number of other governments that were. What was that like communicating between so many different parties?

De Cock: And it changed over time of course, because initially it was small. What made me smile was that from the beginning, the tendency to always grow was impossible to overcome, so what eventually was called the incident management system, which instead

of meeting daily by November/December was meeting three times a week or so. It was huge. At the beginning it was much smaller, but also what was done, I think Frank Mahoney did this actually and then we continued it that CDC was trusted. And health diplomacy, this is what it's about. It's getting people to trust you. One of our weaknesses in the response, other than data management, if I had to say what would you have done differently, data management I've talked about. I think lab capacity we should have expanded earlier and the deployments should have been longer. Everybody has day jobs, but we really should have figured out a way that—especially senior people would just be told you're doing this for the next three months or whatever because you build up trust. You leave after a month, somebody else comes along. Obviously, people are different and they have different ideas. I'm amazed that it went as well as it did actually, despite that. So those are three important things I think I would have done different. The other thing that we didn't do very much and probably could have been handled differently is there was remarkably little research done during this whole event. So for example, the trial of ZMapp has been done, but it's underpowered, statistically. So we have no proof that ZMapp works and yet you've had twenty-eight thousand cases. Those are some observations. What Frank did, which was useful, a smaller meeting was arranged and I think he referred to this as the Gang of Six if I recall. So it would be the incident manager and his deputy and the CDC team lead and his or her deputy and it was a very small group, like an inner sanctum of the incident management system, and that was very useful and of course influential as well.

Q: Can I just ask then, are there any other memories that you have of conversations or vivid things that just pop up into your brain when you consider all of your deployments to West Africa?

De Cock: Things we didn't talk about in addition to increase to the stress, the airlines stopped flying. The American Embassy evacuated, non-essentials were sent home the first time I was there. I advised about all of that. So there was a real sense of the place was being isolated. The events back here that contributed then to the way Ebola was looked at was what happened in September 2014 I guess it was when Thomas Duncan from Liberia flew while incubating his illness, arrives here, gets sick, Dallas [Texas Health] Presbyterian [Hospital], all of that. That brought the roof down. I was back in Kenya when all that was happening and actually, I remember sending Tom Frieden a message just to say look, because he had a hard time over all of that. I sent him a message just saying look, we're with you. I sent him a quote from Theodore Roosevelt, I think, about—I can't remember the exact quote, but it's the critic, it's easy for the critic who watches the great man stumble or whatever, but it's the person in the field with scars and blood. [laughs] It's a bit dramatic, so it's a wonderful quote actually. I can't remember it exactly. You see it on people's walls sometimes. He hadn't heard it before and he said he appreciated it.

What was sitting in Kenya, what was kind of interesting is thinking—I mean I can understand why the events in Dallas were so important, attracted so much attention and fear, all the rest of it, but at the same time one has to sort of think, you've got some of the

best hospitals and laboratories in the country. You've got three or four cases, and we're out there struggling with thousands of cases and conditions most people here couldn't imagine. It is a little disproportionate, but that's the way the world works. It's a privileged experience and actually what is so interesting, part of this irony of EIS to no cases to this, it's unquestionably one of the most vivid medical professional experiences of my whole life, unquestionably.

Q: Well thank you again so much for your time and for the energy you've put into this. It's been a total privilege sitting in front of you and hearing, so thank you.

De Cock: Good to meet you.

END