CDC Ebola Response Oral History Project

The Reminiscences of

Amanda L. Balish

David J. Sencer CDC Museum

Centers for Disease Control and Prevention

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Amanda L. Balish

Interviewed by Samuel Robson
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Interview 1 of 1

CDC Ebola Response Oral History Project

Q: Hello, this is Sam Robson here today with Amanda Balish. Today's date is August 10th, 2016, and we are in the audio recording studio at CDC's [United States Centers for Disease Control and Prevention] Roybal Campus in Atlanta, Georgia. I'm interviewing Amanda as part of our CDC Ebola [Response] Oral History Project, and we'll be discussing her life and career and especially her response to the 2014 to 2016 West African Ebola epidemic. Amanda, thanks so much for being here.

Balish: You're welcome.

Q: It's good to have you. For the record, could you state your full name and your current position with CDC?

Balish: My name is Amanda Balish. I'm currently with the Center for Global Health; Division of Global Health Protection; Epidemiology, Informatics, Surveillance, and Laboratory Branch.

Q: That's quite a bit. [laughter]

Balish: Yes it is.

Q: I'm glad I only have to say I'm with the CDC Museum. Can you tell me when and where you were born?

Balish: I was born in Walterboro, South Carolina, outside of Charleston, in '66.

Q: Can you tell me a bit about your upbringing?

Balish: Born there, moved all over. Not military, garment industry. In the late sixties, seventies, it was going overseas back then, so moving around. Lived a lot of different places up and down the East Coast.

Q: So one of your parents was involved in the garment industry?

Balish: It was a family business. My grandfather had a factory outside of Charleston. He didn't end up having to move, but my father did.

Q: How about your mom?

Balish: She was a [registered] nurse, an RN. She took a long sabbatical to raise us and then she went back to nursing.

Q: Did you go through high school in the same place, or were you still moving then too?

Balish: Still moving. I spent part in Jacksonville, North Carolina, high school, and then finished my senior year in Spartanburg, South Carolina.

Q: What kinds of things were you interested in as a kid?

Balish: Really athletic. Played a lot of sports. We were brought up mainly during the summers at our beach house on Edisto Island, so we spent a lot of time in the water and water sports and things like that.

Q: Where did you go next for education?

Balish: North Carolina Wesleyan College. It's in Rocky Mountain, North Carolina. I started there, and then my parents wanted me to move closer to them, so I ended up going to the College of Charleston—Charleston, South Carolina—and unfortunately, the school had a financial issue so I could no longer afford to go. I took a sabbatical and went back to Wesleyan. It's a long path, but I received my undergraduate from Wesleyan and a master's from Benedictine University.

Q: How did you get involved in the broad field of public health?

Balish: I was fortunate when I finished school, got a position with the North Carolina State Lab of Public Health, and I worked in the virology laboratory. They gave me a chance. Really enjoyed it. Then I got a position as a visiting scientist here at the CDC, gosh, fifteen and a half years ago, and I've been here ever since. I never went back to North Carolina. [laughter]

Q: I was wondering, was the idea that you were going to go back?

Balish: I was supposed to, yeah. [laughter]

Q: What interested you in virology?

Balish: Honestly, partly, they offered me the position, because I studied mainly human biology and bacteriology in school. But I found it very interesting and just took to it.

Q: So you came—you said fifteen years ago to CDC?

Balish: Over fifteen, yeah.

Q: Who were some initial people who you formed a bond with here at CDC?

Balish: There were a lot. A lot of them are gone now, retired or passed on. Henrietta Hall. She's retired. She was, I guess you'd say, the supervisor of the laboratory. We were small

back then. My immediate boss was Dr. Alexander [I.] Klimov, Sasha. Jackie [Jacqueline M.] Katz, she's still here and still in influenza. Nancy [J.] Cox, she retired. Those are some of the people. There's a long list, but those are the top.

Q: Did you move around at all in those fifteen years?

Balish: I was in flu up until this past March.

Q: I've had the pleasure of talking with Dr. Tim [Timothy M.] Uyeki.

Balish: Yes, a brilliant man.

Q: Yeah. [laughs] That's so cool. So how did you get involved in the Ebola response?

Balish: At the moment of the Ebola response, our now director, Dan [Daniel B.] Jernigan, was the IM [incident manager]. They needed volunteers. I just kind of stayed, and ended up over a year, I was in the Ebola response.

Q: What did he specifically need you for?

Balish: The position was working at the time with Mark [A.] Rayfield in the laboratory team, International Task Force. That's where I stayed. I was the longest-[serving] person in the laboratory group at headquarters.

Q: Did they have a specific need that you were filling there?

Balish: It was everything. The position was rather varied, and luckily, I had a background in working with contracts and cooperative agreements, etcetera. That was helpful because we were working with companies and legal documents, research collaborative agreements, material transfer agreements, and then also working in conjunction with Viral Special Pathogens [Branch]. But that was some of the tasks, and also just the lab background to be able to explain what Ebola is.

Q: At the outset—I don't know if you look back and can remember some of the earliest things you were involved in specifically, some of the companies you were talking to or anything like that?

Balish: I mentioned when I came in earlier that even though the response is over, I'm still helping with the Ebola-affected countries. There's a team under Barb [Barbara J.] Marston which you—everyone is aware that her group is taking care of that, but I'm kind of still their lab person for the Ebola-affected countries. We still talk to the countries every week, and the companies. One of those happened to be OraSure [Technologies, Inc.], which we were able to deploy their rapid diagnostic test out to the Ebola-affected countries. Other companies, we still work with now because of the Zika response. But that was helpful, all these companies now, they're coming up with a different RDT [rapid

diagnostic test]. It's a good transition and we have that familiarity, and it's good that we can utilize—and I'm back working with Mark Rayfield.

Q: Can you tell me about Mark? I haven't met him.

Balish: Mark Rayfield has been with CDC for over thirty years. He is the guru of rapid tests. He was in HIV [human immunodeficiency virus]. He set up most of these programs. He was internationally, domestically—he was the branch chief. I'm sorry, I forgot what group he was in—we had a reorganization. He would be an excellent person to talk to. He was there in the early stages of the Ebola response. His main focus was Sierra Leone. We're still working with Mark also, helping on the recovery part. We're still involved. But he would be an excellent person to speak with.

Q: I will do that.

Balish: I speak to him daily. [laughter]

Q: Where along in the process were rapid diagnostic tests when you entered the response in, I think—February of 2015? Is that what you said?

Balish: Correct. A few of the companies, they'd already worked with and had developed research collaborative agreements, but there were just very few. It's funny, those few companies, they actually never produced anything. They were never able to get to that

point of having a device to get out into the field. That happens a lot. At that point, we were talking with multiple companies. It was over fifteen at the time. But it gets to a point where the companies are like, no, we're good, we're not going to do anything, or even, we can do it on our own. It's like, good, fine, as long as you get something out there. Then we ended up with just a few companies that we were working with on an ongoing basis after that point. But we developed the research collaborative agreements or material transfer agreements. In all of this, of course, we're working with Viral Special Pathogens because they are the SMEs [subject matter experts] for Ebola and viral hemorrhagic fevers.

Q: I actually—I don't know what a research collaborative agreement is.

Balish: What it is, is just saying that, okay, we're going to work together. We're going to work together with company X, and these are the guidelines. You're going to give us this, we're going to give you this, and that's it, and then there's an endpoint of this collaboration. It's just covering us and covering the company. It goes through our technical transfer office, so kind of the legalese.

Q: So an example would be, the agreement is—the company would say, we're going to work on the—

Balish: We're going to say that for the Ebola response, company X, we're going to help you through the developmental stage of your rapid test. This is what we're going to do:

we're going to evaluate it at the CDC, we're going to send you inactivated materials, we're going to put it out into the field, and then we're going to share the results. That's actually kind of what OraSure's was, in very brief summary. That was the original one.

Q: You said you had experience with this kind of liaison-ship before, like with the contracts.

Balish: Yes. Actually, I had contracts. I'm classified as a contractual officer representative corps. And I've worked with a lot of companies and things like that, so I had the background, as well as the lab. Back when flu was small, we all did everything. [laughter]

Q: Were there rapid diagnostic tests for flu in the past?

Balish: Oh, gosh yeah. That was the other thing is I have extensive experience with rapid diagnostic tests, specifically for flu. I worked with non-human influenza viruses the latter part of my career. I rarely worked with seasonal. It was more like avian influenza, swine influenza. So when the H5—I evaluated rapid diagnostic tests using H5 viruses. Also, when the H7, as well as the pandemic, I evaluated the rapid test against those viruses, too, to see if the existing rapid diagnostic test for flu would actually be able to identify that as influenza A or influenza B, and it did. Most of them do.

Q: Do you do a lot of work in the lab like that?

Balish: I did, for fifteen years. Now I'm more on the other side.

Q: As part of the agreement, then, CDC is helping the company develop the rapid diagnostic test?

Balish: It depends. A lot of companies already have it developed, which there were other companies that did. The issue with Ebola, it's biosafety level 4. It's a highly pathogenic virus. Not many facilities were able to test. Of course, they could do that here, and so Ute Stroeher's group evaluated using clinical samples in their biosafety level 4 facility here. Not just OraSure, but other companies, too. Not a ton because that's a lot of—and that was the other thing. Because of the containment, it's a lot harder to do that, where like Zika is a biosafety level 2, which is much easier. It's a standard lab here, or at most public health labs.

Q: When we say we were providing inactivated materials, what does that mean?

Balish: What that means is they're going to—so in the case of Ebola, one of the ways is they were gamma radiating. You're killing the virus itself, but you're still leaving the RNA [ribonucleic acid] intact so you're not going to be able to regrow that virus. Does that help?

Q: Yeah, so that the test can still detect it.

Balish: A molecular test could. And so do the lateral flow assays, will identify inactivated viruses. And we know they do because that was some of the testing that Ute's group performed was using the inactivated virus, which you could do it at a biosafety level 2 instead of a biosafety level 4. That's why they inactivate.

Q: That makes sense. So these rapid diagnostic tests, are these the lateral flow assays?

Balish: Yes.

Q: Can you explain what that is?

Balish: It's just kind of flowing from one side to the other, and it's going through their different specific monoclonal antibodies. The virus, just take out the antigen, is going through their proprietary antibodies, and some of them have gold beads inside just for attachment. It's not, you know, a high price. [laughter] It's flowing over this strip and through these monoclonals, and then a little line which will have specific—it's kind of that endpoint will show whether it's positive or negative. It also has a test line on it also—sorry, a control line that shows you that the test performed like it was supposed to. If the control line came out purple, and the test line didn't show anything, then it's negative. But you know the test worked right because the control line worked. A lot of them call them lateral flow, some call it point of contact, rapid diagnostic test. They all kind of have different names but they're all pretty much rapid diagnostic tests.

Q: And the little test, when it's portable, it looks like this little stick, right?

Balish: Some do. Now, that's company-by-company. Theirs looks like a stick because what OraSure did is they already had a HIV test that looks exactly like that. They use that same type, premise, because they need the paddle for the cadavers to get [unclear] blood, so they use their HIV set-up, the cartridge. That's why it looks like a stick. Another company, [unclear], they used a similar concept of their other type of test and it looks like just a piece of paper, a long strip that you put in a tube. Other companies, it's their regular cartridges. Why reinvent the wheel when you already have—it works. All you're doing is changing the monoclonals inside and a few other reagents to change the virus.

Q: That makes sense to me. So the design of the rapid diagnostic test itself takes into account what kind of sample you're collecting? If it's like a long stick with a paddle, that's going to go deep into the throat?

Balish: Or being put in urine or whatever. Whatever you need it to do. They have other types of tests at OraSure. It just happened to be they used the one they use for HIV. Because they have other rapid diagnostic tests, and it's available on their website. They even have flu. An example is, like for flu, Becton, Dickinson [and Company] makes one that looks like a little triangle. The only difference for flu, it says "influenza A," and then there's one that's influenza A and B, and then they have one that's for RSV, and they all look exactly the same. It's just what's inside changes, not the outside.

Q: So you start in February of 2015. How long is it before some of these tests start to be completed, like this is ready to go out into the field?

Balish: They were at different—in the manufacturing world, it's—and of course this is expedited because it's an emergency, the Ebola response, so they all vary. Some, like I said, never made it. One just got completed not too long ago. The response was over, there were no more Ebola cases, but they went on and finished, and it's ready to go out in the field. They finished their final testing. But like with OraSure, it can take anywhere from a month, three months. But like I said, it was a little different because you had to develop these antibodies that had to be tested in the higher-level containment, and there all different factors involved in that. So like the Zika might be quicker than—

Q: Than what they had to go through.

Balish: Yeah. Of course, with Zika it's [unclear] activity, but that's another story.

Q: I appreciate you explaining this stuff because I'm clearly not a science aficionado, but it's cool to hear about. So yeah, as you said, so—these kinds of things, they're considered by the FDA to be like medical devices? Is that right?

Balish: That's the category they put them in. It's kind of like the pot that they have. They have different categories.

Q: And my understanding is that those are regulated so that they have to reach some sort of level of clearance before they're given out to the population.

Balish: In the United States. FDA is only the United States. Now, the only reason that it was considered in the other countries is because they needed some way to know—you know, sometimes WHO gave their Emergency Use [Assessment and Listing], I think it was EUAL. There are devices in these countries that never could have come to the US. They were made by Korea or—but the ones out of the United States, they need emergency use authorization for an outbreak. Otherwise, if you invent something, a new device for flu we'll say, it would not go through an EUA because it's not an emergency. It would get what's called a 510(k).

Q: And the 510(k) is just the typical—

Balish: Yes. Long process through the FDA, yes.

Q: How long can that take?

Balish: Really long. [laughter] And also understand that right now, a Zika response, there's a lot of things—so it depends. Still long, no matter—yeah.

Q: So instead of taking years through the 510(k) process, because it's an emergency going on in West Africa—or—

Balish: It was.

Q: Yeah. Or was it considered an emergency because of the Dallas situation?

Balish: Because it was declared a world emergency.

Q: Oh, the WHO's Public Health Emergency of International Concern.

Balish: Yes. And the United States declared it an emergency, and that's fine. The biggest issue is it was people coming to this country. Traveling through. So that was another part that we do as the lab group, is we had to know all the labs in these countries because of the people coming back into the United States. You know, is that a lab that we know that they had a good level of biosafety and biosecurity? That was another thing we did as the lab group, so that's how that came back around and how it involves the United States.

Q: So you were evaluating labs for safety?

Balish: We were utilizing our staff in-country, and that was one thing Mark Rayfield also did in Sierra Leone is he looked at those laboratories. We would say, yes, we know that

these are really good labs, those are US government labs, we know that they're good. Or, this has been assessed by—

Q: Gotcha. Okay! Another term I don't get immediately is "material transfer agreement." What's that?

Balish: In the Ebola response, one of the things that Viral Special Pathogens had was the inactivated—they referred to it as a "cell slurry." It was an inactivated Ebola virus. It's just they grew it up in cells. The companies would use this, they would make dilutions so they could test their test, they could do it at their facility. That's material, and we had to have this agreement to say, okay, we're going to give you this but if you include it in anything, you need to say where you got it from. It's also so we know where things went.

Q: Can I ask how things proceed with the three countries, if there were any differences over the course of the months you were working on this in 2015?

Balish: The biggest example I think could be the rapid diagnostic test. There are three separate countries, obviously. The biggest difference, of course, Guinea was French, but it's more of their government structure and the partners in-country, and those all play a part. But to give an example, the rapid diagnostic test, we sent it out—the document—to have OraSure OraQuick Ebola rapid test to be used in these countries.

Q: Sure, to be approved by their governments.

Balish: Right. Sent it to all three ministries of health. Well, Guinea—okay, we thought that they were going to be the most difficult, we had to have the document translated. We kept all these documents simple. It's like, okay, this is all we're going to do is we want to get these out in-country to test for Ebola. We thought Guinea would take the longest. Oh, no. It ended up that they had a large number of cadavers at that point, and they wanted to of course appropriately bury them safely, so they wanted them all tested first. They were like, this is perfect. So it helped get rid of that. So they went ahead and got started, we did lots of testing in-country.

Liberia, it went through their government. We had people that would go into country and they decided they would want to change this document that we had already made and had been approved by the Ministry of Health [and Social Welfare]. So then it got changed. They had to go back through, and it delayed the process. And then within the country, there were delays. It had to get ethics approval. I can't remember if the IRB [institutional review board] in—but different levels within the Ministry of Health.

Sierra Leone had not only the Ministry of Health [and Sanitation], it had their ethics board, and it had a pharmacy board. We're not sure how the pharmacy part really played into that, but they said it had to go through all these layers. It had just gotten approved—November? Or was it more recent? It's not that long, it's been just approved in Sierra Leone, but there were no cases anymore.

That tells you the variance between the three countries. It was like, Guinea, right on it. They've tested thousands, used thousands of OraSure OraQuick tests. Sierra Leone and Liberia, hardly any because they just got approval in-country not that long ago.

Q: That's interesting to think about.

Balish: So that's something to consider when going into these countries, is the ministry of health and how we keep relations with all these countries. That helps also. We want to give you something, we want your approval, but sometimes you need to hurry.

Q: When did all of this process with the rapid diagnostic tests, was that started before you came aboard in February 2015, or were conversations happening about that earlier?

Balish: Conversations with the governments? No, not yet. The companies were still trying to develop [the tests]. We sent it out in May of 2015, the actual document, to the ministries of health. That tells you how long it took for them to—

Q: Got you. And the companies were working on this before? Were they even back as far as 2014 working on some of these rapid diagnostic tests?

Balish: Not for Ebola.

Q: Not for Ebola.

Q: Until they knew Ebola—yeah. You have to understand, for a company, unless there's a profit margin, they're not going to develop something that they're not going to make a profit on. That's why they utilize the technology they had, like the outer casing. It was the internal components of antibodies, etcetera, that they had to change. But it was a pretty quick turnaround, and that's why it's important to work with these companies, especially in this type of situation like the Ebola response is you need to get these diagnostics out there and make sure that they work.

Q: When Liberia was making the changes to the agreements that the Ministry of Health had kind of already approved and Liberia is making some changes here and there, what are these changes?

Balish: Well, it was just a brief document and then it ended up being like a twenty-page document. Sometimes, more detail is not needed. Simple is best, and that's the way we wrote it, to make it simple, just to get it started. Then you would go and write, okay, now we're calling it a pilot, now we're actually going to roll it out, and there should be phases or steps. But they tried to roll it all into one. Sometimes, you need to get the ball rolling before it can pick up speed. But working with the countries can be difficult. There's different priorities, and there was a lot going on in the countries. You can't so much blame them, but maybe they've learned that they need to streamline within their country.

Q: Were the changes that were made because of different opinions on how the process should work, or were some of them substantive, like, we don't want you testing this way and that way?

Balish: Yeah, it was more the process and making it more like you would roll out a pharmaceutical, not a rapid diagnostic test in West Africa. It became too complicated. But lessons learned. We did not find out until it was already submitted to the Ministry of Health, so we couldn't stop it. You don't want to go, "Whoa, [hold on.]"

Q: It sounds like—obviously, the governments in these countries weren't expecting an Ebola response, a terrible emergency like this. Why would they have the systems in place to deal with approving things like this?

Balish: Right. But now they should actually have—you know, maybe we don't need to do all this, or work a little more closely with the World Health Organization, they could provide a little more guidance because they do have that broader—we have country teams there now that are providing ongoing support. But that's not in every country.

Q: Backing up a little bit. When you're working with Viral Special Pathogens and working to translate—tell me if I characterize your work wrong—translate their subject matter expertise to the companies.

Balish: We're working with them. We're on the same call, and we're doing the logistical part and all of that with the companies and everything, but when they have specific questions, we want to make sure we have those SMEs with us, like Ute would be on all the calls or Stuart [T.] Nichol.

Q: Like, what would one of the questions be from a company?

Balish: Has the virus changed genetically? That cell slurry you sent us with Ebola, did that have any of this other Ebola strain in it? Which we wouldn't have known the answer to, because it's not ours. It was great to have such a great relationship with Special Pathogens, and we all still do.

Q: That's great. So you were working with Ute and—

Balish: Stuart Nichol, Bobbie [R.] Erickson, and then [unclear], of course. She was part of the Ebola response and kind of positioned within Special Pathogens. She's the program manager, I believe is her title.

Q: Had you known them before the Ebola response?

Balish: No. The only one I knew, Pierre Rollin. He's an epidemiologist. I've known Pierre since I started with CDC. [laughter] He's the only one I knew in the whole group.

Q: Yeah, he's a legend. [laughs]

Balish: Yes, he is.

Q: Were there other companies besides OraSure who you worked with closely?

Balish: Quite a few. We worked with Abbott, a big company. Pretty much all of CDC knows about Abbott, just one of their different areas, and they had developed an assay to use the same machine that's used to test for HIV. Which was, hey, that's great, you already know how to use the machine, easy enough to test. Unfortunately, they could not get it quite sensitive enough for Ebola. Was it worth it then to keep going? Probably not. The company, once again, has to think of the bottom line. Chembio, who we're working with still with the Zika response. We worked a lot with Chembio, a very good company. They had a rapid diagnostic test, also. We worked with a few that the companies don't exist anymore. One company that still exists, and we're working with and talking to with the Zika response, is Nanobiosym. We're working with BBI.

Q: What were these companies—how were they differently involved?

Balish: They all have their own different types of tests. Some were molecular based, some were lateral flow tests or the rapid diagnostic tests. So it wasn't just rapid tests we were doing. We were also doing molecular, like Abbott was a molecular test.

Q: And that's in the setting of a lab, or—it's not a rapid diagnostic test.

Balish: Right, it would be done at laboratory level, correct. Now, some of these are developed, like Nanobiosym is developing a test that can be taken out into the field and be easily used by anyone. That's something they're working on, and a lot of companies are working on that. The handheld devices. And we've talked to a lot of different companies that had those, and that even have—you can get an iPhone app, and the results go into the cloud so you can go back to the lab. It's all these different technologies and great innovations that we work with all these companies. Yes, it was for the Ebola response, but like I said, we're carrying it on into a different response and also other products. I've forwarded information on to the Influenza Division. It's like, hey, we work with these companies, but they have this product, too. I still think flu from time to time.

Q: I really like that perspective, that the relationship with these companies and this work is not something that was one hundred percent unique to Ebola but has been going on for—

Balish: Right, and sharing it with other groups within CDC and building those relationships. That's also what we're doing within our group and DGHP [Division of Global Health Protection], is we're trying to help these countries. Well, we don't have a lab, so we want to work with the other labs. There's measles outbreaks, yellow fever, all over the world so it's good to work with these groups. "Hey, here's this company, do you want to talk to them?"

Q: So reaching across the disciplinary boundaries of CDC.

Balish: That's what we're working on, yeah. It's a lot of fun, too.

Q: Did you say it was May 2015 by the time—how was the rapid diagnostic test process going? I remember you said May was—

Balish: That's when we sent out the documents to the countries.

Q: That's when the documents were sent out. And then the next point, did you say November?

Balish: Actually—it's hard to remember the exact timeline. It was only between one and two months that Guinea started using the test. They accepted they weren't perfect—

Q: June, July they're—

Balish: Right, they're on. Like I said, they've tested thousands, and they did not only the cadavers but also what's referred to as live alerts, live people with signs and symptoms. Liberia, it was almost November for Liberia. Then it was later for Sierra Leone, which is a shame because it kind of missed it. Now, in these countries, they did allow, even if the protocols weren't approved—we did do two pilots, one in Sierra Leone and one in

Liberia. But it was only a small sampling. Out of the scheme of things, it was—but at least we had some testing in the early stages. It was only like one hundred samples. That's like a drop in the bucket.

Q: What was the purpose of the pilots?

Balish: To show the government, look how the test works and look how it can be used. But which is good is our team in-country—both of them, Liberia and Sierra Leone, and of course ongoing in Guinea—stayed very vigilant. Even though they hadn't received approval, they moved on with training and tried to keep it going, which was great. So we had some great teams in-country.

Q: So even before they could use it with cadavers, etcetera, people—

Balish: At least show you how to use it.

Q: At least show you how to use it, so that when final approval comes, people can go out and immediately start using these rapid diagnostic tests.

Balish: Right, that was kind of the theory. Do train-the-trainers and stuff like that. The government was fine. Of course, always ask permission.

Q: You mentioned you're still working with Ebola to some extent. What goes on now?

Balish: We're still working with the countries because now it's at the recovery stage. We had that momentum going, building up these labs and getting people trained, and you don't want it to just stop. These countries have other diseases they need to be concerned about. They need to get plans in place while we're there. So working with other USG, US government agencies and partners, trying to help them, okay, let's get this national reference laboratory built up. Where are you going to store these highly pathogenic viruses, or are you? Do you want to get rid of them? We're here to help. While we're here, let's keep this ball going, start testing for other things. Like Lassa. There was a Lassa outbreak in Liberia, and we helped with that.

Q: I didn't even know that. Was that recent?

Balish: It started a few months ago. Well, you see it in ProMED [Program for Monitoring Emerging Disease], but it doesn't make headlines.

Q: It must've been initially kind of scary with the febrile illness.

Balish: Correct. See, they were so prepared for the Ebola, but then not so much for Lassa. And that also still falls under Viral Special Pathogens, so luckily that relationship was all still there, so that was great.

Q: Has your work all along not just been focused on the rapid diagnostic tests, but also on building capacity for laboratories in the countries?

Balish: Yes. Molecular capability, testing is being done there. Working with our partners, which are cooperative agreements that we have, and these companies are in these countries. What are you doing, and how are you doing it, and how can we do this better?

Q: How has that been between the countries, the building capacity?

Balish: It's a process. We'll get there.

Q: Any differences you can note between the three of them?

Balish: Well, of course, once again, Guinea, French territory. Institut Pasteur is more of a player there, so we're kind of in a support role, which we're happy with, you know, we're happy to help. It's a little different in Liberia than it is in Sierra Leone, and the government wants. The government changed in one—oh, no, that was Guinea. They had to get a new minister of health, so that slowed things down a bit until someone was in place. It will be a process. There's different issues with each country and the different partners. It's a lot of players on the ground, so we just want to make sure we all get together and get it going and help these countries.

Q: When you look overall at your work with the rapid diagnostic test—sorry, I keep focusing on that. How do you evaluate how everything went?

Balish: That's what we're trying to—over the whole response?

Q: Yes.

Balish: That's what we're trying to look at now, where we are. It's a lot of information, even just for the rapid diagnostic test, and that's actually being compiled—there's actually a group doing that. That's how much information there is. We saw over time that, yeah, there were glitches, a lot of lessons to be learned. Overall, I can say Guinea went well, and it's hard to judge in Liberia and Sierra Leone because we wish we would've been out there when there were cases. But I take it as lessons learned, and what we can do better, and use this for—we hope won't happen—but another outbreak like that. Zika is a different animal. A mosquito actually. [laughter]

Q: A different animal, exactly. If you looked at the three countries, and Guinea kind of has this longer tail in the epi [epidemic] curve than the other two—maybe just the fact that it worked out there is for the best.

Balish: Yeah. I would say yes. There's a lot of pluses to Guinea. But we didn't get a lot of information out of Guinea. But you know, that does belong to the government. We're a different government. Also, they were working more with Institut Pasteur, and that's fine.

Could we have gotten more information out, like you're talking about the epi curve? Well, we'd like to see the lab data and stuff like that. A lot of that we didn't get, but we can understand. Back to Pierre, he was actually such an integral player for us in Guinea. He had such great relationships, and that's why we got a lot of the epi data.

Q: What would we have been able to do with that data?

Balish: Just see, was it in specific areas? We want to examine the different changes and what was going on. Ebola, there was little information about Ebola. Now, this is a chance to have tons of information. When the response first started, you would do a search for papers on Ebola. Might get a few, maybe. Now, hundreds. Now, there's a lot of information so if it happens again or something similar, another viral hemorrhagic fever, now we have this information that we can use to combat the next.

Q: You've done this a little bit so far, but talk again a little bit about the transition to focusing on Zika and the continued look at rapid diagnostic tests? I don't know if you're also working on laboratory capacity in Latin American or other affected countries as well.

Balish: Well, DGHP, specifically the branch I'm in, we work with the Global Disease Detection sites. There's about ten of those in the country. As well as the Global Health Security Agenda countries, and there's a lot more of those. That's what our group does, is we work with these countries. Just in June, we had a meeting where the directors from all

the Global Disease Detection sites came to Atlanta, had a big meeting, and we were talking about networking. Part of it, of course, Zika. So using these sites. We sent out a broad agency announcement so we could get funding from USAID [United States Agency for International Development] to help support activities in these countries. We're looking at [unclear] cohorts, and of course laboratory, ecology, sentinel surveillance at these sites. We have country people already there. We can get this going, and we've already started. We're working with the countries. We hit the ground running on this. From the lab side, I'm one of the points of contact for this project within our group for the lab. We're looking at, what testing are they going to be doing in-country? The Trioplex [reverse transcription polymerase chain reaction assay], which was sent out to all the different sites, is part of the influenza reagent resource. You can also get it through the EOC. What are they going to test for, how are they going to do it as part of these different studies? That's how we're utilizing our centers, the Global Disease [Detection] GDD sites, as well as GHSA [Global Health Security Agenda] sites for Zika. And how we can fund them, or can they fund it, or other outside, and do studies. An example is our ecology study. We're looking at Brazil, Guatemala, and Peru. Part of that is just to have a background in ecology. It's interesting.

Q: Can I ask what it has meant for you to be part of the Ebola response?

Balish: It was a rewarding experience. I run into people constantly, and they're like, I don't know if I want to be on the EOC. I say, do it. It's a great experience. You get to meet people from other parts of CDC that you would never meet before. You get to see

the inner workings of this. For everyone that served within our group, I can say it was a very rewarding experience. They learned a lot, and they were like, if I could do it again, I would.

Q: Is there anything else that I haven't asked about that you'd like to share as part of your story of your work on Ebola?

Balish: Like I said, it was wonderful to work with the different groups and to keep that relationship going because of other—like Lassa, and with Viral—you know. It's a very good thing, and we keep on going. We still meet every other week. It's a good relationship, and we share this with other groups, like if other things come up we're like, hey. We pass things along. I think it strengthens groups. I think that was one thing that came out of the laboratory group.

Q: Thank you so much again for being with me, Amanda. It's been a pleasure.

Balish: Thank you.

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