Where Do We Stand in the Fight Against Ebola?
A Conversation with CDC Director Tom Frieden
Kaiser Family Foundation
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JOSH MICHAUD, PH.D: Welcome everyone to today's event and welcome to the Kaiser Family Foundation and the Barbara Jordan Conference Center. I'm Josh Michaud. I'm the Associate Director for Global Health Policy here at the Kaiser Family Foundation. It's my pleasure to welcome all of you to this important event. I'd like to note that we are co-hosting this event with CSIS and I'd like to thank Steve and his staff for their assistance in putting this event together. It's been a great partnership and we look forward to more partnerships in the future. I'd also like to thank the Kaiser Family Foundation staff, and you know who you are, who have helped put this event together as well and make it successful.

As you know, we're here to talk about where we stand in the fight against Ebola and we have our special guest who I will bring up in a few minutes, Dr. Tom Frieden. The event will proceed as follows. I will give a few remarks at the beginning to lay the groundwork and give some background as to where we are in terms of cases of Ebola, where the response effort lies in terms of financing, and the US domestic Ebola funding as well as some new and, as of yet, some unpublished data that our polling team here at Kaiser has put together on Americans' views on Ebola; both the West Africa outbreak and Ebola in the United States. I am pleased to be able to present those.

After my brief presentation, I will ask Dr. Frieden to take the podium and to give his opening remarks, after which he will be joined by Steve Morrison of CSIS for a moderated discussion during which there will be an opportunity for audience members to ask questions.

To get right into the background, as we all know the current outbreak of Ebola has truly been historic. As a reminder of just how much larger this outbreak has been compared to prior outbreaks this slide breaks down the more than 23,000 cases that we know of Ebola since it was discovered in 1976. Fully 90-percent of the cases reported to date have been reported in the last year and are connected with the current outbreak in West Africa. Only 10-percent of cases occurred in that long stretch of history prior to the current outbreak. As you can see in the last year alone, Sierra Leone's case total comprises 42-percent of all Ebola cases ever reported. Likewise, Guinea and Liberia make up significant percentages of all Ebola cases known.

On this chart, we have a time trend in cumulative cases as reported by the World Health Organization over time in the three most affected countries since March of last year through data provided last week by WHO. As we know, there was an explosive period of growth in Liberia and Sierra Leone in late summer and through the fall of last year. Since then, the pace of the growth of the epidemic in Liberia has slowed somewhat

while Sierra Leone's has continued at a rapid pace, at a disconcerting pace, with hundreds of cases a week reported as late as the end of the year last year. Guinea, meanwhile, has had a smoldering epidemic that, while not as explosive as the other two countries, has continued to accrue cases over time now reaching almost 3,000 cases as of last week.

Turning to financing now. As you know, the UN is coordinating an international and regional response to the Ebola epidemic in West Africa and is bringing together the efforts of many partners, public, private, international, country governments, multi-lateral partners, bilateral partners as well as donors. Collectively, the world has provided, according to the UN's Office of the Coordinator for Humanitarian Affairs, 2.4 billion dollars for the international response effort in West Africa to date.

The bars on this chart show you the top 10 donors to this effort. As you can see, the United States has provided the greatest amount in support of the Ebola response in West Africa, giving 861 million dollars to date, which comprises about 37-percent of the entire international external financing for this effort. This contribution from the United States spans all the departments and agencies which have been involved in this effort, from USAID, CDC, to the Department of Defense, and others.

Other countries and private donors have been generous as well as you can see here. Still, even with this generosity, the UN reports that all needs for its response plan are not being met. As of last week, there was still a 20-percent gap between what had been generated in terms of international support and what the UN estimates is needed for the response and to achieve the goals of its response plan.

On the US domestic side, as most of you know, the fiscal year 2015 federal budget was passed and signed into law last month. Without going into all of the details about the important global health aspects of that budget, I wanted to focus on the extraordinary commitment that was shown to the Ebola effort and that was contained within that legislation. Over and above the amounts provided for global health programs that have long been supported by the US government including HIV/AIDS, malaria, maternal and child health, et cetera, Congress appropriated an additional 5.4 billion dollars for emergency Ebola funding. This spans both support for international efforts as well as domestic Ebola preparedness and response. 3.7 billion of this emergency appropriation is targeted for the international effort with CDC receiving 1.2 billion of that – 1.7 billion directed towards the domestic preparedness and response programs. A key question for today's discussion and going forward will be what can be accomplished with this additional funding and how can we make sure that we

achieve the greatest amount of progress with this emergency Ebola funding?

To switch gears just a little bit, I wanted to turn to public opinion. Here at Kaiser we have a wonderful survey and polling research team and we have been tracking the US public's opinion about Ebola, both in West Africa and domestically, since the fall of last year. As part of this polling work, we conduct regular surveys of a nationally representative sample of the US population and ask them about their thoughts and their opinions and experiences with different health policy issues. When we asked them about Ebola, we generated quite an interesting response.

This slide shows you what were, according to our polls which are conducted regularly last year, the top news stories; both the top health news stories at the top and the top overall non-health news stories at the bottom last year. It may surprise none of you that Ebola ranked as the top health news story, meaning that great majorities of the US public paid very close attention. They reported following the Ebola story in the US and the Ebola outbreak in West Africa news very closely or fairly closely. Interestingly, it was one of the top news stories of any kind last year on par with the attention given to conflicts in Ferguson, Missouri, and the missing Malaysia Airlines jet back in March of last year.

Over time, the public's attention has shifted, but overall remains remarkably focused on the Ebola story. This slide shows some of the time trends that we've seen in our polling data over time since we began tracking it the end of the summer last year. As you can see here, on the top of the slide, the number of people reporting to follow the story of the Ebola outbreak in West Africa very closely or fairly closely peaked in November of 2014 with 78-percent, but maintained three-quarters of people in December who said they still followed it very closely and fairly closely. Similar trends were seen in the news about Ebola in the United States. We've seen that this attention to the story of Ebola has not diminished despite the fact that it appears that media attention and news time dedicated to this story has diminished somewhat. Certainly, Google traffic and search trends on Ebola has diminished quite a bit.

In our regular polling, we asked people to give us what they think should be the priorities for what the US government is supporting in global health. For the first time in the most recent iteration of our poll in December, we introduced this option of fighting the Ebola outbreak in West Africa as one of the priorities that people could choose. What we found was that in addition to the long-standing support that the US public has shown for making a priority of improving access to clean water, children's health, and reducing hunger and

malnutrition, fighting the Ebola outbreak in West Africa is on par with those top priorities of the US public for global health. These are essentially the priorities that the US public reports as being important for US programs.

Finally, I would like to end with this one simple point. Many Americans believe that the Ebola epidemic in West Africa is now under control. When we asked this question about whether the epidemic is under control in October of 2014, 10-percent of Americans said that they thought it was under control. In our latest iteration of the poll, 41-percent or four in 10 people reported as believing that the epidemic in West Africa was under control.

As we have seen, it's pretty hard to say, and premature to say, that it is under control across West Africa. I think an important component of today's discussion and going forward will be to focus on where the epidemic has come under control, where it still needs to be controlled, what we need to do to get there, and get to the point where all of us can well and truly say that it is under control in West Africa and everywhere.

With that, we'll move on to the next portion of our program. It's my pleasure to introduce now Dr. Tom Frieden who is our guest and keynote speaker today. He is, of course, the Director of the Centers for Disease Control and Prevention and has been since 2009. He is going to give us his thoughts about

where we stand in the fight against Ebola and some reflections following his recent visits to the region. After Dr. Frieden gives his remarks, again, we will have Steve Morrison of CSIS join him on stage for a moderated discussion during which we can have questions from the audience. Rather than going into long introductions for each of our speakers, please refer to the information in the bios that are included in your packets today. Without any further ado, please Dr. Frieden.

TOM FRIEDEN, M.D., M.P.H.: Thanks very much Josh for that very interesting presentation and to all of you for your interest. Thanks also to the Kaiser Family Foundation and to Steve Morrison for the invite and for moderating. I'm very much looking forward to this session.

I got back recently that I've just finished my active monitoring for fever coming back from all three of the West African Countries. I guess if I had to summarize the current status I would say that we've seen tremendous progress. The difference between August/September when I was there and late December is really night to day. There's been real progress, but there's enormous heterogeneity within and between countries. I'll talk more about that later.

There are areas that used to be epicenters that are now clear of Ebola. There are other areas that are at enormous risk and there are still other areas where Ebola continues to spread widely. There is tremendous fragility to this system,

so it's quite easy to have a backsliding. Until we get to the last case, until we get to zero, we won't be at zero risk in West Africa or here. The challenge really is in this new phase of the response to the world's first epidemic of Ebola going from the build and burial phase of building treatment units and safely burying people in a dignified manner to the core public health track, trace, outreach, respond phase. That's a transition and I'll look forward to talking with you about what that transition looks like in the field with some of our staff.

This is the most intensive response globally in CDC history. As of today we have more than 200 people working in West Africa. Our emergency operation center has been activated since the first or second week of July of last year. Agency-wide, we have over 800 people working on this. We've had around 900 different individuals in West Africa and the response has been intensive and far-reaching.

Now I wanted to think of what could I do to describe the difference, the tale of the epidemic at two different parts and I realized, just by happenstance, I had two two-floor elevator rides in a hotel in Conakry, Guinea that – I'm sorry, in a hotel in Sierra Leone in Freetown - that epitomized to me the difference between early September and late December. In early September I was in Sierra Leone. I was traveling around and seeing a situation, which we knew was going to get much worse quickly. I happened to ride down from the third floor to

the first floor with one of our epidemic intelligence service officers. I said how's it going? She said, terrible. I said, tell me about it. Yesterday there were 27 new cases reported in Freetown, none of them was investigated, none of their contacts were identified, none of them were isolated. That was where we were then.

This time, in that same elevator, I talked to staff who were so excited that their biggest challenge was how can we train the dozens or hundreds of African Union responders who have come to help stop the outbreak there. A tremendous amount of progress in the Freetown western district area where there was a very rapid scale up of services, Doctors Without Borders/MSF put up an Ebola treatment unit in 16 days from start to finish to seeing patients. We at CDC upgraded the skills, and equipment really more than skills, of a South African laboratory. They went from 30 to 50 specimens a day that they could do to 200 specimens a day that they could do with support from the CDC Foundation. We resolved the specimen transport problems in the Freetown area so that specimens were transported and patients rapidly diagnosed and contact tracing was being done with increasing intensivity and focus.

That, to me, just epitomized the night to day change, but there's still huge challenges and there are still images that I will never forget of the trauma that individuals face and the resilience that communities have as well.

There are extraordinary efforts of health workers on the front lines in each of the three countries and they're making a really big difference and there are an increasing number of survivors. This is one woman getting out of the Ebola treatment unit run by the Firestone Corporation in Liberia. She was delighted. She was rejoining her family. We were able to document the very sensitive work that the Firestone Corporation did to re-integrate survivors into their communities in a sensitive way so that they could become full members of the community and could contribute to the response moving forward.

Now there's much more to be done. The good news is that there's progress. The bad news is that we have a long way to go. I guess it's easiest because it is such a heterogeneous epidemic to talk about the countries individually for a couple of minutes, the differences between them, the progress, and the risks.

Let me start with Guinea. In Guinea, the outbreak has been going on for more than a year. I met with a nurse who six months into the outbreak placed an intravenous line without gloves, without washing her hands, and developed Ebola. She survived, but is now still dealing with severe stigma, both at work and at home. She is having to leave her home and having difficulty getting back to work despite the fact that she works in a leading healthcare facility in the capital city. Really,

in the same breath, she explained to me that there are still people who believe that Ebola is not real and there are some people, perhaps some of the same people, who don't want her anywhere near them. The challenge of resistance in Guinea is quite major.

Resistance is a very broad term. It covers a very wide variety of problems from individuals who don’t believe Ebola exists to individuals who have seen Ebola and have not been happy with how the government has responded. Perhaps a family member was taken to a treatment unit, died, and they never heard back of what happened to that individual. Or perhaps an individual went to a treatment unit and didn’t like how they were treated or contacts didn’t like how they were treated or individuals who've survived Ebola or whose families have survived Ebola and who don’t want to admit that they had the problem because of stigma.

The resistance is complex. It gets into resistance of government. The forest region of Guinea is quite different from the rest of the country; different linguistically, culturally, politically, and in terms of many of the social and religious patterns as well. That difference makes it so much more difficult for the government to get the trust that's needed and have the effect of programs needed, but they work hard on it. Community by community, they’ve broken down the barriers to trust, they’ve enlisted community action, and

they've gone through what you might call a goldilocks experience in terms of the use of force or security.

Initially they took a very heavy hand and it didn't work. They were trying to use the military or police extensively. Then they realized it didn't work and the police really stood back and didn't take any action, even when a couple of criminal or violent young men or youth attacked ambulances or response workers. Well, it turns out that in virtually in every community, there are lots of people who don't like it when rowdy youths destroy property and hurt people. Now they're taking kind of the just right approach of enforcing the law if there are violent outbursts against ambulances and responders. They found that it's often a question of just a few youth who may be alienated, angry, confused, or making trouble, or a criminal. With the arrests of just two or three people in communities, they've seen big changes in the welcoming of a community. You obviously have to be careful with that. You have to make sure that that's really only in response to activities that are outside of the pale of what could be accepted.

Resistance remains an enormous challenge. The forest region is large. It itself is heterogeneous between one town and the next. One of my staff was working on communications there, entered a town where there had been no one allowed in for months. Someone had died from Ebola and the traditional

healer had said, well, seven more people have to die before the cycle will be broken. Seven people died and then an eighth person died. He said well that's a problem. We have another seven people have to die. After 39 people had died, the community said, I think we need to get some outside help. They opened up and quickly were able to stop the outbreak, but not before it had gone on to the next village.

Guinea does have real challenges going forward because of both the diversity of the country, the resistance, and the risk of complacency. In Guinea, there's the risk that people will say you know, it's not a common disease. It's not killing nearly as many people as malaria. What's the big deal? If you're a healthcare worker, you may see a thousand people with fever before you see one with fever from Ebola. Not easy to keep the attention up.

We also at CDC have been limited by our limited number of French speakers. We've been working hard to try to increase the number of French-speaking public health staff coming into the country. I will talk a little bit more about the African Union, which is truly a game changer there, which is helpful, and other entities as well. That's been very important.

I would say in summary in Guinea, we're seeing risks but progress. The risks are the resistance, the complacency, but the progress is impressive. I speak regularly with my teams in country and even in the three weeks since I left,

there's been substantial progress in Guinea. Now we don't know that that progress will hold. They've had three different surges of cases in Guinea. After each one, they make progress and then it comes back again. Over the last three week, they've had a reduction in cases.

When I was there, we and I was terrified that they would have a large outbreak in Conakry, a big city, just as Freetown and Monrovia had big outbreaks. For the first time, the Ebola treatment unit in Conakry had been full. For the first time, they didn't know where most of the cases in Conakry were coming from. They didn't identify the chains of transmission. For the first time, we'd identified an outbreak elsewhere in the country that had emanated from Conakry rather than vice versa. It was at that point, really in the balance, but over the last three weeks, they've been able to bring cases down. The treatment unit is no longer full. They haven't had to turn away any other patients and they've made progress there.

When I was in Guinea, I traveled to Macenta. This is a forest area, which had been a center of resistance, an area where there had been violence. In fact, I was with the Minister of Health who when he was there when I was there in September had been attacked by some rowdy youths. They had smashed the windshield of his car.

Now, the Macenta treatment unit, when I was there had seven patients, now has zero. When I was there the outbreak was going down. The outbreak was going down and now they've had zero patients in their treatment unit. We don't know what will happen in the next months, but for now, what had been an epicenter is now under control.

We've got lots of new things happening. There aren't 911 systems in any of these countries. This is a call center put in place in a two-week period by the CDC Foundation. With private dollars, they were able to interview a thousand people, hire 92 of them, implement an information system, open and rent the call center, develop the scripts, and it's a very well functioning call center. It works as well as any call center anywhere in the world getting 10,000 calls per day. On average 100 to 150 are hot ones that require investigation, have a warm hand off to local public health authorities around the country, those have to become more functional. Their latency time, the average time that people wait, was five seconds. We are seeing a very effective response happening.

Now Liberia is a very different situation. In Liberia, we've got the risk that with the recent downturn in cases we'll have that same situation that Guinea has seen, a rollercoaster effect with an increase in the future, but what's happening so far is quite encouraging. We went from building ETU and safe and dignified burial to a rapid response capacity to keeping up

infection control training. We've trained in the region thousands and thousands of healthcare workers in safe care. We began a strategy in October of rapid isolation and treatment of Ebola in hot spots or the RITE strategy.

The RITE strategy was implemented when we realized that after the huge outbreak in Monrovia, people who were sick were returning to their native villages. I spoke with some of the contact tracers and patients. For whatever reason, there was a sense that you could get better care out of Monrovia. That's bad. I spoke with a woman who had traveled six hours by taxi to a treatment unit six hours away because she felt she would get better care there. That happened all over the country. After this explosive spread in Monrovia, you had kind of like a forest fire shooting out sparks and the sparks igniting fires elsewhere in the country, all over the country. Although we think well, of course, Monrovia is big so we had lots of cases, there's a city in Lofa County that just has 20,000 people in it and yet had many hundreds of cases. Any one of these sparks could have ignited a very large outbreak.

What this slide shows is that as time went on, we got better and better at doing this and the duration of the outbreak got shorter and shorter. When we could get there quickly, we could stop an outbreak within two or sometimes even one generation of spread. Instead of having a hundred or 500 cases, had five or 10 or 15 cases. That RITE strategy was

critical for tamping down those sparks from the forest fire that had ignited in Monrovia.

I spoke, when I was there, with Dr. Mosoka Fallah, a very, very committed Liberian physician who went back to work in Monrovia. He was well and accurately described in a nice article in New York Times, totally committed to work. He said we have to have a sense of urgency in our hearts. That's really a summary of what's needed because the speed with which we have to operate in Ebola is something that has taken us all aback. Even though at CDC our ethos is if we are going to go, we go today. Even with that ethos, to get enough people in enough places to turn the epidemic around as fast as we would have liked to was just impossible. The assistance internationally, within the US government, DOD, USAID, has been really essential. What we think made the single most biggest difference in turning the tide in Liberia, beyond the Ebola treatment units, beyond the safe and dignified burial, beyond the RITE strategy, the other key component that was essential in turning the tide so far has been community action.

We undertook micro-planning exercises with communities from around the country outlining what needed to be done; rapid isolation, effective contact tracing, and communities themselves, in many cases, did it. They isolated people. They brought them food. They identified the contacts. We said to people, when I was there in August, don't wait for others. You

have to take action now because the urgency was so great and the need for rapid action was so great.

Now Sierra Leone is in a different situation. They're still in the situation of having many, many cases in the past three weeks. Those numbers have come down a bit. We'll see how that goes. I was at Connaught Hospital. Connaught Hospital is one of the major hospitals in Freetown. In Connaught Hospital, as I walked in, a man was screaming in pain in a separate tented area for patients who might have Ebola. My country team lead who had been there for months said that he had never come to this or any other major hospital without having a similar experience or having to step over someone who had died from Ebola or another condition. It's still a horrific situation there. Connaught Hospital is where Dr. Salia worked. I saw photographs of him at the hospital. He is the man who was flown to Nebraska and died from Ebola there. He was a beloved physician who worked hard at this hospital. This hospital is largely empty at this point.

All of those other health needs, whether it's malaria, surgical intervention, or others are not being met. There have been definite decreases in the Freetown area since what they call the Western area surge. However, they still have a huge number of cases. It's easy to get inured to what these numbers mean. There is still more cases in a week than we would sometimes see in a year around the world. They still have the

risk of spreading. We have an outbreak going on now in an area of Sierra Leone called Kono District, which has no telephone coverage. It makes it pretty hard to coordinate among our team. It has very little road coverage. The treatment unit is just being built there. It takes 10-15 hours to drive someone to the Kenema treatment unit, which is now full, where people are being treated. There's still huge challenges in Sierra Leone as well and a very long way to go.

There is progress. The work that is being done for rapid laboratory testing is important. We have now established, and the DOD and international partners have established laboratory services throughout much of all three countries. That's new. That wasn’t in place before. Previously we had to really guess at what proportion of probable cases or even deaths were Ebola infected. Now virtually all of them can potentially be tested if we can move the specimens to the laboratory.

The equipment you see in the background here is a high throughput machine that allows us to turn this to a high throughput lab. That was an important innovation. The other really important innovation, which we hope to test in the next month or so, are a field test of rapid diagnostics where a point-of-care test may be able to give us, in 20 to 30 minutes, whether the person has Ebola. It will not be as accurate as a

PCR laboratory like this, but if it is positive, it will mean a positive. We are hopeful for that progress.

I also witnessed safe and dignified burials. This is a huge challenge. Our team in Sierra Leone had gone out with burial teams and had identified some real problems with how families were being communicated with. We provided a script to the burial team. They wanted to do a good job, but they hadn't been trained with how bodies were being handled, with how families were being addressed. What was happening now was that the burial team was going out to the family with a pastor and an imam, because there're some Christians and some Muslims. As per the preference for the family, prayers were being said before they did anything with the body. They then would ask the family do you want us to put any special clothing on your loved one for them to be buried? They would then clothe the deceased person in the clothing selected by the family. They would allow the family to watch as they did the work and to process with them to the cemetery and to observe the interment from a safe distance. That's all new and different in a marked grave that they would then commemorate and could come back to in a cemetery. That's very important because you have to have trust if people are going to come forward.

That kind of sensitivity is increasingly being established. In fact, in Liberia, I was at a funeral site where the deaths had been so fast that they couldn't keep up

with burying the bodies for a while. They then had kept up and then when the funeral site was prepared, at that point, actually, they had incorporated effective treatment in the Ebola treatment units, they'd done contact tracing, and they stopped the outbreak. The deaths went down to zero to none and the team of grave diggers then had time on their hands and began with wood from nearby making furniture for the survivors' families which was a wonderful kind of metaphor to what needs to happen in each of the countries moving forward.

Some of the work on contact tracing, which is crucially important, is really tough. This is a team going through crocodile-infested waters. We've had teams that have hiked four hours, taken a trip like this, hiked another hour or two into a remote community, not knowing if they're going to face a hostility or not, had to get samples, retrace those steps, and then go back. We've been able to get helicopter support, but there're many places that even helicopters can't reach.

In September, we looked at the way cases were going and we made what was a very concerning prediction. If cases continued to go the way they were going, if there hadn't been an overwhelming response from communities, from the national governments, from the US and from global partners, we could have seen a continued exponential rise of cases of Ebola. The model that the CDC produced had three really interesting findings – alarming findings and encouraging findings as well.

The first was that time mattered more than we could even imagine. I think all of us, at least I have, difficulty conceptualizing exponential growth. Exponential growth really means exponential. It doubles every certain period of time and it gets huge very fast. The model predicted that for every one month of delay with effective scale up, the size of the epidemic would triple.

The second prediction of the model was that if we reached a tipping point where about 70-percent of people with Ebola were safely cared for and safely buried, we could turn that tide.

The third interesting finding was that if we reached that tipping point, the cases would decrease exponentially just as they had increased exponentially. It doesn’t mean they’ll get to zero because that’s a different struggle. This was the prediction of the model from the September MMWR bulletin of the CDC. This is a fitted analysis of what has happened in Liberia over a similar timeframe.

Cases have come down. We're nowhere near out of the woods, but it's a striking demonstration that it's possible to make really rapid progress if we move fast enough and that's been one of our major challenges; strengthening culturally sensitive burials, providing treatment unit care that’s adequate and effective and respectful to families and patients, and getting skilled health workers in.

This is Arthur Mutawe and Stuart Nichol, who is the Director of our viral special pathogens branch. Arthur is a Ugandan physician. He is trained by CDC in the field epidemiology-training program. It is a two-year hands-on training program. He's worked on an Ebola outbreak before in Uganda and helped to stop it. He is now in rural Liberia sent there through the African Union. The African Union sent what I would like to refer to as health keepers instead of peacekeepers. That was an African approach. They've now sent more than 500 people to the three countries; doctors, nurses, epidemiologists. They are making a huge difference there.

Dr. Mutawe is working side-by-side with our own staff; we're in the same community, and with the district staff to do the contact tracing, but also to teach them to do the contact tracing. It's complicated. They're getting cases in from Grand Cape Mount. They've got people coming in from Monrovia. They've got contacts exposed here who have gone back to Monrovia and come back here if they get sick. A very complicated effort and they've had to work with the regional hospital, which has had multiple infections and multiple deaths. He went into the hospital. He trained them on infection control. He showed them how to use the equipment and then he had the doctors and nurses there train the rest of the staff and he observed them training the rest of the staff. It was a very inspiring example not just of getting the job done,

but of building the local capacity to get the job done. I think that's what we have the opportunity to do going forward.

Through the CDC Foundation, we've also provided 300 jeeps. Jeeps are often frowned upon in some development work because they can be misused. We're providing these with drivers, petrol, and maintenance. We will determine how they're used. They will be used to transport specimens, patients, and staff and do contact tracing. They will be critically important in stopping the outbreak. That kind of basic public health and healthcare infrastructure is needed in each of the three countries.

There are also new challenges arising. Complacency is a major risk. Until there are zero cases of Ebola, we have the risk of endemicity; the risk that Ebola will fester and flare for years to come. As cases go down, we actually have to scale up our level of effort and that’s what we're doing. We actually have more than 200 of our staff in the region now. It's the largest number we've had in the outbreak and that number continues to increase.

We're bringing in locally employed staff, international staff, the African Union staff to match the ferocity of the epidemic, but we're dealing with a healthcare system that has stopped treating HIV and TB and malaria. We're dealing with a million children not vaccinated against measles; in the past year and as the cohort ages in the risk of a large measles

outbreak. We're dealing with schools that are closed and kids that are therefore in dangerous environments and working really hard to get those schools open as quickly as possible. Until we get cases to zero in West Africa, the risk won't be over there and it won't be over here.

We do have some hopeful possibilities going forward. One of them is the emergency funding request. It's about 1.8 billion dollars to fight Ebola on all fronts; roughly a third, a third, a third in international Ebola response in the three heavily affected countries and the 11 around them; the domestic preparedness aspect to improve infection control to continue our monitoring and strengthen hospital preparedness; and global health security so that we can find outbreaks before they get out of control in the future.

We've been talking about global health security for a few years. We've had pilot projects that have been highly successful. With the emergency funding requests, we now are able to really make a big start on this. Not only the US, but more than two dozen countries around the world are committed to rapid progress in global health security. A big part of our response to Ebola is related to this, but Ebola isn’t the only risk we face. If you look at the three risks there, it's not just emerging organisms. It's also drug resistant organisms, which may spread to any part of the world and the intentional creation of dangerous organisms.

The opportunities are the public health framework that works, new laboratory and surveillance tools, and success in outbreak control. In each of the three countries, there were places that used to have a terrible problem that now has no or almost no cases. Not just Ebola, but other infectious disease threats have been controlled. The basic approach is to prevent wherever and whenever possible, to detect rapidly, and to respond effectively. These are resources that will help us to build the systems to do that.

We made a commitment when Secretary Sebelius was in office, in February 2014. We launched the global health security agenda. We actually mentioned the threat of Ebola even though Ebola was not recognized until the following month. This will allow us to accelerate progress and try to meet that commitment of 30 countries with 4 billion people effectively protected through functional public health systems that can find, stop, and prevent health threats.

The job is far from over. This is the operation center in Freetown where you have 100 plus people working around the clock to stop the outbreak. We are making real progress and that progress is in no small part because of the interest and commitment not only of the people on the front lines, the CDC and local staff, the folks from around the US government, but also of people in this city and people throughout the US who

have really stepped up to say an outbreak anywhere is an outbreak everywhere and we're committed to helping to stop it. Thank you all very much.

STEPHEN MORRISON, PH.D: Thank you Tom. Good afternoon. First of all, I want to thank Diane Rowland, Josh Michaud, and Katie Smith from Kaiser Family Foundation for joining with us today and hosting us in the beautiful facility. Sahil Angelo my colleague here from CSIS who put a lot of work into making this happen. I also want to thank former Secretary Sebelius for being with us today and for your support of the global health security agenda. We're going to touch on a couple of key topics and then soon open the floor and welcome you all to come forward with questions and comments. We'll have a few microphones and we will run up to the end of the hour and then Josh will do the benediction and we'll be done.

Tom, let’s start with talking about this 5.4 billion dollar emergency funding package, which I think that surprised a lot of people here on multiple fronts. It was quite generous. It enjoyed strong bipartisan support. It was both immediate and emergency. It was long-term capacity building. It was domestic. It was international. It was complicated and it was a lot of money. It had considerable contingencies built into it in terms of flexibilities, the ESF funds, and the other provisions in that. How do you explain this? How did this happen? The general image in Washington is of a dysfunctional

political system and one in which these kinds of decisions become terribly difficult. As you look back, what were the key factors that made this possible?

TOM FRIEDEN, M.D., PH.D: That's a hard question Steve. I think first off that there is more common ground than sometimes frankly the media may highlight. There is no pro-Ebola lobby. There is a widespread recognition that this is important. As President Obama said, this is a national security issue for the US. The support within the administration on both sides of the aisle, both houses of congress, was quite strong. I think the only real questions we got were whether it all should be in an emergency funding request, which means it didn't have budget offsets. That was really the only hard question offered.

Lots of good questions were asked, as they should be. There was lots of interest and support, but ultimately health is an area where there can be common ground. Health protection, in particular, is an area where there can be common ground. I'm hopeful that this very substantial investment will not only allow us to put an end to the risk of Ebola and get to zero in West Africa if we keep up our guard and we don't have setbacks in the future, but will also put us on a pathway to really strengthening the global protections against a wide range of threats that can have massive economic impacts.

Yes, 5 billion dollars is a lot of money. SARS cost the world 40 billion dollars. This outbreak will cost billions of dollars. Public health and basic public health systems remain a best buy. It isn't actually very expensive to train a bunch of epidemiologists and put in a laboratory network and create an emergency operations systems compared to many of the other things that we do in government or even in health. Yet, it can have a major payoff, not just in terms of lives saved, but in terms of social and economic stability and in terms of the risk around the world.

STEPHEN MORRISON, PH.D: I mean looking back and seeing the panic and fear that was set off in Dallas, it was set off in New York, stirred an enormous political response. People were, I think, swayed by the argument that the importation of cases could only be ended if there were a major effort. There was also a sense that it had to be through civilian agencies and that US leadership, which became so big in mid-September and became such a central feature that the President stood by this and the continued uncertainty around the outbreak, that people could not feel comfortable at short changing the response so they compensated by building in those contingencies in the event that this does spread or reignite in various ways.

Tell us about the way forward right now because there wasn't a lot of time to do a great deal of spending planning for this. This is a breakthrough moment in sorts and the

responsibility is put upon CDC, upon USAID. There will be a lot of oversight and a lot of demands for proof that this money is being spent well. Now you're in the scramble mode, as you put it moving from one phase to the next. Tell us a bit about how you're going to proceed in this moment, which is having such a profound impact on CDC and USAID.

TOM FRIEDEN, M.D., PH.D: Well, you mentioned contingencies and before I address that specific question I do just want to remember what happened in Nigeria because the world would be a totally different place if Nigeria had not stopped the outbreak it had there. We had one person go from Liberia to Lagos. That person led to a cluster ultimately of 19 secondary cases. We sent 10 of our top disease control experts there within 48 hours. We repurposed 40 of the polio disease detective doctors who we had trained and they were able to stop the outbreak, but just imagine what would have happened if Ebola would have gotten a toehold in Lagos and Nigeria. It would have been all over Nigeria. It would have been all over Africa and potentially all over the world. Until we get to zero in West Africa, that risk persists.

I think in terms of implementation, first and foremost, we have to continue to ramp up the effort to get to zero and that means addressing every single case that occurs in West Africa as we addressed that case in Lagos with a very intensive and extensive public health response to identify all contacts,

to trace all contacts, to isolate people promptly, to provide expert care, and if people died to provide safe and dignified burial.

The bottom line is, I think, if we do stop it in West Africa, the oversight is going to be a whole lot easier than the alternative. I think we have to stop it because the alternative—forget the oversight. The public health implications of failing to get to zero are horrific. If we get to a situation of endemic Ebola, where it just continues to sputter and flare and go on, then it can be exported to any other country at any time. I think the biggest challenge is tightening the grip as the cases come down and go off the headlines. Even within the three affected countries, as things look better, actually now is the time you have to work harder, not less hard.

In terms of the implementation for the Ebola specific activity, that's the most important single issue for the domestic side that are various aspects of the response. The active monitoring program, we've now tracked 6,000 people who have come back to the US from West Africa. Health departments all over the country are doing that. They're up to very close to a 100-percent tracking of individuals. We've prepared dozens of hospitals in dozens of states to care for people. Keeping that system up and effective and using it for more than just Ebola but other infectious disease threats will be

critically important. Then the global health security dollars are a real game changer because we should be able with this, over the next few years, to put into place the early warning systems that we currently lack and the rapid response systems that will take those early warnings and, basically, prevent them from becoming the next Ebola.

STEPHEN MORRISON, PH.D: Are you worried about a drop off at the end of 36 months or 48 months or whenever this burst of funding has reached its conclusion? If we look at many other cases, Haiti or others, you see a pattern of a sharp ramp up, lots of political attention, ample funding, and then it's off the headlines and the funding mechanisms change, congressional interest wanes, and the sustained ability becomes highly problematic. How are you thinking about that as you look ahead in the two to three to four year timeline?

TOM FRIEDEN, M.D., PH.D: Success breeds success. When we put in programs that work, programs that find and stop outbreaks, I believe that will generate support from the countries themselves, from other international partners, and from the US. I don’t think there is any better argument for more funding than effective use of existing funding.

STEPHEN MORRISON, PH.D: Now let's talk for a moment about vaccines. You mentioned about rapid test field trials. There's an enormous amount of activity on the ground unfolding right now around vaccines as well as therapies and rapid test

diagnostics. In your mind, what lies in store for 2015? What are we likely to see? What are you watching most closely?

TOM FRIEDEN, M.D., PH.D: With diagnostics, as I mentioned, I hope we'll be in the field with some new tools within a month or so. In terms of treatments, there are clinical trials going on now to see what we can do to reduce mortality. The vaccine work is very challenging. There are several products out there. CDC has the lead on what's called an adaptive trial design in Sierra Leone. We would do what's called a stepped-wedge approach. It's not a placebo-controlled trial. You randomize clusters and then you vaccinate in different clusters.

The last time I reviewed the methodology, they identified 17 different risk groups within the healthcare field. You would randomize within them and then you can compare over time the disease attack rates of individuals vaccinated earlier versus later to estimate vaccine efficacy. We can’t proceed with that trial until we have the completion of the Phase I trials to determine whether the vaccines are safe and what dosage should be used. That should happen within the next one to two weeks. Then within a week or two or three after that, if everything goes well, we want to be in the field with a vaccine trial. That's an enormous effort. These usually take a year or two to plan and then three to five years to do. We are trying to compress that to a time period that I

don’t know of any prior vaccine trial that's been done this quickly.

We've had a team of 10 to 20 of our top vaccine experts in Sierra Leone. We have national counterparts. The challenge is enormous. It's everything from finding where do you treat people who have adverse events to the communication. You have to make sure that healthcare—this would be a healthcare worker vaccine trial. The healthcare workers that get vaccinated don’t think, oh, I’m protected so I don’t need to wear protective equipment nor can you afford to have rumors that, oh, this vaccine is poison and they're experimenting on me. It’s a very delicate balance.

When I met with the team, their leading challenge was communication. How can we thread that needle? If the vaccine is able to get up and running and begin the vaccine trial in the next month, month and a half, then the question will be erased between how quickly we control the disease versus how quickly we get the vaccine trial up and running. I just can’t predict what's going to happen with that. If the vaccine were to be found effective, that might happen toward the middle of next year. Then we might use it for healthcare workers and cluster. In the future, for outbreaks, you can then do kind of a ring vaccination approach or a surveillance and containment approach where your vaccinated around individual cases. That's all very much crystal ball. This is a day-to-day issue.

The thing that keeps startling me about Ebola is how rapidly things change. I wouldn't have predicted when I left the region three weeks ago that three weeks later the situation would be as different as it is today from the time I was there three weeks ago. Fortunately, in this three-week period, it's a lot better than it was then, but it can also get worse very quickly.

STEPHEN MORRISON, PH.D: On that point, I mean a lot of people have talked about the gap in health workers and they've also talked about the need for a distributed and decentralized approach to this. That, as the epidemic has morphed, it's required quick response and adaptability that moves now towards the corners of many of these countries in every prefecture or district or county. It puts demands on the response mode that are quite different and it seems like no one fix remains static for very long. It's a highly fluid and evolving approach here.

TOM FRIEDEN, M.D., PH.D: That's true. The first time I went, the guidance to my staff was that our three fundamental principles had to be speed, flexibility, and front lines first. That remains the case. That model finding that accelerate your effort by a month and you cut cases, you prevent a tripling in cases, is really striking. You can understand it if you kind of go under the hood and you look at what that means. If you have a single unsafe burial, you can have dozens of cases coming from that in of those cases. If they have a single

unsafe burial or care can result in dozens more cases. You get that exponential increase. Now the diversity within country, between countries is important to understand, particularly the forest region of Guinea where you have very remote communities, very isolated from the rest of society. Yet, if there's Ebola spreading in any one of those communities, it could flare up in the whole region again.

STEPHEN MORRISON, PH.D: Can you say a few words about the US military role which was very much at the front end of this and terribly important and also USAID's role in this.

TOM FRIEDEN, M.D., PH.D: The Department of Defense went in with the idea of rapidly building isolation and treatment capacity, training large numbers of health workers, serving as an air bridge to bring material and equipment in, and providing general support to the overall operation. USAID, through the Office of Foreign Disaster Assistance, or OFDA, has been the lead for coordination. For the first time ever we've had a different approach to a DART, Disaster Assistance Response Team, where OFDA is the overall coordinator and lead and CDC has a deputy for the DART leading all public health medical aspects. It's been a terrific collaboration.

There's real synergy there between some of the technical and connections that CDC brings and the logistic capacity and operational capacity that the DART has brought. As we move forward to the reconstruction phase, there are a

clear set of tasks that have to happen to get the health system up again, to get communities moving again, to do economic issues, which are going to be core for USAID, and for us at CDC looking at the public health aspects and building resilient public health systems, putting in infection control specialists in the healthcare facilities who can also do triage and reporting to public health so we have a surveillance system.

My team was talking to me in two of the different countries recently about their concern about where they had success and districts were free of Ebola. They've trained all of these surveillance people and unless they did something, they were going to lose their skills. Sometimes they're implementing vaccine programs. In other areas, they're reporting cholera or measles of vaccine preventable diseases, or doing malaria control. Strengthening the public health system in these countries will be the next big order of business.

STEPHEN MORRISON, PH.D: Let's talk a little bit about the UN and then I want to invite some questions and comments. You're a member of the executive board at WHO. There's a lot of discussion now and options are being actively developed around reform. This is not a new subject. Reform has popped up at different points over the last several decades, but the failure by WHO in this context has been so conspicuous and so impactful and profound that it stirred a level of effort that

is quite remarkable. What do you see as the prospects for bringing it back better, both politically, institutionally, in terms of its human capacities, its ability to cope with these unforeseen outbreaks? What's your view?

TOM FRIEDEN, M.D., PH.D: WHO is essential. It has become less central in the world of global health as more players have come in, but it retains an essential role. We have a great self-interest in strengthening their capacities. At CDC we often second people, enroll people to WHO. I was on secondment to WHO for five plus years working in India. WHO has the ability to draw people together in ways that no other organization can. However, sometimes political considerations get in the way of technical and operational competence. That's a problem.

There are terrific people at WHO. The world's experts in many conditions are there at WHO. When I was traveling in Africa in August and September, I met Dr. Youte, who is one of the best Ebola experts there. One of the things he said to me made a really big impression. We can stop this if we just do at scale what we've done in all prior outbreaks.

There are great people within WHO, but the challenge is sometimes the regional office, sometimes the country office, sometimes the impingement of non-technical issues into technical matters, and the need to ensure that WHO has the best possible staff or supported as effectively as possible. If we

can make progress on that concept of best possible technical staff effectively supported, then we'll have a more functional WHO. How to get there given the constraints, how to get there given the multiple prior attempts to do some of this, I'm not sure, but it's certainly well worth pulling all the stops and trying.

STEPHEN MORRISON, PH.D: Let's turn to our audience. What we'll do is bundle together. Why don't we start here in the front. There are several hands up. We'll bundle together four or five questions and comments and then come back to Tom. Please introduce yourself. Let's start right here. Right here. Please introduce yourself and be very succinct and offer one intervention please.

Jerome: Thank you. My name is Jerome . I am with UNAIDS. My question is given the uncanny parallels that you are already seeing with Haiti, that both are fragile states and we had an overflow of aid and then the exit strategy wasn't so well organized so much so that now one could argue that cholera in Haiti is becoming much more of a menace than the earthquake possibly ever was. How have you organized your end game in West Africa?

STEPHEN MORRISON, PH.D: Thank you. Let's hold for a second. Right here.

DAVID SHEON: Thanks. I'm David Sheon with RealWorldHealthcare.org, a health and medical blog. I thought

this was a fantastic presentation. Just wanted to note with regard to supportive treatments and you mentioned briefly that you're interested in that. There was a lengthy article in *Forbes* last month that looked a treatment that could address shock. It said that it's NIH funded and the FDA has approved it for compassionate use. This is a product, according to the article, would be able to be used immediately and save a lot of lives based on the 200 patients who have already had it. Does the CDC look at something like that to deal with treatments?

STEPHEN MORRISON, PH.D: Over here. Yes.

RUSSELL MORGAN: Hi. My name is Russell Morgan of the NPCA Ebola Relief Fund. Dr. Frieden, I'm sure all the people in this room want to thank you for your leadership, your commitment, and your passion for reducing Ebola. One of the things I've heard you mention in a number of presentations is the importance of the community. I'd be very interested in knowing from your recent experience in West Africa what you think are the types of interventions that groups in the United States are concerned about strengthening the communities in these countries. What is it that they could do to help?

STEPHEN MORRISON, PH.D: Let's do one other. Over here.

STEVE WALLER: I'm Steve WALLER from Uniformed Services University in Bethesda. Dr. Frieden, what percentage of the US government contribution that's currently on the ground over

there do you think will translate into long-term, sustainable assets for the West African countries?

STEPHEN MORRISON, PH.D: Why don’t we pause there and come back to Tom.

TOM FRIEDEN, M.D., PH.D: Several of the questions are about the end game or legacy of what's going to be left behind. I think first and foremost what has to be left behind is an Ebola-free West Africa. If we don’t get to zero, if we do allow endemicity to happen, the disruption to the healthcare system, the potential of further flares is just too great to contemplate. First and foremost, we have to get to zero. That's going to be hard. The last case is often the hardest. Knowing there are no cases anywhere in the forest region isn’t going to be easy.

In terms of the Haiti analogy, CDC has worked very hard in Haiti to establish public health systems. Vaccination rates are up. New vaccines have been introduced. Filariasis is being eliminated. A cadre of public health-trained Haitian polio specialists is being established. I think we are thinking hard about that long game. West Africa does have some parallels in the challenges in faces.

One of the things community groups can do is—there're lots of different things. You can choose an area to work on, water or sanitation or vaccination. Or you can choose a geographic area to have a sister project with and you can then

get a deeper sense of what's needed where. Communities have made a huge difference here and the response of communities has been very effective.

In terms of supportive and other treatments, there's a lot we don't know about Ebola. If we don't learn it in this outbreak, it's going to be unlikely that we'll learn it. Things like clinical trials would be the lead of the National Institutes of Health, NIAID. To look at those, there are a number of things that are promising. Even the basics of rehydration can make a big difference. There may be some new tools that make a difference. There are very fundamental things that we don't know. Would loperamide, Imodium, reduce mortality rates? We don't know. There's a lot that is unknown and we hope that clinical trials can be done so that we can save more lives and also increase the confidence people have in the Ebola treatment centers.

STEPHEN MORRISON, PH.D: There's a woman in the back there. Yes. Standing up in the back there.

CAROL PEARSON: Hi, it's Carol Pearson from the Voice of America. Dr. Frieden you mentioned some things that had to be learned like adapting to local customs in order to get the community involved and to stop the epidemic. You also mentioned speed, whereas, when it first broke out, everybody thought it would die out like it does in Central Africa. What are some of the lessons learned in this outbreak that could be

applied to the next outbreak of infectious disease, no matter what it is?

STEPHEN MORRISON, PH.D: We have some hands over here and there's one right here.

IKE PUZON: Thank you. Ike Puzon with PYXERA Global. You addressed this a little bit in your presentation, but we heard in October, November, December logistics to the rural areas was a major issue. I am wondering if you would expand on what improvements have been made to get to these rural areas to control it.

STEPHEN MORRISON, PH.D: Right here. Thank you.

MARY PACK: Thank you very much for the opportunity and the briefing. It was excellent. I'm Mary Pack with International Medical Corps and we're operational in the region running ETUs in Sierra Leone and Liberia and also training Liberians, Sierra Leone, and international healthcare workers. Dr. Frieden, I was wondering if you could comment on UNMEER, the coordination body that has been set up by the U.N., particularly with regard to information management and coordination of the response, your thoughts on value added, and if this is a model that should or could be replicated as needed in the future? Thank you.

STEPHEN MORRISON, PH.D: Thank you. There's a hand right here.

LISA PARADIS: Hi, my name is Lisa Paradis with the Office of the Director at NCI. Dr. Frieden, you spoke so eloquently about the public health infrastructural needs and the clinical needs. Obviously, they are very important in the Ebola response, but could you touch upon the communications needs as well both here in the US and in West Africa where there's been a lot of challenges with misinformation and getting credible information on infection and what to do. Also, piggybacking on that, is there a place where folks who are interested in learning more about some of the hiring opportunities moving forward with the new funding, is there a place or a point of contact for people to go to? Thank you.

STEPHEN MORRISON, PH.D: Tom, why don’t we come back to you. We've got the big question that Carol Pearson from VOA put forward, Mary's about UNMEER, and Lisa's around the communications needs and the hiring plan.

TOM FRIEDEN, M.D., PH.D: On the logistics as well. I think we're still learning lessons from the Ebola outbreak. Clearly it taught the world that we're all connected; that a disease outbreak anywhere is a threat everywhere, that we need to be able to respond more rapidly and robustly, where there is a problem that we need a stronger WHO, and that we need a stronger country capacity. That’s what the global health security dollars should address. In fact, I could answer all of the questions in addressing the question of lessons learned.

The logistics remain very challenging. These are countries that don’t have a good road system, where you can’t even get into many places by helicopter. We're using helicopters to get around now. It’s not a very efficient way to get around. There're real limitations in what you can do. There are no shortcuts to development and there're no shortcuts to good surveillance. You need to build the systems and you can’t do that overnight, as much as you liked to do it over night, it's hard. We still have problems with phone service and internet service, the ability to communicate with our staff in a variety of places.

West Africa is one of the least developed places in the world. That's one of the reasons it's been so hard to stop the outbreak there. Of course, here we know the importance of being very clear about what we know, what we don’t know, and having a sense of what might happen. I think communications-wise, always better to under promise and over deliver. Looking back on the fall, certainly, there're things we would have said and done differently, but ultimately our focus was always to get the most recent accurate information possible and to use that information to protect people, both in West Africa and here. That’s been our approach.

Communications is a huge challenge. In West Africa, there is such variability within and between communities and countries, it's not that there's one right communications

objective or communications approach, but the need to address each community separately, but using a consistent set of information that needs to be conveyed and information that needs to be listened to from communities. We've done KAP surveys in Sierra Leone very effectively, very rapidly with mobile devices.

The information management has been very challenging. Not having internet or email access has made that very hard. The information management systems we had were completely overwhelmed. One of the ironies of dealing with this situation has been that when the situation was out of control and increasing, it was very difficult or impossible to keep up with active information and effective services. As cases come down, when you don’t really need the same information, then we have the ability to deal with that information well. Having that scalable response is so very important, but we would much rather have too many beds than too few. We would much rather have too many staff than too few. We'd much rather have too robust a response than the opposite. That’s been the approach to really roll in as effectively as possible.

I think UNMEER has done some important work. It's still a work in progress. Figuring out how to do optimal coordination within countries, between countries, how to make optimal use of the UN system, these are really important issues. I’m very supportive of the UN and of their role. The

key is to identify their role and make sure that it achieves that kind of synergy that's needed because coordination remains a real challenge, in particularly Guinea and Sierra Leone where there are many different challenges. We were able, over August and September to establish incident management systems run by someone within the country, in Guinea and Liberia. That provides a way for people to feed in, but sometimes those systems can be overwhelmed by well-meaning individuals and groups that want to help. I think UNMEER could be very helpful in coordinating that type of process.

STEPHEN MORRISON, PH.D: Paul and then here. We have two gentlemen right here. Paul when you're done, right behind you.

PAUL EHMER: Yes, thank you. My name is Paul Ehmer, a retired foreign service officer worked with AID for a number of years and just wanted to follow on a question that Steve asked and you answered it in some way. I just wanted to bring it up again and get a little bit more detail possibly and that is, is there any way we can use this unfortunate opportunity, we can call it an opportunity, to use the money that is now being invested to actually improve capacity, improve systems, improve training, and have it go beyond only the Ebola response? We've seen, Steve mentioned, I think a number of cycles of support and money for MCH, for vaccination, for malaria, for TB over a period of time and we haven't somehow been able to use that

money to its best uses to actually improve the system in such a way that when the next thing comes along that's not Ebola that actually the system will be able to respond. I just want to give you a chance to talk about that.

MICHAEL B. KRAFT: Thank you very much. Michael Kraft. I'm working with the Global Resistance Systems, but also former state department officer. You alluded, doctor, a bit to some of the coordination issues. I'm wondering if you could expand on this, especially in countries like Guinea and Sierra Leone where the French and British governments supposedly have the lead and there're so many NCOs involved. Are you satisfied that there isn't duplication and also that there's nothing falling between the stools? Just could you describe a little bit how the mechanism works? Thank you.

STEPHEN MORRISON, PH.D: Thank you. Right here.

JESSE KIRSCH: Hi, I'm Jesse Kirsch from the Medill News Service here in DC. I was curious, you talked a lot about the US response oversees, but obviously we did have a very minor outbreak here in the United States and I was wondering if you could talk about how the US and the CDC approach developed as the outbreak spread here in the US, specifically pertaining to healthcare workers because we did have a couple healthcare workers infected because of exposure in the workplace. Thank you.

STEPHEN MORRISON, PH.D: Right here.

CLEMENT: Hi, my name is Clement. I'm with the George Washington University Hospital. You mentioned earlier that one of the reasons in the delay was rejection of the treatment, those who believe that Ebola wasn’t real. Are there any efforts being done to inform the people in the three African countries under progress for the vaccine so that when it's time for the country trials they'll be more informed and know exactly what stage of development the vaccines are so they will be more accepting?

STEPHEN MORRISON, PH.D: Thank you. Tom, might I suggest, there's a woman whose hand was up in the back and there's a gentleman right here. Let's take those two and come back and you can answer those and then Josh can sign us out. Yes, please.

MARGARET MIDYETTE: Yes, good afternoon sir. My name is Margaret Midyette from the Institute for Defense Analyses. You’ve spoken very well about this laboratory capacity that we've been building in West Africa. I know not every laboratory sample can come back positive for Ebola, so I’m curious what other diseases people are testing positive for if that testing is going on at all, if that capacity even exists or if samples are simply tested for Ebola, and if they're negative, there's no additional testing? Thank you, sir.

STEPHEN MORRISON, PH.D: Last question here.

TIM OGBORN: Thank you. Tim Ogborn from Project Concern International. We have a very comprehensive response in Bong and Nimba Counties in Liberia thanks to US government funding. Thank you. In our regular conference call yesterday we heard that some of the DOD-funded ETUs that are not yet finished are perhaps not going to be finished in Liberia and I was wondering what is the decision-making process for these transitions? We spoke a little bit to it earlier, but how are those decisions being made as to when we phase out, when we change strategy? Thank you.

STEPHEN MORRISON, PH.D: Have we stacked up enough questions for you?

TOM FRIEDEN, M.D., PH.D: Money is going to go to improve systems generally in ways that are critically important and have multi-functionality. Laboratory networks that can diagnose many different diseases. Surveillance systems that can identify clusters and trends. An emergency operation center than can respond. In fact, it was in Nigeria that a polio emergency operation center that was able to repurpose to Ebola. That was pivotal to the success there. Field epidemiology training programs so that we have doctors like Dr. Mutawe who I talked about in my remarks who are from West Africa. Immunization programs that can get to 90-percent measles rates and rapidly implement for individual areas. One of the really encouraging aspects of the global health security

resources is that they are functional pluripotent, as we would say; they can act in many different ways and that's critically important.

I do think coordination is a work in progress to answer that question. It is challenging with many groups in to make sure that there's minimal duplication and things not falling through the cracks, but there is so much to be done that I'm confident that that won't be a problem long-term. As we get into reconstruction and creation of new health systems, primary care system, community health workers, all of that is much needed. A public health infrastructure has not been there, to a great extent, until now.

In terms of the US approach, clearly we've learned that it's a lot harder to treat Ebola in this country than we had anticipated. We didn't anticipate how severely ill people would be. How much diarrhea and vomiting they would have. How much infectious material that would cause and how much training healthcare workers would need. Faced with the two infections that occurred here, we changed our guidelines based on the most up to date information and undertook an extensive program to train healthcare workers to safely care for people with Ebola.

We also implemented a program called Active Monitoring where every person that comes back from West Africa is met by a CDC team at the airport. You're provided with a care package of check and report Ebola. I got mine when I came in three

weeks ago. It has a thermometer in it. It has a log. It has a wallet card of a number to call. Then with your local health department, you check your temperature twice a day and you report in. We've had now over 800 people who have been investigated for Ebola. Most of them didn't require testing because they didn't have symptoms or exposure consistent. All over the country we've had people call CDC through hospitals, through health departments directly and we've arranged for them to be safely assessed, safely cared for so that if we do have another case, we can never be a 100-percent sure that that person won't be missed. That there won't be further spread, but we've done everything we can to minimize the possibility of that happening.

Laboratory capacity is very important. As we move forward in response we're adding laboratory capacity. Initially we did only Ebola testing. Some places also test for malaria. That's somewhat useful, but we treat everyone for malaria, so you're not quite sure how useful it is to test. Other pathogens need to be identified. Malaria is an overwhelming challenge there, but there're other pathogens as well. I think the transition issue is an important one. It's an important one not just for the countries, but it's important within the US government. We have a whole of government approach coordinated. It's organized as a clear sense of who's doing what and that's worked well, but within each country we

also need to look at as well. We are transitioning in different phases of the response. We've gone from the break exponential growth to the get to zero. Once we're at zero, it'll be stay at zero and rebuild and build back better.

STEPHEN MORRISON, PH.D: Thank you. This has been extraordinarily rich and informative and uplifting really. I mean US leadership, in this situation, has had a dramatic impact. Your vision has been a huge part of that. Thank you and congratulations. Josh.

JOSH MICHAUD, PH.D: Well at this point, my job is very easy. It's to thank Steve and CSIS for helping organize this event, but especially thank Dr. Frieden for taking the time and really sharing quite a bit of information about Ebola and how we're doing in our response. Thank you all for coming and join me in thanking Steve and Dr. Frieden.

[END RECORDING]