



Curbing The Ebola Outbreak: Are We on the Right Track?

The Kaiser Family Foundation

Alliance for Health Reform

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Ed Howard: Good afternoon. My name is Ed Howard. I'm with the Alliance for Health Reform and on behalf of Senator Blunt, Senator Rockefeller, and our board of directors, I want to welcome you to today's program on how we—in this case, we means every one of us on this planet—are faring in trying to curb the current Ebola outbreak. Ebola has grabbed the attentions of Americans like few recent public health events. It is pretty easy to see why. There is no known cure. There are few facilities prepared to cope effectively with it, and almost half of those infected are predicted to die. Perhaps worse, the American public knows so little about Ebola that the fear of the virus has actually leaped ahead of the actual danger level here.

Today, we are going to try to shed some much needed light—as opposed to heat—on the subject. We are going to look at what we know about Ebola, how the global health community is responding, how well prepared the US health sector is to cope with Ebola and possible similar outbreaks, and we are going to examine some of the legal questions involved. We are going to check progress toward developing a vaccine that might actually cure it.

Our partner and cosponsor of this briefing is the Kaiser Family Foundation. One of the foundation's areas of concentration for a number of years has been global health, especially those conditions that affect poorer people and poorer nations. We are pleased to have co-moderating today's discussion the foundation's vice president and director of global health and HIV policy, Jen Kates. We did not have a chance to talk about this, but let me do a little housekeeping and then I will turn it to you if I can.

In your packets, you will find some important information including speaker bios, a list of background materials, and the PowerPoint presentations, all available on our website, allhealth.org. There will be a video recording of this briefing available in a couple of days, thanks to the Kaiser Family Foundation, on their website, kff.org, and available through our website. If you would like to Tweet about what you are hearing and seeing, you see the hashtag on the screen: #ebola2014. You can use the green cards at the appropriate time to write a question and it will be brought forward. You can use the microphones that you see in the audience to ask your question orally. And, if you would, fill out the blue evaluation form at the end of the briefing. We would very much appreciate that to help us improve these briefings and bring you the things and people who would be most useful for you.

Let us get to the program. As I mentioned, we will start with our co-moderator and an expert on global health in the meantime, Jen Kates.

Jen Kates: Thanks very much Ed. Good afternoon and welcome everyone. Thank you very much for being here. I know it has been a busy day already focused on Ebola on the Hill. We thank those who are here. I really want to thank the alliance for asking us to cohost this event with them and for the service that they do on having these kinds of briefings here on the Hill. Thanks to our panelists.

Before we turn to the panelists, I want to help set the stage very briefly by providing a short overview of the latest Ebola outbreak statistics and some basics just to get us all on the same page before we proceed. Very quickly—I will not read all of this—I think there are some important

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things to know about this current outbreak and why, as Ed alluded to, we have all been so focused and our attention gripped by this. While it likely began almost a year ago, it did not really come into public health consciousness until March. But then, there was a major escalation and some say that wasn't really recognized until a little too late when the WHO finally declare Ebola in West Africa a public health emergency of international concern. Why this is such a concern is if you look at the current statistics, the current data, almost nine and ten of all Ebola cases every reported since Ebola was first discovered are from the current outbreak. The cases thus far have been reported in eight countries, the three most effected ones in West Africa, two that are now Ebola free—Nigeria and Senegal—and three that are still what we call in a period of waiting to see if they can be declared Ebola free, and the United States is one of them.

Some key characteristics of Ebola that I think hopefully people have heard these before. We have an infographic in your packet that puts a lot of this information in one place. Important things: It is only transmitted through direct contact with bodily fluids and only when somebody is symptomatic. Incubation period is 21 days. As Ed said, there is no vaccine to prevent it, there is no treatment for the disease currently, and there is no cure. We will hear more about that. The case fatality rate is quite high. This is just some visuals from our infographic.

Very quickly on the impact as I mentioned, just to show you in a graph, 86% of cases every reported for Ebola—the first case was discovered in 1976—are in this current outbreak. That is going to grow because cases are still increasing. This is the trend in the most highly effected countries—Liberia, Sierra Leone, and Guinea. Importantly, it looks like from the latest data, the cases in Liberia are on the decline. Sierra Leone cases continue to increase. And Guinea, they are leveling off. But, this is a precarious situation that needs to be watched on a pretty regular basis.

I'm not going to go through all of this information, but I think it's important to know that beyond the immediate health impacts—the loss of life, the morbidity—there's a lot of secondary affects—secondary health impacts and economic impacts. For example, the World Bank has developed some estimates of the impact of this outbreak in West Africa on GDP in these countries. That is a very significant level of impact.

My last slide is just going to go over what's happened in the United States in terms of the number of people because I think this is an area that there's some confusion about who, what, how and what's the current status. So, to date, there have been ten people that have or are being treated for Ebola in the US. Eight are cured, meaning they no longer have signs of Ebola virus. Two have died. Of these ten, four were diagnosed in the United States. Those two were the nurses who were actually infected in the US and two were infected in West Africa but not diagnosed until they were here. Six others were diagnosed elsewhere in West Africa and brought here for treatment. Unfortunately, the most recent person—a doctor who came on Saturday—just passed away yesterday. So that is just to give you a layout of the ten cases who had Ebola in the US and who they were.

I am going to wrap this up. This is in your packet and there is a lot more information on some of the specifics there, and turn it back to you Ed so you can go.

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Ed Howard: Very good. Thanks Jen. That is a very useful overview for us. We have a terrific panel. We have an all-star crowd up here and let me just give a couple sentences to identify each of them serially and then we will not interrupt the presentations for that purpose.

We are going to start with Josh Michaud, who is the associate director for Global Health Policy at the Kaiser Family Foundation. Josh oversees a range of internationally oriented research projects. He has got a PhD in International Health Policy and a couple of Master's Degrees all from John's Hopkins where he also teaches graduate level courses at the School of Advanced International Studies. Josh is going to give us a sense of the global response so far to Ebola.

Next, if he gets here in time, we will hear from Lawrence Gostin who directs the O'Neill Institute for National and Global Health Law at Georgetown where he is also the first and only holder so far of the Linda and Timothy O'Neill chair in global health law. His biographical sketch contains a sentence that begins "His most recent books are" so you get some idea of how impressive his record is. He is going to share with us some of the legal issues involved, including the power of governments to quarantine those infected.

Peter Hotez will speak next. Dr. Hotez runs the National School of Tropical Medicine at Baylor, serves as the President of the Sabin Vaccine Institute. He is going to explain the state of development of a vaccine to fight Ebola.

Finally, we will turn to Dr. Jeffrey Gold, Chancellor at the University of Nebraska Medical Center—the first independent academic health center in the US to care for an Ebola patient. He is here to share the sum of what he and his colleagues have accomplished at UNMC and what lessons can be learned from their experience.

Let us start with Josh and get right into the program.

Josh Michaud: Thank you Ed and thank you for all of you for coming today. It is a pleasure to be on this stellar panel really. In the short time that I have today I was going to focus on the epidemic in West Africa and what the global response has been. Really, I want to focus on four aspects of that and will only be able to touch on the key points in those four aspects. Those are: who is involved in the response, what is the current approach for the response, how much support has been given to the response including financial support, and what gaps remain in the response.

As Jen mentioned, this has been a growing epidemic over time. The initial, I would say over the summer months, the initial response was heavily criticized as being too little, too late, and too disorganized and not coordinated. I think there was a change in the response in terms of the engagement of the global community in mid to late September, around the time that President Obama made his talk in Atlanta when he announced that the US government would increase its engagement in the response to Ebola. And, the week after, the UN General Assembly met and a number of donor countries and other agencies made new commitments to the Ebola response. Since then, there has been a dramatic scale of the response.

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Turning to the US government and how it is involved in the response in West Africa. The Office of Foreign Disaster Assistance within the US Agency for International Development is the lead response agency. It has the authority to coordinate the US government departments and agencies that are working on the ground on the response. They put together a disaster assistance response team—DART. For the first time, a DART was put together for a health emergency. This is the first one.

The Centers for Disease Control, of course, has been heavily involved in the response. Right now, somewhere on the order of 230 personnel from CDC are engaged in West Africa in the response. This is the largest deployment of CDC employees overseas for a single health response in its history. The Department of Defense has increased its support overtime. Right now, somewhere over 2,200 military service members are in West Africa working on the Ebola response. There is an estimate that number could reach up to 3,000 in the next month or two. You can see here—I will not read them—what these different agencies are involved in.

Turning to the other countries and other groups that are involved, the United States is heavily involved in coordinating across all the different actors that are in the response. The UN has set up a mission. This is the first time that they set up a mission for a health response. It is the UN Mission for Emergency Ebola Response—UNMEER. That agency or that body is responsible for coordinating across all the different UN agencies and also being a point of contact for all the different international and national actors, which are involved in the response. The World Health Organization has been involved clearly since the beginning of this and continues to be under the umbrella of the UNMEER response, and other UN agencies.

Speaking quickly about the local and regional governments and the actors—clearly the governments and the ministries of health in the countries themselves have played a huge role in the response in their own countries. It's interesting to note that there has been a division along the lines of how major international actors have formulated their response in that across the three countries—Guinea, Sierra Leone, and Liberia—sort of colonial ties have been directing where resources have gone. The US has been a heavily supporter of the response in Liberia, the UK, and Sierra Leone. The French and the UN agencies have been involved in Guinea. I'll also mention the African Union, which has been key in both financial and in recruiting health care workers to support the response in the three most affected countries in West Africa.

I also wanted to mention of course the non-governmental organizations, which are involved. A key one being Doctors Without Borders or Medicines sans Frontieres. They have been there since the beginning of this outbreak, providing care in clinics on the frontline. Also, it is interesting to note that tech companies have stepped up in a way that we have not seen before. Both Google and Facebook have provided in their public pages buttons where the general public can support the Ebola responses. That is the first time Google has done so. They have already met their fundraising goals through those tactics.

What is the actual approach for the response? The UN has a response plan, which it released in mid-September. These five points listed on this slide are the five strategic objectives for that plan. Really, this is where the heart of the response is focused. The first is to stop transmission. To do

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that, you need to identify those who are infected. You need to get them into care and isolation and make sure they are not transmitting to others. That in itself is a very difficult task in many of these countries given the state of their health systems, given the state of the transportation networks, and given sort of the serial mistrust over time of authority figures and public health authorities in general. So, this has been a real challenge of course. Identifying those who are infected and getting them into treatment.

Another aspect of this is behavior change—making sure that if someone dies from Ebola, that body is handled in a safe way and that burials are handled in a safe and dignified way. Burials in the past have been a major vector for the disease to be transmitted. There has been some improvement in that apparently in West Africa.

The other important thing is to treat those who are infected in quality care units. That is the second point here. This has been a real focus of the effort for the international community—building up the bed capacity, building up the clinic capacity for treating those who are infected with Ebola. In the past, there have been cases where persons infected with Ebola were turned away at the door of the clinic because there were not beds available. So, it has been a real concerted effort to increase that capacity, but still some ways to go. There are other essential services, which need to be provided, including food and nutrition, and care for orphans, as well as non-Ebola medical care. Much of the resources and the focus for the health systems in these countries are entirely focused on Ebola. Therefore, some other areas may fall by the wayside, including maternal care and immunizations, etc.

There are other points to this plan, including encountering stigma, mobilizing communities, and also making sure that neighboring countries are prepared and looking for and able to prevent the importation of disease. There has been a recent cluster of cases of Ebola in Mali, which is a neighboring country. That of course is a great concern. We will see how that is handled in the future.

All told, the UN estimated that about \$1 billion was needed to fund all of these aspects of the response in these five areas. So, where are we in terms of the actual financing of this response? The UN itself has an agency, which tracks the financing for Ebola. As of last Friday, they estimated that \$1.23 billion had been provided. Now, it is important to note that they separate this into two different buckets: money that goes directly in support of the UN response plan, which we just talked about; and then money, which is provided for Ebola response, but outside the framework for the UN response plan. So, if you just look at that almost \$700 million, we are talking about 70% of that initial ask where that need has been met, but there remains a gap. In the bar charts, you see the top ten donors to the international response. The US clearly is the largest donor, providing about 1/3 of the overall funding for the Ebola response in West Africa.

There are remaining gaps in barriers still out there. I will not go through all of these. This comes from a World Health Organization report from the fifth of November, which is the first time that they started providing metrics as to how they're doing in the response. You can see there is still a need as far as filling the need for beds in Ebola treatment centers—that is what the ETC is. And, isolating cases—they have not quite met their goal of 70% of cases being isolated. As well as,

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providing laboratory services in all the districts—there is still some need there along with other areas. This is just a sampling of that. Clearly, there is an ongoing need for these and other areas. Another important bottleneck has been finding the health care workers and training those health care workers to staff the clinics once they are set up and also making sure that they are properly equipped and trained to use their equipment.

In my final point, I just wanted to look forward a little bit and say what is necessary to continue to respond effectively to the Ebola epidemic in West Africa is some understanding that there will be changes over time. This, like every epidemic, is going to evolve over time. So, there is a need for flexibility and the ability for decision makers on the ground to make changes in the way they approach it, both geographically and also the way they approach in terms of technical approaches. There will be a transfer of responsibilities. Eventually the number of cases will drop down and the transfer of responsibilities to the UN or the UN to local national government. We need to make sure that those capacities are in place in order to mitigate any future epidemics and to make that transfer as smooth as possible. And, just broader global health security and preparedness, making sure that countries...here, we had a case where weak health systems in West Africa created or the conditions were allowed to have a threat which originated there—something that became a global, global threat. So, concern about how to make sure that weak health systems are bolstered and this epidemic, which became a global concern, does repeat itself.

I'll stop there. Thank you.

Ed Howard: We will turn next to Dr. Hotez.

Dr. Hotez: Thank you very much. I am an M.D., PhD physician scientist. I have a nonprofit organization that has called a Product Development Partnership, or a PDP. These are nonprofits that use industry practices to make the products that the major pharmaceutical companies cannot make or will not make because they affect people living in extreme poverty. Our full name is known as the Sabin Vaccine Institute at Texas Children's Hospital Center for Vaccine Development. We are based in Houston, Texas. We are making several neglected tropical disease vaccines that are now in clinical trials.

I think one of the first points I want to make is Ebola is not unique. Ebola belongs to a family of around over a dozen afflictions that we call neglected tropical diseases, which are not rare diseases but in fact are probably the most common afflictions of people living in poverty. We have recently completed an analysis with the Seattle's Institute for Health Metrics and Evaluation that shows that every single person living in extreme poverty on the planet, all of the bottom billion, all of the 1.3 billion people who live below the World Bank poverty figure of \$1.25 a day—essentially no money—is afflicted by at least one of these neglected tropical diseases. That is what we are doing at Sabin and Texas Children's is advancing them into clinical development.

What is the problem with making these vaccines? There is a twofold problem that we have with Ebola vaccines that we have with our hookworm vaccine, our schistosomiasis vaccine. You can go down the list of any of those vaccines and the problem is, number one, market failure because these only affect people living in extreme poverty so that there is little market incentive from the major

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pharmaceutical companies to get involved with developing these vaccines unless there's some kind of catastrophic or heroic even that requires their involvement. So, they tend to be very reactive to situations.

I think the second part about neglected tropical disease, aside from the link in poverty, it actually turns out the tropical part is the least important part—the least interesting part of NTD's. Its number one is poverty, but its number two is conflict. Not many people are aware of this, but this is a pattern that we have seen repeatedly over the last several decades. It began in the 1970's in the Democratic Republic of Congo and Angola when more than half a million people died annually from African sleeping sickness. This is an epidemic that went on silently because there were no journalists covering the sleeping sickness problem in Angola and the Democratic Republic of Congo. It then happened in the 80's and 90's in southern Sudan when kalazar—how many people have heard of kalazar? Three or four. So, this is an epidemic that killed more than 100,000 people, 20 times more than the Ebola epidemic, in southern Sudan. Again, it was not covered. This is a disease that is caused by a protozoan parasite that affects the bone marrow, liver, and spleen.

Ebola, from our standpoint, is the latest iteration of that. This something that we have been trying to get across, that wherever you are going to see a major conflict in the setting of poverty, you can now anticipate an outbreak of neglected tropical diseases. I think now, the other thing we have to think about as we think about how we are going to tackle Ebola is what is the next shoe that is going to drop? What I think the next shoe that's going to drop, and we're already seeing the beginnings of it, is in ISIS occupied Syria and Iraq where we've seen another form of leishmaniasis called cutaneous leishmaniasis that's affecting more than 100,000 people. This one is not a killer neglected tropical disease. It is a disfiguring one, especially of the face. It is disfiguring tens of thousands of little girls that will be rendered unmarriageable and grounds for future spousal abandonment. This is something that is going on silently. We are seeing the re-emergence of polio, the re-emergence of rabies—all of these things we should have vaccines for.

I think as Congress now has Ebola hearing after Ebola hearing, to me it is a little bit like the little kid soccer game where you watch all the little kids go after the ball, the ball moves somewhere else, and then all the kids run after it. We really need to look at this whole space of neglected tropical diseases and see what we are going to do for developing this new generation of vaccines where because of market failure they are not advancing.

The problem that we have had with Ebola vaccines is not too different from the other vaccines that we are developing for hook worm or schistosomiasis. So, for instance, the vaccine that is now being developed by New Link Genetics in Aims, Iowa, it requires a Rhabdovirus known as vesicular stomatitis virus. It is a very promising vaccine. The evidence that it is protective in nonhuman primates against Ebola virus infection was published in the Public Library of Science in 2008. Then, the technology kind of sat there for six years because there was nobody to shepherd that vaccine through what we call the valley of death. There is two valleys of deaths actually. One of them is the valley of death of going from discovery into phase one clinical trials for safety. And then, the second valley of death is taking it through advance clinical development and then licensure. So, that happened with the New Link Genetics vaccine.

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We have also got the same problem with two equally exciting vaccines being developed now by GlaxoSmithKline and JNJ, which involves an adenovirus technology. That was actually discovered—this approach to Ebola vaccination—back in 2000 by Gary Nabel’s group at the Vaccine Research Center of the NIH. It kind of slowly inched along over the next decade or so until it finally made it into phase one trials. My point is we have lost a lot of years when we could have had a vaccine stock piled and ready to go. We have got to figure out a different mechanism.

I think it is great that the major pharma has finally picked it up and they often come to our rescue. But, I think we cannot rely exclusively on major pharma to develop this whole portfolio of the 17 or so neglected tropical disease vaccines that the world needs. It is not in any way a criticism of major pharma, but we need other mechanisms.

So what is out there? Well, one of them is these interesting types of organizations called PDP’s—product development partnerships. There is about five or six of them devoted specifically for vaccines that affect the poorest people. Many of them have been launched through initial support of the Bill and Melinda Gates foundation. Some still have Gates funding, others have diversified.

The other mechanism I think that is out there is there is about a dozen countries that we call IDC—innovative developing countries. These are countries with great pockets of poverty, but punch above their weight in terms of making biotechnologies. So India, China, Indonesia makes vaccines. We have Brazil making vaccines. Cuba makes vaccines. But then, we have big gaps in the world where no vaccines are made. So, there is almost no capability for making vaccines in the Middle East, almost no capability for making vaccines in Sub-Saharan Africa, and very little capability of making vaccines for the Islamic world, which counts for a big percentage of where these diseases are.

I think looking at how we are going to integrate PDP’s together with developing country manufacturers, and they literally call themselves the developing country vaccine manufacturers network. You can actually go to that specific website. We are also going to need some innovation and financing. If we look at where funds are going to come from, clearly the National Institutes of Health, in my opinion, is a bit tapped out. I do not think we can go back to the NIH and yet ask them to set aside more funds specifically for neglected disease vaccines.

What I have proposed in the Public Library of Science back in 2011, and almost everybody hated the idea, was to...if you look at the president’s global health budget which is around \$10 billion—that includes PEPFAR, that includes the president’s Malaria Initiative and neglected tropical diseases. If we could just set aside 1-2% of that for neglected disease product development that would pump \$100 - \$200 million new dollars into the system. I think that could be game changing.

I also think that we cannot rely exclusively on the United States. If you look at the Policy Cures G-FINDER Report, roughly about 69% of all neglected disease R&D is supported by the United States government. So, I think it is unfair to continually always ask the United States to provide all of that support. If you look at the countries that provide the leading support, number one is the United States, number two is the UK government—United Kingdom, number three is the country known as the Bill and Melinda Gates Foundation, and then it really drops off precipitously. What we are

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finding is that...so we have a lot of underachievers. We have underachievers like a lot of the BRIC countries—Brazil, China, India—they need to step up and provide a larger percentage of R&D support for global health products. As I said, the Middle East I think is going to be a very important one, particularly because I think that is where the next shoe is going to drop in the Middle East.

We have this terrible situation right now where our technical ability to make a vaccine has outpaced our social, political, financial, economic institutions that we have for getting these vaccines actually developed and clinically tested. I think that is where a lot of the focus has to come, not relying exclusively on the NIH in the United States, having the United States do more, and looking at something beyond pharma like PDPs and developing country manufacturers. Thank you so much.

Ed Howard: Thank you Peter. I just got word that Larry Gostin is not going to be able to join us today. You will have the opportunity to ask questions and there are materials that go to the questions that he was going to talk about. Jeffrey Gold, can you...

Jeffrey Gold: Thank you very much. It is a great honor to be with you today. My background is in your briefing materials, as is this slide deck. So, I will not read it to you. Most important, my email address, website, contact information is shared. Please feel free to use it at any time. Unlike my colleagues sitting at the panel, I am not a subject content expert here. I am a nearly recovered cardiac surgeon who happens to be the chancellor of a large public university in the middle of the United States. So, what I am going to share with you is what our initial experiences have been, what got us here, and a couple of thoughts about the future. And by the way, I should add that I agree with everything that my colleagues have said.

Briefly, why Nebraska? How do we get a team of young women and young men who are willing to risk their life every day to build and maintain the preparedness of this unit? What are our early reflections on the experience, and what do we think it's going to take to create enduring preparedness for the United States and how that's going to influence the rest of the world?

Academic health centers are the pillar of this—relevant education programs, groundbreaking discovery, world-class health care delivery, broad community engagement, and medical readiness to respond with capacity. That is an aerial view of what the Nebraska Medical Center looks like. Lots of education, lots of research, lots of health care that come together in a crisis time to deal with this kind of situation and has excess capacity, brain power, and also workforce to try to make this happen.

We are centrally located in the United States. It is interesting that this artist did paint the state of Nebraska red. I guess it is because of the football team. We are within a rock's throw of the United States Strategic Air Command. We are a UARC—University Affiliated Research Center, the only one focused on WMD—weapons of mass destruction. We are less than ten miles from Offutt Air force Base. We are a large, multidisciplinary health sciences University and a large Hub health care system, and also the home of the State Diagnostic Laboratory. So, from a geographic and from a neighbors and relationship perspective, it all seemed to make sense.

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After 9/11 when the weapons of mass destruction and SARS and Anthrax and other things happened, we built and in 2005 cut the ribbon for a ten-bed bio containment unit, which was at that time and still is the largest asset in the United States. It is located within the Nebraska Medical Center, but it sits atop one of the University towers with separate water, separate air, separate access, etc. So, it is almost like a mini hospital in a hospital. It is a joint project of Nebraska Medicine, which is the clinical delivery system, the University, and the state of Nebraska.

As I said, it was commissioned as a Federal asset by the CDC and the military in 2005. It has provided and continues to provide first line of treatment and BLS research in the areas of bioterrorism and also naturally occurring extremely infectious diseases. So, long before Ebola became an issue, this research and this asset for biocontainment for the military and other sources has been in place and has been used. It is fully equipped and staffed to safely care for anybody exposed to a wide range of highly infectious, contagious, and dangerous diseases. I think that is one of the interesting things. After the unit was opened in 2005, it was fully staffed and has remained fully staffed since that time.

The core staff, you see some of them photographed here, is 46 members. They are all volunteers. They have worked together, many of them, for nearly ten years in not only designing the unit bureau tin their state of preparedness—22 nurses, respiratory therapists, 10 core physicians, infectious disease, critical care, anesthesia, and pediatrics. To the best of my knowledge, we are the only unit in the United States that is equipped to stand up care for children with highly infectious diseases. And, many, many individuals have volunteered since the Ebola outbreak. Actually, more than 100 are currently in training given the fact that we may need to scale this for all the reasons you all are well aware of. Then, there are many other critical individuals in our research mission and our educational mission in facilities and grounds and security, etc., that are not part of the core team but are actively involved in this.

The team meets monthly to review policies and procedures, drills quarterly with all the local first responders and the department of health—they go through simulation exercises. They are fully engaged and highly emotionally supported and I cannot underscore how important it is to have them work together and to trust each other because they literally bet each other's lives and the lives of their families every day on the fact that every single member of the team is doing their job perfectly and they trust each other to do so.

Every ongoing change in research, policy, practice is brought into the new protocols. We try to stay very much on top of things. We communicate with our public and multiple national organizations, with STRATCOM and OFFED and other DOD entities—CDC, etc.—as all of this changes. We have a few connections on the federal and on the state level. The alphabet soup is truly amazing, from the CDC to the Department of Defense, state, HHS—I just came from a meeting with Ron Clain [PH] this morning—USAMRIID, of course we work closely with both houses of Congress, US-AID, STRATCOM, the World Health Organization, and on and on and on. I would also like to say that we work extremely closely with Emory University and we are literally joined at the hip as we are the major resources in a decade each of bio containment policies and procedures. We work with the NIH. We reached out and spent an extensive amount of time with the people in New York City during their recent needs.

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The current US capacity is this: Four existing BCU's with a total of 16 beds. If they were all utilized, that is ten in Nebraska. By the way, realistically speaking, there are probably seven beds in the country because there is no unit that I know of that's going to give up their last bed, because in an event a staff member would become ill you'd always want to reserve one bed for a staff member. Those institution units such as ours that have two bedded rooms understand that you can only put one patient in a room. So, when you do the math, that is seven bio containment beds in the United States of America as we sit here. So, we clearly need more capacity within existing units and we need more facilities.

Most hospital are lacking expertise of highly infectious disease treatment and there are only recently nationally standardized training in highly infectious disease and facility assessment. That needs to be put into place and needs to be monitored. Twenty-four by seven staff need to be made available as we have and Emory has to evaluate and receive patients. Ongoing rigorous training not only insures competence of the team, but creates tremendous public confidence. I think the communities that know that you r people have had a decade of example and are skilled in what they're doing have tremendous confidence in the organizations as opposed to the lack of confidence that is unfortunately rampant across the countries who go through airports and other communities. We need to communicate the process effectively and repetitively. As I like to say, we have to continuously reassure the curious and the fearful clearly, frequently, and through a multimedia approach. There are any number of people who are curious and unfortunately there are even a small number of those that are truly fearful.

Working with global media has been a very important art of what we do. This is a map of the broadcast media density since we accepted our first patient on September 5th. We have not exceeded 650 million homes through the broadcast audience and approximately 125 million impressions in the print audience. Not to mention, all the social media interaction that has occurred. So, we were and as is Emory, immediately cast into the public spotlight. Again, we monitor and engage constantly.

Tremendous activities on the educational level—huge demand. We have implemented a multimedia approach. We've worked with Apple computer through iTunes U. We have put up material through multiple electronic health record systems, etc.—all free, all just in time learning. But, we know exactly who is using it. We have a large piece for the public, which is very widely used as well, attempting to answer questions about what do you need to know, what do your children need to know, what is it related to your pets, what's the latest statistic, as you heard earlier, etc.—just one common place. It's based on a formal academic curriculum and it's multi-audience focused for public health care professionals, etc. That is the website for iTunes U.

So, very briefly, what are our lessons learned and where do we think we are going? A decade of planning and practice matters. This is a prototypical example of teamwork and building trust within the organization. Partnerships with worldwide and US resources are critical and cannot be underestimated. Clear, frequent, and accurate communication is key with the media, internally within the organizations, and through the national organizations as well. I cannot underscore this enough that every tiny detail of care and logistics matters down to how you tie the bow on the bio

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containment equipment, makes a difference between life and death. There is no detail that cannot be focused on.

It is a truly organization wide effort. It is expensive—very expensive, and is yet un-reimbursed in any way. We can spend hours talking about how this can and should be financed, but right now there's been no way to do it. The public and political opinions have an impact and we're sensitive to that. I know you are as well. There are predicted and unpredicted personal and organizational risks including death threats, bomb threats, all kinds of things that occur and centers down to taking the children of our employees and asking them to not attend daycare, asking them not to attend church, asking their parents not to go to senior citizen care, that have tremendous ramifications on staffing these units and maintaining a highly critical staff. I tell people to expect the unexpected. Stuff just happens. It is a true test of leadership of academic medicine in America at a critical time for us. Our reputation as well as our health is at stake. But, I do firmly believe that we are up to this global challenge and we will surely succeed.

So, what is it going to take to sustain national readiness? Well, first, training for hospitals and teams on highly infectious diseases is essential and we are working closely with HHS and the CDC with Emory to deploy that. We have teams that are training as I sit here today all across the United States and will continue to do that. Reimbursement for lost revenue and unrecovered costs for preparedness is essential. We have to continue to maintain the preparedness and cover the costs. It costs approximately—we compared our numbers to Emory—it costs somewhere between \$25,000 and \$35,000 a day for an average hospitalization of approximately 20 days for each of these patients we care for here. Not to mention, all of the other associated costs for preparedness.

There must be an independent, national containment unit accreditation program to ensure training and skill levels are maintained, just as there are transplant units, just as there are artificial heart units, and just as there are labor and delivery standards and many, many other standards in the United States. There needs to be a set of standards for this that need to be widely understood, taught, and tested. We need to expand the current facilities. Each of us have capacity to expand, but we need resources to do so.

We need national registries of patients and contacts so that we can track who is where when. We need to establish and enhance triage and communication system of core hospitals and transfers so that we can compare notes as effectively as possible. As opposed to spending literally hours on the phone every day with Centers for Disease Control, World Health Organization, state, and others. We need to get that communication better honed. Then finally, as Peter said, and I agree completely, we need funds for expedited research and clinical trials.

But I would like to take one more minute of your time, if I may. And just tell you why we do this. And maybe you could cue the video for us. This is Dr. Rick Sacra, the first patient that we had the honor of caring for on September 5.

[Video clip 00:45:58 to 00:46:04]

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Dr. Rick Sacra: Centers for Disease has declared me safe and free of virus. Thank god! I love you all.

Jeffrey Gold: I just wanted to tip my hat in particular to our team, nurses, respiratory therapists, and technicians. You were boots on the ground 24 hours a day. You acted with courage and compassion. And I am very proud of every one of you. Thank you.

[Video clip 00:46:19 to 00:46:32]

Dr. Rick Sacra: I am so grateful. Thank you so much. And you know you all have made me feel so welcome here that I am now an official lifetime Huskers fan. Go big red!

Jeffrey Gold: And we have one more very, very brief clip if you can play it, if you have it. If not, we can just end at that point – probably not. Anyhow, that was Deb Sacra. And one of the side benefits of this was I have gotten to know all of these patients extremely well and their families. I was actually in the unit yesterday when Dr. Salia died and was with his wife and sister when it happened. And you really get to know these people extremely well.

And Dr. Sacra particularly because he talked about his experience. He and his wife lived in Liberia for 15 years when their children were younger. And the tragic care and lack of care that is going on there has to be addressed if we are going to create safety in the United States.

Anyhow, thank you so much for giving me the privilege of sharing this with you today. My contact information is in your briefing materials and your slides. I like forward to your questions. And please do not hesitate to call me and call us at any time. Thank you.

Ed Howard: Terrific! Thanks, Dr. Gold. Now it is time for you to enter into the conversation. As I pointed out, there are microphones you can use to ask questions in your own voice. If you do, I would ask you to keep the question brief and identify yourself. And if you have one, an institutional affiliation. If you prefer to remain anonymous or anomalous, you can write a question on the green card in your packet and someone will bring it forward.

And I would also say to the panelists, if you have any other comments in response to what you heard your colleagues say, you should feel free to break into that at any point. And, of course, Jen will be asking questions as well. We will start on the left.

Liz Szabo: Hi, I am Liz Szabo with USA Today. And Dr. Gold, I was interested in this 30 thousand dollar a day cost for the Ebola patients. Have you talked to government agencies about getting reimbursed? Who would potentially pay you back for that?

Jeffrey Gold: Well we have talked to the third party payers. We have talked to the employers of the patients that were involved. And by the way, this is just the direct cost of nursing care, supplies, equipment, and etcetera. And we have also talked to a good number of people in defense in state, Centers for Disease Control, and others. As yet, that question has not been answered either

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retrospectively or moving forward. No, we have not asked that question ever before accepting a patient in transfer. But at some point, we will have to deal with that.

Ed Howard: Can I follow up on that Dr. Gold? You talked about a marvelous team that you have assembled and that has been together for the better part of the decade. Who pays for that?

Jeffrey Gold: So to date, this is unlike the Emory team, which is in contract with the Centers for Disease Control. We have maintained the cost of the preparedness. And that core team, we calculated, costs approximately 350 thousand dollars a year to maintain the expertise of that team through the drills, practice, and etcetera. And that does not count the huge amount of in kind [PH] time that comes from our physician leadership and our facility leadership that goes into maintaining the preparedness. But I will tell you. The ability to stand up this response was truly based on having a team that was really ready to go at a moment's notice.

Ed Howard: Okay. Yes, go ahead.

Audience Member: Good afternoon. My name is Roman Ammoman. I am from Russian Language American Channel. So we are speaking about global media attention. Today, the nurses from National Nurses United had a protest in front of Department of Labor. And they told really interesting stories about situations in the hospitals of the United States where they do not have the necessary equipment still. And I want to quote.

They say something interesting. "The Center for Disease Control and Prevention has issued updated guidelines. They are still inadequate and they are not mandatory. And Centers for Disease Control has no regulatory authority". Another quote, "the Occupational Safety and Health Administration that does have this authority does not do enough." So my question is for all experts here. Do you think that Centers for Disease Control has to have more authority? And do you think that American hospitals now have all necessary equipment to protect nurses, patients, and public?

Peter Hotez: So I will start out. Thank you for that question. I think every hospital in the United States should have the ability if a person walks into their emergency room, certainly every acute care hospital, to isolate and appropriately diagnose a suspected patient with Ebola virus infection.

Having said that, I think one of the things that we learned in Dallas (and I think we will see this elsewhere) is taking care of patients with Ebola virus infection or other complicated infections is not simple. Because the virus still gets very high towards the end stages of the disease. And transmissibility becomes easy at the end states.

And so I think we are seeing we should create a separate tier of, just as Dr. Gold has said, specialized hospitals that can be referral hospitals for Ebola. I think we probably need to expand that capacity. And my State Governor, Perry, has identified University of Texas – two University of Texas hospitals for that purpose.

Where, just as Dr. Gold points out, nurses are trained on a regular basis. Healthcare staffs are provided on a regular basis. But the vast majority of acute care hospitals should not be in the

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business of managing Ebola virus patients unless something catastrophic happens that we have a huge outbreak in the United States.

Jeffrey Gold: I agree completely that we need a multi-tiered system. We need the ability to rapidly diagnosis and isolate patients when and if they show up in airports, show up in hospitals, show up in sports facilities, etcetera. And then we need a small number of very skilled facilities with practice teams, all of the state of the art equipment necessary to care for these patients. And we need to scale the current resources. And they need to be strategically located across the United States to handle both the military as well as the civilian needs.

And to answer your question about equipment, there are all kinds of perceived shortages of personal protective equipment. We have not experienced any of that because Emory, our center, and one or two others, of course, are the designated centers in the United States. And we are pretty well stocked. But as a result of that, hospitals are duplicating, triplicating orders. And so there is a perceived need that may be existing. Also, the national stockpile has collected a good deal of personal protective equipment as well as a further reassurance in event this escalates.

As it relates to your point about policies and procedures, this has been evolutionary with the Centers for Disease Control. We monitor it very carefully. We have really not changed our policies and procedures. And currently, our policies and procedures are very, very close to the Emory policies and procedures. And the Centers for Disease Control have essentially modeled the current policy and procedures on the combined University of Nebraska Medical Center and Emory procedures.

Unfortunately, they are literally hundreds of pages long and detailed. And so what we have done together is we built some instructional videos. Because that is really how you are going to educate people. It is going to be very hard to get somebody to read through hundreds of pages of single spaced text, not have the opportunity to see it, and then practice it.

Jennifer Kates: Just to add very briefly to your question about Centers for Disease Control and authority and not to answer exactly. But I think it is a much bigger issue than that. Because Centers for Disease Control, the current way in which public health recommendations and guidelines are promulgated in the United States is as recommendations.

The Centers for Disease Control does not have the enforcement authority. That is really at the state level. So it is a much bigger question as to what – how would we think about public health and the relationship between the federal government and the state governments in terms of adopting regulations and how we would go forward. So it is not necessarily one that can just be solved by this current issue.

Jeffrey Gold: And to underscore that, I mean we are truly tied at the hip with the state government in Nebraska. And we have a daily, at least daily, conference call with them about all of these matters. And so we stay very tightly aligned.

Audience Member: Hi, thank you all for a great panel. My name is Sonya Sperry. I am with Congressman Bill Keating's office. My question, I think, is for Dr. Gold. You made some really

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great recommendations at the end of your presentation. And I wanted to know if you think that the president's Ebola request addressed any of those recommendations and what you think of the president's request?

Jeffrey Gold: I am grateful that resources are attempting to be garnered to not only deal with the Ebola challenges, but to deal with the next wave, and the next wave, and the next wave. I mean in some regards, it is actually favorable that this is Ebola because it has only spread through body fluid contact. If we were talking about aerosolized infectious materials, we would be talking about a much bigger problem across the United States and around the world.

So there are three phases to this. There is the management of Ebola both here and Africa. There is the preparation for the next infectious disease outbreak of these neglected diseases and others that we have yet to learn about. And then there is what we are going to learn about better hospital care.

So there are things that are coming out of our experience alone and I know from Emory as well that are going to reduce hospital-acquired infections in the United States. And are going to make routine hospital care for labor and delivery, for total joint replacement, for cardiac surgery, safer. So all three of those halo effects have got to be looked at as the outcome of this funding proposal.

In answer to your very specific question, I do not think the funding proposal carries the detail, the granularity, at the level I discussed. We are working very closely with Health and Human Services and the Department of Defense. So as I said, I was with Ron Klain earlier this morning. And to try to make sure that these principles are carried through in the final appropriation.

I mean one of my biggest concerns is that it ends up being a mile wide and a millimeter deep. The country has a very small number of fixed assets that really can scale up quickly and provide the educational materials. And so to spread this very widely across all of the states and all of the jurisdictions, while it may be a politically expedient thing to do, is not going to get us to where we really need to be to really jump start this. And that has been the message that I and Reig [PH] Kaufman, my colleague at Emory, Centers for Disease Control, and others have been trying to share. But if you have any suggestions on how to do it better, we would like to share that. Thank you.

Audience Member: Hi, Linda Bennett with AFSCME and I just wanted to point out, in reference to the question about OSHA (Occupational Safety and Health Administration). We have asked and you guys have graciously included a fact sheet that we have about how protecting healthcare workers is so important for protecting the public. One, because, as Dr. Gold has pointed out, if this was a disease that was spread the way H1N1 was spread with the combination of the fatality of Ebola, we would be in serious problem nationally. And we are not ready.

So there is the combination of Centers for Disease Control guidelines, which are vital, important, and thoughtful. And often overlap with Occupational Safety and Health Administration standards for bloodborne pathogens for personal protective equipment for respiratory. Because some of the – though it is not by air, some of the materials through the vomitus and stuff can be aerosolized. And that is why the workers do need specific protections. And respiratory protection is important.

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We just want to point out that fact sheet is there. We have been – a number of unions have been pushing for Centers for Disease Control to at least reference the Occupational Health and Safety Administration guidelines because they are mandatory on hospitals and through the Centers for Medicare and Medicaid. The bloodborne pathogen compliance with it, the bloodborne pathogen standard is a requirement for hospitals that are not otherwise covered by Occupational Health and Safety Administration.

So every public hospital in the nation is covered by the bloodborne pathogen standard if they take Medicare reimbursement, which is the case. So there is a way to leverage more protections for workers, which then means protection for the public. And security for the public to know that the healthcare system is secure.

Jeffrey Gold: And therefore, the key to enforcement becomes the conditions of participation.

Jennifer Kates: We have a lot of really good questions that have come in. This is one that any of the panelists could take. I will ask Josh to start. But it is a very good question about public attention to Ebola and about how that has ebbed in recent weeks. And will that potential reduction in attention or concern among the public affect government and private sector support for the Ebola response, particularly in West Africa. So will it affect funding generally? Will it affect vaccine development, support for frontline healthcare workers? How will – what is the relationship? And this is obviously – no one might have the exact answer, but if you have any thoughts on that. Start with Josh.

Josh Michaud: Sure, I think speaking on the global aspects of the response and then maybe turning a little bit to the United States. But in the funding data that I had shown, not included in there were the pledges, which are outstanding. So a number of donors, organizations have made concrete commitments and actually have had money go out the door, which is mainly what is reflected in those graphs.

But yet there are unfunded pledges, which are still out there. So the World Bank has made a pledge of hundreds of millions of dollars. But they have not put that out the door. So there is still money coming down the road to support the Ebola response. And from the numbers, it looks like it is still increasing. But as we know, we do not know where it is going to go from here.

Sierra Leone, the increases in cases there became a little bit of a surprise. So there is going to be this ongoing need to address it in West Africa. And as Tom Frieden and many others have repeated on and on to truly to protect the United States. What we are going to have to do is stop the epidemic in West Africa.

So as far as dulling the financing for the response in West Africa, no immediate concerns about that. But if it continues for many weeks and months down the road, that might be a concern because of this built up momentum that is there in the system.

I think anybody on this panel can agree that there has been a dramatic decline in attention just by the number of interview requests, television spots, and stories about Ebola, particularly on the West

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African epidemic side. And that is a little bit troubling. So it is hard to say what the actual effect will be down the road. But I think the immediate effect is not readily apparent yet, at least from my perspective. I would worry about it having a future effect though.

Peter Hotez: The question about the media attention is interesting. I think that was on MSNBC, FOX, or another station almost every day in the month of October. And then it was almost a very abrupt decline. And I think a lot of the concern was because of the potential threat to the United States. It was very based on that. And I hate to be cynical. But I think one of the things that I have been finding with media attention is if it is concerning people in Bethesda, Maryland, Brooklyn, Massachusetts, West Chester, and New York, then it becomes a national problem. And if it is not of great concern to people who live there, then it flies off the radar screen.

One of the things that I say when journalists ask me if I am worried about Ebola coming to the United States, I explain not for many of the reasons you explain how the disease is transmitted. But I do say, by the way, we have 12 million Americans now living in poverty with one or more neglected tropical diseases. And then I say let me tell you about Chagas disease. No thank you, Dr. Hotez, we are out of time now. And so it is interesting how things rise to the level of the media.

Jeffrey Gold: Just a quick comment, we are about to deploy several thousand more Americans into West Africa to stand up some of the field hospitals in theatre in attempt to control this infection. The holidays are coming up when people who are doing volunteer service in West Africa are almost certainly going to come home and spend some time with their families. And we are heading smack dab into what has got to be an extremely flu season. So add all that up, shaken and not stirred, and what you are going to end up with is a lot of people coming back from West Africa who develop fever. And it is going to raise the level of awareness and concern at least for the next several months.

Our job – my job is very much to be sure that we do not lose the level of preparedness that we are currently building. And that we can find a way to sustain that in an economically favorable way. And to be sure that we the side benefits that spin off in terms of hospital safety as well as enduring preparedness are there in a measurable, tangible way.

Audience Member: Hi, thanks. Darrel Henry, Executive Director of the Healthcare Coalition for Emergency Preparedness. And Dr. Gold, I would like to give you kudos to your facility, your staff, and everybody. We cite you guys all the time as the way to do the job. And you should be commended.

We were one of the first groups to call out the Ebola waste issue and the problems that Emory and others ran into dealing with it. Obviously, it fell through the cracks at Emory in the preparedness. So I would like to – Dr. Gold, if you could address your experience with that and talk to – do more healthcare institutions, especially our Army medical centers, Veterans Administration, trauma centers have autoclaves onsite to deal with Ebola and future potential diseases such as this? And at the same time, looking towards Africa, should we be deploying some of that technology that we use here over there as the German – the person who died in Germany was the doctor that was in charge of medical waste at his facility. So we have seen that it can kill.

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Jeffrey Gold: So this is a critically important question. It is as important as vaccines, antiviral agents, and convalescent serum. So to the best of my knowledge, we are the only center in the United States that actually fully decontaminates the waste before it leaves the unit. And so all of the waste that we generate is handled as routine hospital waste. Because we have specialty designed autoclaving systems that are built into the unit to allow that everything that is passed through is completely decontaminated and then disposed of routinely.

There is a huge risk that is created by having to transport these highly contaminated materials to sterilization and decontamination sites. And we are very aware of that. We have shared the design plans with anybody that wants them. They are all on our website. What I know is institutions across the country are thinking about standing up units. This is a major consideration as I understand that the waste that was generated in New York City in recent weeks had to be transported halfway across the country on an 18-wheeler in order to be disposed of, by the way, in Texas.

I think I have to excuse myself. I have a testimony before the United States Congress, which is a small organization on the other side of the street. So I am going to do that. But I am quite sincere, folks. If you would like to reach out, do not hesitate to call, email, send smoke signals, or whatever. It is a great honor to be with you. And thank you for the privilege.

Ed Howard: Dr. Gold thanks very much. Yeah?

Audience Member: I am Jim Landers of the Dallas Morning News. I am curious about why the epidemic in West Africa is stabilizing, lowering. I mean when this disease reached Monrovia and Freetown, I did not see any possibility for containment given the health facilities they have there.

Josh Michaud: I will try to answer that question. I think the article has not been written explaining completely why this has occurred. But I think it is undeniable that it has occurred. The Ministries of Health in Liberia, the World Health Organization, the Centers for Disease Control, the MSF (Medecins Sans Frontieres), all agree that cases seem to be stabilizing in Liberia.

And we should talk about Liberia alone because Sierra Leone and Guinea are different cases. But there is some suggestion that there has been – because of the changes made in behavior around burials and also the mandate from the government that bodies are disposed of by cremation rather than burials have had an important effect. There is probably (and this is speculation) a behavior change effect.

It became such a large problem that people changed their behavior in the face of what became an undeniable threat. Previously, there had been lots of denial about Ebola that it even existed or that it was something else entirely. I think that mentality has waned somewhat and there has been real concern. And then just the resources that have been put toward it, the building of the clinics, limited as they are, have had some effect, particularly in the capital.

So the situations that you had alluded to in the past do not exist to the great extent that they did. So things had fairly rapidly changed. I think people are mostly surprised at how rapidly they changed.

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And there is no telling where it is going to go from here. But I think the news from there is quite positive for all those reasons.

Peter Hotez: Josh, if I can – oh, I am sorry. No, I was just going to say that that is a very good answer. This is not a disease that people are getting walking in the open markets of Monrovia. This is a disease that is not infectious in the early stages. It is only when you are sick or moribund that you have a huge amount of virus. And then therefore, there is a possibility of transmission -- or if you are washing the bodies of the newly dead.

The World Health Organization accordingly adopted the school of what they call 70/70/60 meaning that 70 percent of the people killed by Ebola need to be buried safely. And we need to get 70 percent of those with the disease treated in a hospital like setting with 60 days. And the prediction is once you meet those goals, then the epidemic will start to shift downward. And it seems that may indeed be the case in Liberia.

Ed Howard: And I was going to just ask. Josh, you mentioned in your presentation that Nigeria and Senegal have been declared Ebola free at this point. And I wonder how that happened when you have got such a large concentration of people particularly in Nigeria.

Josh Michaud: Right, there were lots in turn about Nigeria. And I think in the end, I cannot remember the number of cases, they had 20 or so. There was an all hands on deck effort in public health. The Centers for Disease Control supported this. But the Nigerian public health system sprang into action as it were. They were already primed for this action because some investments had been made in the global Polio Eradication Program and set up an emergency operation center to track polio cases as one of the last three countries where polio is still pandemic.

They have had a lot of investments in that area, which was pivoted towards to the Ebola response. So I think they took the threat very seriously. They put the assets they had towards it. And they had this prepositioned emergency operations center and other assets related to it. But it was a lot of shoe leather epidemiology getting a lot of hours logged to tracking contacts, knocking on doors, finding contacts, and things like that. So it was not just luck. There might have been some of that. It was a lot of hard work involved in doing that response. So they did it right in a way.

Unidentified Male: Josh, you have been with the University of Michigan. You mentioned there is going to be volunteers from Africa coming home this holiday season scattered all over the country. We clearly have extraordinary places like Nebraska that were featured here that know as much as there is to know. But there is also – these volunteers are going to be going everywhere. They are going to be seeing doctors, hospitals, and all sorts of places.

I guess the question I have – going on today; there is a meeting of the American Medical Informatics Association here in D.C. And there is the American Public Health Association meeting in New Orleans. And I use that example because these are two disciplines that clearly interact in solving these kinds of problems and making sure the information gets everywhere it needs to go. And yet they are literally fragmented in the sense that you cannot be at both. Obviously, they are two different things. And that is just one example.

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How in the face of various fragmentations do we try to solve this problem of getting – we are never going to get everything that Nebraska knows. But getting a lot of that type of stuff to every doctor, every hospital so at least they know what to do when someone comes, so they have the absolute latest information, latest training, enough so at least we get the patients to Nebraska or to wherever they need to go?

Jennifer Kates: I am looking around at the panelists. And no one is volunteering. So I think – we already go to this a little bit about how the multi-layered approach that not every hospital is going to be a specialist in the response. But I think the scenario you painted is an interesting one to think about. There are protocols in place. So all of those volunteers coming back and all the healthcare workers coming back who are working in West Africa are actually going to be going through certain airports, getting certain screening, following certain protocols, which, as we mentioned earlier, somewhat determine – Centers for Disease Control can recommend what those are. States also are going to be involved in that.

But I think the hope is that with all of the awareness raising that has gone on with Centers of Excellence like we have that that will be a much more controlled response. But I think we have to acknowledge that that is a point to watch and see how it is handled in the United States. When people are coming back, especially since a big issue that has just occurred was the need to respect healthcare workers who are putting themselves at risk and coming back home and wanting to provide them with as much safety and security as they need as well.

Do you want to take some more?

Ed Howard: Sure, we have about ten minutes left. We have a lot – an hour and one-half worth of questions on the cards. So if you want to be sure that your question gets addressed, remember the microphones. But in the meantime, Jen has been sifting through them.

Jennifer Kates: These are excellent questions. Here is one that Dr. Gold would have, I am sure, been great to answer this. But I think we can get at it. It was in reference of Dr. Salia who was reported in the news. This was the doctor who, unfortunately, died yesterday who was being treated at the University of Nebraska. But he had a delay in being diagnosed that he had a false positive test initially, still had symptoms. He was not actually diagnosed until about a week or so later. And someone said that is a factor in why he got so sick. He was not....

Unidentified Female: I am sorry. Excuse me. I had to correct you. That was my question. It was a false negative test.

Jennifer Kates: Sorry, a false negative test. Sorry, the bigger question was about diagnostic testing. And how accurate, how available are the diagnostic tests that we have. So that was a situation that he got a false negative. Thinking he was negative, he still had symptoms. He went back later and was retested and he was positive. So does any – Josh?

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Josh Michaud: I can start and Peter, I am sure, can add. So yeah, this is a big gap still. And the gold standard testing for Ebola, you still have to wait typically three days after someone first shows symptoms to actually start seeing a positive test on the polymerase chain reaction, which is the gold standard test.

So if someone is tested for that time window, it is not one hundred percent sure. But it is possible that you can get this false negative effect. So even if they are infected. This is apparently what happened in the case with Dr. Salia. So there is no immediate solution to this given that that is the golden standard right now. So clearly, better, rapid diagnostic testing is needed.

There are some experimental diagnostics out there. Perhaps Dr. Hotez can talk about that. But as for now, for the widespread testing in West Africa, that is really the gold standard and I think in the United States. But I am willing to be corrected on that. So this is a real gap. And I think it is explained by the lack of funding, just as there is a lack of vaccines, just as there is a lack of treatments, despite the fact that the science is probably there to get these things out the door. The financing has not pushed it forward as quickly as it has been needed.

Peter Hotez: Yeah, that is a good answer. The test that is generally used is what is called a reverse transcription polymerase chain reaction. And it is a very sensitive test. But it also highlights the fact that in the early stages of Ebola virus infection, the amount of virus you have in your body is very low. So much so that even that is below the point of detection of reverse transcription polymerase chain reaction, which is generally a very sensitive test. And that is why people in the United States do not have to worry about getting Ebola going on subways and going in bowling alleys because the amount of virus is so profoundly low. And it is only when the virus shuts down your interferon response at a later stage of the disease, when you are sick and moribund that the viral load gets extremely high.

Audience Member: I am Dr. Drew Kemark [PH] I am from the Senate Special Committee on Aging. And as an add on, you talked about the reverse transcription polymerase chain reaction test. But is there one standard approved test that we use in the United States? Is it a commercial test? Is it one – say this particular company makes the test and this is the test we are using so we can be sure that – is that true? Are people using a variety of different tests?

Peter Hotez: Well my understanding is it is not a standardized commercialized kit. That is my understanding that it is – they are using the same primers for the polymerase chain reaction from the same protocol.

I think what we do need to move towards is a point of care diagnostic, which would be almost like a pregnancy test if we could get one that is sensitive enough. I think that would be a game changer.

Ed Howard: Yeah, let me get this. I am going to ask our panelists to channel their inner Larry Gostin if I can. You may remember the case of – I think her name was Casey Hickox, the nurse who had been volunteering in West Africa, came back to the United States, and had a variety of governmental entities trying to control her activities after that. And it raises the question of the authority of government to do what needs to be done to contain this disease.

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Who has that authority and what are the limits on it? How has it been exercised? I guess the first two parts of that more important. Anyone want to take a crack at that?

Peter Hotez: I will just say – it is not going to directly address your question. But I do think it was unfortunate that the governor of New York and New Jersey adopted policies that were not grounded in science that they were grounded in politics. And I guess that is not a huge surprise. But that is one of the things that we are – which is unfortunate because, of course, New York and New Jersey have some of the finest research institutes and universities in the country. And it would have been possible for both, each governor, to assemble a task force of experts to advise them appropriately. And that was not done.

That is what we did in Texas. We created a task force of scientists to advise the governor on what actually makes sense. So in terms of legal authority, I think the governors did have the legal authority to do that. Of course, I am not an expert. And I would defer to an expert. But it is unfortunate that it was based on politics, not science.

Jennifer Kates: Just more generally, on the legal authorities, the current legal authorities are that if there is – Health and Human Services has the legal authority to quarantine and to exert that with limits for anyone who is coming into the country from another country, so entering the border of the United States or interstate movement. Anything within a state is under the authority of the state or local government. And that is pretty much the entwinement in how our federalism and constitutional power – separation of powers work. There are some potential exceptions to that. But in general that is the way it works.

There are, however, limits to that authority. And those have been challenged at times in the past. And I think that was what was raised here. This nurse clearly was coming in from another country. So that would raise Centers for Disease Controls ability to be part of it. But within New Jersey then to Maine and I think she brought to court some of the issues about her restrictions, particularly because the question is when the federal, local, or state government have the authority to quarantine somebody.

In other words, hold them somewhere away when they do not have any evidence of the virus. That was the key here. She actually did not have the virus. She did not have symptoms. So even if she had the virus, she was no infectious. But she did not actually have the virus. In that case, there are limits on what the government can do. And that was the big issue there.

Josh Michaud: Just a quick add on, is what you get in the system that Jen described is, of course, a constellation of different rules and regulations across the states, which may be a good or bad thing depending upon your point of view. But when you are trying to tackle one particular disease like Ebola, it is kind of confusing for the public and maybe public health authorities.

And just to throw in that the Department of Defense has its own regulations in this regard. And the last I saw, requiring that returning soldiers who were performing in what would be the Centers for Disease Control's low risk category to basically be in 21 days of quarantine after returning from

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West Africa, which is above the level of concern shown or the level of caution shown in the federal guidelines generally. But in keeping with previous military policies in regards to return from high risk areas like this.

Ed Howard: We have time for two quick questions.

Audience Member: Kim Zavareh for the American Academy of Nursing. It is estimated that about 50 to 70 thousand people die a year of hospital-acquired infections, particularly *Clostridium difficile*. What measures specifically that have come out of the Ebola and preparedness for that can be applied to *Clostridium difficile* and other hospital acquired infections? And are you hopeful that it actually will happen or will this fade away as the press has gone away and things have settled down?

Ed Howard: And can you tell some of us who may not know all of the acronyms what C. diff is?

Kim Zavareh: Oh, C. diff, I will leave that to the medical people to say correctly.

Peter Hotez: Yeah, it is funny. When I was asked, but doctor, Governors Cuomo and Christie are doing this out of an abundance of caution. And I said well where is the abundance of caution of an estimated 99 thou – the number I have is 99 thousand Americans die of hospital acquired infections every year. And 3 to 49 thousand die of influenza. I do not hear them discussing that. So it is disingenuous when they talk about an abundance of caution because there is no real caution about those very serious issues.

I am not aware that the proposed hearings in legislation are addressing that issue. It is unfortunate. But it would be great if they would.

Jennifer Kates: Yeah, I think indirectly there are spillover effects that could be helpful as there is more awareness, more preparedness, and etcetera. But I think the bigger issue that is raised by that question is what is going to come out of this long term whether it is in West Africa or whether it is in the United States. Are the lessons going to actually carry forward and change practice and change preparedness? I think that is the big open question. So is there really going to be a global housed security agenda that makes a difference in countries that have weak infrastructure? It is an open question. And maybe in a year we will all be here and we can say there is a success. But I am a little skeptical of that.

Ed Howard: And the last question?

Audience Member: Hi, I just wanted to clarify a couple of points on the authorities. I am Rachel Morgan with the National Congress's State Legislatures. And this has been a question that has come up quite a bit. It has been in a lot of discussions. The states have the authority through their police powers to regulate the quarantine and isolation. And when it relates to interstate commerce as going across state lines and so forth, then the federal authorities kick in. Now, of course, the governors have that ability to request that the federal agencies come in and assist them when needed. But otherwise, that is a state authority.

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Ed Howard: Okay. Always glad to end on a factual note. Let me remind you that it would be great if you would take a minute to fill out the blue evaluation form as we get to wind down here. I want to thank our colleagues at the Kaiser Family Foundation for not only great co-moderating and occasionally even greater participation in responding. But also for some of the great materials that you will find in your packets. And there is a terrific concentration of usable, understandable explanations of some of the tough issues in your packets largely from the foundation.

So the other thing I would like to do is to thank our panel. And I would ask you to join me in doing that.

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