Good afternoon. I'm Commander Ibad Khan and I'm representing the Clinician Outreach and Communication Activity, COCA, with the Emergency Risk Communication Branch at the Centers for Disease Control and Prevention. I'd like to welcome you to today's COCA Call, Ebola Clinical Presentation: Evaluation, and Infection Prevention. All participants joining us today are in listen only mode. Continuing education is not offered for this COCA Call.

After the presentations, there will be a Q&A session. You may submit questions at any time during today's presentation. To ask a question using Zoom, click the Q&A button at the bottom of your screen, then type your question in the Q&A box. Please note that we receive many more questions than we can answer during our webinars. If you're a patient, please refer your questions to your health care provider. If you're a member of the media, please contact CDC Media Relations at 404-639-3286 or send an email to media@cdc.gov.

I would now like to welcome our presenters for today's COCA Call. We are pleased to have with us from CDC's National Center for Emerging and Zoonotic Infectious Diseases, Dr. Trevor Shoemaker, who's an epidemiologist in the Division of High-Consequence Pathogens and Pathology; Commander Mary Choi, who's a medical officer in the Viral Special Pathogens Branch; Captain Amy Valderrama, a nurse epidemiologist in the Division of Health Care Quality Promotion;And Commander Brian Harcourt, a biosafety officer in the Viral Special Pathogens Branch. It is my pleasure to now turn it over to Dr. Shoemaker. Dr. Shoemaker, please proceed.

Hello, and thank you for allowing us to present today on this important topic of clinical presentation, evaluation, and infection prevention. I'm going to give a brief introduction going over some Ebola terminology, have some definitions around Ebola case definition, and as well as an update on the current Sudan virus outbreak in Uganda before I turn it over to my colleagues to present the bulk of the presentation. Next slide, please.

So first, just with some Ebola terminology, Ebola disease is an umbrella term we use to describe the clinical disease due to infection with any of the six viruses within the genus Ebola virus. And these six viruses are Ebola virus, species Zaire Ebola virus. This is the virus that causes a majority of the Ebola outbreaks in West and Central Africa. Sudan virus, species Sudan ebolavirus, is the one that is causing the current outbreak in Uganda now, and I'll go for a bit more detail on that a little bit later. Bundibugyo virus, species Bundibugyo ebolavirus. We've had two confirmed outbreaks of this in western Uganda as well as eastern Democratic Republic of Congo. And the last three are Tai forest virus, species Tai forest ebolavirus, Reston virus, species Reston ebolavirus, and Bombali virus, which is a newly discovered Ebola virus and not yet identified to cause human disease, but this is species Bombali ebolavirus. Next slide, please.

Continuing with this, Ebola virus disease is a term we use to describe the clinical disease due to infection with Ebola virus, species Zaire ebolavirus, as I just mentioned on the last slide. And now we call Sudan virus disease, this is the term we use to describe the clinical disease due to infection with Sudan virus, species Sudan ebolavirus. Next slide.

So, another term that has been used mostly in investigations for persons and returning travelers coming back from these Ebola-infected countries is a person under investigation or PUI for Ebola disease, and this was also a widely used term back in the 2014-16 large West Africa Ebola

outbreak. But over the last several months during this current outbreak, CDC has received feedback and some concerns from jurisdictions over the continued use of this term, person under investigation or PUI, mainly because the term is often applied inconsistently and not always used in the same way by varying jurisdictions. And it also can be stigmatizing because as a person under investigation, it sometimes can, you know, maybe associate guilt or essentially thinking that the person may actually have Ebola virus when in fact they are actually just being investigated for the potential of that. So, CDC has had some internal discussions and also had outreach and discussion and input from partners. And we will be transitioning away from the use of PUI and move towards the use of suspect case of Ebola virus. And this will be more consistent, and the revised terminology will align with the National Notifiable Disease Surveillance System, or NNDSS, case definition for viral hemorrhagic fevers. That is an approved case definition. Next slide, please.

So that suspect case of Ebola disease or suspect case of Ebola disease definition is a person with signs and symptoms compatible with Ebola disease and an epidemiological risk factor within 21 days before the onset of symptoms. And the signs and symptoms of Ebola disease, and this will be gone over in a bit more detail later in the presentation, is a fever of greater than or equal to 100. 4 degrees Fahrenheit, headache, muscle pain, joint pain, weakness, fatigue, loss of appetite, GI symptoms, including abdominal pain, diarrhea, and vomiting, red eyes, skin rash, hiccups, or unexplained bleeding or bruising. These are all, you know, nonspecific signs and symptoms of Ebola disease, but all taken together with an epidemiological risk factor can indicate possible Ebola disease infection. Next slide.

So what are the risk factors, as was mentioned in the case definition for Ebola disease? And you can see here, these are the specific epidemiological indications and risk factors that we discuss when we are evaluating a person for the possibility or risk of Ebola virus infection. And it's very important why a clinical consultation with any suspect case of Ebola virus that you may encounter with CDC, and my colleagues will go over that a bit later. But the risk factors are contact with a symptomatic person with suspect or confirmed Ebola disease or any object contaminated by their body fluids, experience a breach in infection prevention and control precautions that result in the potential for contact with body fluids of a patient with suspect or confirmed Ebola disease.

And this is usually with health care workers working in the infected areas in an outbreak setting. Contact with semen from a man who has recovered from Ebola disease or participated in any of the following activities while in an area with an active Ebola outbreak. And this can be contact with someone who was sick or died, or contact with any objects contaminated by their body fluids, attended or participated in funeral rituals, including preparing bodies for funeral and burial, and this is unprotected exposure to a dead body, worked in a health care facility or laboratory, visited a health care facility or traditional healer, contact with bats or wild animals, and work or spend time in a mine or cave. Next slide, please.

So those are the definitions and terminology, and I'm going to give a brief update on the current Ebola Sudan virus outbreak in Uganda. Next slide.

So on September 20th of this year, the Ministry of Health declared an outbreak of Sudan virus disease in Mubende District, which is a district in central Uganda, and it is the red square with the black outline in the center of the map on your right. It's a bit small and hard to see, but it is near locations where there have been previous Sudan virus outbreaks in Uganda. This is the fifth outbreak of Sudan virus disease in Uganda, and the largest outbreak in Uganda is not this one, but was in Gulu, which is in northern Uganda in the year 2000. That had a total of 425 cases, 227 deaths, and a case fatality rate of 53 percent. Next slide.

So as of today, the current case count in Uganda is holding steady at 164 cases, with 142 of those being laboratory confirmed and 22 being probable deaths. The cases have been reported in nine districts in Uganda, and you can see them in red on the right side on the map, and there have been 77 total deaths, 55 of them being in confirmed cases, the other 22 being in the probable, with a case fatality rate overall of 47 percent. Next slide.

So this is a detailed table of the case counts by district as of today, whereas you can see the bulk of the cases, as I mentioned, were in Mubende, were the epicenter of the outbreak, with 84 total cases. Next being in Kassanda, which is a neighboring district with 50 cases, and Kampala being the next with 18. The last column on the right is the days since the last confirmed case, and this is the countdown to the 42-day countdown for the declaration of the end of the outbreak, being one incubation period, 21 days, and then they add an additional incubation period for the final declaration of the end of the outbreak. And Kassanda was the last district with a confirmed case, and so we are at day 23 of that 42-day countdown. Next slide.

But still, the risk of Sudan virus disease spread is low, so the risk of importation into the U.S. is low because of these steady case counts and being at day 23 since the last confirmed case. This is also due to the low number of travelers and no direct flights to the United States. There is currently still exit screening of air passengers being conducted in Uganda, and Uganda has experience in responding to multiple Ebola disease outbreaks, including Sudan virus disease. Next slide.

So requests for Sudan virus testing for returning travelers, you can see this is just a historical background information on what's happened for this current outbreak, so I'll go over a few numbers with you. 20th of September 14th of December this year, CDC conducted consultations on 35 ill returning travelers from Uganda. Sudan virus testing was performed for only 3 of those 35 travelers, and all of them have tested negative. But just to put that into a bit of historical context, not in the 2014-16 outbreak, but from January 2017 to December 2021, prior to this current outbreak, there have been a total of 7 outbreaks of Ebola disease that occurred. And during this period, CDC recommended testing in total for 9 ill returning travelers.

And you can see in the table below, between the years 2017 and 2021, the number of persons tested per year and the jurisdictions in which they were tested. So this year is about on average or similar to what will happen in 2017 and 2018. But just of note, the outbreak that occurred in 2017 and 18 was much larger than this current outbreak. But I think the main point is, overall, there is very few returning ill travelers that rose to the level of suspect Ebola and were recommended for rule-out Ebola testing. Next slide.

So with this, I'll turn it over to my colleague, Dr. Choi, to go into a bit more background and detail on Ebola disease. Thank you.

Thank you, Dr. Shoemaker. Ebola is a serious, highly transmissible, and often fatal disease. In humans, Ebola disease is caused by infection with one of four viruses within the genus Ebola virus, and they are listed here. Without treatment, Ebola disease has a high mortality rate. For Sudan virus, this is around 50%. And based on evidence and the nature of other similar viruses, we believe that Ebola disease is a zoonotic disease and that certain yet unknown species of bats are the most likely reservoir. Next slide.

In an infected person, the virus can be found in all body fluids, to include those listed here. The virus is transmitted through contact with the body fluids of a person who is sick or has died of Ebola. Finally, it's important to keep in mind that Ebola disease does not spread through airborne transmission. Next slide.

The most common signs and symptoms of Ebola disease are listed here. As you can see, these signs and symptoms are nonspecific and can be seen in many other infectious diseases. A couple of things to note on the signs and symptoms. First, there is no sign or symptom that is pathognomonic for Ebola disease. Second, fever is not universally present in Ebola disease patients. Instead, it can wax and wane throughout the day, and is detected in about 70 to 80 percent of confirmed Ebola disease patients. This underscores the importance of asking patients about all the signs and symptoms of Ebola disease, and not just about the presence of fever. Finally, bleeding is not universally present in Ebola disease patients. In general, it is a late manifestation and can be seen in less than 50% of cases. Next slide.

I will now review the typical course of illness in Ebola disease. Infection occurs after exposure to a person who is sick or has died of Ebola disease. Next slide.

Following infection with the virus, there's an incubation period. The incubation period is between 2 and 21 days, but on average is about 4 to 17 days. During the incubation period, the infected individual has no signs and symptoms of Ebola disease, and they are not contagious. Next slide.

The first symptoms that appear are what we call dry symptoms, and include fever, headache, muscle aches, and joint pain. Once signs and symptoms appear, the patient is contagious and is capable of transmitting the virus to others. Next slide.

At or around day 4 of illness, patients develop vomiting or diarrhea, and what we call wet symptoms. At this point, the patient is very contagious. It is important to note that the vomiting and diarrhea tends to be severe, and output was reported to be as high as 10 liters per day in Ebola patients treated in the United States. To minimize transmission of the virus, it is critical to identify and isolate Ebola disease patients as soon as they develop symptoms, but especially before they develop wet symptoms. Next slide.

In fatal cases, individuals die around 7 to 10 days after illness onset. The quantity of virus in the body is highest at the time of death. Next slide.

Reverse transcription polymerase chain reaction, or RT-PCR, is a diagnostic test of choice for acutely ill patients with suspected Ebola disease. It is important to keep in mind that the symptom onset date is critical for interpreting the RT-PCR result. In a symptomatic patient, a negative RT-PCR result from a blood specimen collected less than 72 hours after symptom onset does not rule out Ebola disease. In this situation, another specimen would need to be collected 72 hours after symptom onset and tested. A negative RT-PCR result from a blood specimen collected from a symptomatic patient more than 72 hours after symptom onset does rule out Ebola disease. And the interpretation of the RT-PCR result is one of the topics that would be discussed during the clinical consultation call, which I will discuss in the coming slides. Next slide.

Currently, there is no FDA treatment for Sudan virus. However, there is a promising experimental two-antibody cocktail therapy called MBP134. In non-human primate studies, the cocktail demonstrated efficacy in preventing mortality due to infection with Sudan virus, Ebola virus, species Zaire ebolavirus, and Bundibugyo virus. It is important to note that supportive treatment, such as IV fluids and symptomatic treatment for vomiting and diarrhea, can improve chances of survival when provided early in the disease course. Next slide.

Currently, there is no FDA-licensed vaccine for Sudan virus. However, there are three vaccine candidates that are undergoing evaluation in Uganda. It is important to note that based on the available evidence, Ervebo, the FDA-licensed vaccine against Ebola virus, species Zaire ebolavirus, will not provide cross-protection against Sudan virus infection. Next slide.

I will now review recommendations for clinicians. Next slide.

First, we are asking that clinicians collect travel history for ill patients presenting with a clinical picture subjective of an infectious etiology. For ill travelers recently arrived from Uganda, it is important to ask about risk factors for Ebola disease, which are listed here and that we have reviewed previously. Next slide.

We are also asking healthcare providers to include Ebola disease in the differential diagnosis for ill returning travelers from Uganda. But at the same time, it is important to keep in mind that malaria is the most common cause of disease -- sorry, most common cause of undifferentiated fever after travel to sub-Saharan Africa. As we have discussed, the signs and symptoms of Ebola disease are nonspecific, and nearly all can be seen in patients with malaria. Malaria infection, especially falciparum, can progress rapidly, so early diagnosis and treatment is key to survival.

Malaria testing should not be delayed. Also, it is important to ask ill travelers about malaria prophylaxis and adherence but remember that a history of taking malaria prophylaxis does not exclude the possibility of malaria infection. Bottom line, we strongly recommend malaria testing for any febrile traveler recently arrived from Uganda. Guidance on malaria testing in suspect Ebola disease patients will be reviewed in the coming slides. Next slide.

We are also asking clinicians to implement strict infection prevention and control measures at the healthcare facility when evaluating symptomatic suspect Ebola disease patients. We are asking that these IPC measures remain in place until Ebola testing has been resulted. These measures

are necessary to prevent spread of the virus within the healthcare facility and in the community. We will review these IPC measures in greater detail in the coming slides. Next slide.

If healthcare providers are concerned that their patient may have Ebola disease, we are asking that you first notify your state, local, tribal, or territorial health department and follow jurisdictional protocols for patient assessment. As such, it is important to identify points of contact and contact information for your state and local health departments now. The CDC Emergency Operations Center can also assist in identifying contact information for state and large jurisdictional health departments, and you can reach them by calling the 24-7 phone number listed here. As a resource for public health departments, CDC's Viral Special Pathogens Branch is available 24-7 for consultation by calling the CDC Emergency Operations Center. Next slide.

Now I will review what to expect from initial consultation with CDC. First, you will be connected with subject matter experts in viral hemorrhagic fevers at CDC. SMEs will also be available to provide guidance on hospital infection control practices and laboratory biosafety. Depending on the needs of the jurisdiction of the healthcare facility, subject matter experts from other parts of CDC can also be available for consultation. During the call, we will discuss the patient's travel history, epidemiologic risk factors, their clinical course, and we will review what diagnostic testing has been performed.

We will also want to know when infection control measures are in place. Based on this information, we, meaning all the stakeholders on the call, will make a collective decision as to whether testing for Sudan virus is recommended. Now you might ask, why not test everyone? When we decide to test a patient for Ebola disease, as we reviewed, strict infection control measures must be put in place and may limit the patient's access to care. And the length of time the patients remain under strict precautions can be prolonged. It takes time to get the specimen to the lab.

It takes time to run the tests. Also, as we reviewed, there are caveats when interpreting the Ebola test results. So if the specimen is collected early on in the disease course, precautions may have to remain in place until a second test is performed. It is important to stress that the decision to test the patient is a collective one. We at CDC will make a recommendation as to whether we believe testing is warranted.

But in the end, we will defer to the treating physician. Once a decision has been made to test for Ebola disease, we will work with the hospital and the state health departments to arrange for shipment and testing of the specimen. Following this, we will want to get daily updates on the patient's clinical status and updates on specimen shipment. And of course, when the test results are available, we will convene a call to discuss the results and next steps. Next slide.

Clinical consultation with CDC has benefits for the clinician and the jurisdiction. First, CDC has the most up-to-date information on the outbreak. CDC has had a country office in Uganda since the year 2000. In addition to country office staff, CDC has deployers in Uganda working on the outbreak. As a result, we have the most up-to-date information on the status of the outbreak and where Ebola cases have been reported.

Second, we can call upon these resources to contextualize your patient's epidemiologic risk factors. And we may be able to provide additional clarity on the patient's travel and activities in Uganda. As we reviewed, there is no sign or symptom that is pathognomonic for Ebola. And so the decision to test for Ebola disease is primarily driven by assessing epidemiologic risk factors. Let me give you an example of an instance where these resources were brought to bear.

During one Ebola virus disease outbreak in the Democratic Republic of Congo, we received a consult about a returning traveler who was found comatose in his hotel room. From the information we received from his fiancé, we knew the patient worked for an international NGO or non-governmental organization. But we did not know what his Ebola risk factors were. Through one of our CDC deployers in the field, we were able to contact a colleague from the international NGO. And within an hour, we were able to determine the patient's activities while in the Democratic Republic of Congo. Next slide.

The consultation call is also an opportunity for the clinician and the jurisdiction to ask specific questions about the process at their facility. If testing is recommended, we can also facilitate the shipment and testing of the specimen. We will provide all the necessary paperwork and detailed instructions on what type of specimen to collect and how the specimen must be shipped and where to ship the specimens. Finally, in the event that the patient is at a healthcare facility that does not have the capacity to care for the patient while awaiting test results, we can facilitate discussions with local, state, and federal partners as needed to potentially arrange transport of the patient to a facility that is able to provide these services. Next slide.

Clinical consultation also has benefits for the patient. As I mentioned earlier, when the decision is made to test the patient for Ebola, strict infection control measures must be put in place to prevent potential spread of the virus. These measures may limit the patient's access to care. Also, it is important to keep in mind the length of time that the patient remains under strict precautions can be prolonged. The consultation call provides a forum where the pros and cons of testing can be weighed in order to collectively make a decision that is in the best interest of the patient. So in summary, clinical consultation prior to testing for Ebola is strongly encouraged and we hope that stakeholders view this process as a resource that they can call upon when trying to decide how to manage ill returning travelers. Next slide.

And now I will turn it over to Dr. Valderrama. Thank you.

Thank you, Dr. Choi. I'll be reviewing some key infection prevention and control recommendations over the next few slides. These recommendations are based upon the following considerations. The high rate of morbidity and mortality among infected patients and the risk of human-to-human transmission.

As a reminder, Ebola, including Sudan virus, can be found in all body fluids of an infected person, and especially in the late stage of disease or with severe disease. Transmission can occur through contact of any body fluids with non-intact skin or mucous membranes or with objects that have been in contact with body fluids of a person that is sick with or has died from Ebola disease. Because early Ebola symptoms are similar to those seen with other febrile illnesses, triage and evaluation processes should consider and systematically assess patients for the

possibility of Ebola. If a patient appears to be at risk for Ebola, isolate the patient immediately, avoid unnecessary direct contact, and determine personal protective equipment needed. Recommended PPE will vary depending on the patient's symptoms. Next slide.

Notify the healthcare facility's infection prevention and control program immediately and report to the relevant local health department for patients with Ebola exposure history regardless of symptoms. Isolate the patient in a private room or separate enclosed area with a private bathroom or covered bedside commode. To minimize transmission risk, only essential healthcare personnel with designated roles should provide patient care. A log should be maintained of all personnel who enter the patient's room.

Dedicated medical equipment, preferably disposable when possible, should be used for the provision of patient care. Limit the use of needles and other sharps as much as possible. Procedures that can increase environmental contamination with infectious materials or create aerosol should be minimized. If performing aerosol-generating procedures, follow guidance to reduce exposures, which include limiting personnel present during the procedure and, if available, using an airborne infection isolation room. Healthcare personnel should perform hand hygiene frequently, including before and after all patient contact, contact with potentially infectious material, and before putting on and upon removal of PPE, including gloves.

Use an EPA-registered hospital disinfectant from List L or List Q to disinfect environmental services in rooms of suspect or confirmed Ebola patients. Waste contaminated or suspected to be contaminated with Ebola virus is a Category A infectious substance and subject to local, state, and federal regulations. Next slide.

While evaluating and managing suspect patients who are clinically stable and do not have bleeding, vomiting, or diarrhea, healthcare providers should at a minimum wear a single-use disposable fluid-resistant gown that extends to at least mid-calf, or single-use disposable fluid-resistant coveralls, single-use disposable full-face mask or full-face shield, I'm sorry, single-use disposable face mask, and single-use disposable gloves with extended cuffs. Two pairs of gloves should be worn, and at a minimum, the outer glove should have extended cuffs. Next slide.

While caring for a confirmed Ebola patient or a suspect patient who is clinically unstable or has bleeding, vomiting, or diarrhea, PPE to be worn by healthcare providers includes the following. An impermeable garment, either a single-use disposable impermeable gown or a single-use disposable impermeable coverall. For respiratory, head, and face protection, either a PAPR with a full-face covering and head shroud or an N95 respirator in combination with a single-use disposable surgical hood extending to the shoulders and a single-use disposable full-face shield. Single-use disposable examination gloves with extended cuffs, two pairs of gloves should be worn, and at a minimum, the outer glove should have extended cuffs.

Single-use disposable boot covers or single-use disposable shoe covers, which are acceptable only if they will be used in combination with a coverall. And lastly, a single-use disposable apron that covers the torso to the level of the mid-calf should be used over the gown or coveralls if patients with Ebola are vomiting or have diarrhea. These should also be used routinely if the facility is using a coverall that has an exposed unprotected zipper in the front. This concludes my

remarks. Toward the end of the presentation, there's a slide with links to some of the infection prevention and control guidance documents on the website.

And now I'll pass the presentation over to Dr. Brian Harcourt.

Hello, everybody. Thanks for logging in and listening. I'm going to talk to you about laboratory testing. Next slide, please.

So even prior to specimen collection, you need to think about what it is you're going to be doing. OSHA has the bloodborne pathogen standard, and that's actually going to be foundational to everything we're going to talk about for safety. If you follow the standards, like all U. S. laboratories must, this is foundational. It's going to reduce your potential exposure of personnel to the specimens.

I usually go with the thought, I treat every specimen as a high-risk specimen, just have that thought process in mind at all times. So prior to receiving specimens, you should have in place a site-specific risk assessment to minimize risk to personnel from potential exposures from sprays, from splashes, and aerosols generated during laboratory activities. And actually, a question was asked about the aerosols in the question and answer session that I have already answered. For those of you that are familiar with NIOSH's hierarchy of controls and reduction, it's an upside-down pyramid with elimination and substitution at the top. But clearly, we cannot eliminate testing or substitute for something else, which brings the bottom three components of that pyramid into play, which are engineering controls, like a biosafety cabinet or negative air pressure, administrative and work control practices, and then the least effective is appropriate use of PPE. That is the last line of defense, and that's where the element of human error can really come into play, and the most training involved is needed. Finally, something that sometimes is overlooked, you need to have a plan for appropriate waste management in place and implemented. Next slide.

So specimen collection. So refer to the PPE guidance for healthcare workers during management of clinically stable and clinically unstable patients that you just heard about from Amy. As far as the specimens themselves, for adults, collect two 4 mL tubes of whole blood in a plastic EDTA tube. Plastic is key. We're not going to accept glass for obvious sharps reasons, and heparinized tubes cannot be used during the testing. For pediatric patients, collect a minimum of 1 mL of whole blood in a pediatric-sized plastic EDTA tube. And then, naturally, as part of your standard protocol, immediately report potential exposures to blood, body fluids, or other infectious materials according to your institute's policies. Next slide.

All right. So you've got to the specimen. Public health authorities will determine whether Ebola virus testing will occur at an LRN laboratory, at CDC, or both. It's important to note that in a suspect case for Ebola, all specimens collected from patients must be shipped Category A as a non-select agent. That's key. This is not a select agent. It is not until it is confirmed here at CDC through our various assays. And lastly, for this slide, consider shipping requirements for specimens being referred for routine diagnostic, i.e., non-Ebola virus testing to another lab. Consider shipping them Category A as part of the way, to let these other testing labs know that they're not dealing with the average specimen. Next slide.

So presumptive testing for Ebola virus and Sudan virus is available at select LRN reference laboratories. I believe right now 28 of them have the BioFire system. So whole blood specimens should be sent to LRN laboratories on cold packs at 2 to 8 degrees Celsius. They cannot be frozen. BioFire cannot be used on frozen specimens. Specimens sent to CDC for testing must be sent on dry ice and arrive at minus 20 degrees or colder. If we get a 2 to 8 degree or 4 degree, we're not going to be allowed to test it on our real-time PCR assays. Do note that all test results at the LRN labs or another lab, if something happens, like your spec lab, all Ebola test results must be confirmed by CDC. If short-term storage is necessary, keep specimens at 2 to 8 degrees Celsius for shipping to the LRN labs. But then remember, it must be sent on dry ice and arrive at CDC at minus 20 degrees Celsius or colder if you're shipping to us. Next slide, please.

All right. As mentioned earlier, one of the earlier slides, malaria is the most common cause of undifferentiated fever after travel to sub-Saharan Africa. And most of the signs and symptoms of Ebola and malaria are the same. And the malaria, especially the P. falciparum, can progress rapidly, so early diagnosis and treatment is key to survival. The testing should not be delayed. So how do you test for malaria from a suspect Ebola case? As you know, the gold standard diagnostic test for malaria is microscopic examination of thick and thin smears. Lab staff can safely perform testing by adhering to the bloodborne pathogen standards mentioned earlier. That includes wearing gloves and manipulating the specimen in a biosafety cabinet. But do note that the standard protocols for repairing and staining thick and thin smears do not inactivate Ebola viruses. Next slide.

However, we don't yet have a modified protocol to inactivate Ebola viruses for thick smears. That's going to be coming, not for this outbreak, but it will be coming. However, there is a modified protocol for thin smears that will inactivate high titers of Ebola virus. And the modification is, instead of fixing for two to three minutes in 100% methanol, if you fix for 15 to 30 minutes, that's been shown to inactivate seven to eight logs of Ebola virus, which is a pretty substantial titer. Something you can do for both thick and thin smears, note that they should be air dried, as fan drying may aerosolize the blood specimen.

And while Ebola is not aerosol transmitted naturally, you can produce fomites that can be infectious. And then finally, labs may choose to apply cover slips with rapid drying mounting medium to stain slides. That will essentially eliminate the risk because you've then covered up with blood. I believe -- next slide.

Okay. So there's, as Amy mentioned, we have additional healthcare infection prevention and control guidance for Ebola that can be found on this slide. And with that, I turn this back over to the moderator. Thank you.

Presenters, thank you for providing this timely information to our audience. We will now go into our Q&A session. Joining our presenters for the Q&A session, we have other CDC subject matter experts, Captain Joel Montgomery, Dr. Joanna Prasher, and John Cooles with CDC's 2022 Uganda Ebola Outbreak Response, and Dr. Clive Brown and Dr. Francisco Alvarado-Rami with CDC's National Center for Emerging and Zoonotic Infectious Diseases. So thank you for joining us for the Q&A session. And we'll start our Q&A session with a question that seems to be quite a popular one, and that's regarding the updates and the discussion around the case definition for

suspect case. So our first question asks, is being in an outbreak area without epi risk factors sufficient to meet suspect case definition if patient is ill?

Hi. Sorry. This is Trevor Shoemaker. I can answer that, as this was asked quite a bit. As you can see from what I presented, the epidemiological risk factors are specific activities or contacts or exposures that someone would have that would put them at risk of having Ebola.

Just physically being in the district where there's an Ebola outbreak going on is not sufficient enough to rise to the level of suspect case. As many of you know, you could have an exposure to a mosquito and get malaria, which would cause a very similar kind of clinical presentation early on when they return. And so, just being in that district with no epidemiological, occupational, or otherwise contact with a known or suspect or confirmed case would put that person at risk of getting Ebola. We've had a lot of people kind of drive through compologists doing tourist activities during this outbreak on a lot of our clinical consultations, and they came back with illness within the period of time that could potentially be within the incubation period of Ebola. But talking through their activities and their details and their lack of exposure to any place or person did not rise to the level of suspect case.

And when you rise the level of suspect case, that's when you have to make the decision of when to test that person for Ebola to rule it out. So I think the short answer is just being in the district or in a physical location where there's an outbreak without a particular exposure or risk factor that would put you at risk of getting infected with Ebola does not make you a suspect case. In that sense, you're just an ill returning traveler from a country or a location where there's an Ebola outbreak going on. But I'll let any of my other colleagues add on to that. Over.

Yeah, hi. This is Dr. Choi. Just to complement what Dr. Shoemaker had said, you know, teasing out some of this epi risk factors, it can be a little bit difficult. Sometimes the returning travelers don't exactly remember the names of the places that they went. And so what we would encourage is that if there's any question whatsoever about whether the ill traveler in front of you, you know, rises to the definition of a suspect Ebola patient, we definitely encourage you to first reach out to your state and local health departments, because they really are a great resource. And then if after discussing it with your state health department, there's still some concerns or questions, then please feel free, as I mentioned, to please call CDC. And we would be more than happy to talk to you all and talk through what you are seeing, what the patient is reporting in terms of activities to kind of help contextualize the situation. So would recommend if there's any question at any point, and you're unsure, to reach out to these resources, both the state and local health department, and then to us at CDC as well. Over.

Thank you very much. Our next question is a little bit similar, but focuses more on the signs and symptoms criteria for suspect cases. Question asks, for suspect cases of Ebola disease, does a person need to display multiple or most signs and symptoms of Ebola? Or are there some signs and symptoms that should take precedence or are more specific in the case definition or diagnosis?

Hi, this is Mary Choi. I'll take that question. So as I mentioned, the signs and symptoms for Ebola are not specific. You know, you can see those signs and symptoms in a multitude of

diseases, including many tropical diseases that are present in countries like Uganda. You know, we mentioned malaria, typhoid. And typically, when we have confirmed Ebola patients, they are reporting more than just one symptom. So it's a constellation of symptoms. And over time, in general, the number of symptoms and the severity of the symptoms increase. So they may initially start, as I mentioned, with the dry symptoms, headache, just kind of feeling very, very tired, fatigued. But then after about four days or so, start developing vomiting, diarrhea.

That tends to be pretty severe. Sometimes in Africa, these symptoms are initially confused with cholera. So it can be pretty severe. And then, you know, as a disease progresses, it tends to become more severe. And you can see some signs of hemorrhage. As I mentioned, hemorrhage is not universal. That's one of the reasons why we don't call Ebola disease Ebola hemorrhagic fever like we used to, because we want to get away from that notion that all Ebola patients bleed. But some of them will bleed. And then you can start seeing signs of, you know, hematemesis, you know, black or bloody stools, bleeding from injection sites, and things like that. There is nothing that's pathognomonic, which is what is really difficult about Ebola.

For us in America, we're lucky in the sense that, you know, the potential reservoir for Ebola viruses, they don't exist in this country. And so what we can really do to kind of tease out whether or not someone's signs and symptoms may be due to Ebola is really kind of dive deep into their epi risk factors in terms of activities in that other country, where they came from, where there's an outbreak happening. But there is nothing that's pathognomonic. And that's one of the challenges with diagnosing disease in countries where the disease is endemic. Over.

Thank you very much. Before we move on to the next question, I just want to emphasize for our attendees, because I've seen a lot of questions asking about the various resources, and especially about infection prevention control and others that were shared on a previous slide, these slides can be found on this COCA Calls web page at emergency.cdc.gov/COCA. And we'll share that web link again at the conclusion of this Q&A session. So for our next question, the question asks, how is this virus outbreak different than the 2014 West African outbreak?

Hi, this is Trevor Shoemaker. I'll start and pass to my colleagues if they want to expand. In essence, it's not any different necessarily than any other Ebola outbreak. You know, it is a different virus species. This is Sudan Ebola virus, as opposed to the Zaire Ebola virus.

You know, there are maybe a bit of virologic differences between the two in that, you know, we tend to see a higher case fatality rate with Zaire Ebola virus, as opposed to Sudan. But the clinical presentations, the epidemiological, you know, epi curves, you know, transmission dynamics, all those, you know, same principles apply. You know, maybe one of the differences, there's no licensed vaccine or therapeutics, although there are a lot of candidates that are being used in various ways. But in, you know, in terms of development stage for those, that's one as well. I think the other is the number of overall cases is much less than 2016.

So there's not as wide a geographic spread, it's fairly well contained, even though it's spread to a few districts. Maybe those are some of the small differences. But, you know, Ebola outbreaks, even if there's Zaire or Sudan, tend to behave similarly. But maybe there's, you know, a few clinical or case fatality rate differences. I'll stop there and pass it to Joel, I see his hand up, over.

Yeah, the only thing I think I would add on to what Trevor mentioned, I think all good points. From the virological standpoint, I would also say that the country of Uganda was in a much better position to respond to this outbreak through years of investment of not only the US government, but other countries too, and workforce development, laboratory capacity at a number of institutions, including Ugandan Viral Research Institute, Central Public Health Laboratory, FETP, and other parts of the Ministry of Health. So I think their ability to detect and respond was far different at the time in 2014-16 in Guinea, Sierra Leone, and Liberia. So I think that's been I think a big difference between the West Africa outbreak and this outbreak in Uganda. So a lot of credit, I think, needs to go to Uganda and the government of Uganda for adequately responding to the outbreak. I mean, it's taken time, but so far, we haven't made it to day 42 yet, but so far they've managed to contain this outbreak within the confines and the borders of Uganda. So I think that says a lot about their ability to respond. That's all I would add on. Back to you, moderator.

Thank you very much. Our next question asks, do you have any special recommendations for waste handling?

Hi, this is Amy Valderrama. Yes, there are. There are guidelines about waste handling. As I mentioned, it does need to be treated as a Category A infectious substance. And those guidelines can be found on our website, at Ebola Associated Waste Management web page. And then there's also the federal guidelines on the Department of Transportation's website. They have a document titled Managing Solid Waste Contaminated with Category A Infectious Substance that lays out all the recommendations and requirements for Category A waste.

Thank you very much. And again, as a reminder, the resources that Captain Valderrama is referring to, you can find those on this COCA Calls web page at emergency.cdc.gov/COCA. Our next question asks, you shared the information for consultation with CDC's Viral Special Pathogens Branch. Is there an email address to go with that phone number as well?

We prefer that if you have questions about Ebola or potential suspect Ebola patients, that you reach us through the phone number. That number is answered 24-7 by a live operator. And they can connect you immediately to whoever you need, but including Viral Special Pathogens Branch. We do have an email address, but those tend to be non-emergent questions. And so we would prefer if you have questions about potentially a suspect Ebola patient or concerns about a returning ill traveler, that you reach out to us by telephone.

Thank you very much. Another reporting type question we received is, in addition to the local and state health departments, do we need to report suspected cases to CDC as well, or only confirmed cases?

So we would ask that if a hospital or health department has anyone for whom they are considering Ebola testing, that you go ahead and contact us at the CDC Emergency Operations Center. As I mentioned, when you do that, you can be connected to the various subject matter experts in the various fields, and we can talk through the patient's clinical presentation and epi risk factors and facilitate testing if testing is recommended. So we would ask that if you've gotten to the point where you think that a patient meets the definition for a suspect Ebola patient, that

you go ahead and contact us at CDC as well, of course, after you contact your state and local public health department. Thanks.

Thank you. Our next question asks that under the epi risk factors, you mentioned exposure or contact with bats and other wild animals. What are the other wild animals or contacts that are likely that should raise a red flag?

Hi, this is Trevor Shoemaker. You know, I think just to clarify that a bit, we suspect bats to be the reservoir species for Ebola virus. We know that they are the reservoir species for Marburg virus, which is a related viral virus. Even though we've not maybe definitively identified the bat species that carry Sudan Ebola virus, you know, other Ebola virus species have been identified in bats. That being said, you know, it's not all bats, but because of the absence of knowledge of which specific bat species might carry it, you know, if you are exposed to a bat or, you know, might have had significant contact and then come down with symptoms compatible with Ebola, then obviously that is a risk factor to consider for testing.

In terms of the animals, you know, we don't suspect any animals other than maybe non-human primates are just as susceptible as humans to Ebola. So if you have contact with a dead or sick non-human primate, but also any, you know, dead or sick animal species, even though they may not have died of Ebola, it potentially could be -- you know, there could be an intermediary infection in an animal. It's just safe or at least something to flag that if you have contact with a dead or sick animal, that, you know, it could indicate you are doing other activities that could put you at potential risk, you know, than just that one particular documented exposure. Even though we know, for example, if you had exposure to a dead or sick cow, that could also indicate another -- you know, you could have been exposed to an animal that was infected with another virus, not Ebola, but could also have infected you and given you, and made similar symptoms occur. So it allows us to also go through the clinical rule out of other viral hemorrhagic fevers that you could potentially have been exposed to, and not just Ebola.

So that's the reason for flagging dead or sick animal exposures. I hope that helps a little bit.

Yes, thank you for the clarification. And we have time for one last question, and our question asks, what is the bare minimum info we should collect when taking a travel history?

I think the bare minimum -- sorry, this is Mary Choi. I think the bare minimum should include what country they traveled to, when they arrived, and when they left. I think that at a minimum, that will help us kind of inform some of the differential diagnosis, depending on, you know, time period of when, during, of their travel, where they traveled, and then that, and on top of, you know, onset of symptoms and what the symptoms are, can be very helpful. But I would defer to my other colleagues to see if they have anything else they would add.

Yeah, thanks, Mary. This is John Montgomery. I may also add use of malaria, prophylaxis, and history of yellow fever vaccination too. I think those are helpful to better inform the discussion. But I agree with Mary's comments. Over.

Great, thank you so much. And again, thanks for answering these questions and for sharing your expertise with us today. Today's COCA Call will be available to view on demand a few hours after the live call at emergency.cdc.gov/COCA.

A transcript and closed-captioned video will be available on-demand on the COCA Calls web page next week. Please continue to visit emergency.cdc.gov/COCA to get more details about upcoming COCA calls. We invite you to subscribe to receive announcements for future COCA by visiting emergency.cdc.gov/COCA /subscribe. asp. You will also receive other COCA products to help keep you informed about emerging and existing public health topics.

You can also stay connected with COCA by liking and following us on Facebook at facebook.com/CDC Clinician Outreach and Communication Activity. Again, thank you for joining us for today's COCA Call. Have a great day.