February 2024

Ebola Virus Disease (EVD)

Surveillance and Investigation Protocol

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Division of Infectious Disease Epidemiology
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I. ABOUT THE DISEASE

Ebola Virus Disease (EVD) is a part of a group of illnesses (viral hemorrhagic fevers [VHFs]) in the filovirus family. EVD is a deadly disease that causes occasional outbreaks that occur mostly on the African continent. EVD primarily affects humans and nonhuman primates. The disease is caused by an infection with a virus within the genus *Ebola virus*. In the United States, EVD is a rare but severe and often deadly disease. Recovery depends on prompt and good supportive care. Some studies show that survivors have antibodies that can be detected for up to 10 years.

EVD was first discovered in 1976 near the Ebola River in the Democratic Republic of Congo. While the exact origin is not known, the virus is believed to be animal-borne. That theory is based on similar viruses with the most likely source being bats or nonhuman primates. Infected primates can transmit the virus to other animals and humans.

A suspected case of EVD is a category one disease and should be **immediately reported** to the local health department (LHD) for prompt public health action.

A. Clinical Presentation

EVD begins with "dry" symptoms (such as fever, aches, and fatigue) and typically progresses to "wet" symptoms (such as vomiting, diarrhea, and bleeding) after four to five days. Symptoms may include:

- Fever
- Chills
- Myalgia
- Headaches
- Weakness or fatigue
- Sore throat
- Loss of appetite
- Gastrointestinal symptoms such as vomiting, diarrhea, and abdominal pain
- Unexplained bleeding, hemorrhaging, and/or bruising
- Fleeting maculopapular rash
- Chest pain
- Shortness of breath
- Confusion
- Other symptoms may include red eyes, conjunctival injection, hiccups, and skin rash during late-stage EVD.

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Patients with fatal disease usually develop more severe clinical signs early during infection and die typically between days 6 and 16 of complications, including multiorgan failure and septic shock. In nonfatal cases, patients may have fever for several days and improve, typically around day 6.

Laboratory findings may include leukopenia frequently with lymphopenia followed later by elevated neutrophils and a left shift. Platelet counts often are decreased in the 50,000 to 100,000 range. Amylase may be elevated, reflecting pancreatic involvement. Hepatic transaminases are elevated with aspartate aminotransferase (AST) exceeding alanine aminotransferase (ALT). Proteinuria may be present. Prothrombin (PT) and partial thromboplastin times (PTT) are prolonged and fibrin degradation products are elevated, consistent with disseminated intravascular coagulation (DIC).

B. Etiologic Agent

EVD is an infection caused by a virus in the genus *ebolavirus.* There are many Ebola viruses but only four are known to cause infection in humans:

- Ebola virus (species *Zaire ebolavirus*).
- Sudan virus (species *Sudan ebolavirus*).
- Taï Forest virus (species *Taï Forest ebolavirus*, formerly *Côte d'Ivoire ebolavirus*).
- Bundibugyo virus (species *Bundibugyo ebolavirus*).

Other EVD viruses include:

- Reston virus (species *Reston ebolavirus*).
- Bombali virus (species *Bombali ebolavirus).*

C. Reservoir

The original reservoir of EVD remains unknown. However, the ebola virus naturally lives in the environment and is believed to be a vector-borne pathogen. Non-human primates and African fruit bats are thought to be the main vectors in animal-to-animal, animal-to-human, or human-to-human transmission that occurs from contact with the infected animal's saliva, excreta, or other bodily fluids.

D. Incubation Period

Typically, 2 to 21 days after contact with the virus, with an average of 8 to 10 days.

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E. Mode of Transmission

Index cases of EVD have been associated with exposure to infected nonhuman primates or fruit bats. It is known that EVD may spread through the handling and consumption of wild animal meat or hunted wild animals infected with EVD. Once into the human population, the virus spreads from person-to-person through direct contact (such as through broken skin, or mucous membranes in the eyes, nose, or mouth) with:

- Blood or body fluids (urine, saliva, sweat, sputum, tears, feces, vomit, breast milk, amniotic fluid, and semen) of a person who is sick with or has died from EVD.
- Objects (such as clothes, bedding, needles, and medical equipment) contaminated with body fluids from a person who is sick with or has died from EVD.
- Semen from a man who recovered from EVD (through oral, vaginal, or anal sex).

F. Period of Communicability

A person is contagious after they develop signs and symptoms of EVD. The virus may persist in a few sites for several weeks to months after recovery. Such sites include semen, vaginal fluid, placenta, amniotic fluid, breast milk, saliva, the central nervous system (cerebrospinal fluid), joints, conjunctiva, and the chambers of the eye. Because of the risk of sexual transmission, abstinence or the use of condoms is recommended for at least 12 months after recovery and possibly longer.

II. DISEASE CONTROL AND PREVENTION

A. Disease Prevention and Control Objectives

Reduce the risk of disease through:

1. Education on prevention and control measures including isolation of an infected person, identification of a suspected case, and timely public health reporting.
2. Education regarding travel to areas where there is ongoing transmission of EVD.
3. Detection of suspected cases and transmission in West Virginia.

B. Disease Prevention and Control

1. Avoid contact with blood and body fluids of people who are sick.
2. Avoid sex or use condoms for at least 12 months after recovery and possibly longer.
3. Avoid contact with items that may have come in contact with an infected person's blood or body fluids.
4. Avoid funeral or burial practices that involve touching the body of someone who died from EVD or suspect EVD.
5. Avoid contact with bats, forest antelopes, and nonhuman primates' blood, fluids, or raw meat prepared from these or unknown animals.

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6. Practice good hand hygiene that includes the use of alcohol-based hand sanitizer when hands are not visibly soiled. Use soap and water when hands are soiled with dirt, blood, or other body fluids. In settings where hand sanitizer and soap are not available, use a mild (0.05%) chlorine solution.
7. It is best to avoid nonessential travel to areas with a current outbreak or transmission of EVD. Geographic distribution of EVD can be found at https://www.cdc.gov/vhf/EVD/outbreaks/index-2018.html and https://www.who.int/health-topics/EVD#tab=tab_1.
8. Isolate IMMEDIATELY if you are showing signs and symptoms of EVD and at risk (travel to an area with an outbreak or transmission, contact with someone who is sick or has suspect or confirmed EVD).
9. If a patient presents to a health care facility and is suspected of having EVD, infection control should be notified immediately, appropriate personal protective equipment (PPE) should be used, and the patient should be isolated away from others. For more information, see Donning and Doffing PPE for Evaluating Personals under investigation (PUIs) for EVD Who Are Clinically Stable and DO NOT Have Bleeding, Vomiting or Diarrhea and Guidance on Personal Protective Equipment (PPE) To Be Used By Healthcare Workers during Management of Patients with Confirmed EVD or Persons under Investigation (PUIs) for EVD who are Clinically Unstable or Have Bleeding, Vomiting, or Diarrhea in U.S. Hospitals, Including Procedures for Donning and Doffing PPE.
10. To help prevent transmission, the local health department should be contacted immediately for advice about confirmation and management of suspected cases and their contacts.

C. Vaccine and Treatment

ERVEBO Vaccine

1. There is only one U.S. Food and Drug Administration (FDA) approved vaccine called Ervebo (rVSV-ZEBOV) for the prevention of EVD. **IMPORTANT:** This vaccine only protects against EVD caused by *Zaire ebolavirus*.
2. This live virus vaccine is given as a single dose vaccine.
3. Pre-exposure prophylaxis is recommended for adults 18 years of age and older who are at potential occupational risk of exposure to *Zaire ebolavirus*. Recommendations include those who are:
    a. Responding or planning to respond to an outbreak of EVD.
    b. Laboratorians or other staff working at biosafety-level 4 facilities that work with live ebola virus in the U.S.
    c. Health care personnel working at EVD Treatment Centers in the U.S.

4. For more information about the vaccine, visit https://www.cdc.gov/vhf/EVD/clinicians/vaccine/index.html.

Treatment

1. There are two treatments approved by the FDA to treat EVD caused by the Ebola virus, species *Zaire ebolavirus*, in adults and children, Inmazeb and Ebanga.
2. Inmazeb is a combination of three monoclonal antibodies.
3. Ebanga is a single monoclonal antibody.
4. For all species of the EVD virus, management of patients is mostly supportive care and can improve chances of survival when provided early. Supportive care can include:
    a. Providing fluids and electrolytes orally or intravenously
    b. Using medication to support blood pressure, reduce vomiting and diarrhea, and to manage fever and pain
    c. Treating other infections, if they occur
5. For more information about treatment and management of EVD survivors, visit https://www.cdc.gov/vhf/EVD/treatment/index.html.

III. DISEASE INVESTIGATION

A. Case Detection

Assess an individual for EVD by inquiring about international travel or contact with someone with EVD in the last 21 days of symptom onset. If the individual has both exposure and symptoms, they are considered a person under investigation (PUI). The PUI should be isolated and inform public health authorities.

Individuals can be classified as a PUI if they have;

- Signs and symptoms consistent with EVD virus infection, **AND**
- An epidemiological risk factor within 21 days before the onset of symptoms.

B. Case Definition (2022) *

Source: https://ndc.services.cdc.gov/case-definitions/viral-hemorrhagic-fever-2022/

*Due to rapidly changing public health responses, the most current case definition may not be reflected in this document. Please check CDC's National Notifiable Diseases Surveillance System (NNDSS) website at https://ndc.services.cdc.gov/ for current case definitions.

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The case definition includes all subtypes of VHFs and Ebola virus. The Centers for Disease Control and Prevention (CDC) does not provide a specific case definition for Ebola virus alone. Case definitions are not intended to be used by health care providers for making a clinical diagnosis or determining how to meet an individual patient's health needs.

Clinical Criteria

An illness with acute onset of:

- Fever > 38°C/100.4°F, **AND**
- One or more of the following clinical findings:
  - severe headache
  - muscle pain
  - erythematous maculopapular rash on the trunk with fine desquamation 3–4 days after rash onset
  - vomiting
  - diarrhea
  - abdominal pain
  - bleeding not related to injury
  - thrombocytopenia

Laboratory Criteria

Any one of the following:

- Detection of VHF* viral antigens in blood by enzyme-linked immunosorbent assay (ELISA).
- VHF viral isolation in cell culture for blood or tissues.
- Detection of VHF-specific genetic sequence by reverse transcription polymerase chain reaction (RT-PCR) from blood or tissues.
- Detection of VHF viral antigens in tissues by immunohistochemistry.

**VHF refers to viral hemorrhagic fever caused by filoviruses (Ebola virus, Marburg virus), Old World arenaviruses (Lassa and Lujo viruses), New World arenaviruses (Guanarito, Machupo, Junin, Sabia, and Chapare viruses), or viruses in the Bunyaviridae family (Rift valley fever virus, Crimean-Congo hemorrhagic fever virus). Rift valley fever is not currently a national notifiable condition.*

Epidemiologic Linkage

One or more of the following exposures within the 3 weeks before onset of symptoms:

- Contact with blood or other body fluids of a patient with VHF.
- Residence in—or travel to—a VHF endemic area or area with active transmission.
- Work in a laboratory that handles VHF specimens.

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- Work in a laboratory that handles bats, rodents, or primates from a VHF endemic area or area with active transmission.
- Sexual exposure to semen from a confirmed acute or clinically recovered case of VHF.

Criteria to Distinguish a New Case from an Existing Case

A new case of VHF should be enumerated only if not previously counted as a case of VHF caused by the same virus as determined by laboratory evidence. *

**Among the VHFs included in CSTE position statement 21-ID-04, reinfection with the same virus species has not been documented. There is a theoretical possibility that a VHF (ex. EVD) survivor could be infected by a virus that causes one of the other VHFs included in CSTE position statement 21-ID-04 (ex. Lassa fever, Crimean-Congo hemorrhagic fever, etc.).*

C. Case Classifications

Suspect

- Meets clinical criteria AND epidemiologic linkage criteria.

Confirmed

- Meets laboratory criteria.

D. Reporting Timeframe to Public Health

Suspect or confirmed cases of EVD or other VHFs should be **IMMEDIATELY** reported to the local health department.

E. Outbreak Recognition

EVD is not endemic in West Virginia. Therefore, one case of EVD is considered an outbreak.

F. Healthcare Provider Responsibilities

1. Remain alert for cases of EVD. At this time, returned travelers from Africa are at highest risk; however, the epidemiology can change rapidly. Consult the CDC's EVD outbreak page or the WHO's EVD outbreak page for more information on current outbreaks worldwide. Consider the diagnosis of EVD or VHF in returned travelers with an illness onset within 21 days of travel **or** with one or more of the following exposures:
    a. Contact with blood or body fluids of a person with EVD.
    b. Work in a laboratory that handles EVD specimens.
    c. Work in a laboratory that handles bats, rodents, or primates from an EVD endemic area with active transmission.

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   d. Sexual exposure to semen from a confirmed acute or clinically recovered case of EVD.
   e. Living in the same household as a person with symptomatic known or suspected EVD.
2. If EVD is suspected, notify infection prevention and report immediately to the LHD. If the LHD cannot be reached, contact the State Epidemiologist on-call at (304) 558-5358, ext. 2. An epidemiologist is available 24/7/365 to assist. If there are no risk factors, then alternative diagnoses should be pursued. Many common illnesses can have the same symptoms as EVD, including influenza (flu), malaria, or typhoid fever.
3. Isolate the patient in a single room with a private bathroom or covered bedside commode.
4. Adhere to infection control procedures, wear appropriate PPE and use dedicated equipment for the patient. For more information see the **PPE** section for more information.
5. Limit the health care personnel who enter the room and keep a log of everyone who enters and leaves the room.
6. Only perform necessary tests and procedures and avoid aerosol-generating procedures.
7. Follow CDC guidelines for cleaning, disinfecting, and managing waste.

Specimen collection

CDC recommends that testing be conducted only for persons who meet the criteria for PUI. Once the LHD or state health department is contacted, the CDC will be consulted for testing. Once approved, specimens can be collected and sent to the Office of Laboratory Services (OLS). OLS will then ship to the CDC for confirmatory testing.

1. For adults, 4 mL of whole blood should be collected in a plastic tube preserved with EDTA. For pediatrics, 1 mL whole blood should be collected in pediatric-sized collection tubes. Do not separate and remove serum or plasma from the primary collection container.
2. If the PUI's symptoms have been present for <3 days, a second sample collected 72 hours after onset of symptoms is required to rule out EVD.
3. If necessary, specimens can be kept at 4℃ or frozen for short-term storage of 7 days or less before shipping.
4. To minimize risk to personnel, a risk assessment should be performed by the laboratory director, and other persons responsible prior to receiving specimens. This is to determine whether or not there is a risk for exposure during laboratory procedures. Appropriate PPE should be worn at all times.

5. Before removing the specimen from the patient care area, it is recommended that a plan is put in place to determine the route of the sample to the location where it will be packed and shipped to avoid high traffic areas. Specimens should be placed in a durable, leak-proof secondary container and the outside of the specimen container should be decontaminated with an approved disinfectant.
6. After placing in a secondary container, specimens should be hand-carried to the laboratory or packing area. DO NOT use any pneumatic tube system. See OSHA Bloodborne Pathogens Standard for more information.
7. During specimen transport within the facility, PPE should be worn. Recommendations include disposable fluid-resistant closed lab coat, disposable gloves, covered legs, and closed-toes shoes.

Specimen shipping

1. Contact the WV OLS Bioterrorism Response Lab at 304-205-8917 for directions prior to shipping the sample.
2. Complete the WV OLS BT Lab Clinical Specimen Submission form. https://dhhr.wv.gov/ols/labs/Documents/BT/BTClinicalTestRequestForm_8-07.pdf
3. A certified Category A shipper must ship the package as a Suspect Category A. (Ebola virus is a Category A infectious substance and is regulated by the DOT's Hazardous Materials Regulations (HMR) 49 CFR 171-180. Specimens for shipment should be packaged following the basic triple packaging system consisting of: (1) a primary container (a sealable specimen container) wrapped with absorbent material, (2) a secondary container (watertight, leak-proof), and (3) an outer shipping package).
4. More detailed shipping directions will be provided on the initial phone call with the Office of Laboratory Services Bioterrorism Response Lab.
5. Specimens should be shipped frozen on dry ice.

G. Laboratory Responsibilities

1. The West Virginia Office of Laboratory Services (OLS) will provide guidance and assistance on specimen collection, shipping, and handling to health care providers. At this time, the CDC will perform all testing and OLS will coordinate shipping to the CDC. Please call DIDE to coordinate shipping with OLS.
2. Educate personnel on the Guidance for U.S. Laboratories for Managing and Testing Routine Clinical Specimens When There is a Concern about EVD Virus Disease.
3. Become familiar with the Emergency Preparedness Resource Guide for Laboratories and the Lab Advisory: Guidance for Transport and Shipment of Specimens for EVD Virus Testing.

4. Laboratories should conduct extensive risk assessment to identify and mitigate hazards associated with handling EVD specimens to create the safest pathogens.

H. Local Health Responsibilities

1. Collaborate with state and federal public health epidemiologists on every aspect of an investigation, contact tracing, and implementation of prevention and control measures.
2. Educate the public about VHF's including EVD, the vaccine, the signs and symptoms, avoiding nonessential travel to outbreak areas, and what to do if a person at risk for EVD becomes sick, etc. The risk in West Virginia is low at this time.
3. Notify DIDE immediately once an individual is suspected of having EVD or an individual has returned from traveling to an area with an outbreak and has a high-risk exposure.
4. Educate health care providers about EVD, including infection control and prevention measures.
5. Assist the health care provider in collecting information to facilitate specimen collection, shipping and handling.
6. Disseminate EVD information (health alerts, education sheets) provided by the West Virginia Department of Health (DH), Bureau for Public Health(BPH) to health care providers and the public.
7. Assure that employees have access to appropriate PPE in the event an interview or exposure risk assessment is conducted in person. Only interview potentially infectious persons in a controlled setting such as an isolation unit of a hospital and then only if absolutely necessary. Strongly consider alternatives such as phone interview or proxy interview.
8. Assure that employees are familiar with infection control guidelines.
9. If warranted, LHD's should establish contact with travelers arriving to the U.S. from countries with EVD outbreaks. For a list of current outbreaks, go here: https://www.cdc.gov/vhf/EVD/outbreaks/index-2018.html.
    a. The CDC may request that state and local health departments follow up with travelers for post-arrival risk assessment and management. The risk assessment includes the risk of exposure, provide health education, and conduct symptom monitoring. This assessment should occur within 24 hours of receiving notification of the traveler's arrival.
    b. Become familiar with the CDC's risk assessment and post-arrival management and WVBPH's "Instructions for Monitoring and Follow-up of Returned Travelers".
    c. Complete the WVBPH "Returned Traveler Risk Assessment" and email completed form to dhhreid@wv.gov or fax to (304)558-8736.
    d. After completing the "Returned Traveler Risk Assessment Form", monitor

the traveler based on if they are high-risk or lower risk using the "Monitoring Tool". After the monitoring period, email the completed form to dhhreid@WV.gov or fax to (304)558-8736.

Note: This information is subject to change.

When a case of EVD is reported:

1. Ensure that the case is immediately isolated under appropriate isolation precautions and appropriate PPE is instituted. Follow CDC guidelines: https://www.cdc.gov/vhf/EVD/clinicians/evd/infection-control.html.
2. Notify DIDE immediately once an individual is suspected of having EVD.
    a. A single case of EVD is considered an outbreak. Anticipate the need to collaborate with DIDE and CDC to confirm the case, investigate the case, and institute prevention and control measures. Anticipate the need to work closely with the CDC and the DIDE throughout the investigation. Anticipate that the CDC and the DIDE will commit staff to assist with and lead many aspects of the investigation. If multiple West Virginia jurisdictions are involved, it will also be important to collaborate with other West Virginia jurisdictions as well.
3. Prepare to interview the patient.
    a. Observe infection control measures in place for the suspect VHF case-patient. Make recommendations for immediate correction of any infection control issues.
    b. Phone interview or proxy interview may be the best choice to prevent transmission to the investigation team. If the interview is conducted in the patient room, public health interviewers should use the same personal protection as health care workers caring for the suspected case.
4. Ascertain case status based on data collection.
    a. Complete the EVD case report form and open a case in WVEDSS.
    b. Assure that appropriate laboratory specimens are collected and submitted to OLS.
5. Triage the incident.
    a. Consider an alternative diagnosis if there are no obvious risk factors and/or if the clinical or laboratory findings are not consistent with the diagnosis of EVD or another VHF. Many travel– related illnesses (malaria, typhoid fever, dengue, chikungunya, meningococcemia, plague, rickettsia disease) present initially with similar symptoms and even leukopenia and thrombocytopenia (e.g., malaria) in the early stages. Malaria, influenza, and a variety of other respiratory and gastrointestinal illnesses are likely to be more common in returning

travelers than VHF.

b. If the case is confirmed or highly suspected and an obvious exposure or possible exposure is evident after the initial interview (travel from an endemic area, contact with a known or suspected case, ingestion of bush meat or other illegally imported food, contact with non-human primates or fruit bats), active surveillance will be needed to identify additional cases with the same exposure(s).

c. If the case is confirmed or highly suspected and there are no obvious risk factors after initial interview, broad active surveillance may be indicated to identify additional cases. The possibility of intentional exposure should be considered if the case does not have known epidemiological risk factors. If intentional exposure is among the possibilities being considered, collaboration with law enforcement on the investigation will also be necessary.

6. Environmental control measures.
    a. The residence or other space previously occupied by the VHF patient may be contaminated with blood or body fluids. Take appropriate protective measures for staff who will enter the residence. Consider a delay of several days before entering the space to reduce the infectivity of any contamination in the environment, if possible. Follow guidance for residence decontamination.

Conduct contact tracing (for confirmed or highly suspected case:

1. For each case/patient, identify close contacts.
    a. Close contact is defined as: being within approximately three feet (1 meter) of a person with symptomatic EVD while not wearing recommended personal protective equipment (PPE).
    b. Percutaneous (i.e., piercing the skin), mucous membranes (e.g., eye, nose, or mouth), or skin contact with blood or body fluids of a person with known or suspected EVD.
    c. Direct contact with someone with known or suspected EVD.
    d. Providing health care to a patient with known or suspected EVD without use of recommended PPE or experiencing a breach in infection control precautions that results in the potential for percutaneous, mucous membrane, or skin contact with the blood or body fluids of a patient with EVD while working in an EVD treatment hospital or associated facility (e.g., laboratory) or while taking care of a patient with EVD.
    e. Living in the same household as a person with symptomatic known or

suspected EVD.

f. Visiting the household of the case-patient since the onset of illness.
g. All persons who were visited by the case-patient after the onset of illness.
h. Direct contact with linens or clothing used by the case-patient after he/she developed symptoms.
i. Direct contact with or the occurrence of a breach in infection control precautions while handling a dead body in an EVD outbreak area, the body of a person who died of EVD or had an illness compatible with EVD, or who died of unknown cause after any potential exposure to Ebola virus.
j. Being within three feet of a person with symptomatic EVD without wearing PPE.

2. Prepare a line list of all close contacts in collaboration with CDC and DIDE. Interview case contacts to obtain information about the type of exposure(s) to assign a risk category.
3. Prioritize contacts in accordance with current CDC guidance at "Interim Guidance on Risk Assessment and Management of Persons with Potential EVD Virus Exposure".
    a. Conduct a risk assessment for close contacts that includes inquiring about any high-risk exposures. Contacts should also be assessed for signs and symptoms of EVD during this evaluation.
    b. High-risk exposures are considered:
        i. Percutaneous (i.e., piercing the skin), mucous membrane (e.g., eye, nose or mouth), or skin contact with blood or body fluids of a person with known or suspected EVD.
        ii. Direct contact with a person who has known or suspected EVD.
        iii. Providing health care to a patient with known or suspected EVD without use of recommended personal protective equipment (PPE)2, or experiencing a breach in infection control precautions that results in the potential for percutaneous, mucous membrane, or skin contact with the blood or body fluids of a patient with EVD while working in an EVD treatment hospital or associated facility (e.g., laboratory) or while taking care of a patient with EVD.
        iv. Direct contact with or the occurrence of a breach in infection control precautions while handling a dead body in an EVD outbreak area, the body of a person who died of EVD or had an illness compatible with EVD, or who died of unknown cause

after any potential exposure to the Ebola virus.

v. Living in the same household as a person with symptomatic known or suspected EVD.

4. Arrange monitoring for contacts depending on the exposure type (whether high-risk or not).
    a. People with high-risk exposures should be quarantined, monitored daily, and restricted from traveling by commercial transport.
5. Discuss work, school and travel restrictions with contacts according to CDC guidance.
    a. Educate contacts to:
        i. Stay at home as much as possible
        ii. Restrict close contact with other people.
        iii. Avoid crowded places, social gatherings, and use of public transportation.
        iv. Coordinate any necessary travel with the LHD.
        v. Notify the LHD immediately if fever or symptoms develop. Emphasize that early diagnosis and treatment is critical for the best outcome for the contact.
        vi. Maintain a positive, supportive, and empathic attitude.
        vii. Arrange monitoring of health care contacts in collaboration with the occupational health units of the healthcare employer. The employer should monitor exposed healthcare workers daily (if they are still at work) and report findings to public health daily for the duration of the surveillance period.

I. State Health Responsibilities

1. Notify the CDC regarding any travelers identified with high-risk exposures.
    a. CDC's 24/7 Emergency Operations Center (EOC): (770)- 488-7100 and ask to speak to the on-call epidemiologist for the Viral Special Pathogens Branch, or email spather@cdc.gov.
2. Notify the CDC regarding any suspected (patients meeting the PUI criteria) or confirmed cases of EVD using the contact information above.
3. Help coordinate specimen shipping to OLS.
4. Share CDC's Health Advisory and other relevant resources on EVD to public health stakeholders.
5. Provide guidance in the investigation and control of EVD.

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6. Assist LHD's in contact tracing of individuals who may have been exposed while the patient was symptomatic.
7. Facilitate specimen collection for patients who have been evaluated in conjunction with the CDC and determined to meet the PUI criteria, contact the West Virginia OLS Bioterrorism Response Lab at 304-205-8917 for more shipping information. Also see Healthcare Provider Responsibilities for recommendations for specimen collection, storage and handling.

J. Occupational Health

1. Protect employee health by identifying high-risk employees, those who would be expected to:
    a. Interview infectious persons.
    b. Enter contaminated environments.
2. Assure that high-risk employees are educated about transmission of EVD and infection prevention and control guidelines.
3. Assure that high-risk employees have access to appropriate PPE and provide training on how to properly don and doff.
4. Assure that employees are trained on specimen transport, waste management and cleaning and disinfection.
5. If a patient presents for care at a facility and is suspected to have EVD, infection prevention should be notified immediately.
6. Practice good hand hygiene
7. Establish and implement triage protocols to effectively and promptly identify patients who could have EVD.
8. Designate site managers who are responsible for overseeing the implementation of routine and additional precautions for health care worker and patient safety.
9. Identify, ahead of time, critical patient care functions and essential healthcare workers to care for patients with EVD, collect laboratory specimens, and manage the environment and waste.
10. Ensure that workplace safety programs are in place and have been followed, in particular for OSHA's Bloodborne Pathogens, PPE and Respiratory Protection standards described above.
11. Healthcare workers should practice simulated patient care activities while wearing the PPE to understand the types of physical stress that might be involved and determine tolerable shift lengths.
12. Monitor and record who enters and leaves the patient care area.

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13. In addition to the local and state health departments, the CDC is available 24/7 for consultation to hospitals by calling the EOC at 770-488-7100 or via email at eocreport@cdc.gov.

Personal Protective Equipment (PPE)

1. Recommended PPE includes but is not limited to:
    a. Impermeable garment
        i. Single-use (disposable) impermeable gown extending to at least mid-calf OR
        ii. Single- use (disposable) impermeable coverall.
    b. Respiratory, head, and face protection
        i. Either a PAPR or disposable, NIOSH-certified N95 respirator should be worn in case a potentially aerosol-generating procedure needs to be performed.
        ii. If using a N95 or higher, a single-use (disposable) surgical hood extending to shoulders and single-use (disposable) full face shield should be used.
    c. Single-use (disposable) examination gloves with extended cuffs
        i. Two pairs of gloves should be worn so that a heavily soiled outer glove can be safely removed and replaced during care.
    d. Single-use (disposable) boot covers
        i. Boot covers should extend to at least mid-calf.
        ii. Single-use (disposable) shoe covers are acceptable only if they will be used in combination with a coverall with integrated socks
    e. Single-use (disposable) apron
        i. The apron should cover the torso to the level of the mid-calf and should be used over the gown or coveralls if patients are vomiting or have diarrhea.
        ii. Should be used routinely if using a coverall that has an exposed, unprotected zipper in the front.

IV. DISEASE SURVEILLANCE

A. Public Health Significance

Ebola viruses are maintained in nature in naturally occurring reservoirs including bats and nonhuman primates. EVD is ordinarily restricted to specific geographic areas and is often named for the geographic location where they were first identified. However, cases can be introduced into non-endemic areas by an incubating human host or reservoir species. Outbreaks can result

from introduction of the virus into a new environment or changes in ecology (rainfall, density of vector and reservoir species, land management, etc.). EVD can have a high fatality rate ranging from 25% to 90% in previous outbreaks; however, on an average it is 50%. Person-to-person transmission due to poor infection control in health care settings in the developing world contributes to large outbreaks of EVD. The risk of a bioterrorism attack with VHFs is low, but possible, and would have substantial public health impact because of the high mortality rate of most VHFs.

B. Disease Surveillance Objectives

1. To rapidly detect and confirm a case of EVD if it occurs in West Virginia.
2. To identify and characterize the epidemiologic features of EVD.

C. Surveillance Indicators

1. Proportion of cases with complete clinical, laboratory, and exposure information.
2. Proportion of cases that were reported to public health in a timely manner.

V. REFERENCES

1. Centers for Disease Control and Prevention. Ebola Virus Disease (EVD) at https://www.cdc.gov/vhf/EVD/index.html.
2. Centers for Disease Control and Prevention. Outbreaks at https://www.cdc.gov/vhf/EVD/outbreaks/index-2018.html.
3. World Health Organization. Ebola Virus Disease at https://www.who.int/health-topics/ebola#tab=tab_.
4. American Academy of Pediatrics. Ebola Virus Disease (EVD). In: Kimberlin DW, Barnett ED, Lynnfield R, Sawyer MH, eds. *Red Book: 2021-2024 Report of the Committee on Infectious Diseases*. Itasca, IL: American Academy of Pediatrics: 2021: 368-373.
5. Office of the Assistant Secretary for Preparedness and Response. (2017). *Regional Treatment Network for Ebola and Other Special Pathogens*. U.S. Department of Health and Human Services. http://www.phe.gov/Preparedness/planning/hpp/reports/Documents/RETN-Ebola-Report-508.pdf.
6. *FDA Approves First Treatment for Ebola Virus*. (2020, October 14). FDA. Retrieved June 23, 2023, from https://www.fda.gov/news-events/press-announcements/fda-approves-first-treatment-ebola-virus.

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7. *FDA approves treatment for ebola virus*. (2020, December 21). FDA. Retrieved June 23, 2023, from https://www.fda.gov/drugs/news-events-human-drugs/fda-approves-treatment-ebola-virus.
8. *Viral Hemorrhagic Fever (VHF) 2022 Case Definition | CDC*. (n.d.). Surveillance Case Definitions. Retrieved June 23, 2023, from https://ndc.services.cdc.gov/case-definitions/viral-hemorrhagic-fever-2022/.
9. *1910.1030 - Bloodborne pathogens. | Occupational Safety and Health Administration*. (n.d.). OSHA. Retrieved June 23, 2023, from https://www.osha.gov/laws-regs/regulations/standardnumber/1910/1910.1030.
10. *49 CFR 173.196 -- Category A infectious substances.* (n.d.). eCFR. Retrieved June 23, 2023, from https://www.ecfr.gov/current/title-49/subtitle-B/chapter-I/subchapter-C/part-173/subpart-E/section-173.196.
11. *Emergency Preparedness Resource Guide for Laboratories*. (n.d.). Centers for Disease Control and Prevention. Retrieved June 23, 2023, from https://www.cdc.gov/labtraining/docs/job_aids/additional_resources/emergency_preparedness_resource_guide_for_laboratories_508.pdf.
12. *Biological Risk Assessment: General Considerations for Laboratories*. (n.d.). Centers for Disease Control and Prevention. Retrieved June 23, 2023, from https://www.cdc.gov/safelabs/resources-tools/bio-risk-assessment.html.
13. *Interim Guidance on Risk Assessment and Management of Persons with Potential Ebolavirus or Marburgvirus Exposure | Quarantine | CDC*. (2023, March 31). Centers for Disease Control and Prevention. Retrieved June 23, 2023, from https://www.cdc.gov/quarantine/vhf/interim-guidance-risk-assessment.html?CDC_AA_refVal=https%3A%2F%2Fwww.cdc.gov%2Fquarantine%2Finterim-guidance-risk-assessment-ebola.html.

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