EBOLA VIRUS DISEASE

Ebola Virus Disease (EVD) is one of numerous Viral Hemorrhagic Fevers. It is a severe, often fatal disease (50%-90% fatality) in humans and non-human primates (such as monkeys, gorillas, and chimpanzees). In 2014, West African countries (Guinea, Liberia, and Sierra Leone) have experienced the largest outbreak of EVD. In 2022, Democratic Republic of Congo and Uganda declared outbreaks of EVD.

1. **Agent:** Ebola Hemorrhagic Fever is caused by infection with a virus of the family Filoviridae, genus *Ebolavirus*.

2. **Identification:**
   a. **Symptoms:** Initial signs and symptoms are nonspecific and may include fever, chills, severe headache, sore throat, fatigue, weakness, myalgias, arthralgia and malaise. Fever, anorexia, and weakness are the most common signs and symptoms. Symptoms may appear anywhere from 2 to 21 days after contact with the virus, with an average of 8 to 10 days. Patients may develop a diffuse erythematous maculopapular rash by day 5 to 7 (usually involving the face, neck, trunk, and arms) that can desquamate. Patients can progress from the initial non-specific symptoms after about 5 days to develop gastrointestinal symptoms such as severe watery diarrhea, nausea, vomiting and abdominal pain. Other symptoms such as chest pain, sore throat, loss of appetite and shortness of breath or confusion may also develop. Patients often have conjunctival injection. Seizures may occur, and cerebral edema has been reported. Bleeding is not universally present but can manifest later in the course as petechiae, ecchymosis/bruising, or oozing from venipuncture sites and mucosal hemorrhage. Frank hemorrhage is less common. Other symptoms may include hiccups (late stage). Pregnant women may experience spontaneous miscarriages.

   See CDC website for the latest information:
   

   b. **Differential Diagnosis:** Due to these nonspecific symptoms particularly early in the course, EVD can often be confused with other more common infectious diseases such as malaria, typhoid fever, influenza, meningococcemia, and other bacterial infections (e.g., pneumonia).

   c. **Diagnosis:** In the early stages of case investigation, a case is defined by meeting the Center of Disease Control and Prevention (CDC)’s case definition. (CDC: Viral Hemorrhagic Fevers; Ebola (Ebola Virus Disease):Case Definition)

   **Suspect Case:**

   A person who has both consistent symptoms and risk factors as follows:

   1) Elevated body temperature or subjective fever or symptoms, including severe headache, weakness and fatigue, muscle and joint pain, sore throat, anorexia, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage, bleeding, or bruising; **AND**

   2) Epidemiologic risk factors within the past 21 days before the onset of symptoms (see Page 3) and(CDC Website Ebola (Ebola Virus Disease): Screening Patients).

   A suspect case classification will change if laboratory testing determines suspect case to be negative ("not a case") or positive ("confirmed case") for EVD.

   **Confirmed Case:**

   A suspect case with laboratory confirmed diagnostic evidence of Ebola virus infection.

3. **Incubation:** Usually 8-10 days, (range 2 to 21 days).

4. **Reservoir:** Unknown. However, on the basis of available evidence and the nature of similar viruses, researchers believe that the
virus is zoonotic (animal-borne) with bats being the most likely reservoir. Four of the five subtypes occur in an animal host native to Africa.

5. **Source:** Blood, sweat, vomit, saliva, urine, feces, semen, tears, amniotic fluid, vaginal secretions, or breast milk of EVD cases. Infected bats, rodents, or primates from disease-endemic areas.

6. **Transmission:** Direct contact (through broken skin or mucous membranes) with body fluids from an EVD infected person, such as blood, sweat, vomit, saliva, urine, feces, semen, amniotic fluid, breast milk or through contact with contaminated objects (e.g., clothes, bedding, high touch surfaces, needles, syringes and medical equipment). Direct handling of bats, forest antelopes, rodents, or nonhuman primates from disease-endemic areas.

7. **Communicability:** A person with EVD becomes infectious to others at the onset of signs and symptoms. People remain infectious as long as their blood contains the virus.

The Ebola virus can persist in immune-privileged sites (e.g., testes, central nervous system, interior of the eye and placenta). In women who have been infected while pregnant, the virus persists in the placenta, amniotic fluid, and fetus. In women who have been infected while breastfeeding, the virus may persist in breast milk. How long the virus remains in immune-privileged sites is currently being studied.

8. **Specific treatment:** There are drugs approved by the United States Food and Drug Administration (FDA) to treat EVD caused by the certain species of Ebola virus. Whether or not other treatments are available, supportive care can significantly improve chances of survival when provided early.

See CDC website for the latest information: [CDC: Viral Hemorrhagic Fevers: Ebola (Ebola Virus Disease) Treatment](https://www.cdc.gov/vhf/ebola/)

9. **Immunity:** People who recover from Ebola infection develop antibodies that last for at least 10 years, possibly longer. It is not known if people who recover are immune for life or if they can become infected with a different species of Ebola.

---

**REPORTING PROCEDURES**

1. **Report any case or suspected cases by telephone immediately** (Title 17, Section 2500. California Code of Regulations) to:
   a. Los Angeles County Department of Public Health (LAC DPH) Acute Communicable Disease Control Program (ACDC) at (213) 240-7941. Physicians at ACDC are available 24 hours/day for consultation. Ask for Physician on Call (AOD) during after business hours at (213) 974-1234.

2. **ACDC will notify the:**
   a. CDC Emergency Operations Center at (770) 488-7100.
   b. California Department of Public Health Division of Communicable Disease Control (CDPH DCDC) by calling the Duty Officer at (916) 328-3605 (available 24 hours)
   c. Appropriate ACDC staff.
   d. LAC DPH Public Health Lab (PHL) at (562) 658-1360.

3. **Report Forms:**
   A. [Ebola Virus Disease Comprehensive Intake Form](https://www.cdc.gov/vhf/ebola/)(For ACDC use for symptomatic contacts/travelers and/or asymptomatic high risk contacts/travelers on case-by-case consideration)
   B. [Ebola Virus Disease Contact Investigation Worksheet](https://www.cdc.gov/vhf/ebola/)(For ACDC use)
   C. [Viral Hemorrhagic Fever Case Report](https://www.cdc.gov/vhf/ebola/)(For ACDC use)
   D. [Ebola Virus Disease Exposure Daily Symptom Monitoring Log](https://www.cdc.gov/vhf/ebola/)(For CFS use)
   E. [Ebola Virus Disease REDCap Traveler Interview Form](https://www.cdc.gov/vhf/ebola/) – See
REDCap link in IRIS in the “Daily Monitor” tab under CFS Contact Activities section (For CFS use).

Upon consultation with the reporting clinician, the AOD or a designated staff is to complete:

- **AOD Suspect EVD Intake and Checklist**

If received on weekend/holidays, the AOD or a designated staff to complete the following additional forms:

- **EVD Comprehensive Intake Form (Form A), and**
- **EVD Contact Investigation Worksheet (Form B).**

Face-to-face interview should only be conducted if case or suspect case is asymptomatic. For symptomatic case or suspect case, interview should be conducted via telephone or electronic means with video function or conduct interview with another person that is familiar with the case or suspect case. AOD is to report to Chief or Deputy Chief of ACDC to determine actions to follow.

4. Epidemiological Data:

   Travel History:
   a. Travel to a designated EVD outbreak area in past 21-days.


   b. Close contact (within 3 feet or 1 meter) with person with confirmed or suspect EVD.

   c. Attend a funeral while traveling in a designated EVD area.

   d. Care for someone who was sick while traveling in a designated EVD area.

   e. Contact with animals, domestic or wild (including bats, rodents, or nonhuman primates) during travel.

   Risk Factors
   a. Contact with blood or bodily fluids (including contaminated objects) of acutely ill or dead persons with suspected or known EVD (such as providing care in home or healthcare setting) without wearing appropriate PPE.

   b. Participation in funeral rituals, including preparation of body for burial or touching corpse at ceremony without wearing appropriate PPE.

   c. Working in a laboratory where human specimens are handled without wearing appropriate PPE.

   d. Contact with semen from a man who has recovered for EVD (e.g., oral, vaginal, or anal sex).

   e. Direct handling of wild animals or carcasses that may be infected with EVD (fruit bats, forest antelopes, duikers, or nonhuman primates).

   f. Experiencing a breach in infection control precautions resulting in percutaneous, mucus membrane, or skin contact with the blood or body fluids of a patient with known or suspected EVD.

   [CDC Website Ebola (Ebola Virus Disease): Screening Patients](https://www.cdc.gov/vhf/ebola/index.html)
2. Obtain Contacts to Case or Suspect Case:
   • Detailed name and contact information for all persons with whom case had close contact during the infectious period (household, sexual, healthcare facilities, public transportation, work, school, social events, bars/clubs, friends/relatives, community centers, religious services, other activities, places, or people).
   • Obtain name, address, phone number, email, DOB, gender, and relationship to case/suspect case.
   • Nature of exposure should be obtained to determine risk classification. (FORM B: Ebola Virus Disease Contact Investigation Worksheet)

3. Provide Education to Healthcare Provider if Case/Suspect Case is currently at a Healthcare Facility.
   • Isolate the patient in a single room (with a private bathroom) with the door closed.
   • Follow standard, contact, and droplet precautions, including the use of appropriate PPE.
   • If any aerosolizing procedures are needed, place patient in an airborne infection isolation room. Contact ACDC immediately (213) 240-7941.
   • Obtain the names of all persons who may have had close, direct, and unprotected (not wearing protective clothing) contact during the course of their illness and prior to the implementation of isolation precautions (e.g., emergency medical services, admitting staff, emergency room personnel, family/household members, and other patient contacts).
   • Maintain a log of all staff and visitors entering the patient room. Limit healthcare personnel who enter the patient room. Keep log of all staff and visitors (with contact numbers) that may have had interaction/contact with the case prior to proper isolation of patient.
   • Maintain a log of all staff collecting and handling specimens from the suspected EVD patient. Healthcare and laboratory personnel should follow established standards and protocols compliant with the Occupational Safety and Health Administration (OSHA) blood-borne pathogen standard for blood and other potentially infectious material.
   • Always utilize PPE when in patient rooms or handling patient specimens. The level and use of PPE for the protection of HCP caring for suspected or confirmed EVD patient may change depending on the clinical symptoms and presentation of the patient. Refer to CDPH PPE guidance for details:
     https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/CDPH-PPE-Guidance-EVD.aspx
   • Refer to California OSHA (Cal-OSHA)’s interim guidance (11/14/14) for Ebola in hospital settings for Aerosol Transmissible Disease (ATD) standard, which requires PPE that includes coverage of all surfaces of the body and use of a PAPR when a risk of aerosol exposure exists. Although the focus of the guidance is hospitalized patients, Cal-OSHA states that EDs should have plans to rapidly identify and isolate patients, inform public health, transfer the patient, and ensure worker safety. In hospitals and EDs, engineering and work practice controls and PPE all should contribute to worker protection.
   • Prior to discharge: contact ACDC at (213) 240-7941. Physicians at ACDC are available 24 hours/day for consultation. Ask for Physician on Call (AOD) after business hours at (213) 974-1234.

CONTACTS AND EXPOSURE RISK LEVELS:
Contact identification and follow-up should occur for all suspect cases where there is a high index
If laboratory testing determines that a case is ruled out ("not a case"), contact identification and follow-up can cease.

The CDC may also recommend public health risk assessment and post-arrival management of travelers from countries with Ebola virus disease (EVD) outbreaks.

The CDC will provide guidelines for classifying contacts based on their level of risk exposure (See CDC website for the latest guidelines):


Each contact should be located and interviewed to confirm exposure risk and determine presence or absence of symptoms. (Form E: Ebola Virus Disease REDCap Traveler Interview Form – See REDCap link in IRIS in the “Daily Monitor” tab under CFS Contact Activities section (For CFS use))

1. High Risk – High-Risk Exposures

- Percutaneous (i.e., piercing the skin), mucous membrane (e.g., eye, nose, or mouth), or skin contact with blood or body fluids (including but not limited to feces, saliva, sweat, urine, vomit, sputum, breast milk, tears, vaginal fluid, and semen) of a person with known or suspected EVD.

- Direct physical contact with a person with EVD (alive or dead) or with objects contaminated with the body fluids of a person with EVD (alive or dead) while not wearing recommended PPE.

- 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 Ebola treatment hospital or associated facility (e.g., laboratory) or while taking care of a patient with EVD.

- Direct contact with or the occurrence of a breach in infection control precautions while handling a dead body in an Ebola 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 EVD.

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

a. Symptomatic:

   - Clinical criteria, which includes fever of ≥100.4°F/38.0°C, OR any of the following symptoms: severe headache, weakness, fatigue, muscle pain, joint pain, sore throat, loss of appetite, vomiting, diarrhea, abdominal pain, unexplained bruising or bleeding, red eyes, skin rash, or hiccup.

   - Call ACDC doctor on call (AOD) at 213-240-7941 immediately for consultation and to arrange safe transport to a healthcare facility for EVD evaluation. Ask for Physician on Call (AOD) after business hours at (213) 974-1234.

   - Admit and isolate patient for medical examination, perform EVD testing by contacting PHL with prior approval of testing by ACDC, and conduct contact tracing.

   - Health Officer Order of Isolation may be considered if suspect case tests positive for EVD and if necessary to ensure compliance.

b. Asymptomatic:

   - Health Officer Order of Quarantine in accordance with CDC guidelines is required.

   - DPH will conduct daily monitoring via text message, email, or phone for fever and symptom assessment for 21 days from the date of last exposure with EVD. Daily monitoring log (Form D) is available as a resource for contact if needed.

   - Travel restrictions: travel is not permitted for high-risk contact, even if not showing symptoms.

   - Exclusion from workplaces for the duration of the public health order.
2. **Medium Risk—Present in Designated Ebola Outbreak Area but no High-Risk Exposures:**
   - Reports no High-Risk exposures: CDC Interim Guidance High Risk Exposures (see Box 2.) and
   - Having been in a designated Ebola outbreak area within the previous 21 days CDC Interim Guidance High Risk Exposures (see Box 1.)

   a. **Symptomatic:**
      - Clinical criteria, which includes fever of $\geq 100.4^\circ F/38.0^\circ C$, OR any of the following symptoms: severe headache, weakness, fatigue, muscle pain, joint pain, sore throat, loss of appetite, vomiting, diarrhea, abdominal pain, unexplained bruising or bleeding, red eyes, skin rash, or hiccups.
      - Call ACDC doctor on call (AOD) at 213-240-7941 for consultation. Ask for Physician on Call (AOD) after business hours at (213) 974-1234.
      - ACDC will assess situation and determine next steps for further evaluation.

   b. **Asymptomatic:**
      - DPH will conduct monitoring for fever and symptom assessment twice a week (Day 3, 7, 10, 14, 17, 21 after departed EVD OB country) via text message, email, or phone. Daily monitoring log (Form D) is available as a resource for contact if needed.
      - Travel restrictions: advance notification to DPH is required. DPH to notify destination and dates of travel to health department.

3. **Low risk (but not zero)—Presence in Country with Ebola Outbreak but Not in a Designated Ebola Outbreak Area:**
   - Having been in a country with widespread Ebola transmission within the previous 21 days and reports no High-Risk Exposures.

   a. **Symptomatic:**
      - Clinical criteria, which includes fever of $\geq 100.4^\circ F/38.0^\circ C$, OR any of the following symptoms: severe headache, weakness, fatigue, muscle pain, joint pain, sore throat, loss of appetite, vomiting, diarrhea, abdominal pain, unexplained bruising or bleeding, red eyes, skin rash, or hiccups.
      - Call ACDC doctor on call (AOD) at 213-240-7941 for consultation. Ask for Physician on Call (AOD) after business hours at (213) 974-1234.
      - ACDC will assess situation and determine next steps for further evaluation.

   b. **Asymptomatic:**
      - DPH will conduct monitoring for fever and symptom assessment once a week (Day 7, 14, 21 after departed EVD OB country) via text message, email, or phone. Daily monitoring log (Form D) is available as a resource for contact if needed.
      - Travel restrictions: advance notification to DPH is required. DPH to notify destination and travel dates to health department.
Notify ACDC immediately if fever or other symptoms develop at 213-240-7941. Ask for Physician on Call (AOD) after business hours at (213) 974-1234.

For Healthcare Workers in US exposed to Ebola patient:

- Healthcare facility should conduct daily monitoring of all personnel exposed to the case or suspect case.
- Notify ACDC immediately if fever or other symptoms develop at 213-240-7941. Ask for Physician on Call (AOD) after business hours at (213) 974-1234.
- If a healthcare worker in a U.S. healthcare facility who was believed to be wearing recommended PPE correctly is diagnosed with Ebola, and no known breach was identified, then all other healthcare workers taking care of the Ebola patient in that facility will be considered in the High Risk category.

Isolation and Quarantine

DPH will implement isolation and quarantine measures as needed to assure the public’s health. ACDC Director or authorized designee may assume responsibility for initiation of H-455 Request for Legal Intervention and contact Chief, Public Health Investigation (PHI). DPH AOD will determine if legal orders are necessary, coordinate with the DPH Health Officer if available, and contact LAC DPH Chief PHI for execution. Refer to the LAC DPH Legal Order Manual, page 15, 7f, for full guidance.

DIAGNOSTIC PROCEDURES

Notify the LAC DPH Public Health Lab prior to collection and transport of any testing for EVD (562-658-1360). Prior approval for testing must be obtained before specimen collection. After hours, weekends, or holidays contact the County Operator and ask for the Public Health Laboratory Director at 213-974-1234.

The LAC DPH Public Health Laboratory (PHL) is authorized to perform molecular testing for EVD. It is very important to provide the travel history and other epidemiological risk factor information to PHL prior to testing for EVD to obtain accurate laboratory results. PHL staff will assist in proper Category A (UN2814) specimen packaging and physical transport of specimens to PHL for testing. All molecular results are confirmed by CDC testing. Serological testing will be performed by CDC.

Required Specimens for Molecular Testing are:
- Two (2) whole blood samples collected in plastic lavender top (EDTA) vacutainer tubes. Each tube must contain a minimum of 4 mL blood.

Required Specimens for Serology Testing is:
- One (1) whole blood sample collected in plastic lavender top (EDTA) vacutainer tubes. Each tube must contain a minimum of 4 mL blood.

Do not submit specimens in glass containers or attempt to aliquot. Each whole blood sample should separately be double bagged, stored at 2-8°C, and transported on cold packed in separate Category A packaging. PHL staff will assist in packaging of specimen. (One specimen per Category A packaging) Courier should not be used for transport of suspected Ebola specimens. The LAC DPH Public Health Lab will arrange for transport.

Standard labeling of specimens with a minimum of two patient identifiers (patient full name and date of birth) and collection date should be followed. If a medical record number is available, please also include Forms required for Ebola diagnostic testing at the LAC DPH Public Health Laboratory include:

1) Public Health Laboratory Test Request Form
2) CDC Form 50.34
3) CDC Viral Special Pathogens Branch Test Request Form

Refer to CDC website for the Guidance for Collection, Transport and Submission of Specimens for Ebola Virus Testing (04/01/2022):

https://www.cdc.gov/vhf/ebola/laboratory-personnel/specimens.html
Consultation for collecting and submitting any additional and/or other specimens (e.g., tissue samples) for EVD testing must be made with PHL Director (562-658-1300). Approval for testing must be made with CDC. PHL will submit the specimen(s) to CDC once approved.

PREVENTION-EDUCATION

1. Reinforce the importance of ensuring strict infection control practices in healthcare facilities and among healthcare and other ancillary personnel.

   For guidance refer to the Infection Prevention and Control Recommendations for Hospitalized Patients Under Investigation (PUIs) for Ebola Virus Disease (EVD) in U.S. Hospitals on the CDC website (10/06/2022):
   https://www.cdc.gov/vhf/ebola/clinicians/evd/infection-control.html

2. Regarding Environmental Infection Control for hospitals taking care of patients with suspected or confirmed EVD:

   a. Environmental services staff (EVS) must wear recommended PPE to protect against direct skin and mucous membrane exposure of cleaning chemicals, contamination, and splashes or spatters during environmental cleaning and disinfection activities.
      https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/CDPH-PPE-Guidance-EVD.aspx

   b. Use a U.S. Environmental Protection Agency (EPA)-registered hospital disinfectant with a label claim for a non-enveloped virus (e.g., norovirus, rotavirus, adenovirus, poliovirus) to disinfect environmental surfaces in rooms of patients with suspected or confirmed Ebola virus infection.

   c. Avoid contamination of reusable porous surfaces that cannot be made single use.

   d. To reduce exposure among staff to potentially contaminated textiles (cloth products) while laundering, discard all linens, non-fluid-impermeable pillows or mattresses, and textile privacy curtains as a regulated medical waste.

3. Educate healthcare staff on the importance of strict adherence to proper use of standard, contact, droplet, and airborne precautions.

   Utilize proper PPE at all times. Healthcare facilities should be providing ongoing training on correct use of recommended PPE for their healthcare workers (including but not limited to: EVS, laboratory staff, or ancillary personnel who may be involved with EVD patient care) with special emphasis on careful and meticulous doffing procedures. This should include a trained observer to monitor for strict infection control practices, and eliminate any possible contamination, self-inoculation, and potential secondary cases of Ebola in healthcare workers.
   https://www.cdph.ca.gov/Programs/CID/DCDC/Pages/CDPH-PPE-Guidance-EVD.aspx

4. Educate healthcare workers on the safe specimen handling for routine laboratory diagnostics.

   a. Minimize routine blood specimen draws and specimen handling.

   b. Clean equipment according to manufacturer’s instructions.

   For more information, refer to CDC’s Guidance for Specimen Collection, Transport, Testing, and Submission for Patients with Suspected Infection with EVD (04/01/2022):
   https://www.cdc.gov/vhf/ebola/laboratory-personnel/specimens.html

   Printable Fact sheet:

5. General Education for Ebola Prevention:

   a. Wash hands often with soap and water or use an alcohol-based hand sanitizer.
b. Do NOT touch the blood or body fluids (e.g., urine, feces, saliva, vomit, sweat, breast milk, vaginal fluid, and semen) of people who are sick.

c. Do NOT handle items that may have come in contact with a sick person’s blood or body fluids, such as clothes, personal items, high touch surfaces, bedding, needles, or medical equipment.

d. Do NOT touch the body of someone who has died of Ebola.

e. In December 2020 the FDA approved a vaccine for EVD which is recommended for pre-exposure prophylaxis for adults ≥18 years of age with potential occupational risk of exposure to Zaire ebolavirus, including those:
   - Responding or planning to respond to an outbreak of EVD.
   - Laboratorian or other staff working at BSL-4 facilities that handle live Ebola virus.
   - Healthcare personnel working at Ebola Treatment Centers (9/27/2022)

OTHER RESOURCES:

1) Procedures for Safe Handling and Management of Ebola-Associated Waste (10/20/2022)

2) Web-Based PPE Training. Guidance for Donning and Doffing PPE During Management of Patients with Ebola Virus Disease in U.S. Hospitals (10/7/2022)
   http://www.cdc.gov/vhf/ebola/hcp/ppe-training/index.html

   http://publichealth.lacounty.gov/acd/docs/EbolaHCWGuide.pdf

4) Think Ebola: Early Recognition Is Critical for Infection Control (10/06/2022)
   https://www.cdc.gov/vhf/ebola/clinicians/evaluating-patients/think-ebola.html

5) Interim Guidance for Environmental Control in Hospitals for Ebola Virus (10/20/2022)
   https://www.cdc.gov/vhf/ebola/clinicians/cleaning/hospitals.html

6) Ebola-Associated Waste Management (10/06/2022)
   https://www.cdc.gov/vhf/ebola/clinicians/cleaning/waste-management.html

7) Information on the Survivability of the Ebola Virus in Medical Waste (10/19/2022)
   https://www.cdc.gov/vhf/ebola/clinicians/cleaning/ebola-virus-survivability.html