Viral Hemorrhagic Fever (Ebola)

<table>
<thead>
<tr>
<th>Signs and symptoms</th>
<th>• Fever AND additional symptoms: severe headache, muscle pain, vomiting, diarrhea, abdominal pain, unexplained hemorrhage, other applicable symptom (rash, chest pain)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Incubation</td>
<td>Ebola 2-21 days (typically 3-10) with very low infectious dose</td>
</tr>
<tr>
<td>Case classification</td>
<td><strong>Clinical criteria:</strong> fever &gt; 38.6°C (101.5°F) for Ebola or &gt; 40°C (104°F) for other agents AND other symptom(s): severe headache, muscle pain, vomiting, diarrhea, abdominal pain, unexplained hemorrhage; for some agents low platelets, rash, pharyngitis, chest pain, proteinuria. <strong>Exposure criteria:</strong> direct contact with body fluids (includes semen for 10 weeks) or remains, residence in risk area, handled laboratory specimens, handled risk wild animal</td>
</tr>
<tr>
<td><strong>Confirmed:</strong></td>
<td>Clinical and exposure criteria AND any diagnostic test from a reference laboratory (PCR, ELISA, viral culture, IgM, IgG, immunohistochemistry)</td>
</tr>
<tr>
<td><strong>Suspect (person under investigation):</strong></td>
<td>Consistent clinical and exposure criteria</td>
</tr>
<tr>
<td>Differential diagnosis</td>
<td>Any infectious encephalitis, transverse myelitis, stroke, psychosis, brain tumor, atropine poisoning, prion disease (CJD), tetanus; rule out malaria, influenza, sepsis, RSV, group A strep</td>
</tr>
<tr>
<td>Treatment</td>
<td>Supportive (IV fluids, balance electrolytes, maintain oxygen status and blood pressure, dialysis etc. as needed); experimental medications and protocols available from CDC</td>
</tr>
<tr>
<td>Duration</td>
<td>3-15 days, longer with intensive supportive care; may be ocular and neurologic relapses</td>
</tr>
<tr>
<td>Exposure</td>
<td><strong>High risk:</strong> direct contact with patient or body in any setting without PPE; percutaneous or mucous membrane exposure; laboratory processing without PPE; household contact <strong>Some risk:</strong> in country with widespread transmission; direct contact or laboratory processing with PPE; any patient care in any healthcare setting <strong>Low risk:</strong> brief direct contact or brief proximity to case; travel on aircraft with case</td>
</tr>
<tr>
<td>Laboratory testing</td>
<td><strong>EMERGENCY</strong> LHI and OCDE arrange testing if patient is being hospitalized - emergency</td>
</tr>
<tr>
<td></td>
<td>• Institute infection control measures immediately including during specimen collection</td>
</tr>
<tr>
<td></td>
<td>• <strong>Best specimens:</strong> Two duplicate samples of &gt; 4mL whole blood or plasma (not serum) in lavender-top EDTA plastic tubes, preferably taken 3 days or later into illness</td>
</tr>
<tr>
<td></td>
<td>Store at 2-8°C or if shipping is delayed for more than 72 hours should be stored frozen at -70°C. Previously frozen specimens should be shipped with dry ice.</td>
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<tr>
<td></td>
<td>CDC will accept whole blood, serum, and tissue specimens</td>
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<td></td>
<td>• Pack and ship as Suspected Category A according to USDOT and ICAO/IATA regulations</td>
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<tr>
<td></td>
<td><strong>Specimen shipping (Section 4):</strong></td>
</tr>
<tr>
<td></td>
<td>• Keep all specimens <strong>cold</strong>, <strong>ship cold</strong> with Serology/Virology form <a href="http://www.doh.wa.gov/Portals/1/Documents/5230/302-017-SerVirHIV.pdf">http://www.doh.wa.gov/Portals/1/Documents/5230/302-017-SerVirHIV.pdf</a></td>
</tr>
<tr>
<td>Public Health Actions</td>
<td>LHJ immediately contacts CDE 877-539-4344 for diagnosis and treatment</td>
</tr>
<tr>
<td><strong>EMERGENCY</strong></td>
<td>• Transport to designated emergency department or hospital and arrange testing if ill</td>
</tr>
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<td></td>
<td>• Coordinate contact tracing with DOH and CDC – shared case exposure or exposed to case</td>
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<tr>
<td></td>
<td>• Monitor person under investigation x21 d; restrict travel/public contact if high risk exposure</td>
</tr>
<tr>
<td>Infection Control</td>
<td><strong>Immediate standard, contact, and droplet precautions; single patient room with toilet; monitor and log PPE use; minimize testing and aerosol-generating procedures</strong></td>
</tr>
</tbody>
</table>
Viral Hemorrhagic Fever (Ebola)

1. DISEASE REPORTING

A. Legal Reporting Requirements

1. Health care providers and facilities: immediately notifiable to local health jurisdiction

2. Laboratories: immediately notifiable to local health jurisdiction; specimen submission requested – positive specimens (2 business days) (Sections 3 and 4).

3. Local health jurisdictions: immediately notifiable to Washington State Department of Health (DOH) Office of Communicable Disease Epidemiology (OCDE).

B. Local Health Jurisdiction Investigation Responsibilities

1. Immediately recommend infection control measures if agent is transmissible.

2. Immediately report all cases, potential cases and exposed persons to OCDE: 1-877-539-4344 or 206-418-5500. Conduct a rapid assessment to determine whether bioterrorism is a possibility or if there is potential healthcare facility transmission.

3. Facilitate the transport of specimens for reference testing.

4. Determine the source of infection.

5. Identify other persons exposed and recommend monitoring as indicated.


2. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent:

Agents of viral hemorrhagic fever include four main families of viruses (filoviruses, arenaviruses, bunyaviruses, flaviviruses). Well-known agents are Ebola, Marburg and dengue viruses (also see Hantavirus and Yellow Fever guidelines). Ebola is an enveloped virus and is susceptible to hospital-grade disinfectants but may remain viable for several days in organic matter (e.g., dried blood) on surfaces or in bodies.

B. Description of Illness

Abrupt onset of initial nonspecific symptoms of fever, headache, muscle or joint aches, and anorexia. After about 5 days disease progresses to watery diarrhea, vomiting and abdominal pain; there may be sore throat, desquamating rash, seizures, miscarriage or hiccups. Damage to the liver, adrenal glands and spleen results in coagulopathy, hypotension, and impaired steroid synthesis. About half of cases have unexplained hemorrhage (petechiae, bruising, bleeding from mucous membranes or small injuries). Ebola viremia peaks around 5 days from onset, and most deaths occur at about 10 days. Case fatality rate is 40-90% with deaths due to multi-organ failure and shock; convalescence is prolonged. Mortality is high during pregnancy. Laboratory findings include platelets < 150,000; elevated hepatic transaminases (AST > ALT); and elevated
amylase. Differential includes malaria, typhoid, dengue, yellow fever, West Nile, chikungunya, other tropical infections, influenza, and non-infectious illnesses such as leukemia. Note that some medications (e.g., Coumadin) cause unusual bleeding.

C. Viral Hemorrhagic Fever in Washington

Washington has had no cases. September 2014 a traveler from an Ebola-affected region of West Africa was diagnosed in Texas with Ebola. Two Dallas healthcare workers were infected during care of that patient. Rare cases of Ebola, Lassa and Marburg fever acquired elsewhere and imported into this country have not had subsequent transmission.

D. Reservoir:

Animals such as bats or rodents are suspected or known viral reservoirs. Outbreaks include Marburg in Democratic Republic of Congo (DRC; formerly Zaire) and Angola; Ebola in the DRC (location of the Ebola River), southern Sudan and West Africa. A large outbreak starting in 2013 in Guinea spread to Liberia and Sierra Leone.

E. Modes of Transmission

Direct transmission from reservoir or secondarily infected animals is rare; bush meat may be a risk. Person-to-person transmission of filoviruses (e.g., Ebola) can occur by direct contact with body fluids/excreta (blood, urine, diarrhea, vomit, semen, milk) including percutaneous injection or mucous membrane contamination. With Ebola, viremia starts with symptom onset and peaks at day 5. Ebola has spread by contact with bodies during funerals or handling human remains. There is no evidence of airborne spread in human Ebola outbreaks. Ebola virus is a potential agent of bioterrorism. Person-to-person transmission resulted in healthcare associated outbreaks for some bunyaviruses (e.g., South American hantaviruses). Flaviviruses (e.g., dengue, yellow fever) are primarily vector-borne and can become endemic if introduced into areas with competent vectors.

F. Incubation period

Incubation for Ebola is 2-21 days, typically 3-10 days. The infectious dose is very low.

G. Period of Communicability

All body fluids and all excreta are infected from Ebola symptom onset, with very high virus levels within a few days. Ebola virus has been detected in breast milk. Urine and semen remain infectious for weeks to months after recovery from Ebola. Fomites have not been shown to be a source of exposure but virus may persist for days to weeks in organic debris (e.g., dried blood) including on bodies, bedding or medical equipment (http://wwwnc.cdc.gov/eid/article/21/5/15-0041_article).

H. Treatment

Supportive care to maintain volume, electrolytes, blood pressure, and oxygenation. Antiviral and experimental medications may be used when available.
3. CASE DEFINITIONS


A. Clinical description

Fever of greater than 38.6° C (101.5° F) for Ebola or greater than 40° C (104° F) for other agents of viral hemorrhagic fever (VHF) AND additional symptom(s) such as severe headache, muscle pain, vomiting, diarrhea, abdominal pain, unexplained internal or external hemorrhage, or as applicable symptom of another suspected VHF agent (low platelets, rash, or only for arenavirus pharyngitis, retrosternal chest pain, or proteinuria).

B. Laboratory criteria for diagnosis

Any positive diagnostic evidence from a reference laboratory including:

- Detection of VHF viral antigens in blood by enzyme-linked immunosorbent assay (ELISA) antigen detection
- 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

C. Epidemiologic risk factors

Ebola (or other communicable VHF) – Within the 21 days before the onset of symptoms:

- Contact (including household, sexual, healthcare) with blood or other body fluids or human remains of a known or suspected Ebola virus disease (EVD) case
- Residence in—or travel to—an area where EVD transmission is active
- Work in a laboratory that handles VHF specimens
- Direct handling of or laboratory work with bats, rodents, or primates (or bush meat) from any disease-endemic area
- Exposure to semen from a confirmed acute or convalescent case within 10 weeks of that person’s onset of symptoms

D. Case classification (Ebola 2014 and communicable VHF)

**Person under Investigation (PUI) or Suspect:**

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

1. Elevated body temperature or subjective fever or consistent symptoms, including severe headache, fatigue, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage; **AND**
2. An epidemiologic risk factor within the 21 days before the onset of symptoms including:
   a. High risk: direct contact with a VHF case patient without use of appropriate PPE; percutaneous or mucous membrane exposure to blood or body fluids of symptomatic case; laboratory processing of blood or body fluids of symptomatic case without use of appropriate PPE; direct contact with dead body without use of appropriate PPE; living in household and providing direct care to symptomatic case;
b. Some risk:
   - In a country with widespread VHF transmission or cases in an urban area with uncertain control measures: direct contact while using appropriate PPE with a symptomatic VHF case or the person's body fluids, or any direct patient care in any healthcare setting
   - Close contact (< 3 feet) in households, healthcare facilities, or community settings with a symptomatic VHF case (i.e., contact for a prolonged period while not using appropriate PPE)

c. Low (but not zero) risk: In a country with widespread VHF transmission or with cases in an urban area with uncertain control measures and no known exposures, brief direct contact (e.g., shaking hands) with a VHF case in early stage of disease while not using appropriate PPE, brief proximity (such as briefly being in the same room) with a symptomatic case, in a country without widespread transmission having direct contact with symptomatic VHF case or the person’s body fluids while using appropriate PPE; traveled on an aircraft with a symptomatic case (see: http://www.cdc.gov/vhf/ebola/exposure/risk-factors-when-evaluating-person-for-exposure.html)

d. No identifiable risk: being a contact of a contact of a VHF case, having contact with a case before symptoms develop, being present in an affected country or area but remaining on an aircraft and having no contact with anyone from the community, or having exposures more than 21 days prior to onset of illness

Confirmed: A PUI with laboratory-confirmed diagnostic evidence of VHF infection.

4. DIAGNOSIS AND LABORATORY SERVICES

A. Laboratory Diagnosis

Clinical suspicion based on symptoms and risk of exposure is the most critical element for diagnosis of viral hemorrhagic fever. Hemorrhagic signs may not occur and initial presentation is nonspecific and may resemble other tropical illnesses, so testing for malaria or other clinically compatible conditions should be considered.

Commercial testing is available for dengue fever and chikungunya virus. Early in the illness, appropriate diagnostic tests for Ebola are polymerase chain reaction (PCR), antigen-capture enzyme-linked immunosorbent assay (ELISA), IgM ELISA, and viral isolation. Later in the disease IgM and IgG antibodies can be tested. Deceased patients can be retrospectively tested by immunohistochemistry, PCR, or virus isolation.

A negative RT-PCR test result for Ebola virus from a blood specimen collected less than 72 hours after onset of symptoms does not necessarily rule out Ebola virus infection. If the patient is still symptomatic after 72 hours, the test should be repeated. If the patient has recovered from the illness that brought them to medical attention, a repeat test is not required. A negative RT-PCR test result for Ebola virus from a blood specimen collected more than 72 hours after symptom onset rules out Ebola virus infection.

Ebola laboratory testing must be performed by a reference laboratory such as the Washington State Public Health Laboratories (PHL) or Centers for Disease Control and Prevention (CDC). PHL will test for Ebola only with CDC pre-approval.
B. Tests Available at the Washington State Public Health Laboratories (PHL)

PHL offer PCR testing to detect Ebola Zaire virus (2014 outbreak strain). Negative PCR results should not be used as the sole basis for patient management decisions, particularly early in the illness. Presumptive positive PCR results require additional confirmatory testing by CDC. Prior to submitting specimens, obtain approval from Office of Communicable Disease Epidemiology (206-418-5500 or 877-539-4344). To be tested, the patient should meet one of the case classifications (see Section 3D).

Note that PHL require all clinical specimens have two patient identifiers, a name and a second identifier (e.g., date of birth) both on the specimen label and on the submission form. Due to laboratory accreditation standards, specimens will be rejected for testing if not properly identified. Also include specimen source and collection date.

C. Specimen Collection

Take specimens when a symptomatic patient is seen by a healthcare facility and is suspected of having an exposure to Ebola (see Section 5D); if symptom onset is within 3 days, a subsequent specimen may be needed to completely rule out Ebola virus disease. Autopsy and prior frozen specimens from affected organs are also acceptable. See: http://www.doh.wa.gov/Portals/1/Documents/5240/SCSI-EbolaVirus-V1.pdf.


The following specimen types are acceptable for Ebola virus testing at PHL:

- Two duplicate samples of a minimum volume of 4mL whole blood or plasma (not serum) collected in lavender-top EDTA plastic collection tubes can be submitted for Ebola virus testing. Specimens taken 3 days or later into illness are preferred. Do not submit serum. Do not submit specimens in glass containers. Do not submit blood specimens preserved in heparin tubes. Specimens should be stored at 2-8° C or if shipping is delayed for more than 72 hours should be stored frozen at -70° C. Previously frozen specimens should be shipped with dry ice.

The following specimen types are acceptable for Ebola virus testing at CDC:

- Specimens other than EDTA blood including other whole blood, serum and tissue may be submitted upon Department of Health consultation with the CDC.

Key points for specimen collection:

- Collect specimens using appropriate infection control procedures to protect staff.
- Label vial or container with patient’s name and a second identifier, specimen source, and date obtained.
- Optimal testing is with freshly-collected specimens stored and shipped refrigerated (2–8° C) that arrive for processing within 72 hours of collection.

Safe handling of specimens for persons under investigation for Ebola virus

For CDC recommendations about safe laboratory handling of specimens, see: http://www.cdc.gov/vhf/ebola/hcp/safe-specimen-management.html
Storage, packaging, and shipping of specimens

All persons shipping packages containing medical specimens must have documented shipping training (USDOT and USPS Regulations for Packaging and Labeling Infectious Substances). For assistance contact PHL at 206-418-5458 or chuck.talburt@doh.wa.gov.

PHL can receive priority Ebola specimens 24/7. Prior arrangements must be made with the laboratory to properly receive these specimens. Ship specimens to:

Washington State Public Health Laboratories
Attn: BT Lab
1610 NE 150th Street
Shoreline, WA 98155

It is the responsibility of the shipper to correctly package and label specimens to meet shipping regulations. Please follow these steps:

- Check that the transport tube cap is securely closed; place tube in Biohazard Ziploc bag with a piece of super absorbent paper (bag and absorbent paper supplied with each transport kit).
- Complete WAPHL Virology Specimen Submission Form. Specimens will not be processed until ALL following information is known:
  - Patient name, second identifier, and county of residence
  - Specimen type, date of collection, and test requested
  - Submitter name, address, and telephone/FAX numbers
- Ensure patient’s name and second identifier are on specimen tube and match information on specimen submission form.
- Place completed PHL Virology Specimen Submission Form in OUTER pouch of Biohazard Ziploc bag (one specimen and one submission form per bag). Do not place any paperwork in the inner pouch along with the vial.
- All specimens sent for Ebola testing must be packaged and shipped Category A according to USDOT and ICAO/IATA regulations.

Currently, there are three options for shipping suspect Ebola specimens to the PHL:

- FedEx
  - FedEx WILL NOT accept specimens CONFIRMED to be Ebola.
  - Specimens sent to PHL are suspected to contain Ebola and therefore will be accepted by FedEx if packaged and labeled properly.
  - When completing the Shipper’s Declaration for Dangerous Goods form, the “Proper Shipping Name” field should read: “Suspected Category A infectious substance”. The Authorization Code is A140.
  - See the CDC website for additional information: http://www.cdc.gov/vhf/ebola/healthcare-us/laboratories/specimens.html
• Transport by federal, state or local government employee(s) for noncommercial purposes is permissible. Government employees include but are not limited to:
  o Local health jurisdiction (LHJ) employees
  o State Department of Health staff
  o Washington State Patrol (WSP)
  o Local police or sheriff office staff
  All category A shipping regulations still apply.

• Private couriers. All category A shipping regulations still apply to couriers.

D. PHL testing procedures

Test results turnaround time: Results for Ebola testing will be telephoned within 6-8 hours of testing initiation at PHL. PHL will finalize all negative Ebola results; all presumptive positive results must have confirmatory testing performed at CDC. These results will be available up to five business days from specimen receipt.

Reporting of test results: Test results will be reported in coordination with CDC. Positive Ebola virus RT-PCR results are presumptive until confirmed by CDC.

5. ROUTINE CASE INVESTIGATION

Viral hemorrhagic fever (VHF) agents are potential agents of bioterrorism. Immediately report any suspect VHF cases to Office of Communicable Disease Epidemiology (206-418-5500 or 877-539-4344). Also notify OCDE of potentially exposed persons, such as travelers from an affected region or contacts of a case.

For the most recent Ebola information from Centers for Disease Control and Prevention check: [http://www.cdc.gov/vhf/ebola/index.html](http://www.cdc.gov/vhf/ebola/index.html)

Immediately interview the case, suspect or confirmed, and others such as family, friends, coworkers, or employer who may be able to provide pertinent information.

A. General Approach to Assessment

During an outbreak of VHF with widespread transmission and risk of cases occurring outside the outbreak area, such as during the Ebola outbreak that started in 2013 in West Africa, triage and evaluation processes at healthcare facilities should systematically assess patients for the possibility of disease.

Identify travel and direct exposure history: in the previous 21 days lived in or traveled from a country with widespread VHF transmission, or had contact with an individual with confirmed VHF. If no, continue usual assessment and care.

If the person reports a travel or direct exposure history, identify signs and symptoms: fever (subjective or ≥ 38°C or 100.4°F) or any compatible symptom including fatigue, headache, weakness, muscle pain, vomiting, diarrhea, abdominal pain, or hemorrhage.

If exposure and compatible symptoms are both present during medical evaluation, the patient may meet criteria for Person Under Investigation. The healthcare facility should:

• **Isolate the patient immediately.** Place the patient in a single room with a private bathroom and the door to the hallway closed. Implement standard, contact, and droplet precautions. Notify the hospital infection control program. Require

- **Notify the local health jurisdiction.**

- Essential personnel with designated roles should evaluate the patient using appropriate personal protective equipment and dedicated or disposable medical equipment. Determine symptoms and exposure risk category (High, Some, Low, or No known risk – see Section 3D).

- An ambulatory care facility should coordinate with the local health jurisdiction to arrange EMS transport to a designated emergency department or hospital on a case by case basis.

- Review case with the local health jurisdiction to determine severity of illness, laboratory findings, and alternative diagnoses.

- Arrange laboratory testing if indicated. Note that a negative RT-PCR on a specimen collected less than 72 hours from onset of symptoms should be repeated if there are still consistent symptoms after 72 hours.

- Consider alternative diagnoses to provide timely appropriate patient care, particularly for potentially serious conditions such as malaria.

If the patient requires in-hospital management, decisions regarding infection control precautions should be based on the patient’s clinical situation and in consultation with hospital infection control and the local health department. If the patient’s symptoms progress or change, reassess the need for testing with the local health jurisdiction.

A Person Under Investigation (PUI) may be discharged by a joint decision from the healthcare provider and the local health jurisdiction considering these criteria:

- In the clinical judgment of the medical team, the PUI’s illness no longer appears consistent with a transmissible VHF.

- The PUI is afebrile off antipyretics for 24 hours, or there is an alternative explanation for fever.

- All symptoms that are compatible with EVD (for example, diarrhea or vomiting) have either resolved or can be accounted for by an alternative diagnosis.

- The PUI has no clinical laboratory results consistent with EVD, or those that could be consistent with EVD have been otherwise explained.

- The PUI is able to self-monitor (or an adult can monitor, if the PUI is a child) and comply fully with active monitoring and controlled movement. Monitoring applies for a full 21-day period from last exposure for those with risk exposures.

- There is a plan in place for the PUI to return for medical care if symptoms recur which has been explained to the PUI, and the PUI understands what to do if symptoms recur.

- Local and state health departments have been engaged and concur.
At discharge the person should be told where to seek health care if symptoms recur, and should complete the full 21-day monitoring period. Note that a negative RT-PCR collected less than 72 hours after onset does not necessarily rule out Ebola virus disease.

B. Details for Evaluating the Diagnosis

Compatible symptoms are fever (> 38.6° C or 101.5° F), severe headache, muscle pain, abdominal pain, vomiting, diarrhea, and in about half of patients unexplained hemorrhage (petechiae, bruising, oozing from cuts, mucosal bleeding). Gastrointestinal symptoms start around day 5 and there may also be a diffuse erythematous maculopapular rash that desquamates. Other symptoms may include sore throat, shortness of breath, chest pain, confusion, seizures, conjunctival injection, hiccups, or miscarriage.

Supportive laboratory findings include thrombocytopenia (platelets < 150,000) and elevated hepatic transaminases (AST > ALT). If disseminated intravascular coagulation develops, prothrombin (PT) and partial thromboplastin (PTT) times are prolonged. Leukopenia, elevated amylase, and proteinuria may occur.

Consider testing a febrile patient for malaria, the most common cause of fever in travelers returning from the affected region or, if clinically indicated, other infections such as influenza, meningococcemia, pneumonia, cholera or typhoid fever, and other bacterial and parasitic cause of diarrhea.

C. Detailed Potential Sources of Infection

Identify potential sources in the prior 21 days, including travel to currently affected countries or previous endemic areas, or contact with a person having such travel.

Relative to the 2014 Ebola outbreak in West Africa:

High risk exposures:

- Percutaneous (e.g., needle stick) or mucous membrane exposure to blood or body fluids of a person with Ebola while the person was symptomatic,
- Exposure to the blood or body fluids (including but not limited to feces, saliva, sweat, urine, vomit, and semen) of a person with Ebola while the person was symptomatic without appropriate personal protective equipment (See: [http://www.cdc.gov/vhf/ebola/healthcare-us/ppe/guidance.html](http://www.cdc.gov/vhf/ebola/healthcare-us/ppe/guidance.html))
- Processing blood or body fluids of a person with Ebola while the person was symptomatic without appropriate PPE or standard biosafety precautions,
- Direct contact with a dead body without appropriate PPE in a country with widespread Ebola virus transmission
- Having lived in the immediate household and provided direct care to a person with Ebola while the person was symptomatic

Exposures with some risk:

- In country with widespread Ebola transmission: direct contact while using appropriate PPE with a person with Ebola while the person was symptomatic
- Close contact in households, health care facilities, or community settings with a person with Ebola while the person was symptomatic (prolonged period of time while not wearing appropriate PPE within approximately 3 feet)
Exposures with low (but not no) risk:

- Having been in a country with widespread Ebola transmission and having had no known exposures
- Having brief direct contact (e.g., shaking hands) while not wearing appropriate PPE, with a person with Ebola while the person was in the early stage of disease
- Brief proximity, such as being in the same room for a brief period of time, with a person with Ebola while the person was symptomatic
- In countries without widespread Ebola virus transmission: direct contact while using appropriate PPE with a person symptomatic with Ebola
- Traveled on an aircraft with a person with Ebola while the person was symptomatic

Exposures with no risk:

- Contact with an asymptomatic person who had contact with person with Ebola
- Contact with a person with Ebola before the person developed symptoms
- Was in a country with widespread Ebola transmission more than 21 days before
- Having been in a country without widespread Ebola virus transmission and not having any other exposures as defined above

D. Evaluate for testing

Laboratory testing for transmissible viral hemorrhagic fever such as Ebola must be performed by a reference laboratory such as the Washington State Public Health Laboratories (PHL) after approval from CDC. Facilitate transport of specimens to PHL for confirmatory testing (see Section 4). Include a full travel history with a request.

Testing for Ebola virus disease:

Ebola testing is recommended for persons with exposure and symptoms below but also consider testing for malaria or other tropical infections as indicated; optionally other cases without a consistent diagnosis may be tested. After approval from the local health jurisdiction and Department of Health consultation with CDC, PHL will test specimens from cases with any risk of exposure who develop either fever or compatible symptoms:

- Fever of greater than 38° C or 100.4° F
- Compatible symptoms (fever, severe headache, diarrhea, vomiting, muscle pain, abdominal pain, impaired kidney or liver function, internal or external bleeding, or other symptoms considered compatible by a healthcare provider). Supportive abnormal blood work includes platelet count < 150,000 and AST/ALT elevation (may also be prolonged AT/ATT).
- Optional testing may be considered after consultation with the local health jurisdiction for other patients.

Testing for other agents of viral hemorrhagic fever:

Test as indicated by symptoms and exposure history for dengue or other agent of VHF. See Section 6 for discharging persons under investigation for Ebola virus disease.
E. Patient Management

Medical treatment of a case includes providing intravenous fluids (IV), balancing electrolytes, maintaining oxygen status and blood pressure, addressing organ failure (e.g., providing dialysis for kidney failure) and treating other infections if they occur. Consult with Centers for Disease Control and Prevention regarding experimental medications to treat Ebola virus disease. For transmissible agents, always follow strict infection control measures.

F. Infection Control/Case Management for Transmissible VHF Agents (e.g., Ebola)

1. Emergency departments, urgent care centers, and other healthcare facilities providing primary care should take a relevant exposure history immediately or if possible in advance of entrance. Ask if the patient resided in or traveled from a country with widespread VHF transmission in the previous 21 days, or had contact with a VHF case. If the patient cannot give a history, ask other sources (e.g., family or EMS). Ask patients with an exposure about signs or symptoms compatible with VHF (fever, headache, muscle pain, vomiting, diarrhea, abdominal pain, unexplained bleeding). If exposure and compatible symptoms are present, follow hospital guidelines below.

2. The hospital should notify the hospital infection control program, other appropriate staff, and the local health department of a suspected Ebola virus patient or exposed person regardless of symptoms.

3. Hospiliated suspected VHF cases or VHF-exposed patients should be cared for in a single patient room (with a private bathroom) with the door closed, and transport within the facility minimized. The room should have a mattress and pillow with plastic covers that are impermeable to fluids. Do not use a carpeted room. Remove upholstered furniture, decorative curtains, and any extra items.

4. Log all staff entering the room and minimize staff authorized to enter. Avoid entry of visitors into the patient's room. Exceptions may be considered on a case by case basis for those who are essential for the patient's wellbeing.

5. Healthcare personnel including the site monitor must be trained in proper donning and removing of PPE before use in a clinical setting.

6. A trained site monitor should supervise all clinical care and donning and removing of PPE to minimize infection control breaches; healthcare personnel should remove PPE items in the correct order and do hand hygiene after removal of each piece of PPE.

7. Hospital care and environmental cleaning of VHF patients require use of full barrier precautions or the highest level that is available for all personal protective equipment (PPE) including gloves, gown (fluid resistant or impermeable), eye protection (goggles or face shield), and facemask, at a minimum. See: http://www.cdc.gov/vhf/ebola/healthcare-us/ppe/guidance.html

8. If copious amounts of body fluids or excreta are present in the environment, require use of additional PPE including but not limited to double gloving, hood, disposable shoe covers, and leg coverings. Use dedicated medical equipment, preferably disposable, and clean and disinfect any non-disposable equipment after use.
9. Limit use of needles and other sharps, use only safety sharps, and handle used sharps with extreme care when disposing of them in puncture-proof sealed containers.

10. Minimize laboratory testing, and notify the laboratory that incoming specimens are from a suspect or confirmed VHF case. Clinical laboratories should be prepared to provide sufficient testing to ensure patient care is not compromised while patients undergo assessment. Assessment and treatment facilities should consider how they might safely perform the following tests as needed or identify alternative approaches to patient management (e.g. empiric treatment, alternative diagnostic strategies):
   - Complete blood count (CBC), including differential, and platelet count
   - Sodium, potassium, chloride, bicarbonate, calcium, blood urea nitrogen, creatinine, and glucose concentrations
   - Aspartate aminotransferase (AST), alanine aminotransferase (ALT), and total bilirubin
   - Coagulation testing, specifically prothrombin time (PT), expressed as INR
   - Blood culture for bacterial pathogens
   - Malaria testing (smear or rapid test; review the complete blood count smear as an initial presumptive diagnosis)
   - Influenza virus testing
   - Respiratory syncytial virus (RSV) and other respiratory virus testing
   - Rapid group A strep testing on throat swabs
   - Urinalysis

A risk assessment should determine the potential for staff exposure from splashes or aerosols generated during all laboratory processes. Mitigate risks through engineering controls, administrative and work practice controls, and use of appropriate personal protective equipment (PPE). Consider limiting the number of staff engaged in testing: evaluating and segregating equipment used for testing: and performing tests in a dedicated space. Consider if testing may result in removal of core laboratory instruments from service and how to mitigate such potential outcomes. See: http://www.cdc.gov/vhf/ebola/healthcare-us/laboratories/safe-specimen-management.html

11. Minimize aerosol-generating procedures (AGP) for the patient. Conduct AGP with minimal required staff and no visitors present in an airborne infection isolation room (AIIR), if available. During AGPs, staff should use full barrier precautions including at least a fit-tested N95 filtering facepiece respirator. The AGP procedure should be followed by environmental cleaning of the room and equipment by trained staff using appropriate PPE (see items 7 and 8 above).

12. If inadvertent exposure occurs during patient care, staff should immediately wash or irrigate the affected area, report to employee health, be assessed for all appropriate pathogens (e.g., HIV, HBV, HCV), and initiate monitoring (See Section 6 below).

13. Move patients between healthcare facilities only by medical transport capable of safely implementing infection control for Ebola.

14. After discharge, patient should be informed that urine and semen may contain virus for up to 60 days during convalescence, and that relapses can occur. The discharged patient may use toilets with routine sewer disposal of bodily fluids.
15. Only personnel trained in handling infected human remains, and wearing PPE, should touch, or move, any VHF-infected remains. Wearing PPE, experienced personnel should shroud the body in plastic, place in a zippered body bag, place in a second zippered body bag, clean and disinfect the exterior of the second bag, and transport. Minimize handling, and avoid embalming and autopsies; if an autopsy is necessary, consult with Office of Communicable Disease Epidemiology (206-418-5500 or 877-539-4344). Cremate remains or bury promptly in a hermetically sealed casket. See: http://www.cdc.gov/vhf/ebola/healthcare-us/hospitals/handling-human-remains.html

G. Identify Potentially Exposed Persons for Transmissible VHF Agents (e.g., Ebola)

Contact traceback and management will be done in coordination with the Centers for Disease Control and Prevention (CDC). Contact tracing for transmissible viral hemorrhagic fever cases is key for disease control. Immediately institute identification of potentially exposed persons for evaluation of level of risk and appropriate public health actions such as fever watch or home quarantine for 21 days (maximum incubation period). See: http://www.cdc.gov/vhf/ebola/pdf/contact-tracing.pdf

1. Identify persons with shared the initial exposure of a case patient, such as co-travelers or co-workers.

2. Identify contacts of a case patient during the communicable (symptomatic) period, including household members, friends, coworkers, persons sharing a travel vehicle, EMS workers, healthcare workers, and other patients being seen at the same time and location in the healthcare facility as the VHF case.

3. Identify persons who traveled within 21 days from an affected country.

4. Evaluate above persons with risk exposures for symptoms. Contact by telephone to determine their symptoms and details of potential exposures. If symptomatic, manage as a Person Under Investigation (Section 5). If asymptomatic, see Section 6 for monitoring.

H. Environmental Measures for Transmissible VHF Agents

Physical agents that can eradicate Ebola virus include heat (60°C or 140°F for 60 minutes; 72-80°C or 162-176°F for 60 minutes; autoclaving for 30 minutes; submersion in boiling water for 5 minutes; or incineration), sunlight, ultraviolet light, E-Beam, and gamma rays. Chemical agents that eradicate Ebola virus include bleach, detergents, solvents, ammonia, aldehydes, halogens, peracetic acid, peroxides, phenolics, and quaternary ammonium compounds.

Potentially contaminated materials include anything containing body fluids or excreta such as medical devices, syringes, laboratory testing equipment, bedpans, textiles and laundry, and utensils and dishware. To reduce exposure to potentially contaminated textiles while laundering, discard all linens, non-fluid-impermeable pillows or mattresses, and textile privacy curtains as regulated medical waste. Dishes and cutlery should also be discarded. Add disinfectants to bagged waste. Immediately clean spills. Do daily environmental cleaning and disinfection of a patient room for all surfaces and reusable equipment potentially contaminated with body fluids or excreta, and high touch areas such as handles, bed rails, tables, and counters. Use a U.S. Environmental Protection Agency (EPA)-registered hospital disinfectant with a label claim for a non-enveloped
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virus (e.g., norovirus, rotavirus, adenovirus, poliovirus) to disinfect environmental surfaces in rooms of patients with suspected or confirmed communicable VHF infection. Use other methods such as autoclaving or incineration as appropriate.

Staff doing environmental cleaning and disinfection should wear appropriate PPE, including at a minimum, disposable gloves, gown (fluid resistant/ impermeable), eye protection (goggles or face shield), and facemask to prevent exposure to cleaning contamination, chemicals, and splashes or spatters; consider using additional barriers (e.g., shoe and leg coverings) if needed. Use face protection (face shield or facemask with goggles) when doing tasks that can generate splashes such as liquid waste disposal. Follow standard procedures, per hospital policy and manufacturers’ instructions, for cleaning and/or disinfection. Put disposable materials in leak-proof containers and discard as regulated medical waste. To minimize contamination of the exterior of a bag, place the bag in a rigid waste receptacle designed for this use. Sanitary sewers will safely dispose of patient wastes.

If a hospital is currently treating an Ebola patient there is a small risk of exposure for plumbers working in the hospital, sewer maintenance workers working on active sewer lines serving the hospital, or construction workers repairing or replacing active sewer lines serving the hospital. Any such workers handling untreated sewage should be trained in the use of and have available personal protective equipment: goggles or face shield, surgical mask, impermeable or fluid-resistant coveralls, waterproof gloves, and rubber boots. Thorough hand washing should be done after handling sewage or any PPE contaminated with sewage. Soiled PPE should not be taken home.

6. MANAGING SPECIAL SITUATIONS

Managing persons potentially exposed to transmissible VHF agents.

Potentially exposed persons will be managed in coordination with Centers for Disease Control and Prevention recommendations. Obtain information about exposure to VHF patients and travel to affected countries, including details of exposures, date of last exposure, and exposure to healthcare settings or reservoir animals.

1. Evaluate the exposure as high risk, some risk, low risk, or no risk based on exposures for the past 21 days. For details see Section 5B and:

   a. High risk: percutaneous, mucous membrane or skin exposure to body fluids or excreta of a VHF case; processed specimens from a VHF patient without personal protective equipment (PPE); direct contact with human remains in a country with widespread transmission without appropriate PPE; lived in household and provided direct care to symptomatic case

   b. Some risk: in country with widespread transmission had direct contact with symptomatic case while using appropriate PPE; close contact (3 feet for prolonged period) with a symptomatic person such as household, healthcare facility, or community without PPE

   c. Low but not no risk: in a country with widespread transmission and with no known exposures, briefly in a room of a symptomatic person without direct
contact, brief skin contact with a symptomatic person when the person was not very contagious, travel on an airplane with a symptomatic person

d. All other situations are no risk

2. For persons with high risk exposures initiate restricted travel and restricted public activities (stay home for 21 days; do not attend work or school; do not use shared transportation methods; do not leave the residence for shopping, meals, or other activities). Consider these restrictions on a case-by-case basis for persons with some risk of exposure. The local jurisdiction should make sure the person restricted to their residence has access to any needed food, medications, personal care items, etc. and assistance with essential errands. Ask about mammalian pets in the household and recommend the person have no contact with the animals for 21 days. If a person under monitoring is not willing to stay in their residence, contact DOH regarding quarantine and isolation facilities.

3. For persons with high risk exposure and others sharing the residence, recommend if possible they use a separate bathroom and sleeping area, wash hands frequently with soap and warm water, clean and disinfect the bathroom daily and any surface with body fluid contamination, not share dishes and eating utensils, not share linens (e.g., towels, sheets, blankets), do laundry separately, not share a toothbrush or razor, and bag anything with body fluids (e.g., tissues, used razor) and put in trash.

4. For persons with any risk exposure (high, some, low), initiate daily temperature and symptom monitoring for 21 days from last exposure. Monitoring should include initially at least an in-person visit by local health jurisdiction personnel for temperature and symptom check (direct active monitoring). Daily or if appropriate twice-daily in-person visits should continue for persons with high exposure risk. For some risk exposures maintain daily real-time contact (e.g., telephone, Skype, FaceTime). Low risk exposures could have in-person visits or be monitored through reporting in daily through electronic means (voice message, text, email). During 2014-2015, cell phones were providing to travelers on entry to the United States for 21 days of surveillance. The cell phone can be retained by the traveler after monitoring is completed (extend service by dialing 611 on the phone or by going to https://www.att.com/shop/wireless/gophone.html).

a. Inform the person how to contact the local health jurisdiction (LHJ) and where to seek health care if symptoms develop. Ask them to develop a personal plan for travel to the healthcare setting. Recommend the person be up-to-date on influenza vaccination. Recommend the person not use antipyretic analgesics (e.g., aspirin, ibuprofen, acetaminophen) while under monitoring to avoid suppressing a diagnostic fever.

b. If a person being monitored develops consistent symptoms including temperature greater than 38° C (100.4° F): Initiate infection control measures in a healthcare setting (including PPE for providers and environmental cleaning), evaluate the person, test for Ebola if indicated; move only by air medical transport; if medical evaluation does not support the diagnosis of Ebola, follow as an asymptomatic person with daily monitoring and travel restrictions until 21 days after last exposure. Recommend the person not take any antipyretic
medications so that fever can be accurately tracked.

c. The LHJ will advise a person being monitored about:

- Using long distance commercial and public transport (if high risk, no travel on commercial airplanes or commercial long-distance trains, buses, ferries or ships, or local public transport taxis, trains or buses.)
- Whether to stay home from work, school, and avoid public activities.
- Reporting to the LHJ any exposure to influenza-like illness from a household member or other close contact. Starting antiviral agents may be appropriate for a person being monitored following exposure to influenza.
- Reporting any symptoms of Ebola immediately to the LHJ: fever, diarrhea, vomiting, severe headache, muscle pain, abdominal pain, or bleeding. The LHJ should provide a 24/7 telephone number.
- Seeking healthcare only at the pre-designated facility, including contacting the facility before arrival, and mentioning possible exposure to Ebola. The LHJ should provide the facility’s name and its 24/7 telephone number to the person being monitored as well as the LHJ 24/7 number.
- Traveling to the healthcare facility only by ambulance or private car.

Home restriction or use of a quarantine facility may be considered for an unreliable person being monitored. If home restriction is imposed, ask about support needs including dietary needs, personal care supplies, prescription and non-prescription medications, child care supplies and pet care.

When recommending monitoring of an asymptomatic person, develop an individual plan for steps if a fever or other consistent symptoms develop, including:

- Identify a receiving healthcare facility able to evaluate person in a private room with a door; notify the facility without giving the patient’s name
- Confirm the receiving facility has appropriate PPE for staff 24/7
- Determine a notification point of contact at the facility 24/7
- Confirm the facility’s laboratory preparation for receiving specimens and testing in a closed system
- Suggest the person develop a family plan, such as child care if person is a single parent, or pet care
- Identify a means of transport to the facility to minimize exposing others (e.g., patient to drive self; if patient does not have vomiting or diarrhea, family or friend can drive while using eyewear and avoiding skin contact with patient; if vomiting or diarrhea inform and involve EMS transport)

Considerations for discharging persons under investigation for Ebola virus disease

A Person Under Investigation (PUI) for Ebola can be discharged from health care if there is a negative RT-PCR test result for Ebola on a blood specimen collected more than 72 hours after onset of symptoms. If the test was not done or if a negative specimen was collected less than 72 hours after onset of symptoms, the decision to discharge a PUI should be based on clinical and laboratory criteria supporting another diagnosis and on
the ability to monitor the PUI after discharge; the decision should be made by the person’s medical providers in consultation with local and state health authorities.

Consider these criteria when deciding to discharge a PUI:

1. In the clinical judgment of the medical providers, the PUI’s illness no longer appears consistent with Ebola.
2. The PUI is afebrile off antipyretics for 24 hours, or the fever has an alternative explanation.
3. All symptoms that are compatible with Ebola (e.g., diarrhea or vomiting) have either resolved or can be accounted for by an alternative diagnosis.
4. The PUI has no clinical laboratory results consistent with Ebola, or those that could be consistent with Ebola have been otherwise explained.
5. The PUI is able to self-monitor (or to monitor a child, if the PUI is a child) and comply fully with active monitoring and controlled movement.
6. The PUI understands where to return for medical care if symptoms recur and how to notify public health and healthcare personnel that symptoms recurred.
7. Local and state health authorities have been engaged and concur.
8. Active monitoring and controlled movement requirements still apply for persons who had exposures and are under follow-up as contacts for the full 21-day period.

7. ROUTINE PREVENTION

A. Prevention Recommendations

Except for yellow fever, there are no licensed vaccines for viral hemorrhagic fever agents. Ebola virus vaccines are under development.

Meticulous attention to personal protective equipment (PPE) and environmental cleaning during patient care are essential to prevent exposure to transmissible VHF agents in healthcare settings. Particular care should be taken when removing PPE to avoid contamination.

8. RESOURCES

As of June, 2015, recommendations and guidances for Ebola virus disease change periodically. Check the Department of Health and the Centers for Disease Control and Prevention websites for the most current information.

DOH:
http://www.doh.wa.gov/ForPublicHealthandHealthcareProviders/NotifiableConditions/EbolaVirusDisease

CDC document site: http://www.cdc.gov/vhf/ebola/index.html

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UPDATES

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Updated October 29, 2014 based on new CDC recommendations for case definition, patient screening, and infection control.

Updated November 7, 2014, based on new CDC recommendations for evaluating ambulatory patients.

Updated December 23, 2014, based on updated laboratory shipping requirements and new CDC recommendations for medical waste and sewage.

Updated March 23, 2015 to include more detail about clinical laboratory handling of specimens.

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