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**INTRODUCTION** — The family *Filoviridae* consists of two genera, the Ebola and Marburg viruses, which are among the most virulent pathogens of humans [1]. The Zaire species of Ebola virus, discovered in an outbreak in Zaire (the present Democratic Republic of the Congo) in 1976, is the causative agent of the 2014 epidemic in West Africa, where the case fatality rate is estimated to be as high as70 percent [2]; rates in earlier outbreaks reached 80 to 90 percent [3].

Epidemics of Ebola virus disease are generally thought to begin when an individual becomes infected through contact with the body fluids of an infected animal. Once the individual becomes ill or dies, the virus spreads to others who come into direct contact with their blood or other body fluids. On rare occasions, Ebola virus disease has resulted from accidental laboratory infections, and there is concern that the virus might be used as an agent of bioterrorism.

The clinical manifestations and diagnosis of Ebola virus disease will be reviewed here. The epidemiology, pathogenesis, treatment, and prevention of this disease are discussed elsewhere. (See "Epidemiology and pathogenesis of Ebola virus disease" and "Treatment and prevention of Ebola virus disease".)

**CLINICAL MANIFESTATIONS** — During the nearly 40 years since the first recognized Ebola outbreaks in Zaire and Sudan in 1976, a number of publications have described the clinical and laboratory features of this disease [1,4,5]. That information is now being supplemented by a rapidly increasing number of case reports and large patient series from the epidemic in West Africa that describe the clinical manifestations and disease course of Ebola virus disease among those in West Africa, as well as those treated in American and European hospitals (table 1) [6-10].

Although most features of Ebola virus disease in West Africa match earlier descriptions, two aspects appear to differ:

- Hemorrhage is a less common and less clinically important aspect of the syndrome. Thus, the term "Ebola virus disease" is now being used, rather than the earlier name "Ebola hemorrhagic fever."
- Volume losses from vomiting and diarrhea make a greater contribution to severe illness than previously recognized.

**Incubation period** — Patients with Ebola virus disease typically have an abrupt onset of symptoms 6 to 12 days after exposure (range 2 to 21 days) [6,11,12]. There is no evidence that asymptomatic persons still in the incubation period are infectious to others. All symptomatic individuals should be assumed to have virus in the blood and other body fluids, and appropriate safety precautions should be taken [13]. (See "Epidemiology and pathogenesis of Ebola virus disease", section on 'Transmission' and "Treatment and prevention of Ebola virus disease", section on 'Infection control precautions'.)

### Signs and symptoms

- **Initial syndrome** — Most cases of Ebola virus disease begin with the abrupt onset of fever, chills, and general malaise, but low-grade fever and malaise may also precede the development of more severe symptoms [14].

Common signs and symptoms reported from the 2014 West Africa outbreak include fever, fatigue, headache, vomiting, diarrhea, and loss of appetite [6,11,15]. Reports have also described weakness, myalgias, as well as a high fever accompanied by relative bradycardia as seen in typhoid fever [5,14].

- **Rash** — A diffuse erythematous, nonpruritic maculopapular rash may develop by day five to seven of illness. The rash usually involves the face, neck, trunk, and arms, and can desquamate [4,5,16-19]. During the 2014 outbreak in West Africa, rash was reported as rare in Sierra Leone [6]; however, it was clearly described in case reports of infected healthcare workers [10,14].

- **Gastrointestinal** — Gastrointestinal signs and symptoms are common, and usually develop within the first few days of illness. These include watery diarrhea, nausea, vomiting, and abdominal pain. During the 2014 West African outbreak, vomiting and diarrhea have resulted in severe fluid loss, potentially leading to dehydration, hypotension, and shock [6-9].

- **Hemorrhage** — Despite the traditional name of "Ebola hemorrhagic fever", major bleeding is not a common finding. Case series from the 2014 outbreak in West Africa indicate that approximately 20 percent of patients have unexplained hemorrhage, most commonly manifested as blood in the stool (about 6 percent), petechiae, ecchymoses, oozing from venipuncture sites, pregnancy related hemorrhage, and/or mucosal hemorrhage [11,20]. Major bleeding is seen most commonly in the terminal phase of illness.

- **Neurologic** — Patients may develop a syndrome suggestive of meningoencephalitis, with findings such as an altered level of consciousness, stiff neck, and/or seizures. These clinical manifestations present later in the course of disease, typically after day 10 [9].

- **Other findings** — Patients with Ebola virus disease may also develop hiccups, chest pain, and/or shortness of breath. In addition, conjunctival injection and dark red discoloration of the soft palate are common physical findings [17]. Pregnant women may experience spontaneous miscarriages [20].

Reports of past outbreaks have largely focused on cases of severe and fatal illness, but the spectrum of Ebola virus infection may include milder cases that have escaped detection [21-23]. A brief report of an outbreak in Gabon from 2000 suggested that some family members of patients developed "asymptomatic" infections after providing care [22]. However, this observation is difficult to interpret since the report did not provide a description of physical examination findings, while laboratory data suggested the subjects were undergoing an intense inflammatory response. Further information on the occurrence of mild cases of Ebola virus infection is expected to emerge from the 2014 epidemic.

**Laboratory findings** — Patients with Ebola virus disease typically develop leukopenia, thrombocytopenia, and serum transaminase elevations, as well as renal and coagulation abnormalities [4]. Other laboratory findings include a marked decrease in total plasma protein (reflective of a capillary leak syndrome) and elevated amylase levels (table 1).

- **Leukopenia** — Leukopenia usually presents as lymphopenia, followed by an elevated neutrophil count [11]. Immature granulocytes and abnormal lymphocytes, including plasmacytoid cells and immunoblasts, may be seen in blood smears.

- **Thrombocytopenia** — Platelet counts are usually in the range of 50,000 to 100,000/microL [11]. Platelet counts typically reach a nadir around day six to eight of illness [16,17].

- **Transaminase elevations** — Because Ebola virus can cause multifocal hepatic necrosis, blood chemistry tests usually demonstrate elevated serum aspartate aminotransferase (AST) and alanine aminotransferase (ALT) levels. As an example, among 39 patients with confirmed Ebola virus disease in Sierra Leone, the mean AST and ALT levels were 793 U/L and 257 U/L, respectively [6].

- **Coagulation abnormalities** — Prothrombin (PT) and partial thromboplastin times (PTT) can be prolonged, and fibrin degradation products elevated, consistent with disseminated intravascular coagulation (DIC). These changes are most prominent in severe and fatal cases.

- **Renal abnormalities** — Proteinuria is a common finding, and renal insufficiency with elevated blood urea nitrogen and creatinine occurs with progression of illness [6]. When these findings occur early in the course of illness, they are largely due to excessive fluid loss from diarrhea and vomiting without adequate volume

replacement.

- **Electrolyte abnormalities** — Patients may develop significant electrolyte disturbances (eg, hyponatremia, hypokalemia, hypomagnesemia, and hypocalcemia) secondary to the gastrointestinal manifestations of the disease. Such individuals may require frequent repletion of electrolytes to prevent cardiac arrhythmias. (See "Treatment and prevention of Ebola virus disease", section on 'Supportive care'.)

**Disease course** — Patients who survive Ebola virus disease typically begin to improve during the second week of illness [11]. Fatal disease has been characterized by more severe clinical signs and symptoms early during infection, with progression to multiorgan failure with death typically occurring in the second week. (See "Treatment and prevention of Ebola virus disease", section on 'Prognostic factors'.)

Some patients develop secondary complications related to their disease and/or the treatments they receive [24,25]. These include bacterial sepsis, respiratory failure associated with aggressive fluid resuscitation, and/or lung and kidney injury. (See "Treatment and prevention of Ebola virus disease", section on 'Supportive care'.)

**Convalescence** — The convalescent period of Ebola virus disease is prolonged, and marked by weakness, fatigue, and failure to regain weight that was lost during illness. Extensive sloughing of skin and hair loss are commonly observed, which may be due to virus-induced necrosis of infected sweat glands and other dermal structures [26]. The formation of antigen-antibody complexes during recovery may also cause acute arthralgias and other symptoms [27]. During convalescence, viral RNA and infectious virus may persist in certain bodily fluids (eg, urine, semen). A discussion on viral persistence if found elsewhere. (See "Epidemiology and pathogenesis of Ebola virus disease", section on 'Risk of transmission through different body fluids'.)

**DIAGNOSIS** — Although there are no approved specific therapies for Ebola virus disease, it is essential to make the diagnosis as early as possible, in order to initiate supportive measures before the development of irreversible shock and to institute infection control procedures. Thus, providers should ask patients who present with fever and/or other symptoms consistent with Ebola virus disease if they have travelled to the epidemic area or had contact with a patient with possible Ebola virus disease within 21 days prior to the onset of symptoms [11,28-32]. (See "Epidemiology and pathogenesis of Ebola virus disease", section on '2014 outbreak in West Africa'.)

Whether Ebola virus disease is initially considered in the differential diagnosis of a patient with fever and flu-like symptoms will vary markedly with the circumstances. In the setting of the current 2014 epidemic, there is a heightened level of suspicion, both in local residents and in healthcare workers returning from West Africa to their home countries.

However, clinicians should remember that the acute onset of a febrile illness in a person who lives in, or has recently been in West or Central Africa can result from a variety of local infectious diseases, including malaria and other causes of fever, such as Lassa and Marburg virus. (See 'Differential diagnosis' below and "Evaluation of fever in the returning traveler" and "Diseases potentially acquired by travel to West Africa".)

**General approach** — The approach to evaluating patients with possible Ebola virus disease depends upon whether or not the individual displays appropriate signs and symptoms, how likely it is that the exposure will result in disease (ie, the level of risk), and when the exposure occurred.

- Patients who present with signs and symptoms consistent with Ebola virus disease (fever and/or severe headache, weakness, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage) should be immediately assessed to determine their risk of exposure to Ebola virus. (See 'Determining the risk of exposure' below.)
    - Infection control precautions should be used for all symptomatic patients who may have been exposed to Ebola virus (ie, those who have had a high, some, or low-risk exposure). Infection control precautions should also be used for patients whose risk of exposure is unclear at the time of their initial presentation, until a medical evaluation can be performed. (See 'Symptomatic patients with identifiable risk' below and 'Patients with no identifiable risk' below and "Treatment and prevention of Ebola virus disease", section on 'Infection control precautions'.)
    - Testing for Ebola virus by RT-PCR should generally be performed for patients who have symptoms consistent with Ebola virus disease **and** have had an exposure that puts them at risk. In addition, they should be evaluated for other possible febrile diseases including those that are common in areas

where the patient traveled or resided (eg, malaria, typhoid, influenza). (See 'Indications for initial testing for Ebola virus infection' below.)

- By comparison, asymptomatic individuals who have had a possible exposure to Ebola should be monitored so that they can be isolated if signs or symptoms occur; additional restrictions may also be required, depending upon the type of exposure. (See 'Asymptomatic individuals with identifiable risk' below.)

The specific triage system and type of personal protective equipment (PPE) used during the initial assessment of a patient with possible Ebola virus disease may vary depending upon the setting (eg, emergency department, ambulatory clinic), risk of transmission in the community (eg, low versus high risk), and the patient's clinical symptoms [29,33-37]. As examples, medical facilities, especially those in areas with widespread Ebola transmission, should designate areas for screening patients [35,38]. In addition, the types of PPE that are recommended for healthcare personnel caring for a patient whose condition is associated with a high risk of direct contact with body fluids (eg, presence of vomiting, diarrhea, bleeding) are different from those used when evaluating a patient who does not present a hazard due to body fluid exposure [39]. In all settings, only essential personnel who are trained in proper donning and removal of PPE should interact with the patient. A more detailed discussion on infection control precautions is found below. (See "Treatment and prevention of Ebola virus disease", section on 'Infection control precautions'.)

In response to the 2014 outbreak in West Africa, the United States Centers for Disease Control and Prevention (CDC), the World Health Organization (WHO), and other international organizations have provided recommendations for the evaluation and management of persons who may have been exposed to Ebola virus [11,30,31,40-45]. Their approaches depend upon when the exposure occurred, if the exposure was high risk or low risk, and whether or not the individual is displaying signs and symptoms consistent with Ebola virus disease.

The discussion that follows is consistent with the recommendations from the CDC in the United States [11,28,30,32,39]. Clinicians in other countries should consult with their ministries of health and/or the WHO for specific recommendations [42,44,45]. In general, the WHO and CDC provide similar recommendations for evaluating individuals with a possible exposure to Ebola virus disease [41-43]. In addition, the WHO includes a history of sexual intercourse with a sick person or a person recovering from Ebola virus disease when determining the risk of infection.

**Initial assessment for Ebola virus disease**

**Determining the risk of exposure** — The risk of exposure to Ebola virus helps to guide the evaluation and management of both symptomatic and asymptomatic individuals. The level of exposure risk ranges from high to low to no known identifiable risk. For healthcare workers, the level of exposure risk can vary depending upon the intensity of the epidemic at their work site (ie, the risk of exposure is greater in areas of widespread Ebola virus transmission). The level of risk defined below is consistent with CDC recommendations, which take into account uncertainty about the extent of Ebola virus spread in some urban areas in West Africa [46].

**High risk** – A high-risk exposure includes any of the following:

- Percutaneous (eg, needle stick) or mucous membrane exposure to blood or body fluids (eg, feces, saliva, sweat, urine, vomit, and semen) of a person with symptomatic Ebola virus disease
- Exposure to the blood or body fluids of a person with symptomatic Ebola virus disease without appropriate personal protective equipment (PPE)
- Processing blood or other body fluids of a person with symptomatic Ebola virus disease without appropriate PPE or standard biosafety precautions
- Direct contact with a dead body without appropriate PPE in a country with widespread transmission or cases in urban areas with uncertain control measures
- Having lived in the immediate household and provided direct care to a person with symptomatic Ebola virus disease

**Some risk** – Some risk of exposure includes any of the following:

- In countries with widespread transmission or cases in urban areas with uncertain control measures:

- Direct contact while using appropriate PPE with a person with symptomatic Ebola virus disease (or their body fluids)
- Any direct patient care in other healthcare settings

- Close contact in households, healthcare facilities, or community settings with a person with symptomatic Ebola virus disease. Close contact is defined as being within approximately three feet (one meter) of the infected person for a prolonged period of time while not wearing appropriate PPE

**Low (but not zero) risk** – A low-risk exposure includes any of the following:

- Having been in a country with widespread transmission or cases in urban areas with uncertain control measures within the past 21 days **and** having no known exposures to Ebola virus
- Having brief direct contact (eg, 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 symptomatic Ebola virus disease
- Direct contact while using appropriate PPE with a person with symptomatic Ebola virus disease (or their body fluids) in countries **without** widespread transmission or cases in urban settings with uncertain control measures
- Traveled on an aircraft with a person with Ebola virus disease while the person was symptomatic

**No identifiable risk** – Some exposures or situations have no identifiable risk of infection. These include:

- Contact with an asymptomatic person who had contact with a person with Ebola virus disease
- Contact with a person with Ebola virus disease before the person developed symptoms
- Having been more than 21 days previously in a country with widespread transmission or cases in urban areas with uncertain control measures
- Having been in a country with Ebola virus cases, but **without** widespread transmission or cases in urban settings with uncertain control measures, and not having any other exposure as defined above (eg, direct contact with a patient with Ebola virus disease)
- Having remained on or in the immediate vicinity of an aircraft or ship during the entire time that the conveyance was present in a country with widespread transmission or cases in urban areas with uncertain control measures, and having had no direct contact with anyone from the community

These guidelines have been used to identify at-risk individuals during the 2014 outbreak in West Africa. Individuals may also be at risk for Ebola disease if they have handled bats, rodents, or non-human primates from other endemic areas of Africa. (See "Epidemiology and pathogenesis of Ebola virus disease", section on 'Transmission from animals'.)

**Symptomatic patients with identifiable risk** — Clinical findings that are consistent with Ebola virus disease include fever and/or severe headache, weakness, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage [11,40] (see 'Clinical manifestations' above). Infection control precautions should be used for **all** symptomatic patients who have an identifiable risk for Ebola virus disease. (See 'Determining the risk of exposure' above.)

Such patients should be isolated in a single room with a private bathroom and with the door to the hallway closed, and all healthcare workers should use standard, contact, and droplet precautions (eg, gown, facemask, eye protection, and gloves). In addition, the hospital infection control program and other appropriate staff should be notified, as well as local and state health departments. In patients who are suspected of having Ebola virus disease, phlebotomy and laboratory testing should be limited to tests that are essential for care [47]. In the United States, certain hospitals may be designated as "Ebola assessment hospitals," which are prepared to evaluate and care for patients with possible Ebola virus disease until a diagnosis can be confirmed or ruled out [48]. Such patients who have confirmed Ebola virus disease should be transferred to specialized Ebola treatment centers.

(See "Treatment and prevention of Ebola virus disease", section on 'Infection control precautions'.)

The next step in management is the decision whether to test for Ebola virus infection [11,28,30-32,46]. (See 'Indications for initial testing for Ebola virus infection' below.)

**Asymptomatic individuals with identifiable risk** — Monitoring for symptoms and signs of Ebola virus disease should be performed for asymptomatic persons who have had an exposure to Ebola virus at any risk level (ie, high, some, or low risk) (see 'Determining the risk of exposure' above). Such individuals should be monitored for 21 days after the last known exposure and should immediately report the development of fever or other clinical manifestations suggestive of Ebola virus disease [30].

The type of monitoring (eg, self-monitoring and reporting versus direct observation by a designated health official), as well as the need for travel restrictions, restricted movement within the community, and/or quarantine depend, in part, upon the exposure risk level, and are described in detail in the CDC guidance for the monitoring and movement of persons with Ebola virus exposure [30]. Local authorities may also have specific regulations for management of asymptomatic individuals with Ebola virus exposure.

**Patients with no identifiable risk** — If after initial evaluation, patients are determined to have no identifiable risk for Ebola virus infection, monitoring or diagnostic testing for Ebola virus disease is not warranted. However, if patients have fever and other signs or symptoms of infection, they should be evaluated for other causes of febrile disease (eg, malaria, Lassa fever, influenza). Appropriate infection control precautions will depend upon the patient's clinical findings, as well as the specific pathogens that are being considered. (See 'Determining the risk of exposure' above and 'Differential diagnosis' below and "General principles of infection control".)

**Indications for initial testing for Ebola virus infection** — Evaluation of all patients with suspected Ebola virus disease should be done in conjunction with local and state health departments [11,30,49]. In the United States, certain hospitals may be designated as "Ebola assessment hospitals," which are prepared to evaluate and care for patients with possible Ebola virus disease until a diagnosis can be confirmed or ruled out [48].

- Testing for Ebola virus infection is performed in symptomatic patients with any possible risk of exposure to Ebola virus (high, some, or low risk). (See 'Symptomatic patients with identifiable risk' above.)
- Testing is not warranted for patients who have an identifiable risk but no signs or symptoms of Ebola virus disease. These patients should be monitored and tested if they become ill. (See 'Asymptomatic individuals with identifiable risk' above.)
- Testing is not warranted for patients without any identifiable risk of exposure to Ebola virus. (See 'Patients with no identifiable risk' above.)

Ebola virus is generally detectable in blood samples by reverse-transcription polymerase chain reaction (RT-PCR) within three days after the onset of symptoms; repeat testing may be needed for patients with symptoms for fewer than three days duration [50]. According to CDC guidelines for discharging a person who is under investigation for Ebola virus disease, a negative RT-PCR test that is collected ≥72 hours after the onset of symptoms excludes Ebola virus disease [51]. (See 'Laboratory diagnosis' below.)

Patients who have confirmed Ebola virus disease should be transferred to specialized Ebola treatment centers.

**Laboratory diagnosis** — The laboratory diagnosis of Ebola virus infection is made by the detection of viral antigens or RNA in blood or other body fluids. This can be done using immunoassays or nucleic acid testing.

**Guidance during the 2014 outbreak** — In response to the 2014 outbreak in West Africa, the CDC has released guidelines for the evaluation of patients in the United States suspected of having Ebola virus disease [11,31]. If testing is indicated, the local or state health department should be contacted immediately. Additional details on specimen collection and handling can be found in the CDC interim guidance for laboratory testing and submission information for patients with suspected Ebola virus disease [50,52,53]. Clinicians, nurses, and laboratory workers should be aware that CDC select agent regulations apply to the handling of patient specimens confirmed to contain infectious Ebola virus [54]. For clinicians outside the United States, the World Health Organization (WHO) has also issued guidance for the diagnosis, safe collection, and shipment of samples from patients with suspected Ebola virus disease [55-57].

**Diagnostic tests** — Rapid diagnostic tests for Ebola virus infection are the most commonly used tests for diagnosis. Rapid blood tests can detect specific RNA sequences by RT-PCR.

Most acute infections are diagnosed through the use of RT-PCR. Viral RNA is generally detectable by RT-PCR within three days after the onset of symptoms [7,50].

- Repeat testing may be needed for patients with symptoms for fewer than three days duration [50].
- A negative RT-PCR test that is collected ≥72 hours after the onset of symptoms rules out Ebola virus disease [7,51].
- The demonstration of genetic diversity and rapid accumulation of sequence changes of Ebola virus in the West African epidemic indicates that careful monitoring will be needed to ensure the continued sensitivity of RT-PCR diagnostics [58].

In past outbreaks, testing for viral antigens by enzyme-linked immunosorbent assay (ELISA) was also frequently performed [59-65].

**DIFFERENTIAL DIAGNOSIS** — When evaluating a patient for possible Ebola virus disease, it is important to consider alternative and/or concurrent diagnoses, including infectious and non-infectious disorders. The differential diagnosis depends, in part, upon the patient's age, comorbid conditions, and where the individual has travelled or resides [11,20,66]. Since most patients suspected of possible Ebola virus disease will have travelled to and/or reside in West or Central Africa, the following disorders should be considered:

- **Malaria**: Travelers returning from West or Central Africa should be evaluated for malaria [11]. Malaria can present with similar findings to Ebola virus disease and may occur concurrently. Microscopic examination of blood smears and/or rapid antigen testing are typically used to diagnose Malaria. (See "Diagnosis of malaria" and "Clinical manifestations of malaria".)
- **Lassa Fever:** Lassa fever is a viral infection that is restricted to West Africa, though imported cases have been seen in the United States. Although symptoms may be mild, approximately 20 percent of patients develop a severe clinical syndrome that can progress to fatal shock. Transmission to humans occurs primarily through exposure to the aerosolized excretions of local rodents (multimammate rats), or in rare cases, through contact with body fluids of infected individuals. Diagnosis is made by reverse-transcription polymerase chain reaction (RT-PCR) testing and/or serology [67]. (See "Diseases potentially acquired by travel to West Africa".)
- **Typhoid:** Typhoid fever is characterized by a systemic illness with fever and abdominal pain. The organism responsible for the enteric fever syndrome is *S. enterica* serotype *Typhi* (formerly *S. typhi*). Worldwide, typhoid fever is most prevalent in impoverished areas that are overcrowded, with poor access to sanitation. The diagnosis is typically made through identification of the organism in blood cultures. (See "Epidemiology, microbiology, clinical manifestations, and diagnosis of typhoid fever".)
- **Meningococcal disease**: Patients with meningococcal disease can present with meningitis and/or bacteremia, and certain signs and symptoms (headache, fever) may overlap with those seen in Ebola virus disease. Cultures of blood or cerebral spinal fluid are used to make the diagnosis. (See "Epidemiology of Neisseria meningitidis infection" and "Clinical manifestations of meningococcal infection".)
- **Influenza**: Influenza often presents with the abrupt onset of fever, headache, myalgia, and malaise, similar to the presenting signs and symptoms of Ebola virus disease. However, with influenza, these manifestations are often accompanied by respiratory signs and symptoms, such as nonproductive cough, sore throat, and nasal discharge, which are not part of the Ebola syndrome. Direct fluorescent antibody or other rapid assays are used to diagnose influenza. (See "Clinical manifestations of seasonal influenza in adults" and "Diagnosis of seasonal influenza in adults".)
- **Marburg virus disease**: Marburg virus causes clinical manifestations similar to Ebola virus disease. Cases have been identified in Central Africa, but not in West Africa. The diagnosis is typically made by RT-PCR testing.

A more detailed discussion of fever in the returning traveler is found elsewhere. (See "Evaluation of fever in the

returning traveler" and "Diseases potentially acquired by travel to West Africa".)

**BIOTERRORISM** — Ebola virus is classified as a Category A bioterror agent by the United States Centers for Disease Control and Prevention (CDC) and the National Institute of Allergy and Infectious Diseases (NIAID) [68,69]. During the current Ebola epidemic, clinicians are focused on identifying a history of exposure to Ebola virus in patients presenting with fever and other signs and symptoms. In the case of a bioterror attack employing Ebola virus, patients with no possible exposure to an Ebola patient would develop the same disease and would be seen in doctors' offices or hospital emergency departments. The appearance of multiple patients with a similar, rapidly progressive illness would be especially suggestive of bioterrorism. Any clinician suspecting that such an event is unfolding should report it promptly to local and state health authorities. General concepts regarding bioterrorism are discussed elsewhere. (See "Identifying and managing casualties of biological terrorism".)

**ADDITIONAL RESOURCES AND CONTACT INFORMATION** — The following documents provide additional guidance on the clinical manifestations and diagnosis of filoviral infections.

WHO consolidated Ebola virus disease preparedness checklist, 2014

http://www.who.int/csr/disease/ebola/evd-preparedness-checklist-en.pdf?ua=1

WHO frequently asked questions on Ebola virus disease, 2014

http://www.who.int/csr/disease/ebola/faq-ebola/en/

WHO Ebola virus disease fact sheet N°103 (Updated September 2014)

http://www.who.int/mediacentre/factsheets/fs103/en/

CDC for general healthcare settings in West Africa: Guidance for drawing blood safely when caring for patients with confirmed or suspected Ebola

http://www.cdc.gov/vhf/ebola/hcp/international/drawing-blood-safely.html

CDC resources for parents, schools, and pediatric healthcare professionals

http://www.cdc.gov/vhf/ebola/children/index.html

CDC is it Flu or Ebola, 2014

http://www.cdc.gov/vhf/ebola/pdf/is-it-flu-or-ebola.pdf

CDC healthcare workers - could it be Ebola? 2014

http://www.cdc.gov/vhf/ebola/pdf/could-it-be-ebola.pdf

CDC what you need to know about Ebola, 2014

http://www.cdc.gov/vhf/ebola/pdf/what-need-to-know-ebola.pdf

CDC healthcare provider preparedness checklist for Ebola virus disease, 2014

http://www.cdc.gov/vhf/ebola/pdf/healthcare-provider-checklist-for-ebola.pdf

CDC healthcare facility preparedness checklist for Ebola virus disease, 2014

http://www.cdc.gov/vhf/ebola/pdf/healthcare-facility-checklist-for-ebola.pdf

CDC questions and answers on Ebola

http://www.cdc.gov/vhf/ebola/outbreaks/guinea/qa.html

**INFORMATION FOR PATIENTS** — UpToDate offers two types of patient education materials, "The Basics" and "Beyond the Basics." The Basics patient education pieces are written in plain language, at the 5$^{th}$ to 6$^{th}$ grade reading level, and they answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written

at the 10th to 12th grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to print or e-mail these topics to your patients. (You can also locate patient education articles on a variety of subjects by searching on "patient info" and the keyword(s) of interest.)

- Basics topic (see "Patient information: Ebola (The Basics)")

**SUMMARY AND RECOMMENDATIONS**

- The Zaire species of Ebola virus, the causative agent of the 2014 West African epidemic, is one of the most virulent human pathogens. (See 'Introduction' above.)
- The incubation period is typically 6 to 12 days, but can range from 2 to 21 days. (See 'Incubation period' above.)
- Patients with Ebola virus disease usually have an abrupt onset of non-specific symptoms and signs, such as fever, malaise, headache, and myalgias. As the illness progresses, vomiting and diarrhea may develop, often leading to significant fluid loss. Patients with worsening disease display hypotension and electrolyte imbalances leading to shock and multiorgan failure, sometimes accompanied by hemorrhage (table 1). (See 'Signs and symptoms' above.)
- During the 2014 Ebola epidemic, clinicians worldwide should evaluate patients to determine if they have clinical findings consistent with the disease (ie, fever and/or severe headache, weakness, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage) and obtain a careful history to determine if they have had a possible exposure to Ebola virus within 21 days prior to the onset of symptoms. (See 'Diagnosis' above and 'Determining the risk of exposure' above.)
- All patients who have or are suspected of having Ebola virus disease should be promptly isolated. Infection control precautions should include hand hygiene; standard, contact, and droplet precautions; as well as the correct use of appropriate personal protective equipment. Hospital infection control staff, as well as the local or state health department, should be contacted immediately. (See 'Symptomatic patients with identifiable risk' above.)
- Monitoring for symptoms and signs of Ebola virus disease should be performed for asymptomatic persons who have had an exposure to Ebola virus at any risk level (ie, high, some, or low risk). (See 'Asymptomatic individuals with identifiable risk' above.)
- Medical evaluation of symptomatic patients with a history of exposure generally includes testing for Ebola virus and other likely pathogens. Whether or not laboratory testing for Ebola virus should be performed depends, in part, upon the relative likelihood that a patient was exposed to the virus and the presence of compatible clinical symptoms and/or laboratory findings. (See 'Indications for initial testing for Ebola virus infection' above.)
- Rapid diagnostic tests for Ebola virus infection are in use and are principally based upon the detection of specific RNA sequences by reverse-transcription polymerase chain reaction (RT-PCR) in blood or other body fluids. Ebola virus is generally detectable in blood samples within three days after the onset of symptoms; repeat testing may be needed for patients with symptoms for fewer than three days duration. (See 'Laboratory diagnosis' above.)
- The differential diagnosis will vary markedly with the clinical and epidemiologic circumstances. As an example, travelers returning from West or Central Africa should be evaluated for illnesses commonly seen in those areas, such as malaria. (See 'Differential diagnosis' above.)
- Because of its virulence and high infectivity, Ebola virus is classified as a Category A bioterror agent. (See 'Bioterrorism' above.)

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