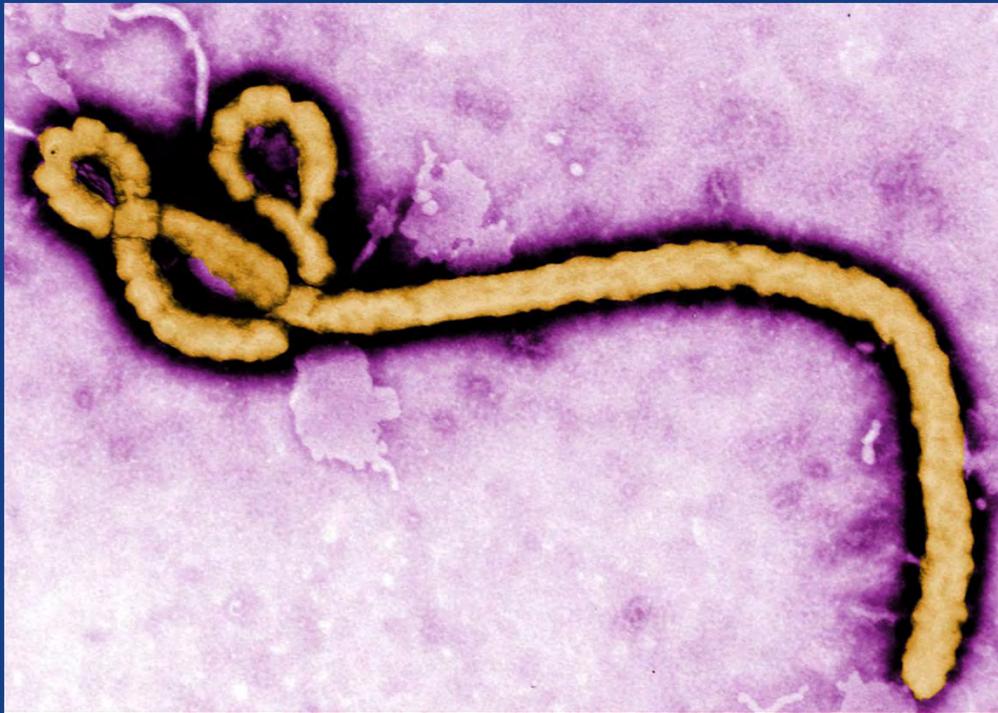# CDC 24/7

Ebola Preparations from the Healthcare Epidemiologists Perspective

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Background: Ebola Outbreak

- **Largest ever recorded**
  - >2,473 cases since March, 1,350 deaths
  - Affected countries: Guinea, Liberia, Sierra Leone, & Lagos, Nigeria
- **Highly virulent in humans**
  - Case fatality ~55%; appears to be @75% in Guinea
  - Spread throughdirect contact with blood and body fluids
- **Virus is 97% identical to variants of Ebola virus (species Zaire ebolavirus)**
- **Two infected U.S. aid workers medically evacuated from Liberia to the US - recovered and discharged**

Ebola Hemorrhagic Fever Outbreak: Guinea, Liberia, and Sierra Leone, 2014

Ebolavirus Ecology

Enzootic Cycle

New evidence strongly implicates bats as the reservoir hosts for ebolaviruses, though the means of local enzootic maintainance and transmission of the virus within bat populations remain unknown.
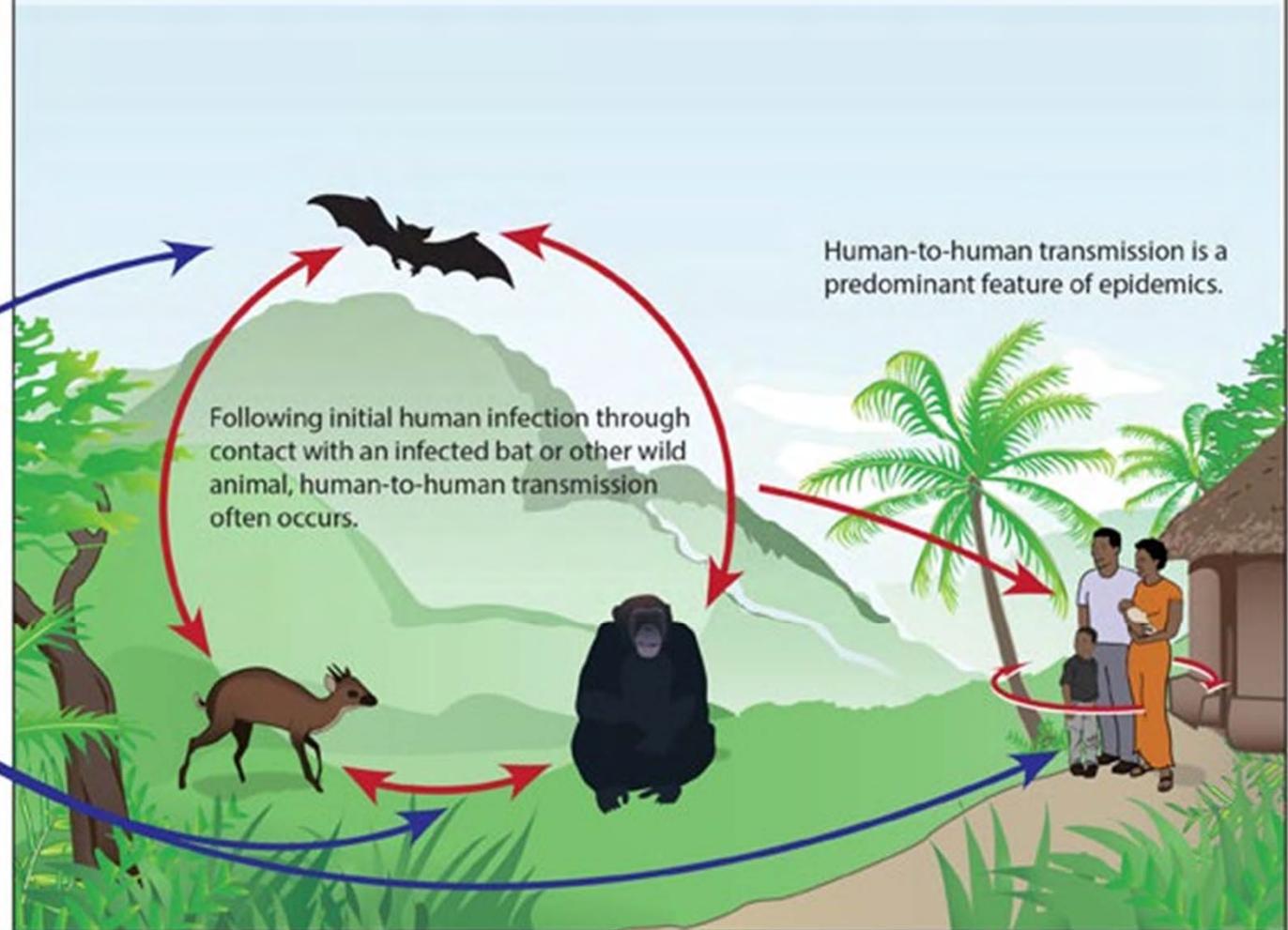
Ebolaviruses:
Ebola virus (formerly Zaire virus)
Sudan virus
Taï Forest virus
Bundibugyo virus
Reston virus (non-human)

Epizootic Cycle

Epizootics caused by ebolaviruses appear sporadically, producing high mortality among non-human primates and duikers and may precede human outbreaks. Epidemics caused by ebolaviruses produce acute disease among humans, with the exception of Reston virus which does not produce detectable disease in humans. Little is known about how the virus first passes to humans, triggering waves of human-to-human transmission, and an epidemic.

Human-to-human transmission is a predominant feature of epidemics.

Following initial human infection through contact with an infected bat or other wild animal, human-to-human transmission often occurs.

Clinical Presentation

- Acute onset; typically 8—10 days after exposure (range 2—21 days)

- Initial signs and symptoms

  - Fever, chills, myalgia, and malaise, weakness

  - May have diffuse erythematous maculopapular rash by day 5 to 7

- Other possible infectious causes of symptoms:

  - Malaria, typhoid fever, meningococcemia, and other bacterial infections (e.g., pneumonia)

Clinical Course

- Patients can progress after 5 days to develop GI symptoms (severe diarrhea), nausea, vomiting and abdominal pain

- Other symptoms: chest pain, shortness of breath, headache or confusion, conjunctival injection, hiccups

- Seizures may occur; cerebral edema reported

- Bleeding is not universally present, can manifest as petechiae, ecchymosis/bruising, or oozing from venipuncture sites and mucosal hemorrhage

- Patients with fatal disease have more severe symptoms and die between 6—16 days of complications (e.g., multi-organ failure, septic shock)

Laboratory Findings

- Lab findings at admission may include:
  - Lymphopenia followed later by elevated neutrophils and a left shift
  - Moderate thrombocytopenia - platelet counts are often decreased (50,000 to 100,000)
  - Elevated transaminases (AST>ALT)
- Other abnormalities:
  - Elevated Amylase, Proteinuria
  - Prothrombin (PT) and partial thromboplastin times (PTT) can be prolonged with elevated fibrin degradation products, consistent with disseminated intravascular coagulation (DIC)

Identifying Patients:
Early Recognition Critical

- Evaluate patients for Ebola infection who have:

  a) A fever of greater than 38.6 degrees Celsius or 101.5 degrees Fahrenheit, and additional symptoms such as severe headache, muscle pain, vomiting, diarrhea, abdominal pain, or unexplained hemorrhage;

     AND

  a) Risk factors within the past 3 weeks before the onset of symptoms, such as contact with blood or other body fluids of a patient known to have or suspected to have EVD; residence in—or travel to—an area where EVD transmission is active; or direct handling of bats or primates from disease-endemic areas.

  Malaria diagnostics should also be a part of initial testing because it is a common cause of febrile illness in persons with a travel history to the affected countries.

  See CDC Ebola Case Definition: http://www.cdc.gov/vhf/ebola/hcp/case-definition.html

High Risk Exposures

- Percutaneous, e.g. needle stick, or mucous membrane exposure to body fluids of a symptomatic EVD patient

- Direct skin contact with, or exposure to blood or body fluids of, an EVD patient without appropriate personal protective equipment (PPE)

- Laboratory worker processing body fluids of confirmed EVD patients without appropriate PPE or standard biosafety precautions

- Direct contact with a dead body without appropriate PPE in a country where an EVD outbreak is occurring

Low Risk Exposures

- Household contact with an EVD patient

- Other close contact with EVD patients in health care facilities or community settings. Close contact is defined as

  - being within approximately 3 feet of an EVD patient or within the patient's room or care area for a prolonged period of time while not wearing recommended personal protective equipment

  - having direct brief contact (e.g., shaking hands) with an EVD case while not wearing recommended personal protective equipment.

- Brief interactions, such as walking by a person or moving through a hospital, do not constitute close contact

No known exposure

- Persons with no known exposures listed above but who have fever with other symptoms and abnormal bloodwork within 21 days of visiting EVD-affected countries/districts should be considered for testing if no other diagnosis is found.

- EVD-affected countries: Guinea, Liberia, Sierra Leone

- EVD-affected districts: Lagos, Nigeria

Is this patient a PUI?

- High or Low Risk exposures: testing indicated if fever (>101.5) alone +/- other symptoms

- No known exposure: testing may be indicated if fever + other symptoms + abnormal bloodwork AND no other explanation for illness

- Travel history & exposure history are key

- Contact health department for consultation– EVD is a reportable disease

CDC Infection Control Recommendations

- Precautions required for Ebola:
  - ➤ Standard
  - ➤ Contact
  - ➤ Droplet
- Includes patients with suspected or confirmed Ebola infections
- Rapid identification of potential cases and implementation of precautions is critical

Patient Placement and Care

- Patients should be isolated in a private patient room (containing a private bathroom) with the door closed

- Facilities should maintain a log of all persons entering the patient's room

- Dedicated medical equipment (preferably disposable, when possible) should be used for the provision of patient care.

- All non-dedicated, non-disposable medical equipment used for patient care should be cleaned and disinfected according to manufacturer's instructions and hospital policies.

Healthcare Personnel Protection

- All persons entering the patient room should wear at least:
  - Gloves
  - Gown (fluid resistant or impermeable)
  - Eye protection (goggles or face shield)
  - Facemask
- Additional PPE might be required in certain situations including, but not limited to: double gloving, disposable shoe covers, and leg coverings
- Healthcare providers should frequently perform hand hygiene before and after all patient contact

Patient Care Considerations

- Limit the use of needles and other sharps as much as possible

  - All needles and sharps should be handled with extreme care and disposed in puncture-proof, sealed containers

- Phlebotomy, procedures, and laboratory testing should be limited to the minimum necessary for essential diagnostic evaluation and medical care

- Avoid aerosol-generating procedures

  - If performing aerosol-generating procedures, perform in a private room, preferably an AIIR, and use respiratory protection at least as protective as a NIOSH certified, fit-tested, N95 filtering facepiece respirator

Clinical Laboratory Guidance

- When collecting specimens, wear:

  - Gloves

  - Gown (fluid resistant or impermeable)

  - Eye protection (goggles or full face shield)

  - Facemask to cover all nose and mouth

- When performing laboratory testing use a certified class II biosafety cabinet or plexiglass splash guard wear:

  - Gloves

  - Gown (fluid resistant or impermeable)

  - Eye protection (goggles or full face shield)

  - Facemask to cover all nose and mouth

Clinical Laboratory Guidance (2)

- Clinical laboratories can safely do routine laboratory testing such as traditional chemistry, hematology, or other laboratory testing used to support and treat patients

  - Follow and strictly adhere to CDC's recommendations

- For automated systems, the manufacturer-installed safety features and decontamination protocols appropriate for enveloped viruses (e.g., HIV, influenza, or hepatitis C virus) for instruments should be used to ensure additional protection and safety

Environmental Infection Control

- Diligent environmental cleaning and disinfection and safe handling of potentially contaminated materials is paramount

- Environmental services staff should wear recommended PPE and consider use of additional barriers (shoe and leg coverings) if needed

  - Gloves

  - Gown (fluid resistant or impermeable)

  - Eye protection (goggles or full face shield)

  - Facemask to cover all nose and mouth

- Face protection (facemask and eye protection) is especially important when performing tasks such as liquid waste disposal that can generate splashes

Environmental Infection Control

- Use an EPA-registered hospital disinfectant with label claim for non-enveloped viruses (e.g., norovirus, rotavirus,etc.) to disinfect environmental surfaces

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

  - Use mattress and pillow with plastic cover

  - Do not place patients in carpeted room; remove upholstered furniture

- Discard all linens, non-fluid-impermeable pillows or mattresses, and textile privacy curtains as a regulated medical waste to reduce exposure among staff while laundering

Stay Informed: www.cdc.gov/ebola

Ebola Information for Travelers

Travel notices, infographics, and more

http://wwwnc.cdc.gov/travel/diseases/ebola

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