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August 11, 2014 *(replaces version dated August 5, 2014)*

To: North Carolina Health Care Providers and Laboratories
From: Megan Davies, MD, State Epidemiologist
Scott Zimmerman, DrPH, MPH, HCLD (ABB), State Laboratory of Public Health
Re: **Ebola Hemorrhagic Fever (3 pages)**

This memo is intended to provide updated information to all North Carolina health care providers and laboratories regarding Ebola virus disease (EVD) and management of suspected cases.

This version has been updated to include updated definitions of high-risk and low-risk exposures; updated laboratory guidance; updated infection prevention guidance from CDC; and information about assessment and monitoring of persons with Ebola exposure.

Summary

National and international health authorities are currently working to control a large, ongoing outbreak of Ebola involving areas in West Africa. A map of affected areas is available at http://www.who.int/csr/disease/ebola/evd-outbreak.jpg. All cases of human illness or death have occurred in Africa; no case has been reported in the United States.

Clinical and Epidemiologic Features

Ebola hemorrhagic fever is a rare and deadly disease. The disease is native to several African countries and is caused by infection with one of the ebolaviruses (Ebola, Sudan, Bundibugyo, or Taï Forest virus). It is spread by direct contact with a sick person's blood or body fluids. It is also spread by contact with contaminated objects or infected animals.

The incubation period for Ebola is usually 8–10 days, but could potentially range from 2–21 days. The risk for person-to-person transmission of hemorrhagic fever viruses is greatest during the latter stages of illness when viral loads are highest. Ebola is not transmissible during the incubation period (i.e., before onset of fever).

Symptoms include fever, headache, joint and muscle aches, sore throat, and weakness, followed by diarrhea, vomiting, and stomach pain. Skin rash, red eyes, and internal and external bleeding may be seen in some patients.

Case Investigation and Testing

- Ebola should be suspected and testing is recommended for febrile patients with clinically compatible illness who, within 3 weeks before onset of fever, have had a **high-risk exposure**, defined as follows:
    - Percutaneous, e.g. the needle stick, or mucous membrane exposure to body fluids of EVD patient
    - Direct care or exposure to 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
- Participation in funeral rites which include direct exposure to human remains in the geographic area where outbreak is occurring without appropriate PPE

- Ebola and testing should be considered for febrile patients with clinically compatible illness who, within 3 weeks before onset of fever, have had a **low-risk exposure**, defined as follows:
  - Household member or other casual contact with an EVD patient. Casual contact is defined at: http://www.cdc.gov/vhf/ebola/hcp/case-definition.html.
  - Providing patient care or casual contact without high-risk exposure with EVD patients in health care facilities in EVD outbreak affected countries

- **Clinicians caring for patients meeting these criteria should immediately implement isolation precautions (see below) and contact their local health department or the state Communicable Disease Branch (919-733-3419; available 24/7) to discuss laboratory testing and control measures.**

- Ebola and testing may be considered for febrile patients with clinically compatible illness who, within 3 weeks before onset of fever, have had no known exposure, defined as follows:
  - Were in a country with identified Ebola cases;
  - Have had no known low-risk or high-risk exposures.

- Decisions about testing for Ebola will be made on a case-by-case basis.

- Even following travel to areas where Ebola has occurred, persons with fever are more likely to have infectious diseases other than Ebola (e.g., common respiratory viruses, endemic infections such as malaria or typhoid fever). Clinicians should promptly evaluate and treat patients for these more common infections even if Ebola is being considered. Testing for malaria and Lassa fever should also be considered if Ebola is suspected, since there is overlap in terms of clinical features and geographic areas where exposures could occur.

Ebola virus testing:

Testing for Ebola is currently available through the CDC's Viral Special Pathogens Branch. Specimens **will not** be accepted without prior consultation.

- Appropriate specimen types, quantity of material, tests utilized and transport conditions are listed below.

Specimen Type	Quantity	Testing	Transport
Uncoagulated whole blood (purple, yellow, or blue top) in non-glass collection tube	≥ 4ml	Culture, PCR	Refrigerated (4°C), placed on cold packs if shipment is to be received within 72 hrs. For delays exceeding 72 hrs freeze serum at-70°C & ship on dry ice.
Serum (red top, collected in non-glass tube)	≥ 4ml	Culture, PCR, Serology	
Formaline-fixed or paraffin-embedded tissues	As Appropriate	Immunohistochemistry	Ship at room temperature. Note: An autopsy or surgical report must accompany the specimen.
Fresh frozen tissue	1 cm^3 (except for biopsies)	Culture, PCR	Ship specimen frozen on dry ice in a plastic container.

- For consultation on specimen collection and packaging, contact the North Carolina State Laboratory of Public Health (NCSLPH) Bioterrorism and Emerging Pathogens (BTEP) Unit at 919-807-8600.

- All specimen submissions must be accompanied by a completed **CDC 50.34 DASH Form** (http://slph.state.nc.us/Forms/CDC-Dash-NCSLPH-013114.pdf) **and** a **Viral Special Pathogens Branch Diagnostic Specimen Submission Form** (http://www.cdc.gov/ncezid/dhcpp/vspb/pdf/specimen-submission.pdf).

- The NCSLPH **highly recommends** that individuals packaging and shipping these diagnostic specimens use their professional judgment and consider packing instruction 620, IATA guidelines for Category A. Please note when completing a Shipper's Declaration, under the "Nature and Quantity of Dangerous Goods" the proper shipping name for suspect Ebola is: **"Infectious substance, affecting humans (Suspected Category A infectious substance)".** The Technical name Ebola virus should **NOT** be used on the Shipper's Declaration. Comprehensive guidance on packing and shipping these types of potentially infectious substances can be found at the following website: https://clinmicro.asm.org/index.php/bench-work-resources/conducting-daily-operations/packaging-and-shipping. *We anticipate active discussion with all entities requesting diagnostic testing for Ebola, and we will provide more specific guidance on a case-by-case basis.*

- The NCSLPH encourages institutions to conduct an internal risk assessment to review all handling and testing procedures that are associated with specimens from a suspect Ebola case. The NCSLPH highly recommends the use of professional judgment to determine the need for enhanced safety precautions. CDC interim guidelines can be found at: http://www.cdc.gov/vhf/ebola/hcp/interim-guidance-specimen-collection-submission-patients-suspected-infection-ebola.html.

Infection Control

- The following recommendations highlight a few Infection Control measures to follow when caring for persons with suspected Ebola - *SEE CDC LINK BELOW FOR ADDITIONAL INFECTION CONTROL GUIDANCE*.
    - Patient placement: Patients should be placed in a private room containing a private bathroom.
    - Personal Protective Equipment: All persons entering the patient room should wear at least: Gloves, Gown (fluid resistant or impermeable), Eye protection (goggles or face shield), Facemask
    - Patient care equipment: Dedicated medical equipment (preferably disposable, when possible) should be used for the provision of patient care
    - Aerosol-generating procedures: Aerosol-generating procedures should be avoided. If such procedures are necessary, Airborne Precautions (use of N95 respirator or higher and airborne isolation room) should be implemented for the duration of the procedure.
    - Environmental infection control: Diligent environmental cleaning and disinfection and safe handling of potentially contaminated materials is paramount, as blood, sweat, emesis, feces and other body secretions represent potentially infectious materials

- Comprehensive Ebola Infection Control guide is available at http://www.cdc.gov/vhf/ebola/hcp/infection-prevention-and-control-recommendations.html.

Assessment and Monitoring of Persons with Ebola Exposure

- All persons arriving in North Carolina who travelled to an affected region within 21 days and either had contact with a known or suspected Ebola case; worked in a healthcare setting in an affected region; or participated in funeral rites in an affected region should contact their local health department or the Communicable Disease Branch epidemiologist on call to undergo a thorough risk assessment.
- Quarantine measures may be recommended based on findings of the risk assessment.
- CDC guidance is available at: http://www.cdc.gov/vhf/ebola/hcp/monitoring-and-movement-of-persons-with-exposure.html.

Treatment

- Supportive care only; no antivirals are currently available for treatment of Ebola.

Reporting

- Physicians are required to contact their local health department or the state Communicable Disease Branch (919-733-3419) as soon as Ebola or any other hemorrhagic fever virus infection is reasonably suspected.

This is an evolving situation and recommendations are likely to change as new information becomes available. Updated information and guidance are available from the CDC at http://www.cdc.gov/vhf/ebola. North Carolina Public Health will provide updates at http://epi.publichealth.nc.gov/cd/diseases/hemorrhagic.html.