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October 10, 2014 *(replaces version dated October 2, 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 (4 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 reflect implementation of Ebola testing at the North Carolina State Laboratory of Public Health (NCSLPH) and to make case investigation and risk assessment guidance consistent with CDC algorithm for evaluation of the returned traveler.

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.cdc.gov/vhf/ebola/outbreaks/2014-west-africa/. The first travel-associated case of Ebola to be diagnosed in the United States was confirmed on September 30, 2014.

Clinical and Epidemiologic Features

Ebola is spread by direct contact with a sick person's blood or body fluids. It is also spread by contact with contaminated objects (such as needles) 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 is greatest during the later 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 Risk Assessment

- **Any patient with fever or a clinically compatible illness who has been in a country affected by the Ebola outbreak within 3 weeks before fever onset should be placed in appropriate isolation precautions (see below) as soon as possible. Precautions should be maintained while a more thorough risk assessment is completed.**
- An algorithm to assist providers in the evaluation of ill patients who report recent travel is available at http://epi.publichealth.nc.gov/cd/docs/NCDPHEbolaRiskAlgorithm.pdf.
- The algorithm and this document are intended as general guidance. Providers are encouraged to use clinical judgment and contact public health immediately with any questions or concerns.

- Ebola should be suspected and testing is recommended for patients with fever or clinically compatible illness who, within 3 weeks before onset, have had a **high-risk exposure**, defined as follows:
    - Percutaneous (e.g., needle stick) or mucous membrane exposure to blood or body fluids of EVD patient;
    - Direct skin contact with, or exposure to blood or body fluids of, an EVD patient without appropriate personal protective equipment (PPE);
    - Processing blood or body fluids of a confirmed EVD patient without appropriate PPE or standard biosafety precautions; or
    - Direct contact with a dead body without appropriate PPE in a country where an EVD outbreak is occurring.
- Ebola and testing should be considered for patients with fever or clinically compatible illness who, within 3 weeks before onset of fever, have had a **low-risk exposure**, defined as follows:
    - Household contact with an EVD patient; or
    - Other close contact with an EVD patient in health care facilities or community settings. Close contact is defined at http://www.cdc.gov/vhf/ebola/hcp/case-definition.html.
- **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.**
- For persons with fever or clinically compatible symptoms who resided in or traveled to affected areas within 21 days before onset but had no reported high- or low-risk exposures, testing may be indicated depending on severity of illness, presence of abnormal laboratory findings (i.e., platelet count <150,000/µL, prolonged PT/PTT or elevated transaminases), and presence or absence of alternative diagnoses.
- 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. 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 Employed at NCSLPH: The NCSLPH has implemented the CDC/USAMRIID Ebola Zaire rRT-PCR assay that has been granted FDA Emergency Use Authorization. Specimens testing presumptive positive with this assay will be forwarded to the CDC for confirmation. The estimated turn-round-time for negative and presumptive positive results is 6–48hrs. Specimens **will not** be accepted without prior consultation.

USE APPROPRIATE PRECAUTIONS (link below) WHEN COLLECTING SPECIMENS FOR EBOLA TESTING
http://www.cdc.gov/vhf/ebola/hcp/interim-guidance-specimen-collection-submission-patients-suspected-infection-ebola.html

Appropriate Specimens for Ebola rRT-PCR Testing at NCSLPH			
Specimen Type	Quantity	Testing	Transport
Whole blood with EDTA anticoagulant (purple top tube) in non-glass collection tube	≥ 4ml	rRT-PCR	Refrigerated (4°C), placed on cold packs. Package specimens using Category A guidelines.
Appropriate Specimens for Ebola Testing Conducted at the CDC			
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	
Formalin-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.

- **CONTACT THE BTEP UNIT (919-807-8600) PRIOR TO ANY SHIPMENT OR IF YOU HAVE QUESTIONS.**
  Address all specimen shipments as follows: Attention: Bioterrorism & Emerging Pathogens Unit
  North Carolina State Laboratory of Public Health
  4312 District Drive
  Raleigh, NC 27607-5490

- All specimen submissions must be accompanied by a completed **BTEP Specimen Submission Form** (http://slph.ncpublichealth.com/Forms/DHHS-5010-BTEmergingPathogens-0313.pdf), a **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, which utilizes a triple packaging system. *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.*

Routine laboratory testing on suspect EVD cases

- Clinicians should ensure that laboratory staff are aware if a diagnosis of EVD is being considered so that appropriate precautions can be taken in the laboratory when handling routine or diagnostic specimens.

- 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.

- The NCSLPH strongly recommends that laboratories consider the following guidelines for handling of routine laboratory specimens from persons under investigation for Ebola:
  - CDC laboratory guidelines:http://www.cdc.gov/vhf/ebola/hcp/interim-guidance-specimen-collection-submission-patients-suspected-infection-ebola.html
  - NYSDH/NYCH laboratory guidelines: http://www.health.ny.gov/diseases/communicable/ebola/docs/lab_guidelines.pdf).

Infection Control

- Any U.S. hospital that follows CDC's infection control recommendations and can isolate a patient in a private room is capable of managing a patient with EVD.
- Infection prevention procedures must be adhered to strictly.
- Detailed guidance for putting on and removing PPE is available at http://www.cdc.gov/vhf/ebola/pdf/ppe-poster.pdf.
- The following infection prevention measures are recommended when caring for persons with known or suspected EVD - *SEE LINK BELOW FOR ADDITIONAL INFECTION CONTROL RECOMMENDATIONS*.
  - Patient placement: Patients should be placed in a single patient room (containing a private bathroom) with the door closed.
  - Personal Protective Equipment (PPE): All persons entering the patient room should wear at least gloves, gown (fluid resistant or impermeable), eye protection (goggles or face shield), and 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 guidance is available at http://www.cdc.gov/vhf/ebola/hcp/infection-prevention-and-control-recommendations.html.

Assessment and Monitoring of Asymptomatic 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.
- Control measures may be recommended by the local health department 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.
- Key interventions include:
    - Providing intravenous fluids and balancing electrolytes (body salts)
    - Maintaining oxygen status and blood pressure
    - Treating other infections if they occur

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.