The Johns Hopkins Office of Critical Event Preparedness and Response

Johns Hopkins Institutions' Viral Hemorrhagic Fever (Ebola) Preparedness and Response Plan

September 8, 2014

This plan was developed by Johns Hopkins CEPAR and the Johns Hopkins Medicine Office of Epidemiology and Infection Prevention following guidelines from the U.S. Centers for Disease Control and Prevention.

Executive Summary

Within the Johns Hopkins Institutions (JHI), the Office of Critical Event Preparedness and Response (CEPAR) is charged with creating, maintaining and implementing a Johns Hopkins Institutions' Ebola Preparedness and Response Plan and ensuring that all Johns Hopkins Health System (JHHS)/Johns Hopkins Medicine (JHM) and Johns Hopkins University (JHU) affiliates prepare, maintain and update their own plans as extensions of the JHI-level plan.

This plan gives guidance for Johns Hopkins Institutions' response to the Ebola outbreak currently restricted to a few West African countries. Early recognition of Ebola is critical for infection control. All health care workers should be alert for patients presenting with symptoms for Ebola.

Patients presenting to the emergency departments or outpatient areas should be screened using the Viral Hemorrhagic Fever (Ebola) Screening Tool (Appendix A). For those with confirmed disease or identified as highly suspicious pending confirmation, control measures for Ebola include standard, contact and droplet precautions. Additionally, the patient should be placed in a private room. Aerosol-generating procedures should be avoided altogether or, if absolutely necessary, completed in an airborne isolation room. Routine lab specimens, i.e., CBC, electrolytes, etc., will be processed in the hospital lab after consult with the affiliate infection Control (IC) Department of Office. The hospital lab will need to be prenotified if samples are from a patient screened as at risk for Ebola. Blood tests for confirmation of Ebola will be sent to the state lab for processing and eventual transport to the Centers for Disease Control and Prevention (CDC) or USAMRID at Fort Detrick.

An Ebola communication protocol (page 9) has been developed and described in this document to ensure accurate and complete information is sent to the appropriate people in a timely manner.

Because of the evolving nature of the Ebola threat, this plan is considered a working document that may need to be revised as the situation changes and/or in response to CDC guidelines.

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Introduction

The principles and specifics of this plan pertain to all Johns Hopkins affiliates and follow guidance and recommendations from the CDC and the World Health Organization (WHO). It was further developed with input from the Johns Hopkins Medicine Office of Epidemiology and Infection Prevention (JHMEIP).
https://collaborate.johnshopkins.edu/sites/EIP/SitePages/Ebola.aspx

This guidance is not meant to replace existing emergency management or infection control policies, but it provides supplemental guidance and standardization *specific* to the current outbreak of Ebola virus disease (EVD). This guidance will be updated as additional information from the current outbreak becomes available.

Background

In 1976, Ebola first appeared in two simultaneous outbreaks in Sudan and the Democratic Republic of the Congo. The later village, situated near the Ebola River, is where the disease takes its name.

There are no licensed treatments or vaccines for the Ebola virus. Experimental treatments and vaccines to prevent acquisition are in development.

For this virus, the route of transmission is known and it is *not transmitted through water or air*. Ebola does not spread through casual contact like influenza. According to the WHO, patients are contagious only once the disease has progressed to the point that patients show symptoms. Human-to-human transmission of the Ebola virus is primarily associated with direct or indirect contact with the blood or the body fluids of an infected person.

The current outbreak represents the largest and most complex Ebola outbreak in history. The current outbreak is the most severe outbreak recorded in regard to the number of human cases and fatalities. Currently, the case fatality rate is about 56 percent. Experts say the risk to travelers is low, because Ebola requires direct contact with bodily fluids or secretions, such as urine, blood, sweat or saliva.

This document is designed to provide high-level guidance for Johns Hopkins Institutions based on standards and guidelines presented by the CDC, WHO and other health organizations.

Viral Hemorrhagic Fever (Ebola) Summary

An outbreak of EVD, formally known as Ebola hemorrhagic fever (EHF), has been reported in Guinea, Sierra Leone, Liberia and Nigeria. Approximately 56 percent have died of their disease. However, Ebola outbreaks can have a case fatality rate of up to 90 percent. Outbreaks have occurred primarily in remote villages in Central and West Africa, near tropical rainforests. The onset of this outbreak was December 2013, and the situation is still evolving.

Evidence strongly implicates forest or fruit bats as the reservoir and host. Zoonotic spread may occur from consumption of raw meat from infected animals (bush meat). The virus is transmitted to humans from wild animals, triggering waves of human-to-human transmission and epidemics. Transmission to humans is suspected to occur through close contact with blood, secretions, organs or other bodily fluids of infected animals. Human-to-human spread is by direct contact with blood, secretions, organs or other body fluids of infected people and indirect contact with environments contaminated with such fluids.

Health care workers have been infected while treating Ebola patients when there is a breach in compliance with standard, contact or droplet precautions.

CDC Case Definitions

Source: http://www.cdc.gov/vhf/ebola/hcp/case-definition.html

Person Under Investigation (PUI)	▪ 1) Clinical criteria, which include a fever of greater than 38.6 degrees Celsius or 101.5 degrees Fahrenheit, severe headache, muscle pain, vomiting, diarrhea, abdominal pain or unexplained hemorrhage; AND ▪ 2) Epidemiologic risk factors within the past 21 days before the onset of symptoms, such as contact with blood or other body fluids or human remains of a patient known or suspected of having EVD; residence in or travel to an area where EVD transmission is active;* or direct handling of bats, rodents or primates from disease-endemic areas
Probable Case	▪ A PUI who is a contact of an EVD case with either a high- or low-risk exposure (see below)
Confirmed Case	▪ Laboratory-confirmed diagnostic evidence of Ebola virus infection

Contacts of an EVD Case - Exposure Risk	**High-Risk Exposures** A high-risk exposure includes any of the following: ▪ 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 **Low-Risk Exposures** A low-risk exposure includes any of the following: ▪ Household member or other casual contact[1] with an EVD patient ▪ Providing patient care or casual contact[1] without high-risk exposure with EVD patients in health care facilities even in EVD outbreak affected countries[*] [1] *Casual contact is defined as a) being within approximately 3 feet (1 meter) or within the room or care area for a prolonged period of time (e.g., health care personnel, household members) while not wearing recommended PPE (i.e., droplet and contact precautions–see Infection Prevention and Control Recommendations), or b) having direct brief contact (e.g., shaking hands) with an EVD case while not wearing recommended PPE (i.e., droplet and contact precautions–see Infection Prevention and Control Recommendations). At this time, brief interactions, such as walking by a person or moving through a hospital, do not constitute casual contact.* [*] *Outbreak-affected countries include Guinea, Liberia, Sierra Leone and Nigeria, as of Sept.1, 2014.*
Signs and Symptoms	▪ Fever, vomiting, diarrhea, sore throat, joint and muscle aches, stomach pain, headaches and measles like rash. Symptoms commonly appear eight to 10 days after exposure but can range from two to 20 days. ▪ A rash, red eyes, hiccups and bleeding from body openings may be seen in some patients.

Risks	▪ History of having traveled within three weeks to an area of a country where disease is occurring ▪ Direct, unprotected contact with blood, other body fluids, secretions or excretions of a person or animal with EVD ▪ Possible exposure when working in a laboratory that handles the virus
Follow-Up	▪ People who have had close physical contact with patients with EVD should be kept under strict surveillance. Their body temperature should be checked twice a day for 21 days after exposure, with immediate hospitalization and strict isolation in case of the onset of fever.

References/Further Reading:

1. Centers for Disease Control and Prevention Viral hemorrhagic fevers (VHFs) http://www.cdc.gov/vhf/abroad/healthcare-workers.html
2. Centers for Disease Control and Prevention, Aug. 7, 2014 http://www.cdc.gov/vhf/ebola/hcp/case-definition.html

Communication Protocol for People under Investigation for Ebola

All potential Ebola patients will be seen by a licensed medical provider. Patients are screened using the VHF (Ebola) Screening Tool in Appendix A. The medical provider can consult with an infectious disease physician if needed. If the patient screens positive as a "probable case," the following communications should occur:

- Medical provider calls Infection Control.
- Infection Control calls the local and state health departments and JHMEIP.
- The state health department will call the CDC, as needed, and the CDC may ask to speak with the patient's medical provider.
- If Ebola blood work is drawn and sent to the state health department, Infection Control notifies CEPAR.

If Ebola cases are identified within the U.S. or within the Johns Hopkins Institutions, CEPAR may activate the Joint Information System (JIS) and Joint Information Center (JIC) to manage communications, including with the media. As appropriate, the CEPAR website will be leveraged to centralize and maintain communications.

Hospital Epidemiology and Infection Control/Prevention Contacts

All Children's Hospital 727-767-8677 (phone)
Howard County General Hospital 410-890-8677 (pager)
Johns Hopkins Bayview Medical Center 410-550-0515 (phone); 410-283-7641 (after-hours pager)
The Johns Hopkins Hospital, Outpatient Center, Rubenstein Center and Harriett Lane Clinic – 410-283-3855 (pager)
Sibley Memorial Hospital 202-660-5865 (phone); 301-483-1011 (pager)
Suburban Hospital 301-896-4014 (phone)
University Health Services 410-614-5050 (phone)
Other Johns Hopkins outpatient clinics 410-283-6181 (pager)
Kennedy Krieger Institute 443-923-9452 (phone)

Other Numbers

CEPAR 410-735-6450 phone or 443-257-7535 and dwhyne@jhmi.edu
Johns Hopkins Medicine Epidemiology and Infection Prevention 410-283-7078 (pager), 410-502-9617 (phone) or email jteter@jhmi.edu or jharr137@jhmi.edu

Ebola Control Measures in Health Care Settings

Ebola is transmissible by exposure to bodily fluids of a person who is sick or has died from Ebola or from exposure to contaminated objects, such as needles. At the present time, Ebola poses no significant risk to the United States.

Personnel Protective Equipment (PPE) for Patient Care

Control measures outlined within are those recommended by the CDC as of July 30, 2014. The CDC recommends standard, contact and droplet precautions for patients with known or suspected Ebola, regardless of the setting. The CDC also cautions that other control measures may be indicated if the suspected Ebola patient has other conditions or illnesses, e.g., tuberculosis, multidrug-resistant organisms.

Because the initial symptoms of Ebola patients are usually nonspecific[1], standard precautions must be applied consistently with all patients.

At a minimum, anyone entering the patient room should wear:

- Gloves
- Gown (fluid-resistant or impermeable), long enough to cover to the midcalf, ideally with thumb loops or cuff that cover gloves
- Eye protection, ideally a face shield
- Fluid-resistant face mask (standard surgical)

Additional "enhanced PPE" may be required in certain situations where there is a copious amount of blood, vomit, feces or other body fluids. At a minimum, anyone entering the patient room needing enhanced PPE should wear:

- Double gloves with high cuffs
- Disposable shoe covers
- Leg covers
- Fluid-resistant hair cover
- Longer fluid-resistant gown (surgical gown)
- Fitted N95

Aerosol-generating procedures should be avoided except in highly controlled settings. The number of people in the patient's room during aerosol-generating procedures should be limited. Particular caution is required when the following procedures are medically indicated:

[1] Note: These precautions address confirmed diagnoses or patients falling into high-risk categories.

intubation, extubation, bronchoscopy, sputum induction and airway suctioning. These procedures should be performed in an airborne infection isolation room (AIIR), if available. If performing these procedures, PPE should include a fit-tested N95 mask or equivalent respirator and face shield.

Appropriate PPE should be worn by anyone entering the patient's room. Upon exit from the room, PPE should be removed carefully to avoid touching the eyes, mucous membranes or clothing. Ideally, doffing should be supervised (buddy system) to ensure there is no cross-contamination or breach of procedure. Doffing PPE is a very systematic and structured process.

All PPE should be single use and should be discarded into a red trash bag.

Neither CEPAR nor the CDC recommends the use of nondisposable equipment when disposable equipment is available. For example, a PAPR for standard PPE when caring for an Ebola infected patient is not needed, as Ebola is not spread through the air. The concern is that cross-transmission risk increases when manipulating non-disposable equipment.

PPE for Obtaining Lab Specimens

The laboratory must always be called before any specimens are obtained.

CDC PPE recommendations for specimen collection:[2] full face shield or goggles, mask to cover all of the nose and mouth, gloves, and fluid-resistant gown. The purpose of PPE remains to prevent direct accidental exposure.

CDC recommendations for laboratory testing: full face shield or goggles, masks to cover all of the nose and mouth, gloves, fluid-resistant or impermeable gown, AND use of a certified Class II biosafety cabinet or Plexiglas splash guard, as well as manufacturer-installed safety features for instruments.

Before collecting any specimens, HEIC must be contacted. Following specimen collection, the outside of the tubes must be wiped down with disinfectant (quaternary ammonium and or chlorine-based solution) and allowed to dry, and then a patient label should be attached. Specimens should be transported in a rigid container and hand-delivered to the lab. At no time should any specimens go through the pneumatic tube system. All specimens must be clearly labeled on the outside as coming from a patient being evaluated for suspected Ebola.

[2] http://www.cdc.gov/vhf/ebola/hcp/interim-guidance-specimen-collection-submission-patients-suspected-infection-ebola.html

Emergency Medicine and Outpatient Areas

In the emergency departments and outpatient centers, all patients will be screened for fever and travel to an effected area (Appendix B). If the patient has a fever (>38.3 C or > 100.9 F) or a history of a fever and a history of recent travel to an affected area within the past 21 days, they are now considered patients under investigations (PUIs). A surgical mask should be placed on the patient, and the patient should be moved to a private room with the door closed and contact and droplet precautions initiated. Staff at this point will don a surgical mask, fluid barrier gown, face shield and gloves. Providers will then continue to access and interview the patient using the Viral Hemorrhagic Fever (Ebola) Screening Tool (Appendix A). An infectious disease doctor may be consulted as needed. If the patient meets the criteria for a "person under investigation" or a "probable case" (as defined by CDC on page 6), HEIC will be called. HEIC will contact the local and state health department for consultation and guidance at this point. This contact is required before any blood is drawn for Ebola testing.

Admitted Patients

Patients who are admitted to the hospital with suspected or confirmed Ebola **MUST** be placed in a private room (with private bathroom) with the door closed at all times. Rooms with an anteroom are preferred, as this allows a place for staff members to don and doff PPE.

Hospitals should predesignate a specific room or floor for Ebola patients, and those staff members should be trained to care for Ebola patients, including the use of PPE.

If more than one Ebola patient is admitted to a hospital, that hospital should consider cohorting these patients on the same floor to minimize staffing and training needs.

To the extent possible, only disposable equipment should be used to care for the patient, e.g., disposable stethoscopes. If reusable equipment must be used, such as portable X-ray machines, it should remain with the patient throughout their hospitalization (dedicated medical equipment) and then cleaned per hospital policy. Procedures using needles should be limited to the minimum necessary.

The duration of precautions and hospitalization will be determined on a case-by-case basis in conjunction with local and state health departments.

If any "rule-out" Ebola patients are accepted as transfers for admission into any of the Johns Hopkins acute care hospitals, Infection Control and JHMEIP should be included in the decision. Once the patient arrives, Infection Control will notify CEPAR for surveillance purposes.

Personnel

Ideally, Ebola patients should have one-to-one staffing. All personnel who participate in the care of the patient must be trained in and have practiced donning and doffing of PPE. Volunteer health care personnel will not participate in the care of Ebola patients.

A timed log will be kept of all people who enter an Ebola patient's room (Appendix C). A monitor can be stationed at the patient's room entrance to ensure compliance with PPE and visitor restrictions.

Environment Cleaning

Staff members performing environmental cleaning and disinfecting should be similarly trained and should wear recommended PPE when in the patient's room. Additional barriers, such as shoe and leg covers, maybe needed. A hospital-based disinfectant with an effectiveness claim against non-enveloped viruses should be used for cleaning equipment.

Waste and Linens

Linens should be placed in appropriate receptacles, bagged, identified appropriately and autoclaved or incinerated after use.

Exposed Staff

Each entity's employee health service should develop a plan for the management of potentially exposed workers. This plan should include immediate work stoppage, medical evaluation to determine if they are low- or high-risk, self-assessments, twice-daily fever screens for 21 days, psychological support and possible work exclusion depending on the exposure as recommended by Occupational Health Services. See JHM Guidance for Exposure of Faculty/Staff for further details.

Visitors

Visitors will be restricted. Exceptions may be considered on a case-by-case basis for those who are essential for the patient's well-being (e.g., parents of young children). If the patient's condition stabilizes and warrants, visitors maybe scheduled for brief periods of time.

Laboratory Specimens

Routine Blood and Urine Tests

Before any specimens are drawn, the provider of record, or in their absence their designee, **must** consult with HEIC and the lab. This conversation should be documented in the medical record.

Ebola Blood Test

CDC recommends testing for the Ebola virus for all people with onset of fever within 21 days of having a high-risk exposure, such as:[3]

- Percutaneous or mucous membrane exposure or direct skin contact with body fluids of a person with a confirmed or suspected case of EVD without appropriate PPE
- Laboratory processing of body fluids of suspected or confirmed EVD cases without appropriate PPE or standard biosafety precautions
- Participation in funeral rites or other direct exposure to human remains in the geographic area where the outbreak is occurring without appropriate PPE

For those with a high-risk exposure but without a fever, testing is recommended only if there are other compatible clinical symptoms present and blood work findings are abnormal (i.e., thrombocytopenia <150,000 cells/microliter and/or elevated transaminases).

A minimum volume of 4 milliliters of whole blood preserved with EDTA, clot activator, sodium polyanethol sulfonate (SPS) or citrate in ***plastic*** collection tubes can be submitted for Ebola testing. Do not submit specimens in glass containers. Do not submit specimens preserved in heparin tubes. Specimens should be stored at 4 degrees Celsius or frozen. Standard labeling should be applied for each specimen. Any lab specimens should be handled with the highest degree of caution. Specimens should be transported in a rigid container and hand-delivered to the lab. No specimens of any kind should be sent through the pneumatic tube systems. Prior to sending any specimens, the laboratory staff must be alerted by phone and the conversation documented in the patient's medical record.

For Ebola testing, Infection Control will call the local and state health departments. The state health department will give guidance for collecting the blood. The state will not accept specimens without prior consultation. The state health department will consult with the CDC regarding the appropriate place to perform the blood test. If the specimen is transported to the

[3] http://www.cdc.gov/vhf/ebola/hcp/patient-management-us-hospitals.html

state lab for testing, the state lab may also send a repeat specimen to the CDC or USAMRID at Fort Detrick.

Guidance for Safe Handling of Human Remains

Handling of human remains should be kept to a minimum. In patients who die of Ebola virus infection, virus can still be detected throughout the body. Ebola virus can be transmitted in postmortem care settings by laceration and puncture with contaminated instruments, through direct handling of human remains without appropriate PPE, and through splashes of blood or other body fluids (e.g., urine, saliva, feces) to unprotected mucosa (e.g., eyes, nose or mouth).

Enhanced PPE should be worn when doing postmortem care. The body should be wrapped in a plastic shroud. Wrapping of the body should be done in a way that prevents contamination of the outside of the shroud. Leave any intravenous lines or endotracheal tubes that may be present in place. Avoid washing or cleaning the body. After wrapping, the body should be immediately placed in a leak proof plastic bag not less than 150 micrometers thick and zippered closed. The bagged body should then be placed in another leak proof plastic bag not less than 150 micrometers thick and zippered closed.

Prior to transport of the body, surface decontamination of the bags should be performed with EPA-registered disinfectants that can kill a wide range of viruses. Transportation of the remains should be minimized to the extent possible; patient remains should not be transported to the morgue but removed directly from the patient's room.

Travel and Return from Designated Ebola Endemic Areas

The CDC urges all U.S. residents to avoid nonessential travel to the effected countries. Faculty, staff and student travel guidance is covered in a separate document.

People returning to the U.S. from a country designated as a *Level 3 warning,* by the CDC, will be cleared before returning to work or classes. They will be screened by Occupational Health Services for risk and monitored for 21 days for fever and/or other symptoms.

Appendix A
Viral Hemorrhagic Fever (Ebola) Screening Tool

JOHNS HOPKINS MEDICINE

Viral Hemorrhagic Fever (Ebola) Screening Tool

Patient Name

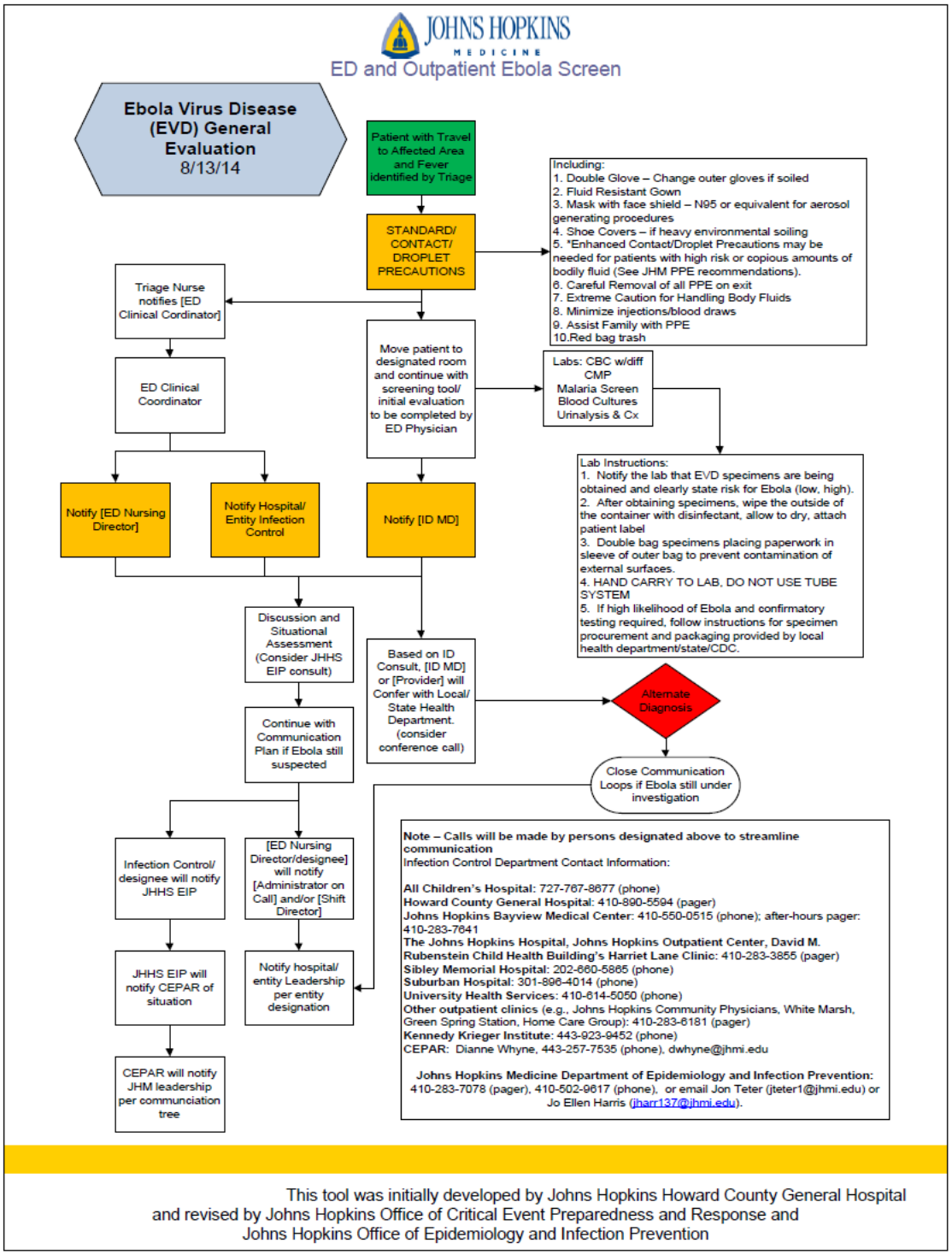
Items 1 & 2 are triage or initial screening questions	
1. Travel within 21 days to: ○ Guinea ○ Liberia ○ Sierra Leone ○ Nigeria ○ Congo ○ _____	Dates: District/Area: Rural or Urban Area:
2. Fever >100.9 F or > 38.3 C (approximately) **Or history of a fever**	Onset:
If "yes" to 1 and 2, begin contact and droplet precautions and escort the patient to a designated private room prior to additional assessment.	
3. Other Symptoms ○ Severe Headache ○ Muscle Pain ○ Vomiting ○ Diarrhea ○ Abdominal Pain ○ Unexplained Hemorrhage	Other/Describe:
4. High Risk Exposure ○ Direct/unprotected exposure to blood/body fluids of known/suspect ○ Lab processing of known/suspect specimens without PPE or biosafety procedures ○ Participation in funeral rites which included direct exposure to human remains in the geographic areas where above	Describe:
5. Low Risk Exposure ○ Spent time in healthcare facility where Ebola is being treated (includes patients, family, staff) ○ Household member with Ebola but no high risk exposure ○ Direct, unprotected contact with bats, rodents, primates from geographic area above; "Bush Meat" ingestion, Cave Exploration	Describe:
If the patient screens/answers yes to anyone of the above risk exposures contact Hospital Epidemiology and Infection Control for further guidance.	

Before processing any specimens the lab will need to know if the patient is high or low risk

This tool was initially developed by Johns Hopkins Howard County General Hospital and revised by Johns Hopkins Office of Critical Event Preparedness and Response and Johns Hopkins Office of Epidemiology and Infection Prevention

8/13/14

Appendix B
ED and Outpatient Ebola Screening Tool



Appendix C
Personnel and Visitor Log

JOHNS HOPKINS MEDICINE

Revised 8/7/14

Hospital Personnel and Visitor Sign-in Sheet

All Personnel entering this room must sign in and sign out.

Date	Name	Service/ Department	Time In	Time Out

Occupational Health/Infection Prevention will retain logs for 21 days once patient is discharged