Laboratory testing and Emerging disease challenges to Biosafety

August 9, 2018

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EBOLA
AL: Good morning Dr. Dickson, sorry to bother you on a Sunday.

BAD: No worries, what’s up?

AL: The ED called and said they might have a patient with Ebola and they are sending blood.

So begins 40 days of the EBOLA EVENT
Timeline of Events for Ebola Patients 1, 2, and 3, Dallas, September 20 - November 7, 2014

FIGURE. Timeline of events for Ebola patients 1, 2, and 3 — Dallas, Texas, September 20–November 7, 2014

- Patient 1 arrives in Dallas, Texas, from Monrovia, Liberia
- Patient 1 visits emergency department (ED) and is discharged home
- Patient 1 revisits ED and is hospitalized
- Patient 1 is diagnosed with laboratory-confirmed Ebola
- Patient 2 visits ED with fever and is diagnosed with laboratory-confirmed Ebola
- Patient 3 travels from Dallas to Cleveland, Ohio
- Patient 3 visits ED in Dallas with fever and rash and is hospitalized
- Patient 3 is diagnosed with laboratory-confirmed Ebola
- Patient 1 dies
- Patient 3 travels back to Dallas from Cleveland
- Of the initial contacts of patient 1, 47 of 48 complete monitoring
- All 177 contacts complete active monitoring

September 20, 25, 28, 30
October 8, 11, 13, 14, 15
November 29, 7

MMWR Nov 14, 2014, Early Release Vol 63
<table>
<thead>
<tr>
<th>Date</th>
<th>Event Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>30.</td>
<td>MR. Duncan visits ER</td>
</tr>
<tr>
<td>8.</td>
<td>Mr. Duncan deceased</td>
</tr>
<tr>
<td>11.</td>
<td>HCW #1 RN + Ebola</td>
</tr>
<tr>
<td>14.</td>
<td>HCW #2 RN + Ebola</td>
</tr>
<tr>
<td>19.</td>
<td>HCW #6 (Resp. Ther) + Ebola</td>
</tr>
<tr>
<td>15.</td>
<td>Boyfriend HCW #1 + Ebola</td>
</tr>
<tr>
<td>16.</td>
<td>HCW #7 (Resp. Ther) + Ebola</td>
</tr>
<tr>
<td>18.</td>
<td>DART Rider + Ebola</td>
</tr>
<tr>
<td>12.</td>
<td>Boyfriend HCW #2 RN ICU + Ebola</td>
</tr>
<tr>
<td>14.</td>
<td>Boyfriend HCW #3 Physician + Ebola</td>
</tr>
<tr>
<td>15.</td>
<td>HCW #5 (RN ICU) + Ebola</td>
</tr>
<tr>
<td>28.</td>
<td>Patient from ambulance + Ebola</td>
</tr>
<tr>
<td>10.</td>
<td>Boyfriend + Ebola</td>
</tr>
<tr>
<td>6.</td>
<td>Airplane exposure</td>
</tr>
<tr>
<td>3.</td>
<td>Airplane exposure</td>
</tr>
<tr>
<td>2.</td>
<td>Traveler contact with Liberian + Ebola</td>
</tr>
</tbody>
</table>

Additional PUI from around community sent to and arriving at THD “The Ebola Hospital” for an “Ebola Test”

The Worried Well
**CASE 1: SOUTH AFRICA 1996**

- 46 yo anesthetist assistant from Johannesburg
- Fever day 1, Headache day 4, Works until day 5
- Admitted to hospital Day 5 for suspected encephalitis
- CSF workup normal, fever 103.5°
- No recent history of travel or insect bites
- Patient dies on Day 23 of illness
CASE 2: New Jersey 2015

- May 18, 55 yo male fever, sore throat, fatigue
- Travel history —no travel to West Africa
- Patient sent home after non-diagnostic workup
- May 21, patient returns to hospital, worsening symptoms
- Patient transferred to second hospital, ?VHF
- May 25, patient dies
Historical Case Diagnosis
Commonality with Dallas

• **Case 1: Ebola Viral Disease**
  – Assisted with central line placement in physician from Gabon who had *no knowledge* of Ebola exposure and who had self-treated for malaria

• **Case 2: Lassa Fever**
  – *False travel history*; Liberia travel

**HISTORY REPEATS ITSELF LEARN FROM IT.**
Lessons learned with the EID patients old and new

- All patients will have *laboratory tests ordered*
- Most *will not be* in *isolation* initially
- Standard PPE *will not be* consistently employed
- Blood will be transferred by ungloved hands and possibly by pneumatic tube
- Geography is no longer a barrier to spread of infectious disease
- *History of travel and exposure dictates differential diagnosis*—but *patient history is often unreliable*
- Probably multiple contacts exposed

Opportunities for outbreaks of EID

- Increases in travel, trade, and tourism
- Zoonotic disease and human interaction in tourism
- Animal pathogen spillover
- Environmental changes resulting in new endemic regions
- Refugee crises and population displacement
- Illegal animal trade
- Market for exotic animal products
- Urbanization
- Natural disasters in populated areas
LAB CHALLENGES
If there is a clinical suspicion of Ebola, a PUI determination and medical evaluation should be made as quickly as possible to ensure patient care is not compromised.

Processes need to be in place to minimize the disruption to patient care in spite of positive emerging disease screen (non-PUI).

The available resources in the community lab and the level of training of lab personnel will dictate the availability of lab testing.

Proposed Minimum availability
♦ POC instrumentation
♦ BSL cabinet
♦ PPE trained
♦ Category B shipping
♦ Ability to determine etiology of symptoms, i.e.: rule out malaria

Preventing U.S. Hospitals for Ebola

CDC has developed a strategy to help healthcare facilities and state health officials prepare for patients with possible or confirmed Ebola. This strategy identifies which hospitals will provide different levels of care for patients being assessed and treated for Ebola.

Frontline Healthcare Facility
Quickly identifies and isolates patients with possible Ebola
Notifies facility infection control and state and local public health officials
Has enough Ebola personal protective equipment (PPE) for at least 12-24 hours of care

Ebola Assessment Hospital
Safely receives and isolates a patient with possible Ebola
Provides immediate laboratory evaluation and coordinate Ebola testing
Cares for a patient for up to 5 days (including evaluation and management of alternative diagnoses) until Ebola diagnosis is confirmed or ruled out
Has enough PPE for up to 6 days of care

Ebola Treatment Center
Safely receives and isolates a patient with confirmed Ebola
Cares for patients with Ebola for duration of illness
Has enough Ebola PPE for at least 7 days of care (will restock as needed)
Has sustainable staffing plan to manage several weeks of care
CDC Ebola Response Teams (CERTs) are ready to deploy to provide assistance as needed

All of the hospitals will be prepared to do the following:
- Ensure staff are appropriately trained and have documented competency in safe PPE practices
- Have systems in place to safely manage waste disposal, cleaning and disinfection
- Adhere to infection control protocols

In some cases, a hospital should be prepared to serve in more than one role. Hospitals may serve simultaneously as an Ebola assessment hospital and an Ebola treatment center. Patients may be transferred between facilities based on the state’s plan.
Published Date: 2018-08-01 21:34:59
Subject: PROAHEDR - Invasive tick - USA (11): (PA)
Archive Number: 201806015942213

INVASIVE TICK - USA (11): (Pennsylvania)
******************************************************************************
A ProMED-mail post
http://www.promedmail.org
ProMED-mail is a program of the International Society for Infectious Diseases
http://www.isid.org

Date: Wed 1 Aug 2018
Source: WTAE [edited]

The presence of an invasive and dangerous species of tick has been confirmed in Pennsylvania.
Tests by the National Veterinary Services Laboratory in Ames, Iowa have confirmed the presence of the Asian or longhorn tick, discovered on a wild deer in Centre County. It is known to carry several diseases that infect hogs and cattle [and humans] in Asia. So far, ticks examined in the U.S. do not carry any infectious pathogens.

Easily confused with other tick species, including the rabbit tick, which is common in the Eastern U.S., the species’ distinctive “horns” may not be visible without a microscope.

The Asian tick infests host animals in dense clusters of numerous ticks.
Female Asian ticks [can] reproduce asexually, so a single tick can reproduce and lay 2000 eggs after feeding on a host. Cattle, pets, small mammals, birds and humans are all potential hosts.
Special Communication from His Excellency the Minister of Health regarding the epidemiological situation in the Province of North Kivu on August 1, 2018

Dear Compatriots,

Ladies and Gentlemen,

On Saturday, July 28, 2018, the Provincial Health Division of North Kivu notified to the Ministry of Health twenty-six cases (26) of Fever with haemorrhagic signs, including twenty (20) deaths, in the health zone of Mangina located in the health zone of Mabalako, territory of Beni, in the Province of North Kivu.

Six (6) samples taken from hospitalized patients arrived in Kinshasa this Tuesday, July 31, 2018 and were analyzed by the National Institute of Biomedical Research (INRB). Of the six (6) samples analyzed, four (4) were positive for Ebola Virus Disease. Sequencing is in progress at INRB to identify the strain of the virus.
Diagnosis...

"I feel agitated, I'm sweaty, my stomach hurts..."

"I've got EBOLA!!"

"More likely it's a combo of jalapeño pizza and too much cable news."
Fever THINK
Malaria, Malaria, Malaria, Malaria

Malaria, especially *P. falciparum*, can progress rapidly. Diagnostic studies should be done promptly and treatment instituted immediately if malaria is diagnosed

• A history of taking malaria chemoprophylaxis does not exclude the possibility of malaria.

• Patients with malaria can have prominent respiratory (including acute respiratory distress syndrome), gastrointestinal, or central nervous system findings.
WHAT’S A LAB TO DO?

Presentation of Emerging Infectious Disease cases in community hospital Emergency Departments is **not preventable**

**BUT**

Mitigation of risk of disease transmission in the laboratory can be implemented, and treating the patient is crucial.

Risk assessment— what can your lab do safely
PPE training and skills development
Lab Drills with debriefing and alteration of lab SOP's
Befriend your Public Health Department Colleagues
Insert the Lab Medical Director centrally in the communication
RISK ASSESSMENT

First identify risk group of pathogen

- **Route of transmission**
  - Human-to-human or vector borne
  - Contact, droplet, airborne

- **Localization of infectious agent in the body**
  - Which body fluids or tissues are infectious
  - Cluster 1 yr later Liberian boy 11/2015
    - EBOV persistant infection (Lancet July 2018)

- **Infectivity**
  - High consequence pathogen?
    - Cause epidemics/pandemics
    - High cost to society or healthcare
    - Infect/affect many people
    - Spread rapidly in short time

- **Is prophylaxis, vaccine, or treatment available**

- **What laboratory testing might be necessary**
  - Stable vs critical pt, frontline vs assessment hospital
First considerations for working with a potentially harmful microbe.

Precautions must be taken in the laboratory to mitigate risk of transmission in daily operations.

• What physical spaces in the lab can be utilized?
  - negative air pressure room
  - closed centrifuge system
  - biosafety hood

• What protective equipment is available.
  - PPE - standard or high level
  - closed automated instrument systems
  - autoclave for waste disposal

• How would you contain the microbe to limit contamination or accidental infection?
# Examples of high consequence pathogens

<table>
<thead>
<tr>
<th>Viral</th>
<th>Bacterial</th>
<th>Prion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poxvirus infections</td>
<td>Actinomycoses &amp; Nocardiosis</td>
<td>Bovine spongiform encephalopathy (mad cow disease)</td>
</tr>
<tr>
<td>Ebola virus disease</td>
<td>Anthrax</td>
<td>Chronic wasting disease</td>
</tr>
<tr>
<td>Rabies</td>
<td>Brucellosis</td>
<td>Creutzfeldt-Jakob disease (classic and variant)</td>
</tr>
<tr>
<td>Hantavirus pulmonary syndrome</td>
<td>Buruli ulcer</td>
<td></td>
</tr>
<tr>
<td>Marburg hemorrhagic fever</td>
<td>Glanders</td>
<td></td>
</tr>
<tr>
<td>Rift Valley fever</td>
<td>Tularemia</td>
<td></td>
</tr>
<tr>
<td>Smallpox*</td>
<td>Leprosy (Hansen disease)</td>
<td></td>
</tr>
<tr>
<td>Zika</td>
<td>Leptospirosis</td>
<td></td>
</tr>
<tr>
<td>Nipah virus</td>
<td>Melioidosis</td>
<td></td>
</tr>
</tbody>
</table>

*eliminated from nature, virus stored in several laboratories

[wwwnc.cdc.gov/eid/eides](http://wwwnc.cdc.gov/eid/eides)
Biosafety in Microbiological and Biomedical Laboratories (BMBL) 5th Edition

Full Document

Full Version of Biosafety in Microbiological and Biomedical Laboratories (BMBL) 5th Edition

Document by Sections

- Introduction, Foreword, Editors, Steering Committee, Guest Editors, Contributors [PDF - 255K]
- Section I – Introduction [PDF - 254K]
- Section II – Biological Risk Assessment
- Section III – Principles of Biosafety
- Section IV – Laboratory Biosafety Level Criteria
# Laboratory Biosafety Level Criteria

## Biosafety in Microbiological and Biomedical Laboratories

<table>
<thead>
<tr>
<th>BSL</th>
<th>Agents</th>
<th>Practices</th>
<th>Primary Barriers and Safety Equipment</th>
<th>Facilities (Secondary Barriers)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Not known to consistently cause diseases in healthy adults</td>
<td>Standard microbiological practices</td>
<td>No primary barriers required. PPE: laboratory coats and gloves: eye, face protection, as needed</td>
<td>Laboratory bench and sink required</td>
</tr>
<tr>
<td>2</td>
<td>Agents associated with human disease</td>
<td>BSL-1 practice plus: Limited access, Biohazard warning signs, &quot;Sharps&quot; precautions, Biosafety manual defining any needed waste decontamination or medical surveillance policies</td>
<td>Primary barriers: BSCs or other physical containment devices used for all manipulations of agents that cause splashes or aerosols of infectious materials, PPE: Laboratory coats, gloves, face and eye protection, as needed</td>
<td>BSL-1 plus: Autoclave available</td>
</tr>
<tr>
<td>3</td>
<td>Indigenous or exotic agents that may cause serious or potentially lethal disease through the inhalation route of exposure</td>
<td>BSL-2 practice plus: Controlled access, Decontamination of all waste, Decontamination of laboratory clothing before laundering</td>
<td>Primary barriers: BSCs or other physical containment devices used for all open manipulations of agents, PPE: Protective laboratory clothing, gloves, face, eye and respiratory protection, as needed</td>
<td>BSL-2 plus: Physical separation from access corridors, Self-closing, double-door access, Exhausted air not recirculated, Negative airflow into laboratory, Entry through airlock or anteroom, Hand washing sink near laboratory exit</td>
</tr>
<tr>
<td>4</td>
<td>Dangerous/exotic agents which pose high individual risk of aerosol-transmitted laboratory infections that are frequently fatal, for which there are no vaccines or treatments</td>
<td>BSL-3 practices plus: Clothing change before entering, Shower on exit, All material decontaminated on exit from facility</td>
<td>Primary barriers: All procedures conducted in Class III BSCs or Class I or II BSCs in combination with full-body, air-supplied, positive pressure suit</td>
<td>BSL-3 plus: Separate building or isolated zone, Dedicated supply and exhaust, vacuum, and decontamination systems, Other requirements outlined in the text</td>
</tr>
</tbody>
</table>
# Emerging Pathogen SPECIMEN HANDLING AT TEXAS HEALTH DALLAS

<table>
<thead>
<tr>
<th>Agent</th>
<th>PPE and Controls</th>
<th>Additional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ebola (Hemorrhagic Fevers), Nipah</td>
<td>Class I or II Biological Safety Cabinet (BSC), High Level PPE</td>
<td><strong>Limited</strong> non-aerosol producing procedures; Bleach; Autoclave, Containment Centrifuge, Automated Line and POC</td>
</tr>
<tr>
<td>virus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MERS</td>
<td>Class II Biological Safety Cabinet (BSC), AFB PPE</td>
<td>No Rapid Antigen testing on respiratory specimens</td>
</tr>
<tr>
<td>Avian/Novel Flu</td>
<td>Class II Biological Safety Cabinet (BSC), AFB PPE</td>
<td>No Rapid Antigen testing on respiratory specimens</td>
</tr>
<tr>
<td>Dengue/Chikungunya/Zika</td>
<td>Standard PPE</td>
<td></td>
</tr>
<tr>
<td>Hantavirus</td>
<td>Standard PPE</td>
<td></td>
</tr>
<tr>
<td>Prions</td>
<td>Class I Biological Safety Cabinet (BSC), Standard PPE</td>
<td>Non-aerosol producing procedures; Containment centrifuges; Bleach</td>
</tr>
<tr>
<td>Sentinel Bacterial Agents (Brucella</td>
<td>Class II Biological Safety Cabinet (BSC), Standard PPE</td>
<td>Non-aerosol producing procedures; Bleach; Autoclave</td>
</tr>
<tr>
<td>spp, Francisella tularensis, B</td>
<td>Specimens BSL-2</td>
<td></td>
</tr>
<tr>
<td>anthracis, Y. pestis, etc)</td>
<td>Culture BSL-2 or 3</td>
<td></td>
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</tbody>
</table>
EBOLA STABILITY IN BLOOD IN VARIED ENVIRONMENTS
HUMID VS DRY
WARM VS HOT
5-7 DAYS
LIQUID > DRIED

EID 21:7, 2015
Risk Mitigation Strategy

Mitigation Controls Include:

Elimination

Removal of biorisk—ie: no testing performed in core lab

Substitution

Options—ie: POC in patient room only

Engineering controls- primary and secondary

Equipment—BSC’s, closed automation, alarms, badge swipes, sensors

Intentional removal of hazardous material from the laboratory

Administrative controls

Who will conduct work

Training

Acceptable behaviors

Practices and Procedures

Policies, SOP’s

Personal protective equipment

What level of protection is necessary for each task
Optimize biorisk mitigation

- The Dallas Ebola event demonstrated how a laboratory facility without a biocontainment lab could implement risk mitigation measures to ensure the safety of the laboratory staff and lab environment while providing excellent diagnostic care for the Ebola stricken patients.
- Flexibility and adaptability are paramount in daily operations.
- Use of elimination and substitution controls were used as well as primary engineering controls, administrative measures, new and revised procedures and PPE training.
- Personnel were volunteers, carefully chosen.
1. Define the situation
2. Define the risks within the situation
3. Characterize the risks

**Risk is individual per institution and depends on what mitigation is already in place, as well pathogen, process, work flow, and acceptable risk per institution.**

**Acceptable risk may be dictated by an institution, by local governance or nationally.**

**Risk acceptability may vary with emergency versus normal operations.**

**Each lab must do their own homework!**
Plan and Prepare

• Who are the stakeholders that need to participate in cohesive plan?
  – Lab Medical Director and Administrative Director
  – Microbiology Lab (all team members)
  – Core Laboratory
  – Infection Prevention
  – Emergency Department
• Who in the laboratory will directly participate in the plan and what are the assigned roles?
  – Single point of contact for event or PUI
  – Pickup of Sample
  – Tester and Buddies
  – Other
• Who will be the point of contact for laboratory communication?
  – Preparation for Event or PUI
  – Suspicion of PUI (Patient Under Investigation)
  – During an event

**Consistent, Clear, Concise, & Available Guidelines are key**
# Planning for High Consequence Pathogen

## Prior to Care
- **Establish multidisciplinary team**
  - Engage stakeholders
  - Establish communication plan
- **Prepare the physical environment**
  - Design and or modify facility
  - Stage equipment and supplies
- **Develop a staffing plan**
  - Recruit staff
  - Establish sustainable schedule
  - Initiate occupational health plan
- **Develop clinical protocols**
  - Identify best practices in other facilities
  - Vet procedures among stakeholders
  - Establish laboratory testing capacity
- **Implement training**
  - Practice donning and doffing PPE
  - Practice procedures in full PPE
  - Establish proficiency standards

## During Care
- **Maintain internal/external communication**
  - Conduct frequent team meetings
  - Designate public information officer
- **Implement staffing and care plans**
  - Use observers to assure proper PPE use
  - Follow clinical protocols
  - Troubleshoot unexpected challenges
- **Facilitate staff well-being**
  - Monitor for fatigue
  - Promote morale and recognition
  - Actively monitor for illness
- **Maintain equipment and consumables**
  - Monitor and resupply stocks
  - Allow only essential equipment in BCU
  - Avoid cross-contamination
- **Manage waste and the environment**
  - Autoclaved waste when possible
  - Disinfect liquid waste
  - Decontaminate work space often

## Following Care
- **Establish lessons learned**
  - Debrief stakeholders
  - Identify system’s strengths
  - Identify areas for improvement
- **Decontaminate environment/equipment**
  - Following CDC and manufacturer’s guidance
  - Repair, maintain, modify physical space
- **Update protocols and training**
  - Review and refine protocols
  - Perform refresher training (PPE, skills)
- **Support workforce**
  - Monitor for illness
  - Provide mental health services
  - Establish formal recognition

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*Fig. 2. Timeline of activities caring for patients infected with high-containment pathogens.*
Training

• Laboratory personnel have specific training in handling pathogenic and potentially lethal agents and are supervised by competent scientists who are experienced in working with these agents. Potential training events can include:
  – Online modules and exam
    • CDC BT Rule Out or Refer: Virtual Knowledge Exercise
  – Simulated Scenarios
  – CAP LPX Proficiency Test
  – More than once per year

• N95 Respirators
  – Must be fit-tested in accordance with 29 CFR 1910.134

• Current Texas Health Dallas Training Includes:
  – Don/Dof with roles of tester and buddy (bi-annually)
  – Review and Role Play the Following Tasks:
    • Transport of laboratory specimens
    • Task oriented movement and adjusted High Level testing procedures while donning laboratory HLPPE
    • Specimen tracking and destruction
    • Cleaning
    • Storage of equipment
    • Proper use of the biosafety cabinet and engineering controls
  – Review of Test Menu offerings available prior to rule out of PUI and following confirmation of emerging pathogen
Biopreparedness lab SIMULATION

- **Develop scenarios**
  - Different emerging agents
  - Stable vs critical patient
  - Include preanalytical, analytical, and post analytical stages

- **Drill in full PPE with instrumentation to be used**
  - PPE is uncomfortable and dexterity and visual fields are compromised

- **Perform the critical tasks required for different procedures**
  - Automated vs manual: core lab vs microbiology
  - In Lab vs POC

- **Develop learning objectives for each scenario**
  - 1–10 objectives for each scenario

- **Develop an Assessment tool to judge performance**
  - Performance assessment or competency

- **Debrief after each drill lessons learned**
LABORATORY TOPOGRAPHY
The Buddy System

- Two techs in high-level PPE
  - One tech to perform testing
  - One tech to record results, prevent others from entering testing area, observe technique and prompt performing tech for adjustments or to slow pace, provide bleach wipes or other supplies, to use computer keyboards and touchscreens
  - An additional tech used as a “runner” in anteroom for extra supplies and a go-between for placing secondary shipping containers into the final shipping box

- The Buddy System is used throughout the lab during all stages/types of testing and shipping of high level emerging pathogens
High-Level PPE Go-Kit

Contents:
- Disposable lab coats (impervious, white, long)
- Knee-high booties
- Extended cuff gloves
- Surgical gowns
- N95 masks
- Hoods
- Face shields
- Apron plastic
- Scissors
- Hair ties and pins
- Don/Dof Scripts (laminated)
- Instruction Guide - Testing, Handling, Cleaning, Disposal (laminated)
Laboratory Services Donning Script

Preparing for Entry: Prepare to be in PPE for 1-2 hours. Please consider eye drops to prevent dry eyes, clean glasses and secure with strap, any routine medication is taken.

1. Coach: My role is to ensure you have no exposed clothing, skin or hair through visual inspection at the conclusion of the donning process. I will read each step of the donning process out loud. Do not begin each step until I have finished reading the instructions and have made eye contact with you.

Enter Donning Area
   a. Coach: Remove jewelry and place personal items in storage area.
   b. Coach: If hair is long enough, tie back into a low bun. Secure any loose hair from face.
   c. Coach: If you wear contacts/glasses, bring and wear your glasses.
   d. Coach: If you
   e. Coach: Are you
   f. Coach and St equipment a

Laboratory Services Doffing Script

Note: if the employee is likely to need assistance, the buddy can assist as needed. The doffing coach may not assist.

When testing is complete and after testing area has been decontaminated, notify the Doffing Coach that you are ready to begin the doffing process.

2. Coach: Put on kn
3. Coach: Put on kr
4. Coach: Put on ex
5. Coach: Put on su

1. Coach: Enter designated doffing area
2. Coach: During this process, avoid reflexive actions that may put you at risk, such as touching your face or rubbing your eyes. I will read each step of the doffing process out loud. Do not begin each step until I have finished reading the instructions and have made eye contact with you.

3. Coach: Turn completely around. I will inspect the PPE to assess for visible contamination, cuts, or tears before you start the doffing process. (If any PPE is visibly contaminated, then clean and disinfect using an EPA-registered disinfectant alcohol wipe. Allow to stay wet for 2 minutes and then let air dry).

4. Sanitize each arm of the surgical gown (top to bottom), the front of the apron, and gloves with disinfectant alcohol wipe. Use a separate wipe for each area (gown, each arm, gloves). Do not wipe up and down. Allow to stay wet for 2 minutes then air dry.

5. Coach: Remove the blue plastic apron. Pull down the top of the apron, at shoulder area to break the neck tie. Roll top of apron away from your body. Pull forward to break the waist tie. Continue to roll the exposed side of the gown inward until it is in a tight ball. Avoid contact of yourself and the floor with outer surface of the gown during removal. Dispose of it in a red bag

6. Coach: Sanitize outer gloves with disinfectant alcohol wipe. Allow to stay wet for 2 minutes then air dry
Containment Room Preparation Checkoff Sheet

1. Trash
   □ To obtain appropriate high-level biohazard containers, contact EVS at x7572. If EVS is unable to bring boxes to the department in a timely manner, use new routine biohazard containers.
   □ 2 containers should be used. Each container should have an absorbent pad in the bottom and 3 large red trash bags in place.
   □ The container closest to the biological safety hood is designated for autoclaved tubes, autoclaved trash, and 1st layer gloves.
   □ The second container located on the opposite side of the room is designated for removal of Dirty PPE (boots, outer gown, 2nd layer of gloves, face shield).

2. Removal of items
   □ Remove all items from the BSC and containment fridge.
   □ Remove any other items that may be needed for mycology and AFB patient testing (stains, etc).
   □ Once the room is designated as a HLPPE containment space other patient testing will be performed in another area of the lab.

3. Supplies Needed for the Containment Room
   a. Inside Biosafety Cabinet
      □ 1 container of bleach wipes in BSC
      □ Sharps container without lid with red trash bag inserted
      □ Suction container with lid and ¼ filled with bleach
   b. Inside Room
Instructions for Manual Testing, Manipulation and/or Packing Non-Airborne Viral Hemorrhagic Fever Specimens (i.e. EBOLA Virus)

READ THIS GUIDE PRIOR TO WORKING WITHIN THE CONTAINMENT ROOM. THIS GUIDE SHOULD BE REFERRED TO BY THE BUDDY DURING TESTING AND/OR PACKING OF SPECIMENS TO ASSIST THE TESTER/SHIPPER WITH PROPER TECHNIQUE AS WELL AS TO SLOW THE PACE OF WORK FOR SAFETY PURPOSES.

Plan Your Work

A minimum of 2 MLSs is required; 1 tester and 1 buddy. An optional 3rd MLS may be a runner that stays in the Ante-Room.

Before Donning PPE make a plan for performing each test requested. Gather all supplies but remember any supply that is moved into the containment room cannot be removed. Make every attempt to only take reagents, devices, pipets, etc. that are necessary to perform one test.

**Don PPE** before entering the Ante-Room outside the Containment Room (Negative Air Pressure/AFB Lab)

Entering the Containment Room

- Before entering the Ante-Room, make sure that the door to the Containment Room is closed.
- Enter the Ante-Room.
- The donning coach is to scan each employee badge for the tester and buddy; each person will enter the room separately.
- The outside Ante-Room door must be closed before opening the Containment Room
Microbiology

Malaria Go-Kit

Contents:

- 30 ml each in a 50 mL conical tube
  - Hemacolor stains 1,2, &3
  - Milli-Q water
  - Methanol
- Plastic slide box containing 4 slides
- 2-3 plastic pipettes
- Pencil
- Capped polystyrene tube containing 4-5 drops Rapid Malaria reagent
- Rapid Malaria Card
- Timer (in separate plastic bag for buddy)
PACKAGING

http://www.cdc.gov/vhf/ebola/hcp/packaging-diagram.html
SPECIMEN TRACKING

• Chain of Custody
  – Forms should accompany samples throughout all stages of collection, transport, testing, storage, and destruction
    • Buddies will complete forms for the specimen handler and/or tester
  – After testing is complete; samples are triple bagged in clear bags so that the tube types are clearly visible through the bag.
    • Sample labels for each accession number contained in the bag is placed on the outside of the final bag with tech initials and notation of the bag contents
• Tracking numbers for shipping
  – Copies are kept of all shipping documents and/or emails regarding shipment and receipt of samples
  – MUST ACCOUNT FOR EACH SAMPLE TYPE AND TUBE RECEIVED BY THE LABORATORY
SPECIMEN STORAGE

Lock-Down

• ALL samples are kept in the Special Procedures Lab “containment” room specimen refrigerator
  • If a specimen requires frozen storage, it will be stored in the -70 C freezer in Special Procedures Lab
  • The specimens are stored in compliance to Category A shipping requirements in an appropriate Bio-Jar container and clearly labeled with content and biohazard labels
  • The freezer is locked at all times. All access is supervised by the Laboratory Manager or designee

• Requires badge access
• ALL personnel (regardless of testing status) MUST badge in
• No specimen is autoclaved or shipped without proper documentation of such activity
  – Use chain of custody log and notate each tube type and accession destroyed or shipped
PREPARE FOR FEARBOLA

"The cycle of fear and stigma, amped up by the media, will continue to spiral, even though there’s little doubt that the epidemic will be contained in the US, which has the staff, stuff, space and systems."

Paul Farmer MD  Ebola Diary October 23, 2014
# Public trust in information provided during the 2014 Ebola outbreak

<table>
<thead>
<tr>
<th>Question</th>
<th>Option</th>
<th>Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>As far as you know, if a person is infected with Ebola, can they transmit the disease to others before they are showing symptoms, or can they only transmit the disease once they are showing symptoms of Ebola?</td>
<td>Not at all likely</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Before they show symptoms</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>Only once they show symptoms</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Don’t know or refused to answer</td>
<td>16</td>
</tr>
<tr>
<td>How much do you trust public health officials in the United States to share complete and accurate information about the Ebola virus?</td>
<td>A great deal</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>A fair amount</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>Just some</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Not too much</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Not at all</td>
<td>20</td>
</tr>
<tr>
<td>How much do you trust information about the current Ebola outbreak that comes from . . .</td>
<td></td>
<td></td>
</tr>
<tr>
<td>the Centers for Disease Control and Prevention, the CDC?</td>
<td>A lot</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Some</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Not too much</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>Not at all</td>
<td>17</td>
</tr>
<tr>
<td>local hospitals and health authorities?</td>
<td>A lot</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Some</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Not too much</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>Not at all</td>
<td>14</td>
</tr>
<tr>
<td>news organizations covering Ebola?</td>
<td>A lot</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Some</td>
<td>38</td>
</tr>
<tr>
<td></td>
<td>Not too much</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>Not at all</td>
<td>15</td>
</tr>
</tbody>
</table>

* Data are from a Harvard T.H. Chan School of Public Health and SSRS poll, October 8–12, 2014; a Kaiser Family Foundation poll, October 8–14, 2014; an Associated Press-GfK poll, October 16–20, 2014; and a Pew Research Center poll, October 16–19, 2014. “Don’t know,” “Refused,” or “No answer” responses are not shown where the percent of respondents was less than 5. (For a
HEALTHY LAB ENVIRONMENT IN CRISIS

• Create opportunities to express concern
• Inspire personal safety
• Provide resources for response
• Address loss of revenue/liability
• Control speed of information flow
• Anticipatory guidance
• Answer queries: family’s safety

www.oahpp.ca

www.aphl.org
CRISIS COMMUNICATION
EARLY AND OFTEN

• **Listen to staff concerns**
  – Address the science--factual, candid, uncertainty

• **Update, be visible, be transparent**
  – Frequent updates build trust and manage expectations

• **Open communications dispel rumors**
  – Rumors in your own lab and in the community

• **Social support—personal stories**
  – Psychosocial consequences can be extremely stressful

• Thank your staff—
  Laboratorians, the unrecognized heroes
Questions?