Biosafety Considerations for U.S. Hospitals Preparing for Ebola Virus Disease (EVD)

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Outline

CDC Technical Assistance to States
- **Rapid Ebola Preparedness (REP) Hospital Assessments**
- **Ebola Readiness Assessments (ERA) for U.S. Hospitals**

Observations and Concerns Identified

Addressing the Issues

Ebola by the Numbers*

27,000+
Total number
of cases

4
Patients diagnosed with
Ebola in the U.S.

11,000+
Total number
of deaths

11
Patients with Ebola
treated in the U.S.

24,665
Health workers trained
by CDC in West Africa

600+
U.S. healthcare workers
trained in Anniston

2,471
CDC deployments

150,000
U.S. healthcare workers
trained by webinars and calls

59,665,191
Number of views for CDC's Ebola website

* As of June 12, 2015

The Issues Facing Everyone...

- **Fear**
- **Perception vs. science**
- **Media reports were dire**
- **First time U.S. healthcare workers were infected**
- **Hospitals were unprepared**
- **Supplies and funding**

The Dallas Morning News

"We learned that comfortable assumptions about preparedness crumble to dust in the presence of a real-time emergency."

"Most of all, we learned a lot about the chaotic, reason-eroding effects of pure, unharnessed panic."

"The cost of the crisis to Dallas-area taxpayers was about $825,000, but the cost of all that anxiety is harder to calculate."

CDC's Response in the United States

Acute care hospitals and other healthcare facilities can serve in three roles:

Ebola Treatment Center (ETC)

o Provide comprehensive care to people diagnosed with Ebola for the duration of a patient's illness

o 55 currently designated across the U.S.

Ebola Assessment Hospital (EAH)

o Evaluate and care for a patient up to 96 hours

o Initiate Ebola testing

o Arrange for transport of the patient if Ebola is confirmed

Frontline Healthcare Facility

o Identify patients with relevant exposure history and Ebola symptoms

o Isolate the patient and inform health departments

CDC Technical Assistance to State Health Departments

Rapid Ebola Preparedness (REP) Teams, Oct 2014-Jan 2015

- Ebola Treatment Center focus
- 21 states plus D.C.
- 81 facilities

Ebola Readiness Assessments (ERA), Feb-Sept 21, 2015

- Ebola Assessment Hospital focus
- 17 states
- 39 facilities
- About 15 more state visits scheduled for Oct-Dec 2015

REP and ERA Team Site Visits

Evaluated hospital capacity and preparedness to receive, identify, and treat critically ill patients

- **5-6 CDC, NIOSH, and HHS personnel with expertise in:**
  - **infection prevention/control**
  - **clinical laboratory and biosafety**
  - **worker safety and personal protective equipment (PPE)**
  - **waste management**
  - **epidemiology**

Ebola Readiness Assessments (ERA)

Instruct and assist state health departments in building state capacity by evaluating their hospitals -from patient arrival to patient departure

- Facility infrastructure: patient room
- Patient transportation
- Laboratory
- Staffing
- Training

- PPE
- Waste management
- Worker safety
- Environmental services
- Clinical management
- Operations coordination

Key Issues for Hospitals

- **Insufficient staff training resulted in *fear and lack of confidence among clinical care staff***
  - **Lack of experience in wearing specific PPE and proper doffing procedures**

- ***Delays in testing* sometimes resulted in *compromising patient care* for other possible infectious diseases**
  - **Malaria, typhoid fever, meningococcemia, Lassa fever and other bacterial or viral infections (e.g., pneumonia)**

Delays in Laboratory Testing

- *At least two persons who tested negative for Ebola died from other causes*. Based on reports from health departments and healthcare providers, in several instances efforts to establish *alternative diagnoses were reported to have been hampered or delayed because of infection control concerns.* For example, laboratory tests to guide diagnosis or management (e.g., complete blood counts, liver function tests, serum chemistries, and malaria tests) were reportedly *deferred in some cases until there were assurances of a negative Ebola virus test result.*

Karwowski et al. Clinical Inquiries Regarding Ebola Virus Disease Received by CDC — United States, July 9–November 15, 2014. MMWR Morbidity and Mortality Weekly Report. December 5, 2014. 63(49);1175-1179

Key Issues for Hospitals

- Waste management (interstate, intrastate and local)
- Specimen management and transport
- Staffing
- Space
- PPE
- Communication
- Environmental decontamination
- Mortuary preparation

- Coordination with state DOH
- Infrastructure
- Patient transport
- Inconsistent guidelines
- Lack of EMS in planning
- Ethics and mental/behavioral health support
- Clinical management
- Special populations
- Training

*Not all issues will be covered in this presentation

Patient Arrival

- **Walk-in to emergency department (ED)-triaged with PPE, travel history, symptomology**
- **Brought by ambulance-moved directly to secure, patient care holding area**
- **Prep for large volumes of body fluids, PPE and waste generation, disinfection issues**

Specially-Modified Ambulance Transport

- Plastic sheeting to cover everything
- Wipe down, fumigation, or UV disinfection?
- Disposal of contaminated plastic sheeting

EMS Staff Decontamination Areas

Overuse and spraying of bleach?
Wastewater treatment-definitive plan?
Disposal of EMS PPE

Specific Concerns Observed

- **Staffing and Training**
  - **Inadequate number of trained staff available to provide care for up to 96 hrs**
    - **Unrealistic shift durations in full PPE (heat exhaustion, dehydration)**

  - **Gaps in documentation for staff training and routine assessment of continuing competency**

Specific Concerns Observed

Inadequate Space in Patient Care Area and Laboratory

- Needed separate unit with 1 to 2 patient treatment rooms segregated from other patient care areas
- Separate areas lacking or insufficient space for donning and doffing PPE (no separation of clean and dirty)
- Lack of unidirectional workflow
- Some patient areas with directional (negative) air flow, but no visual indicators

Specific Concerns Observed

- **Patient and specimen transport**

- **Management and transport of the deceased**
  - **Sealable bags available?**
  - **Staff trained?**
  - **Crematorium agreements?**

Personal Protective Equipment

- **Perception that more is better**
- **SOPs changed frequently**
- **How many pairs of gloves?**
- **To tape or not to tape?**
- **Visibility/communication**
- **PAPRs or not?**
- **Clinical care vs. lab**
- **Emergency issues (breach, exposure)**
- **PPE for point of care (POC) testing**

Waste Management Issues

- 20-40 (50gal) bags of infectious waste per day/per patient
- Adequate and secure storage
- Flushing of human waste into sewage systems
- Movement of waste from patient area and lab to holding area and loading dock
- Highly variable local regulations-verified plans?

Hospital Room Decontamination

- **Potential overuse of bleach products**
- **Wipe or spray down with disinfectant**
- **Vapor phase H_2O_2 systems**
- **UV robots**
- **Who does terminal cleaning-clinical care staff or environmental services?**

Key Laboratory Issues

- **Lab currently has the lowest capability rating of all 11 hospital preparedness domains**
  - **Lab testing is still an issue due to reluctance to do certain tests**
  - **33% of EAH (Sept 1, 2015) self reported as not meeting the minimum**

Specific Laboratory Concerns Observed

- **Insufficient certified staff and supplies available to pack and ship specimens to nearest Laboratory Response Network**

- **Risk assessments not being performed**

- **Biosafety cabinet practices**

- **Confusion about PPE (specimen transport vs. lab testing)**

- **Confusion about how to handle liquid waste from instruments**

- **Confusion about how to decontaminate equipment**

- **Gaps in communication among clinical care staff, infection prevention/control and laboratory**

- **Open tube systems**

Addressing the Hospital Concerns

- **CDC's Ebola Response Team (CERT)**
  - **Available to deploy within 4 hours in response to a request from a state health department**
  - **Team has expertise in epidemiology, medical care, lab, public relations/communication, and infection control**
- **CDC's Public Health Emergency Preparedness (PHEP) Cooperative Agreement Supplemental for Ebola Preparedness and Response Activities**
- **HHS Office of the Assistant Secretary for Preparedness and Response (ASPR) Hospital Preparedness Program (HPP) Ebola Preparedness and Response Activities**

Addressing the Laboratory Concerns

- **CDC's Domestic Ebola Supplement to Epidemiology and Laboratory Capacity (ELC) for Infectious Diseases**
  - CDC has provided funds for 3 years to 62 jurisdictions to improve laboratory biosafety in both public health and clinical laboratories-
- **Association of Public Health Laboratories (APHL)**
  - CDC has provided funds to APHL to provide laboratory biosafety expertise to assist ELC laboratory biosafety grantees
  - APHL has convened a Biosafety and Biosecurity Committee to provide guidance and plans to provide training, tools and technical assistance

Progress!

1. Mistakes were made in the beginning of the Ebola response, but we have learned a lot.

2. Hospitals have put a lot of hard work, critical thinking, and time into their plans.

3. Ebola has brought a focus to biosafety, infection prevention/control, worker safety and public health.

4. The gaps identified present an opportunity to educate and improve safety and operations.

Thank you David Bressler, Dev Howerton, and Luis Lowe!

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The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.

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