Texas 2014 Ebola Response, Lessons Learned and Next Steps

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June 17, 2015
• Discovered in 1976 near the Ebola River in what is now the Democratic Republic of the Congo

• Causes Ebola hemorrhagic fever

• Likely carried by bats; Cause disease in humans and nonhuman primates (monkeys, gorillas, and chimpanzees)

• Five identified Ebola virus species, four of which are known to cause disease
  • Ebola virus (*Zaire ebolavirus*)
  • Sudan virus (*Sudan ebolavirus*)
  • Taï Forest virus (*Taï Forest ebolavirus*, formerly *Côte d’Ivoire ebolavirus*)
  • Bundibugyo virus (*Bundibugyo ebolavirus*)
  • Reston virus (*Reston ebolavirus*)
West Africa Ebola 2014-2015

1976-2013 Outbreaks
- 24 previous outbreaks
- 2,400 cases
- 1,597 deaths, 66% case fatality ratio
- Largest single outbreak, 2000-2001, Uganda, 425 Cases, 224 Deaths (53%)

2014-2015 Outbreak
- >10 times larger than all previous Ebola outbreaks combined
- 26,290 cases
- 10,890 deaths, 41% case fatality ratio

Data current as of 1 May 2015
EBOLA

Signs and Symptoms

If You Have Fever, Diarrhoea and Vomiting With or Without Bleeding
GO IMMEDIATELY TO THE NEAREST HEALTH FACILITY

For more information call 117 (Call free)

Ebola 2014
West Africa
U.S. Diagnosed Ebola Cases = 4

On September 30, 2014, first Ebola case diagnosed in the United States
• Traveler from Liberia to Dallas, Texas
• Patient died on October 8

On October 10, Dallas healthcare worker tested positive for Ebola
• Patient recovered and discharged from the NIH Clinical Center on October 24

On October 15, second Dallas healthcare worker tested positive for Ebola
• Patient recovered and discharged from Emory Hospital on October 28

On October 23, the New York City Department of Health and Mental Hygiene reported a case of Ebola
• Medical worker returned to New York City from Guinea after serving with Doctors Without Borders
• The patient recovered and was discharged from Bellevue Hospital Center on November 11
Ebola Disease Progression

**First symptoms**

- **Day 7-9**: Headache, fatigue, fever, muscle soreness

**Day 10**
- Sudden high fever, vomiting, blood, passive behavior

**Day 11**
- Bruising, brain damage, bleeding from nose, mouth, eyes, anus

**Day 12**
- Loss of consciousness, seizures, massive internal bleeding, death

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Source: U.S. Centers for Disease and Control, BBC
Graphic: Melina Yingling
First Diagnosed Ebola Case in North America

- Thomas Eric Duncan, 42 years old
- September 19, Departs Liberia
- September 20, Arrives in Dallas, Texas
- September 24, Onset of symptoms
- September 25, Seeks care
  - Receives antibiotics
- September 28, Admitted to ICU
- September 30, Confirmed Ebola Virus Disease (EVD)
- October 8, Duncan dies
- Diverse contacts
First Nurse Diagnosed

• 26 year old nurse
• Cared for Mr. Duncan
• October 8, Duncan dies
• October 11, Nurse tests EVD positive
• October 16, Transferred to NIH facility in Bethesda, Maryland
• October 24, Discharged
• Limited contacts
Second Nurse Diagnosed

- 29 year old nurse
- Cared for Mr. Duncan
- October 8, Duncan died
- October 10, nurse flew to Cleveland
- October 13, Flew back to Dallas
  - Was self-monitoring and reporting her temperature
  - Called the CDC, Temp 99.5F (37.5C)
  - CDC testing criteria is 100.4F (38C)
- October 15, Tests positive for EVD and transferred to Emory in Atlanta
- October 28, Discharged
- Large number of contacts
Situational Awareness

• Response operations in Dallas
• Rapidly changing
• State Medical Operations Center (SMOC)
  o Response Operations
  o Programmatic Operations
• Emergency Management
  o State Operations Center (SOC)
  o Disaster District Committee (DDC)
• WebEOC
Texas State Medical Operations Center (SMOC) ICS Structure

SMOC Director
Michael McElwain

Public Information Officer (PIO) Carrie C. Williams

Legal Officer Monty Waters
Liaison Officer

Planning Section Chief Danielle Hesse
Planning Section Deputy Chief Lisa Amaya

Reports Unit Leader
Reports Unit
EAG Team

Logistics Chief Linda Powers
Logistics Section Deputy Chief Cliff Lindell

Finance Section Chief Lisa Schultz
Finance Section Deputy Chief Hil Lassberg

Operations Section Chief Keri Cain

- Epidemiology
- Zoonosis
- Laboratory

TACCOM Support Branch Director Juliana Johansson
Specific Ebola Protocols Lacking

- State rapidly developed protocols for:
  - 911 Call Takers
  - EMS Practices
  - Hospital Patient Screening
  - Lab Submission
  - Mortality Planning
“In western Africa now there is a need for rational and efficient use of protective equipment... achieved by communicating a consistent message that the disease is essentially transmitted through direct contact. In control of infectious diseases, more is not necessarily better and, very often, the simplest answer is the best.”

The scientific community must argue for the most conservative infection control responses that make sense in light of the present data. I believe the authors (Previous Slide) and the Centers for Disease Control and Prevention have failed to do that and in so doing, have imperiled individuals unnecessarily.

Key Highlights

• Repeated infection control training for all healthcare workers involved in the care of an Ebola patient
• Recommended PPE should have no skin exposed
• Upgrade to N95 or PAPR
• Identified onsite manager and trained observers

NOTE: Highlights added by presenter
CDC'S PROTECTIVE GEAR CHANGES FOR HEALTH WORKERS

**PREVIOUS GUIDELINES**
- Goggles, safety glasses or face shield
- Mask or respirator
- Gown
- One pair of protective gloves
- No leg or shoe coverings

**NEW GUIDELINES**
- Disposable full-face shield
- Respirator
- Waterproof apron
- Fluid-resistant gown or coverall
- Two pairs of protective gloves
- Fluid-resistant pants and shoe coverings

Source: USA Today
Response Challenges: Ground Transportation

• Index patient transport not informed
• Requires pre-planning and advanced training
• 911 Public Safety Answering Points
• Must establish:
  o Appropriate PPE
  o Appropriate competency to utilize PPE
• Known vs unknown risk
• Risk stratified
  o Head to toe impermeable barriers with the powered air purified respirators
  o N95, goggles, and Tychem full body fluid impermeable suit
Response Challenges: Air Transportation

• Requires pre-planning and advanced training
• Establish infection control protocols in advance and implement throughout the process
• Training must include
  o Clinical management
  o Infection control
  o Personal protective equipment (PPE)
• Portable Isolation unit recommended
Ebola Treatment Centers
Nebraska Medical Center Example

- Negative air flow with greater than 15 air exchanges per hour
- High-Efficiency Particulate Air (HEPA) filtration system
- Secured access, separate staff entrances and exits
- Staff decontamination shower
- Pass through sterilizer to disinfect materials leaving the unit
- Dunk tank to decontaminate lab specimens leaving the unit
- Close proximity to the Nebraska Public Health Biosafety 3 Laboratory
- HEPA patient transport system

Source: Nebraska Medical Center
Graphic: Greg Good
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Waste Management

- Not a public health area of expertise
- Cleaning the apartment
  - How to clean
  - Identifying waste
- Packaging waste
  - Procedures
  - Supplies & equipment
- Transportation
  - Federal DOT Permit Category A Infectious Substance
- Destruction
  - Incineration & ash
Category A Infectious Waste

- From a healthcare setting:
  - Regulated medical waste
  - Properly packaged and labeled
  - State-registered transporters
  - Authorized disposal facilities
- From a non healthcare setting (e.g. residential, hotel, etc.)
  - Classified as special waste and managed as medical waste
Waste Management

Category A infectious waste treatment methods:

- **Autoclave**: waste placed in pressurized steam
- **Incineration**: Extremely high temperatures, well above the relatively low temperatures needed to kill Ebola virus
- **NOTE**: Chemical treatment methods in the US not yet standardized for Category A waste
Contact Tracing

• Index patient & nurse contacts
  o 177 healthcare worker and community contacts
    • 43 index patient contacts prior to hospitalization
  o 165 contacts on flights with Nurse #2
    • Texas, Ohio, and New York
  o All cleared by November 7th, after 21 day monitoring period

• Highlighted the need for:
  o More epidemiologists
  o More field epidemiology expertise
  o Better information sharing systems

Dallas County chief epidemiologist Dr. Wendy Chung, far right, and members of her team—from left, Sonya Hughes, Emily Hall, and Sibeso Joyner
Pets and Ebola

- Pet issues in recent disasters
- Outcry - Spanish nurse’s dog
- Poorly understood Ebola risk
- Protocols were non-existent
- Dallas Nurse’s small dog
  - Transported to Hensley Field, Decommissioned Naval Air Station
  - 21 day quarantine
  - Texas A&M vet providers

- Recommendation: Those being monitored for EVD should avoid pets
Control Orders

Control orders issued for:
- People
- Places
- Pets
- Possessions

Challenges include:
- Resistance
- Frustration
- Housing, food and other basic needs
“Under the authority of Texas [law] you are hereby ordered…to prevent the introduction, transmission, and spread of this disease in this state:”

“Remain at [ADDRESS]. You will not be permitted to leave…”

“You are not to allow or otherwise permit any visitors…”

“Monitor yourself for symptoms …”

“Make yourself available…for diagnostic testing…”

“If you do not comply with these control measures you may be subject to criminal prosecution…”

This Order will remain in effect until you are notified in writing that the incubation period has passed
Public Perception
Erroneous Public Perceptions

- Inflated Ebola risk
- Conspiracy Theories
- Racism Accusations
- Overreactions

News Headline, “Schools in Ohio, Texas closed over Ebola fears”

In Belton, Tex., on Friday, environmental workers prepared to disinfect North Belton Middle School, which had been closed because of the Ebola scare.

Credit Rusty Schramm/The Temple Daily Telegram, via Associated Press
Behavioral Health Interventions

Issues

- Diverse psych needs of the public, infected patients, family members, healthcare workers, and other responders
- Distress with perceived or actual exposure (Psychological First Aid)
- Grief counseling
- Involuntary control orders
  - Including a homeless individual
Behavioral Health Interventions

Lessons Learned

• Early integration of a behavioral health response
• Consensus on sharing sensitive health information
• Recognition that infectious disease disasters can change the usual response framework and process
• Develop homeless population contingency plans
• Interagency collaboration to develop an overall behavioral health treatment plan
Fatality Management

Post-mortem Checklist

- Phase I
  - Notify next of kin, State Health Commissioner, and local elected officials

- Phase II
  - Additional notifications and mortuary services procedures initiated

- Phase III
  - Coordinate press release
Fatality Management

• Mr. Duncan’s body was “double-bagged” in zippered bags (CDC Policy)

• Bioseal bag was added by Texas-based Global Mortuary Affairs (mortuary contractor)
  o Approved for air transport of un-embalmed remains
  o Assures no leaks are possible
  o Biosafety Level 4 (BSL-4) approved
  o Costs about $65 per bag

• Cremation
  o Placed directly into the retort and incinerated
  o Duncan’s cremains were sealed into a BioSeal pouch for presentation to the family.

• Legal issues of cremains possession
<table>
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<th>Currently under Monitoring</th>
<th>No Longer being Monitored</th>
<th>Total Assigned to Texas to Date</th>
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<tr>
<td>Low Risk</td>
<td>High/Some Risk</td>
<td>Number Transferred Out of State</td>
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<tr>
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Data as of 04/05/2015
# Interim Guidance for Hospital Preparedness for Evaluation, Testing, and Management of Patients under Investigation or with Confirmed Ebola Virus Disease (EVD)

## Persons under active monitoring who develop signs or symptoms compatible with Ebola Virus Disease

1. Contact relevant state or local public health authority.
2. Refer for evaluation and possible testing (based on the state’s plan) to an Ebola Assessment Hospital or Ebola Treatment Center.

## Ebola Treatment Centers

- Care for and manage patient throughout disease process.
- Evaluate and care for patient for up to 96 hours or until discharged or transferred.
- Initiate Ebola testing and transport patient to Ebola treatment Center if lab-confirmed EVD.
- Staff trained and proficient in donning/doffing, proper waste management, infection control practices and specimen transport.
- Identify patients with relevant exposure history and Ebola-compatible symptoms.
- Isolate patients.
- Inform health department.
- Initiate testing if low risk; high risk should be transferred for evaluation and testing.
- Staff trained on specimen transport, waste management, Standard Precautions; proficient in donning/doffing.
- The use of PPE should be based on the patient’s clinical status.
- PPE for clinically stable patients should be sufficient for most patients.
- Maintain access to Ebola PPE sufficient for 12-24 hours of patient care, to be used if needed.

## Ebola Assessment Hospitals

- Maintain Ebola PPE sufficient for at least 7 days of patient care.
- The use of PPE should be based on the patient’s clinical status.
- Maintain Ebola PPE sufficient for 4-5 days of patient care.

## Frontline Healthcare Facilities

- The use of PPE should be based on the patient’s clinical status.
- PPE for clinically stable patients should be sufficient for most patients.
- Maintain access to Ebola PPE sufficient for 12-24 hours of patient care, to be used if needed.
Next Steps

• Ongoing Traveler Monitoring
• Public Health Capacity and Coordination
• Healthcare Systems Concept of Operations (CONOPS)
• Hospital Readiness and Capabilities
  o Planning, Training, Exercises, PPE
• Hospital Infrastructure
  o Infection Control, Patient Flow, Waste Management
• EMS and 911 Systems Preparedness
Conclusion

• Ebola posed unique challenges
• Lessons and practices inform future responses
• What we knew October 2014 is changing
  o Numerous protocols now exist
  o Expanded planning, training, and exercise activities
• Core public health practices were effective in controlling the spread of Ebola Virus in the U.S.
• More information:
  o Centers for Disease Control and Prevention, www.cdc.gov/vhf/ebola/
  o Texas Department of State Health Services, www.texasebola.org
  o Texas Infectious Disease Readiness, http://txidr.org/