Hospital Ebola and Other Emerging Infectious Disease Preparations
Perspectives from the Region IX Ebola Treatment Center

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Overview

• **Part One: About Cedars-Sinai**
  – Who we are
  – Responsibilities as a Regional Ebola Treatment Center

• **Part Two: About our Preparations**
  – Organizational Structure and Treatment areas
  – Laboratory and Waste Capacity
  – Team, Training, and Drills
  – Communications

• **Part Three: Next Steps**
Part One: About Us
Cedars-Sinai

- 886-bed tertiary care, academic, community not-for-profit medical center in Los Angeles
- >49,000 admissions and 630,000 outpatient visits per year
- More than 10,200 full-time employees
  - 2,100 physicians on medical staff
  - 400 faculty
- >500 residents and fellows in graduate medical programs, with fellowships in 80 specialties and subspecialties
- Ranks among the nation’s top independent hospitals in National Institutes of Health (NIH) funding
- Magnet Excellence in Nursing designation four consecutive times by the American Nurses Credentialing Center
CDC Tiered Approach

Interim Guidance for Hospital Preparedness for Evaluation, Testing, and Management of Patients under Investigation or with ConfirmedEbola Virus Disease (EVD)

**Capabilities**
- 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 history4 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 status5
- PPE for clinically stable patients3 should be sufficient for most patients
- Maintain access to Ebola PPE2 sufficient for 12-24 hours of patient care, to be used if needed

**PPE Needs**
- Maintain Ebola PPE3 sufficient for at least 7 days of patient care
- The use of PPE should be based on the patient’s clinical status5
- Maintain Ebola PPE2 sufficient for 4-5 days of patient care

**Ebola Treatment Centers**
- Persons under active monitoring who develop signs or symptoms compatible with Ebola Virus Disease
- Contact relevant state or local public health authority
- Refer for evaluation and possible testing (based on the state’s plan) to an Ebola Assessment Hospital or Ebola Treatment Center4

**Ebola Assessment Hospitals**

**Frontline Healthcare Facilities**

[Diagram with flowchart and details]

Regional Special Pathogens Center: Key Responsibilities

• Be prepared to receive a patient within 8 hours of notification
• Capacity to care for 2 simultaneous patients (including 1 child)
• Maintain a trained response team
• Maintain adequate supplies of personal protective equipment (PPE)
• Capacity to handle a high volume of infectious waste
• Annual NETEC onsite assessment
National Collaboration: National Ebola Training & Education Center (NETEC)

• Members from all 10 regional treatment centers
• Networking, collaboration, and sharing of best practices (regular meetings, points of contact)
• National resource for training and education
• Advocacy & Research
  – e.g. Experimental therapeutics (Zmapp)
Learning from Others
Hospital Preparedness

- Nursing
- Physicians (Critical care, ID, pediatrics)
- Infection Prevention
- Environmental Safety
- Emergency Department
- ICU Staff
- Disaster Management
- Communications
- Laboratory
- Imaging
- Employee Health
- Behavioral health/ Crisis Management
- Bioethics
- Respiratory therapists
- Environmental Services
- Security
- Human Resources
- EIS
- Others ...

Domains of Preparedness

1. Pre-Hospital, EMS, ED
2. Staffing of patient care teams
3. Patient transport
4. Patient Placement
5. PPE Donning/Doffing
6. HCW Monitoring and exposures
7. Lab safety and capacity
8. Environmental Infection Control and Equipment reprocessing
9. Waste Management
10. Communications
11. Management of Deceased
12. Special Populations
Clinical Management of Ebola Virus Disease in the United States and Europe

- Review of all patients who received care for Ebola in US/Europe
- 27 patients; median age 36
- Median hospitalization 20d (survivors)
- 85% received investigation therapy
- Mortality 18.5%

- Take Away for Ebola Treatment Centers:
  - Long hospitalization
  - Be prepared to use investigational agents
  - High quality care can improve outcomes

Uyeki TM et al, NEJM 2016; 374: 636-46
Collaboration

• Planning with LA County Public Health and EMS Agency
• Patient transport
  – California Mutual Aid Region I – Orange, Los Angeles, Ventura, Santa Barbara & San Luis Obispo counties
  – Mutual Aid Region II – San Diego, Riverside, Imperial, San Bernardino, Inyo & Mono counties
    • (Region I providers may be requested under Mutual Aid)
• Treatment and Assessment Center workgroup
  – Cedars-Sinai, UCLA, Kaiser Permanente Los Angeles, Children’s Hospital LA
Part Two: About Our Preparations

Preparing for the *next* threat, not the last threat
Cedars-Sinai Special Pathogens Program

• Special Pathogens Program Coordinator
• Special Pathogens Clinical Education Coordinator

• SPRT Task Force
  – Safety/Disaster Management, Epidemiology, Nursing Resources, Critical Care MDs, Communications, Human Resources, Simulation Center, Laboratory, Crisis Management, EVS, Pediatrics, ED, Patient Safety, EHS

• SPRT Volunteer Clinical Response Team
  – Nurses, physicians (critical care, ID, pediatrics, OB), respiratory therapy, EVS
  – Quarterly training
  – Quarterly drills
US Ebola Cases

• Cases diagnosed in US (2014)
  – Sep 30 – died (Dallas)
  – Oct 10 – survived (NIH)
  – Oct 15 – survived (Emory)
  – Oct 23 – survived (Bellevue)

• Cases transferred to US for treatment (2014)
  – Aug 2 – survived (Emory)
  – Aug 2 – survived (Emory)
  – Sep 5 – survived (Nebraska)
  – Sep 9 – survived (Emory)
  – Oct 6 – survived (Nebraska)
  – Nov 15 – died (Nebraska)
CS Ebola Organizational Response

Ebola Preparedness Leadership Team

- Legal & Regulatory
- Education & Training
- Environment & Lab
- Communication
- ED/Urgent Care
- Dedicated Treatment Unit
- Clinical Policy & Implementation
- Access Points & Early Detection
- Human Resources
- Clinical Documentation
Early Detection

IF you have recently traveled out of the U.S.

OR had close contact with someone who recently traveled out of the U.S. and is ill...

AND now you have: fever, cough, trouble breathing, rash, vomiting or diarrhea

PLEASE TELL STAFF IMMEDIATELY
CS Link (Epic) Screening Tool

Answering yes to either of the first two questions AND either of the second two questions will trigger Best Practice Alert
Hospital Activation Plan

• Electronic notification to leadership and clinical response team
  – Text, phone calls, emails (repeat until answered)

• Open Hospital Command Center

• Prepare treatment unit

• Conduct just-in-time PPE training for response team
Hospital Command Center objectives

- Communication
  - Staff, medical staff, patients, visitors, media
  - Partner agencies notifications (public health, EMS, sanitation, etc.)
- Staffing plan
- Unit setup
  - Moving existing patients off unit
- Security coordination
- Hazardous materials response (spills in public areas)
- Logistics
  - Assess current inventory and possible additional needs

Security Cameras ➔ News feed ➔ Communications
Treatment Areas

- Ambulance bay to accept EMS ground transport
  - Secured, private bay
  - Separate from ED ambulance bay
  - Direct and controlled access to medical ICU

- Emergency Department
  - Dedicated ED room
  - Direct and controlled access to medical ICU

- Medical ICU
  - Negative pressure isolation
  - Large anteroom
  - Secured access
Patient Care Area: Medical ICU

- Negative pressure room with bathroom and large anteroom and
- Patient care room
- POC lab (neighboring room)
- No patient transport outside room
- Designated areas for
  - Donning PPE
  - Doffing PPE
  - Safety monitor
  - Staff shower
  - PAPR Reprocessing
Medical ICU

HCW Roles:

- Bedside HCW
- "Buddy" HCW
- Trained observer
- Safety Monitor
- Tasker
- Support staff
- Waste transporter
- Lab technician
- Lab “buddy”
Patient Care Room
POC Laboratory (Neighboring Patient Room)

- Class 2 Biosafety cabinet setup in adjacent room
- Lab techs will work in pairs (both in full PPE)
- Specimen handoff protocols
- Category A Specimen packaging
- No labs performed in main laboratory
## Point-of-Care Lab Capabilities

<table>
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<tr>
<th>Instrument</th>
<th>Tests</th>
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<tr>
<td><strong>Piccolo Express</strong></td>
<td><strong>Chemistries</strong></td>
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<td><strong>Alere BionaxNOW</strong></td>
<td>Malarial Screen</td>
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<td>Malaria Detection</td>
<td>Sensitivity 99.7%</td>
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<td>Detects all 4 Vivax sp.</td>
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<td>Differentiates falciparum form others</td>
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<td><strong>Sysmex pocH-100i Hematology</strong></td>
<td>WBC</td>
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<td>Analyzer</td>
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<td>MCV</td>
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<td><strong>Urinalysis Dipstick</strong></td>
<td>Glucose</td>
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<td>Specific Gravity Blood</td>
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<td>Citrated Prottime with INR</td>
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<td>Citrated APTT</td>
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<td>Rapid ID of Influenza A and B</td>
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Waste Management

• Waste Streams
  – EMS/Ambulance waste
  – ED
  – Treatment area (ICU)

• Liquid waste
  – Pretreatment with disinfectant prior to flush
  – Protocol approved by LA City Sanitation
  – Toilet, sink, dialysate

• Solid waste
  – EVS transport plan and dedicated pathway
  – Two large-capacity onsite autoclaves
  – Contracted third party waste transport vendor (backup)
2.1 Waste Transportation Inc. Soiled Linen/Sharps - Daily

**Start Process**
- Purell
- Start Donning Process
  - Put on a Coverall
- Put on a N95 Mask
- Wear safety Goggles
- Put on head cover and gloves

**Fully Donned**
- Report with Gondola to pick up point
- Open lid to receive deposit
- Close lid after deposit
- Sanitize Exterior with Clorox Wipes

**Transport via designated route**
- SCCT 2i through Pi to South Twr
- So Twr Freight Elevator

**Destination:**
- Hand off to AGVS Staff

**Repeat Process**
2.4 Transportation of Waste; Map Path (7SCCT-Dock)
Personal Protective Equipment

- Note: We do not endorse any of these products. Brands are provided to help determine desirable features/specifications.
- PAPR: ILC Dover Sentinel HP with Clear Hood, HEPA filters. Options for rechargeable or D-cell batteries.
- Coverall: Viroguard 2
- Cooling Vest: TechKewl Phase Change Cooling Vest
- Apron: Tidi products 10403
- Gloves: CS Pro Gloves (16”) and chemo gloves
- Shoe Covers
- Surgical Cap

- Consider all applicable requirements for PPE selections, such as ASTM F1670 & 1671.
Special Pathogens Response Team

• Membership is voluntary

• Willing and able to work in full PPE for up to 4 consecutive hours

• Able to work in teams and accept constructive feedback

• Commit to participate in training and drills
  – Initial training session (once)
  – Ongoing training (quarterly)
  – Must participate in one drill/year

• Team members by role:
  – Nurses (ED, ICU, Med/Surg, Pediatric ICU/NICU)
  – Physicians (critical care, ID, Pediatrics, Obstetrics)
  – Respiratory therapists
  – Clinical Lab Scientists
  – Environmental Service Supervisors
Special Pathogen Response Team: Principles for Staffing Model

- Staffing scenarios developed for 1 or 2 patients
  - 1 patient: 5:1 RN to patient ratio
  - 2 patients: 8:1 RN patient ratio

- Staff rotate roles every 4 hours
  - Bedside RN, doffing assistant, trained observer, tasker, support staff

- Safety monitor always present

- 12 hour shifts; no more than 4 consecutive hours in full PPE

- No more than 3-4 shifts/week

- Pediatric RN always at bedside for pediatric patient

- CS to provide all clothes under PPE (disposable scrubs, shoes)

- Employee Assistance Program and HR involved in task force
Doffing PPE: A Risk Factor

- Regular training in PPE donning/doffing is essential
- Always use a doffing partner and trained observer
- Never rush

Tomas ME et al, JAMA Int Med 2015; 175: 1904-10
SPRT Training Plan

• **Initial Training (4 hours):**
  – Region 9 Treatment Center responsibilities
  – Infection Control practices
  – Roles and responsibilities of team members
  – Introduction to PPE
  – Patient transport and handoff
  – Post-exposure monitoring

• **Refresher Training (~2 hours):**
  – Briefing on selected protocols or relevant topics
  – Don PPE
  – Practice a skill selected by the instructor
  – Practice a skill selected by participants
  – Doff PPE

• **Bi-Annual Skills Fair**
Training

• Clinical Simulation Lab

• Practice clinical skills in full PPE
  – IV placement
  – Central line placement
  – Intubation
  – Spill management

• Fluorescent dye markers provide direct HCW feedback
California Region I High Risk Ambulance Project

- 8 Units (available for mutual aid requests)
  - LFA 101 - Care - Santa Fe Springs, (Los Angeles County)
  - LFA 102 - Care - Orange (Orange County)
  - LFA 103 - McCormick - Compton (Los Angeles County)
  - LFA 104 - McCormick - Compton (Los Angeles County)
  - LFA 105 - AMR - Santa Clara (Los Angeles County)
  - LFA 105 - AMR - Ventura County

- Dispatched through county EMS agencies
  - Approximately 60 minute personnel PPE muster time

- Unique Features:
  - Driver and patient compartment separated with steel bulkhead, welded and gasketed
  - Patient compartment has negative pressure
  - Separate high capacity air conditioning units for driver and patient compartment – will keep personnel in Level C decontamination PPE (PAPR/PPE) comfortable
  - HEPA filters with UV light disinfection in patient compartment air conditioning and exhaust
  - Tablet mount for receiving facility to monitor patient team by video
  - Intercom and patient status lights to communicate between driver and patient compartment
  - Medical decontamination system for patient access
  - Molded seats for easy decontamination
  - No shelves/cabinets for easy decontamination – medical equipment will be brought in bags
  - May be utilized for treatment transport teams as well as evaluation teams
  - Compatible with biologics isolation system

- Portable UV light disinfection system and disinfection available for post-decontamination

- Purchased with Los Angeles/Long Beach LASH Homeland Security Grant Funds to transport potential or confirmed highly infectious or contaminated patients
Drills

- Performed quarterly
- Invaluable tool to identify weaknesses (and creative solutions)
  - Also a recruitment strategy
- Often involve external partners
  - EMS
  - Local health department
- Debrief and After-Action report
- Mistakes are ok (as long as we continually improve)
Drill Photos: EMS Participation
Drill Photos: Patient Transport
Drills

Central line placement
Use of Telemedicine Equipment

- Remote AV Communication capabilities
- Digital stethoscope
- Portable ultrasound
- HIPAA compliant
Tranquil Terminus
Objectives for Cedars-Sinai:
• Activate Command Center
• Perform Just-In-Time training
• Activate Rapid IRB
• Receive 2 patients via ground transport from EMS
Tranquil Terminus (cont.)
Drills: Examples of Lessons Learned

“Life is trying things to see if they work.” – Ray Bradbury

• Value of including external partners (EMS, public health lab)

• Importance of team work and communication
  – Write HCW roles on PPE
  – Educate to explicit roles and responsibilities

• Early and regular family communication
  – Identify family point-of-contact, engage Social Work

• Importance of involving security

• Smaller drills just as useful as full-scale drills

• Don’t be afraid to try new things (try different locations, manage unexpected events in real time, be flexible)
What the Special Pathogens Response Team is About ...

- Commitment to provide safe and high-quality care to patients who need it the most
- Protecting our staff
- Multi-disciplinary teamwork
- Problem-solving solutions to unique challenges
Electronic Healthcare Worker Symptom Monitoring
Purpose:
– Team-building
– Informational
– Recruitment

Sections:
– In The News
– Policy and Protocol Updates
– Upcoming Training and Drills
– Welcome New Members
– Training Tidbit
– Recruitment statement

Special Pathogens Response Team Newsletter

In the News

New MERS outbreak in a Saudi Arabian hospital. Ten people (including two healthcare workers) were diagnosed with Middle Eastern Respiratory Syndrome (MERS) in March 2017, associated with transmission in a hemodialysis unit. No deaths have been reported and two people were asymptomatic. MERS is a coronavirus (related to SARS) and has been associated with several hospital outbreaks in the Middle East and South Korea since it was first described in 2012. [Article](http://www.reuters.com/article/us-health-mers-rU5KB17060K)

H7N9 Avian influenza activity in China. Seventeen new human H7N9 cases have been identified in China in March. Nearly all had direct exposure to poultry. To date, more than 500 human cases have been related to 179 deaths since October 2016. Many authorities are concerned H7N9 has the potential to cause a human pandemic. However, to date, nearly all infections follow direct poultry exposure and sustained human-to-human transmission of H7N9 has not been observed. [Article](http://www.cdc.gov/ncidod/drl/pandemic-resources/2017/03/china-reports-17-h7n9-cases-fast-disease-progression-noted)

Crimean-Congo Hemorrhagic Fever strikes Oman. Nine cases, including 3 deaths, of CCHF have occurred in Oman. CCHF is a tick-borne viral illness with mortality rates as high as 40 percent. Typically, more than 2,000 cases are described annually in Eastern Europe and Asia, most through tick bites. However, the infection can be spread person-to-person through blood/ bodily fluid exposure and healthcare workers have been infected in several hospital outbreaks. [Article](http://timesofoman.com/article/105061/oman/three-dead-as-crimean-congo-fever-spike-in-oman)
Communications

- Communications plays an essential role in Special Pathogen readiness

- Internal Communication Plan
  - Drills are highlighted in regular employee communications
  - In the event of activation, templates developed for:
    - Staff information and FAQs
    - Patient/Visitor handouts

- External Communication Plan
  - Invite external media to drill events
  - Templates developed in the event of activation
Part Three: About the Future
Situation Report – Highly Communicable Diseases

- Pneumonic Plague (Madagascar)
- Monkeypox (Nigeria)
- Marburg (Uganda)
- MERS* (Arabian Peninsula)
- Influenza H7N9 (China)

*Middle East Respiratory Syndrome
Emerging Respiratory Illness Preparation

- Engage Emergency Department in MERS readiness
- Identify, Isolate, Inform
- Regular unannounced “walk-in” drills for triage staff
- Emphasize the importance of a recent travel history in patients presenting with acute febrile illness
- Challenge is teaching more to principles, less to specific pathogens
Integrating Lessons Learned into Everyday Care

Our long-term vision:

• Leverage Special Pathogens Response Team members to serve as unit resource

• Reinforce basic principles of infection prevention

• Maintain awareness of emerging infectious disease threats
Benefits of Serving as the Region IX Treatment Center

• Developing a team of experts to safely handle the next emerging threat

• Providing service to the community

• Strengthening relationships with local and regional agencies

• Serving as a regional resource

• Contributing to national preparedness efforts
What if a Suspected Ebola (or Other Highly Infectious Patient) Arrives at my Hospital?

• Screen for travel history
• Notify hospital epidemiology/infectious diseases
• Notify local public health
• Consider testing or transfer
• You must have a plan
  – Stabilization of the patient
  – PPE supply
  – Specimen transport
  – Waste management
  – Communications plan
  – Employee monitoring
• It will take time to transfer the patient
How Patient Transfer Works

Hospital receives patient

Hospital notifies local public health

Patient is suspected/confirmed with highly infectious pathogen

If no capacity, CDPH contacts HHS ASPR

State assessment/treatment centers polled for availability

Local public health contacts CDPH and/or MHOAC

*Regional treatment centers polled for availability

Patient transfer plan initiated (ground vs air)

*Pathogen must be confirmed for regional treatment center activation
Questions?
Thank you!
Thank you!

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