MERS-Coronavirus (CoV) Update

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Outline

- Coronavirus and novel coronavirus background
- Overview of cases and clusters
- Recent MERS-related developments in TX and US
- CDC guidance updates
- Investigating novel coronaviruses
- Texas guidance updates
Coronavirus and Novel Coronavirus Background
What are coronaviruses?

- Common viruses that cause mild to moderate respiratory illness
  - Symptoms may include runny nose, cough, sore throat, and fever
  - Can sometimes cause lower-respiratory tract illnesses

- 6 human coronaviruses have been identified so far
  - 4 “seasonal” coronaviruses
  - SARS-CoV
  - MERS-CoV

- SARS-CoV and MERS-CoV can infect humans and some animal species

- No vaccine or specific antiviral treatment
What is a novel coronavirus?

- A newly identified coronavirus causing infection in humans

- Concerns:
  - Pandemic potential
  - Severity of illness
  - Economic impact
SARS

- Severe Acute Respiratory Syndrome
- November 2002 – July 2003
- Originated in China; zoonotic origin
- Worldwide there were 8,098 reported cases of SARS and 774 (9.6%) deaths in 26 countries
- 8 lab confirmed cases, 19 probable cases, and 0 deaths in the United States
- No known cases since 2004

www.cdc.gov/mmwr/preview/mmwrhtml/mm5218a1.htm
MERS

- Middle Eastern Respiratory Syndrome Coronavirus
  - aka EMC-CoV or nCoV
- First known onset: March or April 2012
- Total cases*: 837
- Total deaths*: 291 (34.8%)
- Arabian Peninsula and neighboring countries reporting cases: 9
- Countries with travel-associated cases: 11

Overview of Cases and Clusters
What is going on?

- **Origin / exposures**
  - Countries in/near Arabian Peninsula
  - “Camels are a likely primary source of the MERS-CoV that is infecting humans” (WHO 6/2014)
    - “The current pattern of disease appears to be the result of repeated introductions of the virus from camels to people”
- **Incubation period: 2-14 days**
- **Asymptomatic cases identified**
  - Healthcare workers and children
- **Human-to-human spread**
  - Clear but limited
  - Clusters in households and healthcare settings
Epidemic Curve of MERS-CoV Cases (n=699*)
(as of 6/9/14)

*Does not include 113 cases announced on Saudi MOH website on 3 June as these cases are currently undergoing verification; http://www.who.int/csr/disease/coronavirus_infections/MERS-CoV_summary_update_20140611.pdf?ua=1
Overview of cases (as of 6/9/14)

- Median age: 47 years (range: 9 months to 94 years)
- 63.5% male
- Primary cases are on average older and a larger percentage of them are men than secondary cases
- Many cases have underlying health conditions
- Many cases are in healthcare workers
  - About 60% of recent HCW cases had mild illness or were asymptomatic
- All cases have direct or indirect links to countries in/near the Arabian Peninsula
- Transmission patterns have not changed:
  - Secondary cases still tend to be milder than primary cases
  - No sustained human-to-human transmission
  - Very few instances of household transmission for recent cases
  - No increase in the size or number of observed household clusters
Clusters

- **Household/family/close contact clusters:**
  - Saudi Arabia (many clusters), UK, Tunisia, Italy, United Arab Emirates (UAE), Iran, Netherlands

- **Healthcare settings**
  - Jordan (Apr 2012) – 2 conf, 11 prob cases (10 were HCWs)
  - France – hospital roommates (2)
  - Saudi Arabia
    - Multiple small healthcare clusters
    - Larger hospital-associated clusters in Jeddah and other locations in February to April 2014
  - UAE
    - Multiple small healthcare clusters
    - Hospital cluster in Abu Dhabi (28 cases) in April 2014

Why so many recent cases?

- “The WHO missions to KSA and UAE found that the upsurge in cases in both countries was explained by several hospital-related outbreaks that resulted from a lack of systematic implementation of infection prevention and control measures”
- “…most of the cases recently reported from KSA reflect infection acquired through human-to-human transmission in health care settings”
  - Most cases initially classified as primary in fact had contact with confirmed cases or were in healthcare facilities where MERS patients were treated
  - “...A number of the recently reported asymptomatic cases, have subsequently developed mild symptoms”
  - Role of asymptomatic PCR positive persons in transmission?

http://www.who.int/csr/disease/coronavirus_infections/MERS-CoV_summary_update_20140611.pdf?ua=1
Recent MERS-Related Developments: US and TX
US First Confirmed Case

- Indiana case
  - US citizen; HCW in Saudi Arabia hospital where MERS patients were treated
  - Timeline
    - April 18: developed low-grade fever
    - April 24: began travel to US from Saudi Arabia
    - April 27: increasing fever, runny nose, cough, SOB
    - April 28: hospitalized
    - May 2: tested positive for MERS-CoV by PCR
    - May 9: patient discharged from hospital; fully recovered and PCR negative
  - No positive contacts
    - Asymptomatic Illinois resident who had contact with Indiana case was initially reported positive via serology testing on May 16 (PCR negative for active infection), but a more definitive test contradicted this result
US Second Confirmed Case

- Florida
  - HCW from Saudi Arabia
  - Timeline
    - May 1: began travel to US from Saudi Arabia; symptoms began (muscle aches, fever, chills, slight cough)
    - May 9: hospitalized
    - May 11: tested positive for MERS-CoV by PCR
    - May 18: patient discharged from hospital; fully recovered and PCR negative
  - No positive contacts
  - Not related to first US confirmed case
## Conveyance Contact Investigations – May and June 2014, Texas

<table>
<thead>
<tr>
<th></th>
<th>TX Contacts associated with 1st MERS Case in US</th>
<th>TX Contacts Associated with 2nd MERS Case in US</th>
<th>Total Number of Contacts for both US MERS Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Original Number of Contacts</td>
<td>6</td>
<td>16</td>
<td>22</td>
</tr>
<tr>
<td>Final Number of Contacts</td>
<td>5</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>Number of questionnaires</td>
<td>5</td>
<td>14</td>
<td>19</td>
</tr>
<tr>
<td>Number of questionnaires</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>collected</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td># of specimens collected</td>
<td>3</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td># of specimens tested</td>
<td>3</td>
<td>9</td>
<td>12</td>
</tr>
<tr>
<td>MERS Lab Results</td>
<td>All specimens negative</td>
<td>All specimens negative</td>
<td>All specimens negative</td>
</tr>
</tbody>
</table>

All specimens negative
### Texas MERS PUIs – May to July 2014

<table>
<thead>
<tr>
<th></th>
<th>Number of persons (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reported suspected MERS cases</td>
<td>28</td>
</tr>
<tr>
<td>Met PUI Case Definition</td>
<td>16</td>
</tr>
<tr>
<td>Median Age in years (range)</td>
<td>39.5 (3 – 82 years)</td>
</tr>
<tr>
<td>Age Category (Years)</td>
<td></td>
</tr>
<tr>
<td>0-4</td>
<td>5 (31.3%)</td>
</tr>
<tr>
<td>5-24</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>25-34</td>
<td>2 (12.5%)</td>
</tr>
<tr>
<td>35-44</td>
<td>2 (12.5%)</td>
</tr>
<tr>
<td>45-54</td>
<td>5 (31.3%)</td>
</tr>
<tr>
<td>55-64</td>
<td>0 (0.0%)</td>
</tr>
<tr>
<td>65+</td>
<td>2 (12.5%)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>11 (68.8%)</td>
</tr>
<tr>
<td>Female</td>
<td>5 (31.2%)</td>
</tr>
</tbody>
</table>
CDC Guidance Updates
PUI Case Definition Changes

- Epi-X posting (7/17/14): Updated CDC Interim Guidance for Health Professionals for MERS-CoV and Case Definitions

- Changes to Patient Under Investigation (PUI) case definition:
  - “Fever” now with no specified temperature threshold
  - Healthcare facility addition:
    - Fever AND symptoms of respiratory illness (not necessarily pneumonia; e.g., cough, shortness of breath) AND being in a healthcare facility (as a patient, worker, or visitor) within 14 days before symptom onset in a country in or near the Arabian Peninsula in which recent healthcare-associated cases of MERS have been identified. (As of June 1, 2014, this list includes Jordan, Saudi Arabia, and UAE.)
  - “Palestinian territories” became “the West Bank, and Gaza”
A person with the following characteristics should be considered a patient under investigation (PUI):

- **A. Fever AND pneumonia or acute respiratory distress syndrome (based on clinical or radiological evidence) AND EITHER:**
  - a history of travel from countries in or near the Arabian Peninsula within 14 days before symptom onset, OR
  - close contact with a symptomatic traveler who developed fever and acute respiratory illness (not necessarily pneumonia) within 14 days after traveling from countries in or near the Arabian Peninsula, OR
  - a member of a cluster of patients with severe acute respiratory illness (e.g., fever and pneumonia requiring hospitalization) of unknown etiology in which MERS-CoV is being evaluated, in consultation with state and local health departments.

- **OR**
  - **B. Fever AND symptoms of respiratory illness (not necessarily pneumonia; e.g. cough, shortness of breath) AND being in a healthcare facility (as a patient, worker, or visitor) within 14 days before symptom onset in a country or territory in or near the Arabian Peninsula in which recent healthcare-associated cases of MERS have been identified.**
The new definition is much more specific

- Close contact is defined as:
  - a) being within approximately **6 feet (2 meters)** or **within the room or care area for a prolonged period of time** (e.g., healthcare personnel, household members) while **not wearing recommended PPE** (i.e., gowns, gloves, respirator, eye protection); OR
  - b) having **direct contact with infectious secretions** (e.g., being coughed on) while **not wearing recommended PPE** (i.e., gowns, gloves, respirator, eye protection).

Close Contacts: Testing, etc.

- Close contacts of a **confirmed case**
  - Symptomatic close contacts **should** be evaluated for MERS-CoV
  - Community and conveyance contacts **may** be evaluated
  - Symptomatic contacts should be considered for testing, possibly including serological testing

- Close contacts of a **PUI**
  - Clinicians should consult with public health
  - Self-monitor for symptoms for 14 days
More on close contacts

- Close contacts who are ill and do not require hospitalization for medical reasons while being evaluated for MERS-CoV infection may be cared for and isolated in their home.

- For asymptomatic close contacts:
  - For those under evaluation for MERS-CoV, the possible benefit of home quarantine or other measures, such as wearing masks, is uncertain.
  - Those who test positive by PCR (especially on respiratory specimens or serum), likely pose a risk for transmission.

- Home isolation, home quarantine, or other measures for close contacts (and criteria for discontinuing such measures) should be discussed with the health department.
Investigating Novel Coronaviruses
Investigation Steps: PUI Determination, Infection Control, Notification

- Determine why MERS-CoV is suspected
  - Does the person meet criteria for a Patient Under Investigation (PUI)?

- If PUI criteria are met (or if suspicion is otherwise warranted), continue investigation

- Ensure appropriate infection prevention measures are in place
  - Standard, contact, and airborne precautions are recommended for known or suspected MERS-CoV hospitalized patients

- Notify DSHS as soon as possible
  - LHD → Regional office → EAIDB (Austin)
Investigation Steps: Form

- Complete PUI “short form” on anyone who meets PUI definition
  - Obtain from DSHS website* or EAIDB
  - Form includes:
    - Public health and medical contact information
    - Patient demographics
    - Risk factors/how patient meets criteria for PUI
    - Clinical presentation and outcomes
    - Infection control questions
    - Laboratory testing
  - Fax completed short form to DSHS as soon as possible
  - CDC EOC also needs to be informed (fax 770-488-7107 )

*Coming soon
Investigation Steps: Specimens

- Collect appropriate specimens and submit to an approved public health laboratory for testing
  - Lower respiratory specimens preferred!!
  - Also collect NP / OP swabs, serum, and stool
  - Complete DSHS G-2V Lab Submission Form (Form recently updated!)
    - Under Section 4. Virology, check the box for “MERS Coronavirus (Novel coronavirus)”
Investigation Steps: PUI contacts, etc.

- Close contacts of a PUI
  - Asymptomatic close contacts
    - Self-monitoring for fever and respiratory illness
    - Seek medical attention if symptomatic within 14 days after last contact
  - Symptomatic close contacts
    - Do these persons meet PUI? If yes, then test
    - “Healthcare providers should consider the possibility of MERS in these contacts”
    - Not required to be hospitalized (unless medically necessary)

- Be aware of any possible increases in ILI or SARI and investigate

- Be prepared for the case to be confirmed

What happens if confirmed?

- Expect intensive CDC and media interest
- Longer investigation form will likely be provided
- Home isolation for confirmed case-patient (if not hospitalized)
- Contact investigations
  - Monitoring
  - Testing
  - Isolation or quarantine, as needed
  - Tracking form available at [https://www.dshs.state.tx.us/idcu/investigation/](https://www.dshs.state.tx.us/idcu/investigation/)
- Repeat testing of confirmed cases after recovery
Close Contacts of a Confirmed Case

- Actively monitor close contacts for at least 14 days from last exposure

- Symptomatic close contacts:
  - Evaluate and test (Note: Not all infections result in severe illness)
  - Unless hospitalization is medically necessary, isolate at home if the setting is suitable (http://www.cdc.gov/coronavirus/mers/hcp/home-care.html)

- Asymptomatic close contacts:
  - MERS-CoV PCR positive contacts probably pose a risk of transmission
  - Quarantine? Consult with local or state health department

- Conveyance and community contacts may be considered for evaluation

Texas Guidance Updates
Laboratory Testing

- These Texas public health labs can test for MERS-CoV (as of 8/6/14):
  - DSHS Austin
    - All counties may send specimens
  - Dallas Laboratory Response Network (LRN) lab
    - Counties in the Dallas LRN service area may send specimens:
      - Collin, Dallas, Ellis, Fannin, Grayson, Hunt, Kaufman, Navarro, and Rockwall counties
  - Houston LRN lab
    - Counties in the Houston LRN service area may send specimens:
      - Austin, Brazoria, Chambers, Colorado, Fort Bend, Galveston, Hardin, Harris, Jefferson, Liberty, Matagorda, Montgomery, Orange, San Jacinto, Walker, Waller, and Wharton counties

- Clinicians should contact their LHD or DSHS first, not the lab
  - In general, patients must meet PUI criteria for testing to be approved
  - Testing requires epidemiology approval

LRN service areas: https://www.dshs.state.tx.us/lab/eprLRNcontact.shtm
PUI Case Report Form

- CDC updated their form on 7/23/14
- The DSHS form is different from the CDC form (DSHS form update in August 2014)

- What changed?
  - Updates to capture revised PUI case definition
  - Additional lab test fields available or reformatted
  - 2-page form

- Revised DSHS form coming soon to https://www.dshs.state.tx.us/idcu/investigation/
Guidance and Plans

- **Investigation Guidance – Adding “Novel Coronavirus” section:** [http://www.dshs.state.tx.us/idcu/health/infection_control/investigation-guidance/](http://www.dshs.state.tx.us/idcu/health/infection_control/investigation-guidance/)
  - Background
  - Case definitions
  - Investigation checklist
  - Outbreaks
  - Contact tracing
  - Control measures
  - Reporting requirements
  - Specimen submission

- Novel coronaviruses are also broadly included in the state’s updated ‘pandemic flu’ plan (still in draft form)
“Novel coronavirus” condition already available in NBS
  - Adding user defined fields at the bottom of the investigation page to capture:
    - Symptoms
    - HCW and healthcare facility exposure
    - Epidemiologic links
    - Other information necessary to determine PUI status

DSHS will enter PUIs (purpose: data and workload tracking)

Confirmed and probable cases, if identified, should be entered
Be Prepared

- Recent inquiries about having transport medium on hand in case of MERS-CoV PUIs
  - As usual, LHDs and DSHS regional offices should order a small supply of VTM for flu and ILI outbreaks

- Hajj pilgrimage to Mecca, Saudi Arabia is in early October – **expect more PUI calls**
  - CDC travel health alert on June 4
    - “Practice enhanced precautions”
    - No recommendations for change in travel plans
  - Avoid contact with sick camels and consumption of raw/undercooked camel products (WHO)
  - High-risk persons should talk to their doctors and possibly postpone travel (WHO and Saudi MoH)
HEALTH ADVISORY: MERS
Middle East Respiratory Syndrome
Were you in the Middle East recently?

• Watch for fever with cough or difficulty breathing.
• If you get sick within 14 days of leaving, call a doctor.
• Tell the doctor you traveled.

www.cdc.gov/travel

Questions?