Middle East Respiratory Syndrome Coronavirus (MERS-CoV)
Background

• What is Middle East respiratory syndrome (MERS)?
  – MERS is a coronavirus (named for the crown-like projections on the virus surface).
  – Coronaviruses are very common and usually cause colds and mild upper respiratory infections but can also cause severe illness like the 2003 SARS-CoV.
  – MERS is related to but is not the same as SARS.
  – First identified– late 2012 in Saudi Arabia

MERS virus - Image from CDC.gov
Signs and Symptoms of MERS

- Fever > 38C (100.4F)
- Cough
- Shortness of breath
- Malaise
- Vomiting
- Diarrhea
- Pneumonia

- Incubation period about 5.2 days but can range up to 14 days.
- Symptoms range from mild – severe.
- Mean age: 56
A Patient Under Investigation (PUI) is a person with:

- an acute respiratory infection, which may include fever (≥ 38°C, 100.4°F) and cough; AND
- suspicion of pulmonary parenchymal disease (e.g., pneumonia or acute respiratory distress syndrome based on clinical or radiological evidence of consolidation); AND
- history of travel from the Arabian Peninsula or neighboring countries* within 14 days; AND
- not already explained by any other infection or etiology, including all clinically indicated tests for community-acquired pneumonia** according to local management guidelines.

April 30, 2014
Most cases are either found in or linked to the eastern provinces of Saudi Arabia.

Countries considered in or near the Arabian Peninsula; Bahrain, Iraq, Iran, Israel, Jordan, Kuwait, Lebanon, Oman, Palestinian territories, Qatar, Saudi Arabia, Syria, the UAE and Yemen.

No cases in the United States to this point.
Most of the latest cases reported from the UAE are linked to a cluster in a hospital in Al Ain where 16 healthcare workers (including one case exposed in UAE and reported by the Philippines) have tested positive for MERS-CoV. All these cases are linked to a previously reported case, who died on 10 April 2014.
Other Countries Reporting Cases

<table>
<thead>
<tr>
<th>Reporting country</th>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saudi Arabia</td>
<td>272</td>
<td>81</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>42</td>
<td>9</td>
</tr>
<tr>
<td>Qatar</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Jordan</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Oman</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Kuwait</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Germany</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>France</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Italy</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Tunisia</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Malaysia</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Philippines</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Greece</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>345</strong></td>
<td><strong>107</strong></td>
</tr>
</tbody>
</table>
Figure 1. Distribution of confirmed cases of MERS-CoV by month of onset and symptom status, March 2012–23 April 2014 (n=345*)
Figure 3. Distribution of confirmed cases of MERS-CoV reported between 1 and 23 April 2014 by date and place of reporting (n=151)
Ongoing Concerns

- Exact route of transmission is still unclear.
- High attack-rate.
- No definitive treatment yet.
- Documented nosocomial transmission from patient to patient and from patient to healthcare workers.
- Few definitive lab tests and surveillance tools available

April 30, 2014
CDC Guidance

- State labs were sent materials to test for MERS virus from CDC.
- For inpatient suspected cases: airborne, droplet and contact precautions.
- Cases that meet the criteria for “patient under investigation” must be reported to the state and CDC.
- No travel restrictions or border screening have been announced at this time.
Quick Factoids

• Recent Infections are milder
• Mortality has been decreasing
• 75% of recent cases are in the health care setting
• 75% are secondary transmissions
• Only 2 cases known to be tertiary
  – Anecdotally more
• Season spike is expected
Johns Hopkins Institutions’ (CEPAR) Pandemic Stages

<table>
<thead>
<tr>
<th>Geographic Distribution</th>
<th>World</th>
<th>North America</th>
<th>Regional</th>
<th>JHI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Severity</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>Alert Stage</td>
<td>Alert Stage</td>
<td>Transitional Stage</td>
<td>Transitional Stage</td>
</tr>
<tr>
<td>Moderate</td>
<td>Alert Stage</td>
<td>Transitional Stage</td>
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<td>Moderate</td>
<td>Alert Stage</td>
<td>Transitional Stage</td>
<td>Transitional Stage</td>
<td>Transitional Stage</td>
</tr>
<tr>
<td>High</td>
<td>Transitional Stage</td>
<td>Transitional Stage</td>
<td>Critical Stage</td>
<td>Critical Stage</td>
</tr>
</tbody>
</table>

- **Low**
  - Low infectivity
  - Low morbidity
  - Low mortality

- **Moderate**
  - Low infectivity and high morbidity/high mortality OR

- **Moderate**
  - High infectivity and low morbidity/low mortality

- **High**
  - High infectivity
  - High morbidity/high mortality

- **World**
  - Confirmed human outbreak with sustained person-to-person transmission:
    - U.S. Stage 1-3
    - WHO Phase 4 or 5

- **North America**
  - First human cases in the U.S., Canada, Mexico:
    - U.S. Stage 4 or 5
    - WHO Phase 6

- **Regional**
  - Cases spread throughout MD, DC, DE, VA, WV, PA, NYC:
    - U.S. Stage 5 or 6
    - WHO Phase 6

- **JHI**
  - Cases within the JHHS or the University, including APL.
What is Hopkins Doing?

• We’ve been here before
  – Smallpox scare 2003
  – SARS
  – Avian Flu
  – H1N1
  – MERS CoV 2012, 2013

• Close Monitoring
• Heightened Awareness Communications
• Targeted Testing Expanded
• No Restriction in Travel (WHO, CDC)
  – Monitoring on return
Screening

• Fever, PNA, or ARDS
• Hx of travel from Arabian Peninsula <14 d
• Close contact with symptomatic traveler as above <14 d

Bahrain, Iraq, Iran, Israel, Jordan, Kuwait, Lebanon, Oman, Palestinian territories, Qatar, Saudi Arabia, Syria, the United Arab Emirates (UAE), and Yemen).
Reference Articles

- [http://www.cdc.gov/features/novelcoronavirus/](http://www.cdc.gov/features/novelcoronavirus/)