UPDATE ON INFECTIOUS DISEASES
2015

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2014
A **WILD** SUMMER

• Ebola

• Middle East Respiratory Syndrome (MERS)

• Chikungunya

• Enterovirus D68

• Measles at Disneyland

• Influenza A-H3N2 mutation
What happened to the emerging infections of 2014 in 2015?
Ebola

- Likely reservoir: Fruit bats
  Great apes
  Forest antelopes

- Humans likely infected via hunting/butchering animals
  Perhaps contact with bat saliva on partially eaten fruit, bat urine or droppings
Human – to – Human Transmission

Ebola virus is NOT spread by respiratory route

Patients become infectious to others when they become sick

Spread from intimate contact with body fluids or tissues of a sick person or a corpse
Two Primary Risk Groups for Transmission

- Healthcare workers: all who touch patients, soiled environment, funeral/burial workers
  - Caring for the sick
  - Preparation of loved one’s body for burial
  - Cultural bathing, touching of respect

- Family members
  - Caring for the sick
  - Preparation of loved one’s body for burial
  - Cultural bathing, touching of respect
Ebola: Current Status

Liberia: Second WHO declaration Ebola-free
Now in 90 day period of intense surveillance

Guinea: 3 cases last week
Continuing concern for missed cases

Sierra Leone: 1 case last week
More confidence nearing Ebola-free status
Ebola Successes

• Public health control efforts
  Strategy worked...but many implementation problems

• Scientific advances – all still investigational
  – **Point-of-care diagnostic test**
  – **Treatment**: supportive care
    - convalescent serum
    - monoclonal antibodies
  – **Vaccines**: Trials underway
    - Recombinant VSV-vectored vaccine
Post-Ebola Syndrome

Eyes: Pain behind eyes, sensitivity to light
Blurred vision – uveitis
Recovery of virus 9 weeks after clearance of virus from bloodstream

- Hearing loss
- Low back pain – sacroileitis
- Tendonitis – Achilles, paresthesias
- Easy fatigue
- Memory loss, word-finding difficulties
- Difficulty sleeping
- Psychological distress
- Risk of sexual transmission from males
  199 days after recovery - Liberia
- Orphans
Monitoring Travelers for Ebola returning from West Africa to the US

- Evaluation at embarkation in West Africa
- Airport screening on arrival in US
  - Risk categorization
  - Monitoring during 21-day incubation period
  - Movement restriction for those in selected risk categories
Monitoring Travelers Returning from West Africa for Ebola

Tennessee

Completed monitoring: 184
Currently monitoring: 4
Usual average at any one time: 3-6
Some Ebola Lessons

• Primary role of MSF and CDC
• WHO’s epidemic response capacity needs strengthening
• Fragile states/weak public health systems
• Community involvement is key
• The best public policy is informed by public health
• The “valley of death” is the gap between laboratory science and its clinical/public health evaluation
• Domestically, you cannot have too much good communication to the public
Middle East Respiratory Syndrome (MERS)  
MERS-coronavirus (MERS-CoV)

- Arabian Peninsula
  Saudi Arabia, UAR, Qatar, Oman, Jordan, Kuwait, Iran, Lebanon, Yemen

- Travel-associated to 19 countries
  2 to US in May, 2014, in FL and IN both were HCW in Saudi Arabia
  No spread in US

- Community reservoir: dromedary camels

- Much healthcare – associated transmission
MERS

• Pneumonic infection, \( \sim 30\% \) fatality rate

• Spread to South Korea (185 cases), China (1 case)
  Association with healthcare

• In US, obtain travel history from patients with respiratory illness and prompt isolation
MERS-CoV cases by reporting country

<table>
<thead>
<tr>
<th>Type</th>
<th>Number of cases</th>
<th>Place of exposure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Imported</td>
<td>1</td>
<td>Jordan</td>
</tr>
<tr>
<td>Local</td>
<td>10</td>
<td>Qatar</td>
</tr>
<tr>
<td>Local</td>
<td>100</td>
<td>Saudi Arabia</td>
</tr>
<tr>
<td>Local</td>
<td>100</td>
<td>South Korea</td>
</tr>
<tr>
<td>Local</td>
<td>100</td>
<td>United Arab Emirates</td>
</tr>
<tr>
<td>Local</td>
<td>100</td>
<td>Bahrain to Qatar</td>
</tr>
</tbody>
</table>

Numbers in the map indicate the total number of local and imported MERS-CoV cases.
Chikungunya Virus

- Mosquito-borne virus (Aedes)
- Name means “bent over”
- Illness: Severe joint and muscle pains (may persist) rash, fever
- Africa to Asia years ago
  Introduced into St. Martin, Caribbean, 2013
  Since spread widely
Chikungunya

• Travelers bring CHIK into US
  Florida: 11 locally-acquired cases

• **Travelers to TN**: 40 in 2014
  6 in 2015 (YTD)

• Keep US patients away from mosquitoes!
Enterovirus D68

- Enteric virus
  Identified in 1962, occurred rarely

- Unusual as it causes a respiratory illness associated with a rash

- Sudden large outbreak, summer 2014
  Essentially the entire country – TN spared
Enterovirus D68

- Affected children < 15 years

- Substantial number required transient hospital admission and ventilator use
Enterovirus D68

- Outbreak of subsequent flaccid paralysis (polio-like)
- No return this year!
Measles at Disneyland
Measles at Disneyland

- Although endemic measles transmission has been eliminated in the Western Hemisphere, outbreaks continue to occur.
- Because some US parents are withholding their children from measles vaccine.
- Measles still exists in much of the world and can be brought into the US – often by unvaccinated US children who bring it home after travel abroad.
Measles

- Measles is not trivial
- Recent US cases: 25% hospitalized
- Complications – otitis, pneumonia, diarrhea, encephalitis
U.S. Multi-state Measles Outbreak
December 28, 2014 - April 24, 2015

From December 28 to April 24, 2015, 147 people from 7 states [AZ (7), CA (131), CO (1), NE (2), OR (1), UT (3), WA (2)] were reported to have measles and are considered to be part of a large outbreak linked to an amusement park in California*. 

*Provisional data reported to CDC’s National Center for Immunization and Respiratory Diseases
Measles at Disneyland

• Reminder that vaccines protect both individuals and communities

• Some in the community who have a medical contraindication cannot receive measles vaccine (and others) – they are protected by everyone around them being protected

• California has removed person belief and religious exemptions from school immunization laws. We will have to wait to see whether this is a solution or creates another set of problems
INFLUENZA

• 2014 The A-H3N2 flu virus mutated, so that it evaded the protection of the annual vaccine, making it much less effective

• 2014 was a serious influenza year

• 2015-16 influenza vaccine has been updated

• CDC recommends that everyone over 6 months of age should get flu vaccine every year
Everyone!
Antibiotic Resistance

• Used to be just hospital problem

• Now in community also

• Problem is increasing

• Driven by antibiotic overuse in community, in hospital and in animal food protection
Antibiotic Resistance

• Several concerns:

Methicillin-resistant *Staphylococcus aureus* (MRSA)

*Clostridium difficile* (C. diff)

Carbepenem-resistance *Enterobacteriaceae* (CRE)

*Pseudomonas aeruginosa*
Antibiotic Resistance

Multi-factorial response

• Incentives to drug manufacturers to produce new antibiotics

• Antibiotic stewardship to promote more appropriate use in the community and hospitals

• President’s National Plan to Combat Antibiotic Resistance-2015

• Public health surveillance to define problems

• Coordinated approach led by public health and involving regional hospitals – led in Tennessee by Dr. Marion Kainer
2015 and Beyond

• Infections will continue to emerge and present challenges

• Your dedication to their detection and implementing control measures is the essence of public health

• It is deeply appreciated and makes me proud to be in your company