Vaccine Preventable Diseases Other than COVID-19: An Update

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Disclosures:

• No financial disclosures
• I do not intend to discuss unapproved/investigative use of commercial products
Learning Objectives:

• Learn the presentation, risk, and preventative management of Monkeypox virus infection
• Identify important updates in prevention and epidemiology of current vaccine-preventable infections that pose a risk to people living in Arizona (or immigrating to Arizona)
Monkeypox virus

- Orthopoxvirus (smallpox & cowpox)
- Central & West Africa
- International travel (2021, Nigeria)
- Animal importation (2003, prairie dogs)
- Today…
Monkeypox virus

- Fever
- Rigors
- Lethargy
- Headache
- Lymphadenopathy
- Myalgias
- New rash
- Proctitis
- EPIDEMIOLOGIC Contact!!
Monkeypox virus – Differential Dx
Monkeypox virus

• Infection Prevention
• Testing:
  • 520-724-7797
  • Commercial labs
  • 2 lesions, 2 swabs
• Vaccination:
  • JYNNEOS
  • ACAM2000
  • PEP+, PEP++
  • Pediatrics regimen
• Treatment: TPOXX
Polio

- 1st confirmed case – Rockland County, NY
- Presumed 100’s active cases
- Strong signal – sewage testing
- Vaccine coverage – 2 y.o.:
  - U.S.A. 93%
  - Rockland County: 60%
- CDC team on-site:
  - Testing for new cases
  - Education/Communication
  - Vaccine boosters
Polio

- Clinical:
  - 75% asymptomatic (+ contagious)
  - 25% sore throat, H/A, etc.
  - 1/200 paralysis

- 1940’s:
  - Active polio outbreaks
  - 35,000/year paralyzed

- Today:
  - IPV – 4 doses, 99% effective
  - OPV – strains in stool, vaccine-derived polio
Pertussis

- “100 day cough”
- Incubation: 7 – 10 days
- Catarrhal phase
- Cough phase
- Treatment efficacy?
Measles

- "Three C’s"
- Severe – disseminated
- SSPE
Neisseria meningitidis

- Vaccines:
  - A, C, Y, W135
  - B
- Who?
Respiratory Syncytial Virus

**Do You Know?**

Respiratory syncytial virus (RSV) is a common respiratory virus that infects the nose, throat, lungs, and breathing passages.
RSV

• Paramyxovirus
• Associated with childhood disease in 1957
• Produces fusion of human cells in culture (syncytial effect)
• Two subtypes: A* & B
• Transmitted by direct contact with nasal secretions, (droplets)
• Contaminated fomites
  • RSV epidemic
  • 33% uninfected, hospitalized children acquire RSV
  • Prolongation of hospitalization
RSV - Vaccines

• Initial Vaccine research

• Adult vaccine – Pfizer & GlaxoSmithKline
  • FDA approved ≥ 60 years old

• Vaccine – pregnancy
  • Pfizer: RSVpreF
  • 82% effective for infants 0 – 90 days
  • FDA review

• “Vaccine” – mAb
  • Infants & toddlers < 2 y.o.
  • 75% reduction in hospitalizations and ICU admits
  • Palivizumab, Motavizumab, Nirsevimab
Ebola Virus

- Prototype Viral Hemorrhagic Fever Pathogen
  - Filovirus: enveloped, non-segmented, negative-stranded RNA virus
  - Severe disease with high case fatality

- >25 previous Ebola and Marburg virus outbreaks
- 2014 West Africa Ebola outbreak caused by Zaire ebolavirus species (five known Ebola virus species)
## EVD Case Counts – Spring, 2016

### Countries with Widespread Transmission

<table>
<thead>
<tr>
<th>Country</th>
<th>Total Cases</th>
<th>Confirmed Cases</th>
<th>Total Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guinea</td>
<td>3804</td>
<td>3351</td>
<td>2536</td>
</tr>
<tr>
<td>Liberia</td>
<td>10675</td>
<td>3160</td>
<td>4809</td>
</tr>
<tr>
<td>Sierra Leone</td>
<td>14123</td>
<td>8705</td>
<td>3956</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>28602</strong></td>
<td><strong>15216</strong></td>
<td><strong>11301</strong></td>
</tr>
</tbody>
</table>

### Countries with an Initial Case or Cases and/or Localized Transmission

<table>
<thead>
<tr>
<th>Country</th>
<th>Total Cases</th>
<th>Confirmed Cases</th>
<th>Total Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States</td>
<td>4</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Mali</td>
<td>8</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>13</strong></td>
<td><strong>12</strong></td>
<td><strong>7</strong></td>
</tr>
</tbody>
</table>

### Previously Affected Countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Total Cases</th>
<th>Confirmed Cases</th>
<th>Total Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nigeria*</td>
<td>20</td>
<td>19</td>
<td>8</td>
</tr>
<tr>
<td>Senegal*</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Spain*</td>
<td>1</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>22</strong></td>
<td><strong>21</strong></td>
<td><strong>8</strong></td>
</tr>
</tbody>
</table>
EVD

- Democratic Republic of Congo
  - 3461 cases, 2277 deaths
  - Isolated epicenter
  - Militia violence
  - Robust WHO response
  - Ring vaccine strategy

- Uganda – Sept. 20, 2022
Investigational Therapies for EVD Patients

• Ribavirin: NO proven benefit

• Other interventions:
  • Convalescent serum
  • Therapeutic medications
    • Zmapp – chimeric human-mouse monoclonal antibodies
    • Tekmira – lipid nanoparticle small interfering RNA
    • Brincidofovir – oral nucleotide analogue with antiviral activity

• Vaccines
  • Chimpanzee-derived adenovirus with an Ebola virus gene inserted
  • Attenuated vesicular stomatitis virus with an Ebola virus gene inserted: RING VACCINATION STRATEGY!
When good Javelinas go bad...
Javelina facts

- *Pecari tajacu*
- Peccary family:
  - Hoofed mammals
  - S. America
- Omnivores
- Canines, coyotes = natural predators
- Very poor eyesight!
- Charge vs. escape
- Risk of a bite?
Javelina and infection

- Rabies:
  - Mostly symptomatic
  - Erratic/aggressive/hyperactive behavior
  - Fearful/lethargic behavior
  - Paralysis
  - Hydrophobia
  - Foaming at mouth
  - Transmissible to humans!
Javelina and infection

• Javelina bite:
  • Pets: quarantine
  • Humans:
    • Rabies prophylaxis?
    • Prophylactic antibiotics?
• Infected javelina bite:
  • Surgical evacuation
  • Empiric, broad-spectrum antibiotics
  • Culture-driven management
Aedes mosquito carriage

- Chikungunya
  - Tanzanian: “that which bends up”
  - Fever: 40° C X 3 – 5 days
  - Polyarthralgias: distal > proximal (hands & feet)

- Dengue
  - “Break bone fever”
  - Fever
  - Retro-orbital headaches
  - Polyarthralgias
  - Rash 50%
  - Hemorrhagic complications
Questions?