Disclosure

• Relevant relationships with commercial entities
  – NONE

• Potential for conflicts of interest within this presentation
  – NONE

• Steps taken to review and mitigate potential bias
  – Not Applicable
Roadmap

• What is monkeypox?

• Clin / Epi Summary

• Previous Spread

• Recent World Outbreak
What is Monkeypox?

- Orthopoxvirus
- Same family as Smallpox, Cowpox
- First discovered Denmark 1958 in monkeys
- First Human case 1970 DRC (Zaire)
What is Monkeypox?

- Two main clades
  - West African
  - Central African
- WA tends to be less virulent
Fever is not a sign of ceftriaxone deficiency.
Transmission
Transmission

• Direct contact with infected fluid / resp droplets

• Close contact (e.g. skin to skin)

• Human to Human transmission prominent in 2022 epidemic
Transmission

- Reservoir not definitively known

- Likely sylvatic cycle in African small rodents
Geographic Distribution
Endemic Countries

- Benin
- Cameroon
- Central African Republic
- Democratic Republic of the Congo
- Gabon
- Ghana
- Ivory Coast
- Liberia
- Nigeria
- Republic of the Congo
- Sierra Leone
- South Sudan.
Me after washing my hands for 20 seconds 57 times in one day.
How does it present?

• Similar to smallpox

• Initial viral prodrome (non-specific)

• Lymphadenopathy*

• After 1-3d rash appears macules → pox → crusts
How does it present?

- Illness anywhere from 2-4 weeks
- Incubation period 1-2 weeks
- Most cases mild
Figure 5: Proposed Pathogenesis of Monkeypox

1. **Animal-to-Human Transmission**
   - Bites/Scratches of Infected Animals
   - Blood and Bodily Fluids of Infected Animals
   - Hunting, Cooking and Consumption of Infected Meat

2. **Viral Entry and Replication in Oropharyngeal or Respiratory Mucosa**

3. **Viral Load Circulates to Lymph Nodes Draining Mucosa**

4. **Primary Viremia**

5. **Lymphoid Organs and Distant Lymph Nodes (e.g., Spleen)**
   - Viral Replication Occurs

6. **Secondary Viremia**

7. **Prodromal Stage**

8. **Tertiary Organs**

9. **Skin**

10. **Clinical Manifestation of Monkeypox**

11. **Incubation Stage (7-21 Days)**
How does it present?
Other complications

- Myocarditis
- Encephalitis
- Secondary Bacterial infx
- Severe dysphagia (esophageal lesions)
- Severe proctalgia / encopresis
“Sorry – there’s a shortage of beds. On the bright side, you’re way more infectious than the guy next to you.”
World Outbreaks
US Outbreak 2003

- Exotic pet import from Ghana (rodents)
- Cages next to prairie dogs in facility
- 37 Confirmed, 10 Suspected cases across 5 states
Nigerian Outbreak

- First cases Sep 2017
- 2018: 45 Confirmed + 114 Suspected
- 1 Death (HIV/AIDS)
- Widely Spread through country

https://ncdc.gov.ng/diseases/sitreps/?cat=8&name=An%20Update%20of%20Monkeypox%20Outbreak%20in%20Nigeria
Nigerian Outbreak

Nigeria monkeypox case distribution by Epi-week;
Week32, 2017- Week 37,2108

https://ncdc.gov.ng/themes/common/files/sitreps/6c3cf1e472c509190602a5d431c0af1e.pdf
Imported Cases - UK

• 3 Cases total

• Case #1 – Nigerian naval office visiting Cornwall, UK for training exercise (from Abuja)

• Case #2 – UK Man back from 22d vacation to Southern Nigeria
Imported Cases - UK

- Case #3 – medic who looked after Case #2 in the hospital
- Smallpox vaccination given for prevention
- No other cases since
Imported Cases - Israel

• 1 Case total (expat)

• Israeli man lives & works Port Harcourt (Southern Nigeria)

• Presented Sep 2018 after 2nd UK case

• Concern over more cases to come

https://www.health.gov.il/NewsAndEvents/SpokemanMesseges/Pages/12102018_1.aspx
Why now?
Diseases without Borders

- Increased global travel
- Human encroachment on environment
- Susceptible population
- Amplifying countries / events
- Suitable vector
The Changing Epidemiology of Chikungunya Fever

Infectious Disease Grand Rounds
Dr. Sumon Chakrabarti PGY5
December 8, 2009
Diseases without Borders

- West Nile
- Chikungunya
- Zika Virus
- Monkeypox
Other Factors

• Waning & Absent immunity from smallpox vaccination

• After 1972, smallpox vaccine not given routinely in Canada
Social Networks

- Dec immunity to smallpox
- Restricted sexual network
- Pathogen factor (mode of spread, infectivity etc)
- What spreads in one region may not in others
## Worldwide Case Burden

<table>
<thead>
<tr>
<th>Location</th>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States Of America</td>
<td>28,492</td>
<td>8</td>
</tr>
<tr>
<td>Brazil</td>
<td>9,226</td>
<td>8</td>
</tr>
<tr>
<td>Spain</td>
<td>7,317</td>
<td>2</td>
</tr>
<tr>
<td>France</td>
<td>4,094</td>
<td>0</td>
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<tr>
<td>United Kingdom</td>
<td>3,701</td>
<td>0</td>
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<tr>
<td>Germany</td>
<td>3,668</td>
<td>0</td>
</tr>
<tr>
<td>Colombia</td>
<td>3,523</td>
<td>0</td>
</tr>
<tr>
<td>Peru</td>
<td>3,110</td>
<td>0</td>
</tr>
</tbody>
</table>
Ontario Experience

Comparable with other series

~700 cases, >99% men

Majority MSM, small proportion bisexual

3% Hospitalization

https://www.cmaj.ca/content/cmaj/194/38/E1323/F6.large.jpg
World Monkeypox Epi

Epidemic curve shown for cases reported up to 04 Nov 2022 to avoid showing incomplete weeks of data.

Data as of 04 Nov 2022 17:00 CEST
Canadian Monkeypox Epi

Accumulating data
"Wait, this one's a lawyer. We'd better wash our hands."
Treatment & Prevention
Treatment & Prevention

- Smallpox vaccination (80% reduction in incidence)
- Tecovirimat (severe, hospitalized cases)
- Brin/cidofovir
Vaccination

- Vaccine rolled out to highest risk
- 1st dose coverage maximized
- Important to screen for other STIs
Infection Control

- N95 Respirator
- Gloves
- Gown
- Eye protection
Summary

1. Monkeypox is an Orthopoxvirus similar to smallpox
2. Human to human spread (resp droplets, skin-skin)
3. Ongoing transmission in one region can lead to global outbreaks
4. Social network patterns can amplify infectious diseases

5. Monkeypox epidemic is slowing down around the world

6. Best prevention is smallpox vacc for high risk
NO!

Cookie Monster: Empty Trash

Oscar the Grouch: Delete Cookies

Oscar: No!
THANK YOU!