Plague in the African Region
Plague

• Plague is a disease that affects humans and other mammals
• “Famous” for killing millions in Europe during the middle ages
• Caused by the bacteria *Yersinia pestis*, which is typically found in small mammals and their fleas
Plague transmission

• Bacterium is transmitted by fleas and cycles naturally among wild rodents
• Humans/domestic animals bitten by fleas from dead animals at risk
• Cats can become very ill and can infect humans when they cough
• Dogs can bring infected fleas home
• People can also be exposed by handling infected animals
• Inhalation of respiratory droplets/small particles from a patient

30 types of fleas been shown to act as vectors. The most prominent of these vectors is *Xenopsylla cheopis* (oriental rat flea)
Clinical variations

- Bubonic plague: Most common, caused by the bite of an infected, CFR 30-60% untreated, 5% treated
- Pneumonic plague: lung based, transmitted through respiratory droplets, incubation as short as 24 hours, untreated, CFR 100%; treated CFR 50%
- Septicemic plague: bloodstream, CFR 20-35%
Distribution of reported cases of plague (2013-2018)

- WHO reports 1,000 to 3,000 cases of plague worldwide every year
- African region accounts >90% of all human cases reported worldwide
- Madagascar and DRC are most heavily affected with cases reported almost every year
- Likely under reported due to lower health care
Trends in reported plague cases in the African Region, 2019-2023

Note: graphic only includes countries that reported one or more cases and does not include countries that no cases in the last 5 years
Trends in reported plague deaths in the African Region, 2019-2023

Note: graphic only includes countries that reported one or more cases and does not include countries that no cases in the last 5 years.
## Notable epidemics

<table>
<thead>
<tr>
<th>Year</th>
<th>Countries</th>
<th>Cases</th>
<th>Deaths</th>
</tr>
</thead>
<tbody>
<tr>
<td>2023</td>
<td>DRC (Ituri)</td>
<td>94</td>
<td>15</td>
</tr>
<tr>
<td>2022</td>
<td>DRC</td>
<td>653</td>
<td>7</td>
</tr>
<tr>
<td>2021</td>
<td>Madagascar</td>
<td>48</td>
<td>19</td>
</tr>
<tr>
<td>2020-21</td>
<td>DRC</td>
<td>461</td>
<td>31</td>
</tr>
<tr>
<td>2019</td>
<td>Uganda</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>2019</td>
<td>Madagascar</td>
<td>13</td>
<td>1</td>
</tr>
<tr>
<td>2018</td>
<td>Madagascar</td>
<td>97</td>
<td>9</td>
</tr>
<tr>
<td>2017</td>
<td>Madagascar</td>
<td>2676</td>
<td>238</td>
</tr>
<tr>
<td>2016</td>
<td>Madagascar</td>
<td>62</td>
<td>26</td>
</tr>
<tr>
<td>2015</td>
<td>Madagascar</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>2014</td>
<td>Madagascar</td>
<td>119</td>
<td>40</td>
</tr>
</tbody>
</table>

1Since January 2023, DRC has reported cases each week
2multiple outbreaks
3linked to DRC
During 2004–2014, the Democratic Republic of the Congo (DRC) declared 54% of plague cases worldwide.

- Foci found in Ituri, North Kivu
  - At least 9 outbreaks documented in Ituri with most recent in 2022
  - 14 of the 36 health zones regularly report cases each year

- Reviews of 2020 outbreak
  - 58% of cases male
  - 93% of cases greater than five years old
Madagascar

- Most commonly found in the Central Highlands of Madagascar, altitude above 800 m
- Transmission typically occurs between September (often a peak in Nov) and April
- Reports ~200 and 400 cases of plague each year, the majority of which are bubonic form

*Note in 2017, over 2500 cases*
Characteristics of persons with confirmed, presumptive, and suspected plague cases, Madagascar; 1998-2016

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Bubonic plague case status, no. patients</th>
<th>Pneumonic plague case status, no. patients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Suspected, n = 6,454</td>
<td>Confirmed and presumptive, n = 5,132</td>
</tr>
<tr>
<td>Median age, y (IQR)</td>
<td>11 (6–20)</td>
<td>13 (8–24)</td>
</tr>
<tr>
<td>Sex ratio (M:F)</td>
<td>1.44 (3.803:2.639)</td>
<td>1.38 (2.972:2.157)</td>
</tr>
<tr>
<td>Presence of rats, %</td>
<td>15.1</td>
<td>18.6</td>
</tr>
<tr>
<td>Recent trip, %</td>
<td>6.4</td>
<td>6.9</td>
</tr>
<tr>
<td>Mean (SE) days to care</td>
<td>2.0 (0.05)</td>
<td>1.7 (0.03)</td>
</tr>
<tr>
<td>Median elevation, m (IQR)</td>
<td>1.262 (1.111–1.384)</td>
<td>1.275 (1.063–1.409)</td>
</tr>
<tr>
<td>Contact with other plague cases, %</td>
<td>7</td>
<td>11</td>
</tr>
</tbody>
</table>

*IQR, interquartile range.

Possible factors related to plague persistence in the region

• Climate change -- One study estimated 50% increase in the plague host prevalence with an increase of 1°C of the temperature in spring *

• Tropical and mountainous ecosystem

• Persistent conflict

• Poor healthcare and poverty

• Increased contact with wildlife

Thank you

OBRIGADO

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Thank you