Emerging Zoonotic Diseases

- **Zoonoses**: Diseases that are transmissible between humans and animals

- **Emerging Infectious Diseases**: Diseases that have newly appeared in a population

70% percent of Emerging Infectious Diseases have a wildlife component
### Recent Zoonotic EID’s

<table>
<thead>
<tr>
<th>Disease</th>
<th>Wildlife Component</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avian influenza</td>
<td>Birds</td>
</tr>
<tr>
<td>Monkeypox</td>
<td>Gambian rat</td>
</tr>
<tr>
<td>SARS</td>
<td>Palm civet; Bats</td>
</tr>
<tr>
<td>West Nile virus</td>
<td>Birds</td>
</tr>
<tr>
<td>Nipah virus</td>
<td>Fruit bats</td>
</tr>
<tr>
<td>Hantavirus</td>
<td>Mice</td>
</tr>
</tbody>
</table>
Factors affecting disease emergence

- **Pathogen**
  - Adaptation and change
    - Cross species boundaries
    - Transmissibility
    - Virulence
    - Survival and maintenance

- **Animals and Environment**
  - Ecological change
  - Animal migration
  - Adaptation and change

- **Anthropogenic changes**
  - Population growth
  - Urbanization
  - Travel
  - Agricultural practices
  - Health infrastructure
  - Environmental manipulation
  - Animal translocation
Rabies

Democritus, 500 BC
Aristotle, 322 BC
Celsius, 100 AD
Rabies

• Lyssavirus
• 55,000 deaths each year worldwide
• $30 million/year human post-exposure
• $300 million detection, prevention, and control
• Canine rabies eliminated from US in 2007
Plague

- Plague of Ashdod, 1000 BC
- Justinian’s Plague, 541 AD
- Black Death, 1352 AD
Plague
Plague

- **Yersinia pestis**
- 1000 - 3000 cases / year worldwide
- Plague cycles
  - Sylvatic
  - Bubonic
  - Urban
Tuberculosis

Egypt, 2400 BC
Greece, 541 AD
Persia, 1025 AD
**Tuberculosis**

- *Mycobacterium tuberculosis / M. bovis / M. avium*
- 1.5 million deaths worldwide (2006)
  - 200,000 HIV associated HIV
- Wildlife reservoirs?
  - Cape buffalo
  - Eurasian badgers
  - Brush tailed possums
  - Primates
Tuberculosis
Monkeypox

- Captive *Cynomolgus*, 1958
- Democratic Republic of Congo, 1970
- Midwest US, 2003
- Sudan, 2006
Monkeypox

- Orthopoxvirus
- Endemic in Central and West Africa
- 37 confirmed cases in 2003 outbreak
  - 18 in Wisconsin
Can animals - like canaries in coal mines - warn humans about chemical, infectious, and physical environmental hazards?

We select, curate, and index 1000s of scientific studies from MEDLINE, CAB Abstracts, and Agricola so you can review the evidence of animals as "early warning" sentinels of human health hazards.

Try it now! Find evidence of animal as sentinels:

...for environmental hazards:
- Dogs and Lead
- Birds and West Nile Virus

...for diseases:
- Canaries and Anthrax
- Reptiles and Anthrax

...by location:
- Anthrax and Sverdlovsk

http://canarydatabase.org
Options

- Surveillance
- Communication
- Awareness
- “Shared Risk” concept
One Medicine