ZOOONOTIC DISEASE UPDATES
RABIES
Rabies Background

- Viral disease affecting all mammals (including humans)
- Extremely high case fatality rate
- Acute, progressive encephalomyelitis
- After symptoms begin, clinical course is usually irreversible
  - With supportive care, most human patients die within 15 days after symptoms begin.
  - Incubation period = 1-3 months.

Rabies causes inflammation of the brain and spinal cord.
Rabies Transmission

• Infectious materials
  • Saliva
  • Central nervous system tissues and fluid
• Usually through BITE of an infected animal
• Other ways:
  • Contamination of mucous membranes, open wounds, or abrasions by infected tissues
  • Corneal transplant
  • Aerosol (caves)

Number of animals

Year

The bar chart shows the number of rabid animals reported in Arizona from 2002 to 2014, categorized by species: Bat, Skunk, Fox, and Other. The chart indicates a significant increase in the number of rabid animals in 2009 compared to other years.

- **2009**: The highest number of animals reported, with a significant portion being Skunk and Bat species.
- **2010**: A decrease in the number of animals compared to 2009, with a notable number of Fox and Bat species.
- **2008**: A moderate number of animals, with a relative balance between different species.
- **2002–2014**: A general trend of decreasing numbers of rabid animals, with the exception of 2009.

The chart provides a clear visual representation of the distribution and trends in rabid animal reporting in Arizona over the specified period.
Skunk Epizootic in Southern Arizona

• During winter 2013, increased numbers of rabid skunks identified in Santa Cruz and Pima counties

• Prevention efforts
  • Increase community awareness
  • Domestic animal vaccination campaigns
  • Skunk vaccination
  • Rabies quarantine in county
Rabies Reminders

• Ensure domestic animals are vaccinated for rabies
• Public education to not touch wild animals (particularly bats, skunks, and foxes)
• If potential exposure occurs, seek medical care and consult with local public health

• Questions?
TICK-BORNE RELAPSING FEVER
Tick-Borne Relapsing Fever (TBRF)

- Western states
- Median 20 cases/year in U.S.
- Vector: soft ticks
- Reservoir host: rodents (squirrels, chipmunks)
- High altitudes (1500–8000 feet)
- Often associated with rustic mountain cabins
Cases of Tick-borne Relapsing Fever - United States, 1990 - 2011

Each dot, placed randomly within the county of exposure (where known), represents one case.

Each dot, placed randomly within the county of residence, represents one case.

TBRF: spirochetes

- *Borrelia hermsii*
- *Borrelia parkerii*
- *Borrelia turicatae*
TBRF Vectors

- Soft ticks
  - *Ornithodoros hermsi*
  - *Ornithodoros parkeri*
  - *Ornithodoros turicata*
- Habitats: cabins, caves, burrows
- Long lifespan: 10 yrs
- Nighttime feeders
- Painless bites
- Quick disease transmission (~30 sec)
Why “relapsing” fever?

- Incubation period: 2–18 days
- Symptoms: fever, headache, body aches
- Relapses: fever (2–7 days) then afebrile (4–14 days)
  - Without treatment, can recur up to 4 times
Diagnostics

- **Quick diagnosis**: peripheral blood taken during febrile episode
  - Giemsa or Acridine Orange
  - Visualize loosely coiled spirochetes

- **Slow diagnosis**: Serology (IFA)

- **Treatment**: antibiotics (penicillin, tetracyclines, macrolides)
TBRF

- TBRF cases are uncommon & sporadic

- Diagnosing, reporting & investigating TBRF cases is vital to preventing future cases. A tick-infested cabin can serve as a source of exposure for years!
HANTAVIRUS
Hantavirus Pulmonary Syndrome (HPS) Cases, by State of Exposure

HPS Cases per State:
- 1 - 15
- 16 - 50
- > 50
- Zero Cases

Total Cases:
(N=639 in 34 States)
28 Cases With an Unknown State of Exposure. Cumulative Case Count Per State Valid as of April 21, 2014.

Source: Viral Special Pathogens Branch, CDC
Hantavirus

• Severe respiratory disease
  • Fatigue, fever, muscle aches
  • Can be fatal (38%)

• Transmission: rodents
  • Deer mice (*Peromyscus* species) in Arizona
  • Aerosolized urine, droppings, or nesting materials can cause infection in humans

• Treatment: supportive care
Hantavirus Prevention
Wet Disinfection
Rodent Proofing
Mouse Control
Onchocerca lupi

- Parasitic helminth
  - Related to *Onchocerca volvulus*, cause of “river blindness”

- Dogs/wolves believed to be definitive hosts
  - 2 cases documented in cats

- Suspected intermediate hosts: black flies (*Simulium* spp) and/or biting midges (*Culicoides* spp)
Human cases identified

• Only ~21 published cases of zoonotic onchocerciasis worldwide
  • Outside U.S.: conjunctival/subconjunctival nodules or orbital lesions

• 5 cases in the U.S.
  • Location:
    • 3 in AZ
    • 2 in NM
  • 3 had spinal lesions
Clinical Presentation: Dogs

- Nodules in and around eyes containing parasite
  - Other differentials include hyperplastic lymphoid tissues and the California eye worm (*Thelazia californiensis*)
Testing in Dogs

- Definitive diagnosis: cuticular morphology of female worms (see below)
- Skin biopsy for microfilariae
- No serologic tests currently available
- Report animal cases and seek consultation
Geographic Distribution

- Canine cases of *Onchocerca lupi* have been reported from California, Arizona, Utah, and New Mexico in the United States, as well as in several European countries.
Public Health Notification

- IF canine cases are seen, state or local public health can investigate the origin and travel history of the dog
  - Identify high-risk areas
  - Test potential vectors

- Advise pets and people to avoid black flies