Viral zoonoses

• Rabies
  ▫ Clinically ill horses are a source of infection for humans
  ▫ Transmitted by a bite wound/contact with virus-laden saliva
  ▫ Horses are infected by similar exposure to a wild reservoir
    • Striped skunk
    • Various species of bats
  ▫ Prevention through
    • Vaccination of horse population
    • Judicious handling of horses showing central nervous system disease
Any type of behavioral abnormality, in particular, aggression, should be considered a potential clinical sign of rabies. Do not attempt to handle an animal like this without appropriately trained personnel. Contact the University Attending Veterinarian immediately.
Skunks active in the daytime are always suspect for rabies. North Dakota has a high incidence of rabies in the skunk population. Avoid any contact.

Bats should not be handled without gloves. In fact, it is advisable to place them in container and submit them to the laboratory for testing.
Viral zoonoses

• Vesicular stomatitis
  ▫ In horses
    • Short incubation, fever, salivation, blisters in mouth, on tongue, on lips, in nostrils, on the hoof band
  ▫ In humans
    • Rare, usually a laboratory accident, short incubation, flu-like illness
    • Wear personal protective gear as a preventative since the virus is transmitted by contact
Lesions of vesicular stomatitis in the horse. Note the ulcerations on the coronary band, nose, and lips
Viral zoonoses

- Western equine encephalitis (WEE)
- Eastern equine encephalitis (EEE)
- Venezuelan encephalitis (VEE)
- St. Louis encephalitis (SLE)

As a group the equine encephalidities cause a range of clinical signs from:
- Asymptomatic infections to flu-like illness and encephalitis
- The degree of the infection in people depends upon the dose of the virus, strain of the virus, and the immune status of the host
Viral zoonoses

- **Equine encephalidities**
  - As a group, these viruses are found in nature within wild animal (birds, mammals, amphibians, reptiles) populations (referred to as reservoirs)
  - These viruses are transmitted to humans and horses by mosquito bites (referred to as a vector)
  - Therefore control of the infection is directed at avoidance of the vector
    - Insecticides
    - Personal protective gear
Viral zoonoses

• Equine encephalidities
  ▫ These are not considered true zoonoses since people do not acquire the infection directly from horses
    • Horses do not typically produce enough virus in their bloodstream to be infective
  ▫ Instead, people and horses acquire the infection from mosquitoes that have fed on birds or other animals carrying the virus
  ▫ Therefore, avoidance of the infection in people and horses is directed at the vector and the environment
Prevention - equine

- If possible, keep horses stabled during dawn and dusk
  - mosquitoes are most active
- Turn off lights that attract mosquitoes at night
- Use fluorescent lights
  - do not attract mosquitoes they way incandescent lights do
- If possible, keep screens in stable windows
- Eliminate common mosquito breeding areas
  - shallow stagnant water and puddles
- Empty water collecting in buckets, tarps or tires
- Clean water troughs once a week
- Use mosquito repellent
Prevention - human

- When possible, stay indoors at dawn, dusk, early evening
- Long-sleeved shirts and pants
- Spray clothing with repellents (permethrin or DEET)
- Spray skin with repellent (35% DEET)
Mosquito management

- Can move long distances from breeding sites but usually go only as far as a blood meal
- Adults are strong fliers
- Movement aided by wind
- Live virus was found in overwintering mosquitoes
Mosquito management

- Indoor control
  - Insecticide
  - Tight screening
- Repellents
  - Mosquitoes attracted by perspiration, warmth, body odor, carbon dioxide, incandescent light
  - Use a repellent containing DEET
Mosquito management

- Area-wide management
- Health education
- Breeding places
  - Larval control most effective
- Source reduction and habitat alteration
- Chemical management
- Adult control
  - Fogs, mists, residual sprays, aerosols, aerial application
Mosquito management

- Facility checklist
  - Remove water holding containers
  - Remove old tires
  - Cover trash containers
  - Clean gutters and drain flat roofs
  - Change water in bird baths
  - Fill in or drain low areas to eliminate puddles
  - Insure proper drainage (drains, ditches, culverts)
  - Repair leaky plumbing
  - Trim thick bushes and trees
  - Screens for windows
Adults mosquitoes overwinter in protected areas.
Overwinter as eggs which can survive for years until they are flooded.
DEET safety

- Follow all directions and precautions on the product label.
- Don’t apply over cuts, wounds, or irritated skin.
- Don’t apply to hands or near eyes and mouth of children.
- Don’t allow children to apply the product.
- Use just enough repellent to cover exposed skin and/or clothing.
- Don’t use under clothing.
- Avoid using too much of this product.
- After returning indoors, wash treated skin with soap and water.
- Wash treated clothing before wearing it again.
- Use of the product may cause skin reactions in rare cases.
- Don’t spray in enclosed areas.
- To apply to face, spray on hands first and then rub on face. Don’t spray directly onto face.
Viral zoonoses

- **West Nile virus**
  - Mosquito vector
  - Bird reservoir
  - The virus can infect many kinds of mammals and birds
  - Only licensed vaccines are available for horses
  - Treatment only for symptoms of disease
  - Infected animals or people **do not** always get sick
Other uncommon ways to transmit the virus

- Blood transfusion
- Mother to child (placental)
- Mother to child (lactation)
- Laboratory accident
- Not human to human
- Not horse to human
- Not bird to human
- Can insects other than mosquitoes transmit the virus?
  - Ticks?
What to watch for in horses

- Stumbling or tripping
- Muscle weakness or twitching
- Partial paralysis
- Loss of appetite
- Depression
- Head pressing or tilt
- Impaired vision
- Wandering or circling
- Unable to swallow
- Unable to stand up
- Fever, Convulsions, Coma, Death
Viral zoonoses

- **West Nile virus in horses**
  - Most common from mid-August to end of October
  - No particular age, breed or sex affected
  - Immunity can be passed in milk to foals
Viral zoonoses

• West Nile virus in horses
  ▫ May not always get sick
  ▫ May just see stumbling or weakness
  ▫ Don’t always have a fever
  ▫ Mildly affected horses recover in about a week
  ▫ Surviving horses recover fully
Vaccines for horses

- 1st shot in spring
- 2nd shot 3 to 4 weeks later
- May need a 3rd shot if there is a severe outbreak
- Okay in pregnant horses
- Yearly booster shots
Vaccines for horses

- RecombiTEK equine West Nile virus vaccine
- Two dose vaccination schedule
- Can be used in horses that have received the Fort Dodge product
Vaccinating foals

- Vaccinate mare 4 weeks before foaling
  - Passive transfer
- Vaccinate foal at 6 months
- 2nd shot – one month later
- 3rd shot – 6 weeks after that
Human West Nile virus infection

- Most infections mild
  - Fever, headache, body aches, skin rash, swollen lymph nodes
  - See your doctor
- More severe
  - Headache, high fever, neck stiffness, disorientation, coma, tremors, convulsions, muscle weakness, paralysis, death (rare)
West Nile virus

• The bottom line
  ▫ This is not a true zoonoses
  ▫ Humans and horses become infected by contact with infected mosquitoes that have feed on viremic birds
  ▫ Prevention of human and horse infections comes through control of the vector and the environment
Bacterial zoonoses

- **Salmonellosis**
  - **In horses**
    - Diarrhea, abortion, septicemia and death
    - Foals particularly susceptible
    - Healthy carriers become shedders of the bacteria under stress
    - Outbreaks in equine facilities are not uncommon
  - **In humans**
    - Vomiting, fever, abdominal cramps, dehydration
Bacterial zoonoses

- **Salmonellosis**
  - Prevention through proper hygiene when handling sick horses that are potential *Salmonella* cases
    - Hand washing
    - Gloves
    - Cleaning of facilities used to hold the animal
  - Detecting a horse that sheds *Salmonella* while clinically normal is very difficult
    - This would involve submitting a fecal sample from a suspect animal
Bacterial zoonoses

- *Rhodococcus equi*
  - Pulmonary and enteric infection in young horses
  - Found in soil
  - Stool of horses is the source of soil contamination
  - Humans are infected by environmental exposure or by contact with sick horses
  - Opportunistic pathogen of immunocompromised patients
    - Progressive, chronic pneumonia that may spread to other organs
    - Organism is either inhaled or picked up by contact with a cutaneous lesion
Bacterial zoonoses

- Brucellosis
  - **In horses**
    - Usually seen as “fistulous withers” (draining tract), but may also present as abortion, orchitis
  - **In humans**
    - Fever, headache, chills, depression, joint pain, muscle pain, weight loss, orchitis, epididymitis
    - Transmission by contact with an infected horse
Bacterial zoonoses

• **Leptospirosis**
  ▫ **In horses**
    • Horses can be infected by different serovars of *Leptospira*
    • Fever, abortion, septicemia
    • Ocular infection (recurrent uveitis) is the classic lesion in infected horses
  ▫ **In humans**
    • Systemic
    • Although transmission by contact with infected horses has not definitively been proven, *Leptospira* is typically spread by contact with infected fluids (urine, placenta, ocular fluid)
Note the cloudy cornea associated with recurrent uveitis or “moon-blindness” in horses. This is often associated with a *Leptospira* infection.
Bacterial zoonoses

- *Streptococcus equi* subsp. *zooepidemicus*
  - Reports in the literature of human infections due to contact with horses that abort or foals with respiratory disease

- *Streptococcus equi* subsp. *equi*
  - Cause of “strangles” in horses, it has been reported as an infrequent cause of human disease
  - Spread by contact
  - Cutaneous to systemic affects
Bacterial zoonoses

• Dermatophilosus
  ▫ anaerobic bacterial infection of the skin in humans and animals
    • *Dermatophilus congolensis*
  ▫ Horses tend to get this infection on their extremities, but can occur anywhere
  ▫ Variably severe dermatitis that can be transmitted to people
  ▫ Avoid contact and wear personal protective gear
Note the extensive dermatitis present on the Body of these two horses. It is also know as “rain scald” or “strawberry footrot”
Fungal zoonoses

• Dermatophytosis
  ▫ A superficial fungal infection caused by different species of dermatophytes
  ▫ Referred to as “ringworm”
  ▫ Cause of itchy, flakey skin
  ▫ Very contagious
  ▫ Typically treated and cured by frequent handwashing
  ▫ Avoid contact, wear personal protective gear
Preventative measures

• Any animal with a suspected zoonotic disease should first be isolated
• Always wear personal protective gear when around the animal
  ▫ Gloves, mask, safety glasses, boots, coveralls
• Always clean up the space where the animal his being held to avoid transmission of the disease
• Avoid contact as much as possible when working with the animal