Etiology

• Family Leptospiraceae
  - Genus *Leptospira*
    - *L. biflexa* and *L. parva*: saprophytes
    - *L. interrogans*: pathogens
      - 23 serogroups, > 250 serovars
  - Genus *Leptonema*: nonpathogens

• Host-adapted and non-adapted strains
  - Contact of *maintenance host/urine* with *incidental host* → severe disease
  - Incidental hosts not reservoirs
Most widespread zoonosis in the world?

Dairy farmers, milkers

Slaughterhouse workers, meat inspectors

Veterinarians

Military personnel
Phase I (Septicemic)

- Spiking fever, headaches, myalgia, arthralgias, damage to blood vessels: 4 – 7 days
Phase II (Immune)

- Induction of IgM Antibodies
  - Complement-mediated lysis of organisms
- Organ dysfunction, fever, CNS signs
- Leptospiruria
Diagnosis

Culture

Serology: MAT
Convalescent titers
IgM vs IgG

Dark-field microscopy
Reservoirs

• Rodents: wild, urban
• US: dogs, livestock (cattle, horses, pigs) = major risk factors
• Leptospirae live in proximal convoluted tubules

Prolonged leptospiruria without signs
Transmission

• Source: urine

• Exposure via:
  – nasal, oral mucus membranes
  – conjunctivae
  – abraded skin
  – droplet aerosols
Rodent Leptospirosis in Arizona

• Few culture positives (serovar ballum; all feral Mus musculus)
• Silver-stained organisms detected in ~10% of rodent kidneys (most feral Mus musculus)
• Antibody titers suggest presence of serovars autumnalis, ballum, bratislava, canicola, grippotyphosa, hardjo, icterohaemorrhagiae, pomona
• Lesions in ~60% of kidneys
Bovine Leptospirosis

Abortion, still births, weak calves
Repeat breeders, dysgalactia
Bovine Leptospirosis in Arizona

• Host-adapted strains in dairies (even with vaccination): venereal transmission
  – Sporadic abortions, infertility
  – Transmission to humans elsewhere in world

• Exposure to wildlife strains not adapted to cattle occurs at water sources
  – Extensive abortion storms

• Beef cattle at slaughter: 20% culture positive
  – Serovars hardjo and pomona

• Under-recognized route of human exposure?
Canine Leptospirosis

- Fever, anorexia, vomiting, dehydration,
- Reluctance to move, hyperaesthesia
- Petechial, echymotic mucosal hemorrhages
- Renal changes
  - PUPD
  - May progress to oliguria, anuria
Canine Leptospirosis

• Liver inflammation
  – Cholestasis (acholic feces)
  – Icterus, hepatoencephalopathy

• GI signs: diarrhea, ileus (intussusception), melena
Canine Leptospirosis

• Maintenance hosts of *L. canicola*
  – Endemic pre1970, eradicated by routine Vx
  – Dog derived cases in children in USA, early 1970s
• Increased infection in wildlife vectors (raccoons, skunks)
  – *icterohaemorrhagiae* incidental infection
  – Rat derived
• Other serovars
  – *autumnalis, bratislava, grippotyphosa, pomona*

*Even vaccinated dogs can pose zoonotic threat (symptom-free, lifelong shedding in urine)*
In Sum

• We may not see leptospirosis every day in Arizona, but it’s around every day.
• Nonvaccinated dogs interacting with some rodents may develop severe/fatal disease.
  – Wild rodents: low risk
  – Feral rodents: much higher risk
• Wildlife with leptospirosis expose beef cattle at watering sites
• Host-adapted/non-adapted strains cause sporadic/epidemic abortion
  – Risk for ranchers/dairymen, veterinarians, abattoir workers