### General
- **Tick Born Infections** (Lyme, Babesiosis, Ehrlichiosis, RMSF, Tularemia)
  - Tx: Doxy w/ addition of other abx depending how sick
  - o Remember co-infections are very common because similar vectors for many of them
  - o Assess outdoor activity during certain times of year in certain endemic wooded areas but remember that often pts do not remember they had a bite
- **Zoonotic Infections** (Tularemia, Leptospirosis, Q Fever, Brucellosis, Cat Scratch Fever, Psittacosis, Anthrax, Plague)
  - Tx: Doxy w/ addition of other abx depending how sick
  - o Any infection naturally transmitted b/t animal and man
- **Travel Infections** (Zoonotic & Tick Born Infections, Parasites, Viral Hemorrhagic Fevers, SARS, HPS, Traveler’s Diarrhea)
- **Bioterrorist Infections** (Anthrax, Plague, Tularemia, Smallpox, Botulism, Viral Hemorrhagic Fevers, SARS, HPS)
  - o Can be aerosolized
  - o Consider if many healthy people present w/ Pulm/GI/Derm Sx

### Lyme Disease
**Borrelia burgdorferi** (spirochete)
- Reservoir: white tailed deer
- Vector: Ixodes tick
- Geography: Upper Midwest, NW, and NE Coastal
- Season: Summer/Fall
- Early Dz (days to weeks) (~70%): Flu-Like Illness, Rheum Dz (oligo-arthritis esp of knee), Skin Dz (Erythema Chronicum Migrans = large target lesion at bite site that slowly grows) and when it disseminates hematogenously there is a flu-like illness
- Disseminated Dz (wks-mos) (~40%): CV Dz (conduction disturbances, peri/myocarditis), CNS Dz ("NeuroBorrellosis" resulting in AMS, meningocéphalitis, mononeuritis multiplex, Bell’s Palsy aka CN-its)
- Late Dz (mos) (~30%): Skin Dz (Acrodermatitis Chronica Atrophicans), CNS Dz ("post-lyme syndrome" = fatigue, memory/concentration problems, neuropathic pain, HA, etc. "EM Sx Controversial")
- Dx: PCR, Serology (NB check CNS serology if neuro Sx) then confirm w/ Western Blot as False + w/ other spirochetes
- Tx: Removal of tick w/in 72hrs may preclude infection!!!, Doxycycline x1 if given w/in 72hrs of tick exposure, NB Vaccine was made but withdrawn from market b/c of joint/neuro toxicity

### Babesiosis
**Babesia spp.** (RBC obligate intracellular parasite)
- Reservoir: deer/mouse
- Vector: Ixodes tick, also seen from blood transfusions
- Geography: NE
- Season: Spring/Summer
- S/S: malaria like illness
- Complications: none except if asplenic/elderly/immunocompromised then can be fatal
- 2/2 hemolytic anemia
- Dx: Blood Smear shows RBC Intracellular Moroziotes (Maltese cross shaped), Serology, PCR
- Tx: [Atovaquone + Azithromycin] or [Clindamycin + Quinine], exchange transfusion if parasitemia >10% or hemolytic anemia or SIRS

### Ehrlichiosis & Anaplasmosis
**Ehrlichia & Anaplasma spp.** (WBC obligate intracellular parasite)
- Reservoir: Deer
- Vector/Geography: Human Monocytic Ehrlichiosis (HME) (South USA) Dermacenter or Amblyomma Tick, lives in Monocyte vs Human Granulocytic Anaplasmosis (HGA) (similar to Lyme) Ixodes Tick, lives in Neutrophils
- Season: Spring/Summer
- S/S: Rickettsial Symptoms w/o rash
- Complications: AKI, liver dysfxn, rhedo, ARDS, pancytopenia, death
- Dx: Blood Smear shows WBC Intracellular Morulae (round shaped), Serology, PCR
- Tx: Doxy

### Rocky Mountain Spotted Fever (RMSF)
**Rickettsia spp.** (Endothelial obligate intracellular parasite)
- Reservoir: Dog
- Vector: Dermacenter or Amblyommia Tick
- Geography: any wooded areas in NE, SE, NW BUT ACTUALLY NOT IN THE ROCKY MOUNTAINS
- Season: Spring/Summer
- NB cases are developing outside usual epidemiologic vectors/areas/season
- S/S: rash (peripheral including palms/soles blanching erythematous 5mm macules w/ edema → 6-18hrs later centripetal spread to arms/legs then trunk then neck/face → 2-4d later turn into nonblanching purpuric lesions), F, chills, myalgias esp of the calf, N/V, ab pain, D, prostration, frontal HA, AMS, photophobia, periorbital edema, cough, cardiac arrhythmias esp bradycardia, thrombocytopenia, hynopretremia, elevated CPK, increased LFTs
- Complications: gangrene of extremities, MOF, death from myocarditis (3%)
- Dx: IFA (Indirect immuno Fluorescence Assay), CF (Complement Fixation), ELISA, LA (Latex-Agglutination), IHA (Indirect Hemagglutination), Skin Bx showing necrotizing vasculitis, Weil-Felix Test (cross-linking of *Rickettsia rickettsii* Abs and *Proteus vulgaris* Abs)
- Tx: Doxy or Chloramphenicol (if CNS problems b/c can penetrate BBB)

### Tularemia
**Francisella tularensis** (GNR)
- Reservoir: farm animal esp rabbits
- Vector: Tick Bite or contamination of anything that is edible or that can be inhaled
- Geography: World-Wide but esp South USA
- S/S: rapid onset of constitutional symptoms and variable organ disease depending on which organ infected with purple ulcer w/ central eschar at bite site w/ LAD, pneumonia if inhaled, systemic dz if ingested
- Complications: variable depending on which organs are involved
- Dx: Culture, Serology
- Tx: Doxy

### Leptospirosis
- Reservoir: any wild/domestic
- 1st Septic Leptospiremic Phase: F, GI problems, HA,
- Dx: Dark Field Microscopy, Culture,
<table>
<thead>
<tr>
<th>Condition</th>
<th>Reservoir/Vector/Geography/Reservoir</th>
<th>S/S:</th>
<th>Complications:</th>
<th>Dx:</th>
<th>Tx:</th>
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</thead>
<tbody>
<tr>
<td>Leptospirosis</td>
<td>spirochete</td>
<td>Sx, etc)</td>
<td>hemorrhagic necrosis of various organs followed by death aka “Black Death” which is 100% if unTx and 5% if Tx</td>
<td>Serology</td>
<td>Doxy + PenG</td>
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<td>sprrat (specifically in the renal tubules)</td>
<td>conjunctival injection, calf myalgia, pretribial rash lasting 7d then</td>
<td>2nd Defervescence: no symptoms lasting 5d then</td>
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<td>3rd Immune Leptospiruc Phase: F, HSM, uveitis/chorioretinitis, conjunctival suffusion (brownish exudates), pretribial palpalpable purpura, LAD, meningitis, renal/liver impairment</td>
<td>Complications: the overall dz varies from a self-limited dz with Sx above to a potentially fatal dz with RF+LF+Hemorrhage (Wiel’s Syndrome), hemorrhagic pneumonitis to ARDS, myocarditis, meningitis, and dangerous hemorrhage w/ death up to 35%</td>
<td>Serology</td>
<td>Doxy + Rifampin</td>
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<td>Complications: culture negative IE, large vessel emboli, phlebitis, various other organ involvement</td>
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<td>Brucellosis</td>
<td>Brucella spp. (GNR)</td>
<td>S/S:</td>
<td>IT IS MORE PROTEAN THAN SYPHILIS OR TUBERCULOSIS thus any organ can be involved but classically presents as FUO w/ other non-specific Sx w/ the most common sites of localization being sacroiliac osteo, epididymoorchitis, meningitis, endocarditis, hepatic abscess</td>
<td>Dx: Serology, Culture (very slow growing becoming + in 1-4wks, you have to call the lab and tell them that you are suspecting Brucellosis and therefore to use special biphasic media and to keep a long time and to take extra precautionary measures when handling tissue/blood)</td>
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<td>Complications: MOF</td>
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<td>Dx: Doxy</td>
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<td>Cat Scratch Disease</td>
<td>Bartonella henselae (GNR)</td>
<td>S/S:</td>
<td>papulopustular rash followed by lymphadenitis w/ mild constitutional symptoms</td>
<td>Dx: Serology, Bx, BCx, PCR</td>
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<td>Complications: Bacillary Angiomatosis (vascular skin lesions), Endocarditis, Oroya Fever (different species, high fever and hemolytic anemia and verruga peruanna aka purple skin lesion, seen mainly in Andes Mountains), CNS, Peliosis Hepatitis</td>
<td>Tx: Doxy</td>
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<td>Psittacosis</td>
<td>Chamydia psittaci (GNR)</td>
<td>S/S:</td>
<td>Atypical PNA w/ Horder’s Spots (face rash)</td>
<td>Dx: Serology</td>
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<td>Complications: epistaxis, phlebitis, culture negative IE, hepatitis</td>
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<td>Tx: Doxy</td>
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<td>Anthrax</td>
<td>Bacillus anthracis (GPR)</td>
<td>S/S:</td>
<td>“Inhalation Anthrax” (inhal spore: flu-like illness followed by hemorrhagic mediastinitis w/ characteristic widened mediastinum and bilateral bloody pleural effusions followed by ARDS (terrorist event)) vs “Cutaneous Anthrax” (contact spore: painless lesion/ulcer that then turns into a black eschar with regional painful LAD and induration (farmer) vs “GI Anthrax” (ingest spore: cervical LAD, oropharynx black eschars, N/V, ab pain, bloody D)</td>
<td>Dx: Culture, Serology</td>
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<td>Complications: death esp if inhalational</td>
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<td>Plague</td>
<td>Yersinia pestis (Macrophage obligate intracellular parasite)</td>
<td>S/S:</td>
<td>“Bubonic Plague” (flea bite resulting in suppurative lymphadenitis aka “bubo”, prostration, intense thirst, GI Sx, etc) vs “Pneumonic Plague” (inhalation of bacteria resulting in pneumonia w/ profuse watery blood tinged sputum, encephalopathy, etc, very contagious hence can be used as a bioterrorist agent)</td>
<td>Dx: Culture, Serology of Bubo, Sputum, Serum</td>
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<td>Complications: hemorrhagic necrosis of various organs followed by death aka “Black Death” which is 100% if unTx and 5% if Tx</td>
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