



June 14, 2022

Agenda

- Peter Bulger, MD: *Tick-Borne Diseases of the TASP Region*
- Case Discussions
- Open Discussion

Outline

1. Introduction
2. Ticks
3. Diseases
4. Take-homes

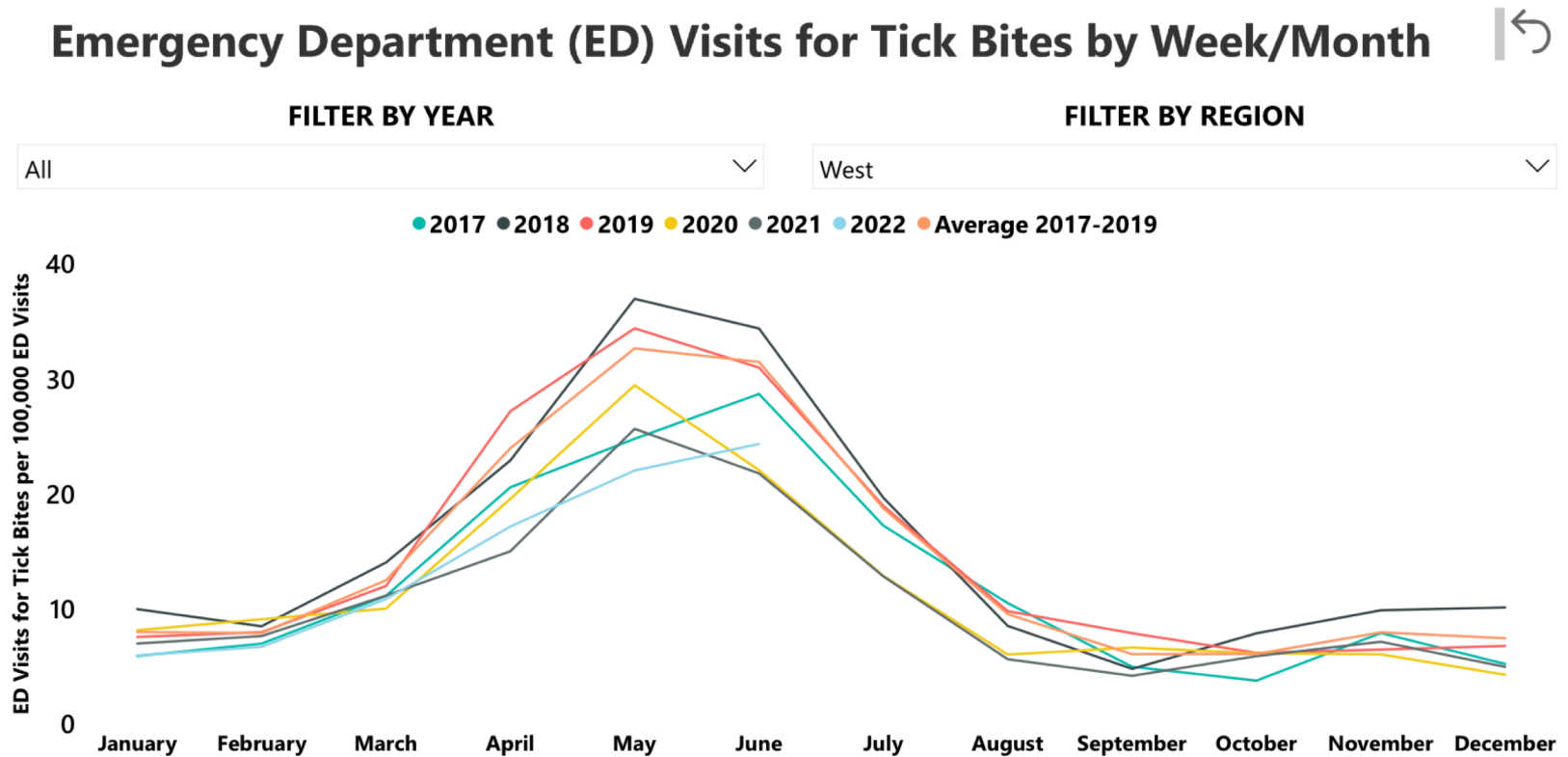


Introduction

- Apologies to Maine
- When looking at epidemiology, pay attention to county of residence vs county of exposure
- People don't always remember the tick bite – think about outdoor exposures and make sure someone looks at their skin



It's tick season



<https://www.cdc.gov/ticks/tickedvisits/tick-bite-by-week-month.html>



TASP Ticks

- American Dog Tick
- Brown Dog Tick
- Rocky Mountain Wood Tick
- Western Blacklegged Tick



American Dog Tick

Dermacentor variabilis

Sometimes called Wood Ticks

Tularemia, RMSF

Highest risk in spring and summer



Brown Dog Tick

Rhipicephalus sanguineus

RMSF (in the SW US and along
US-Mexico border)

Dogs are primary host but may
also bite humans and other
mammals

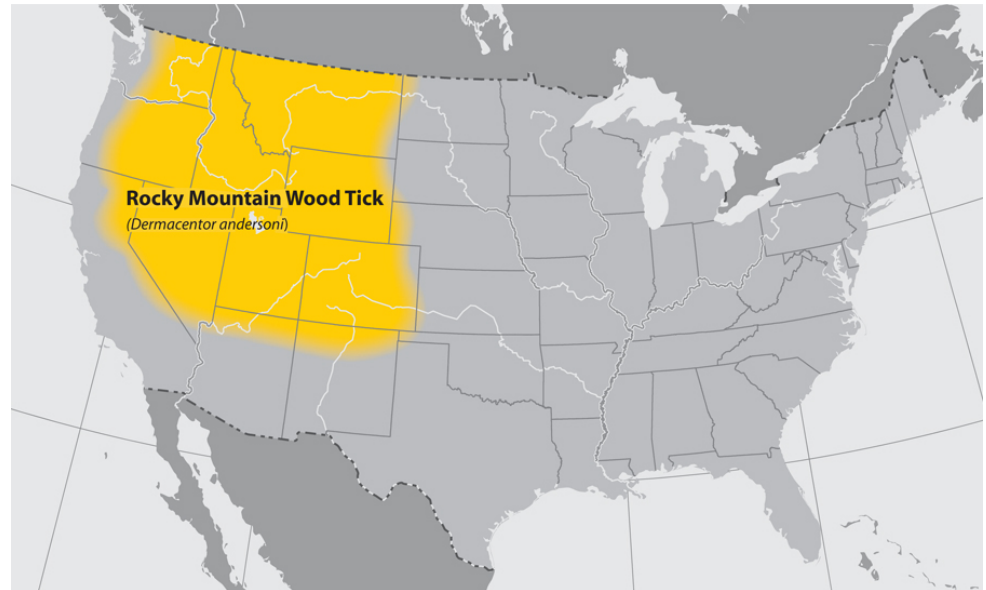


Rocky Mountain Wood Tick

Dermacentor andersoni

RMSF, Colorado Tick Fever and
Tularemia

Adult ticks feed primarily on
large mammals while larvae and
nymphs feed on small rodents.
Adult ticks primarily associated
with disease transmission to
humans



Western Blacklegged Tick

Ixodes pacificus

Anaplasmosis, Babesiosis, Lyme disease

Nymphs feed on lizards and small animals, so rates of infection are low (~1%) in adults. Nymphs and adult females most likely to bite humans.



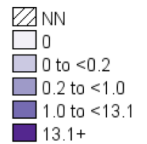
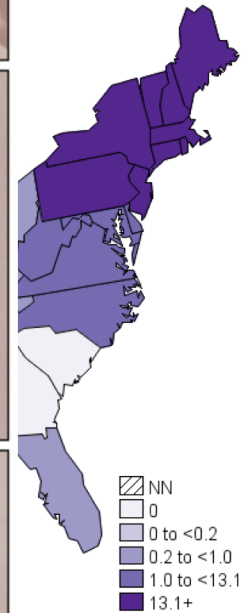
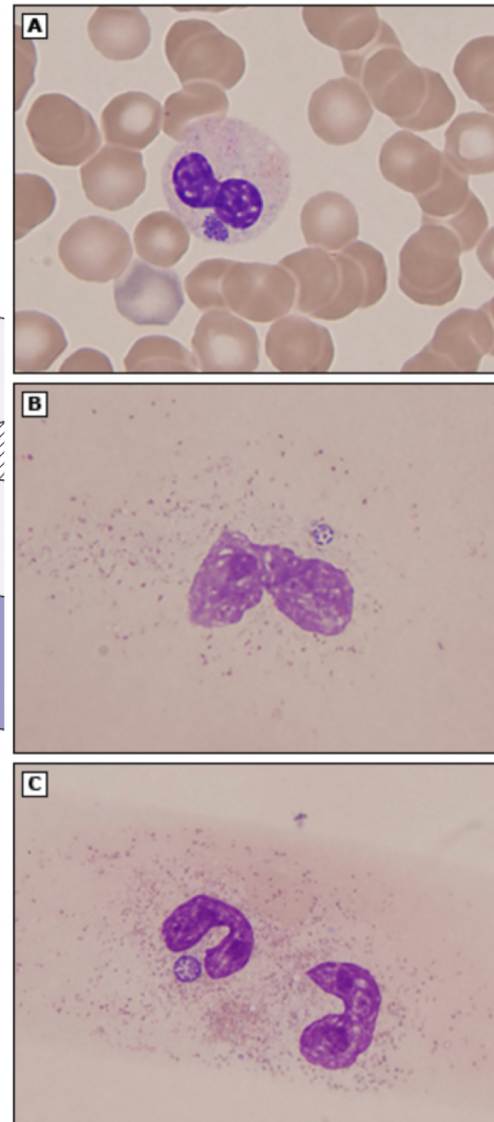
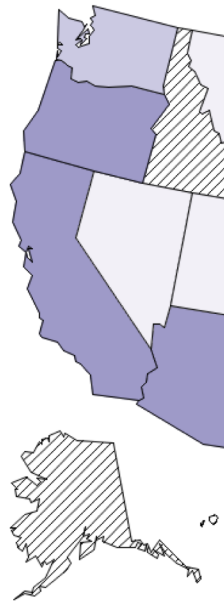
The Diseases

- Anaplasmosis
- Babesiosis
- Lyme Disease
- Rocky Mountain Spotted Fever
- Tularemia
- Colorado Tick Fever
- Tick-Borne Relapsing Fever
- Tick Paralysis



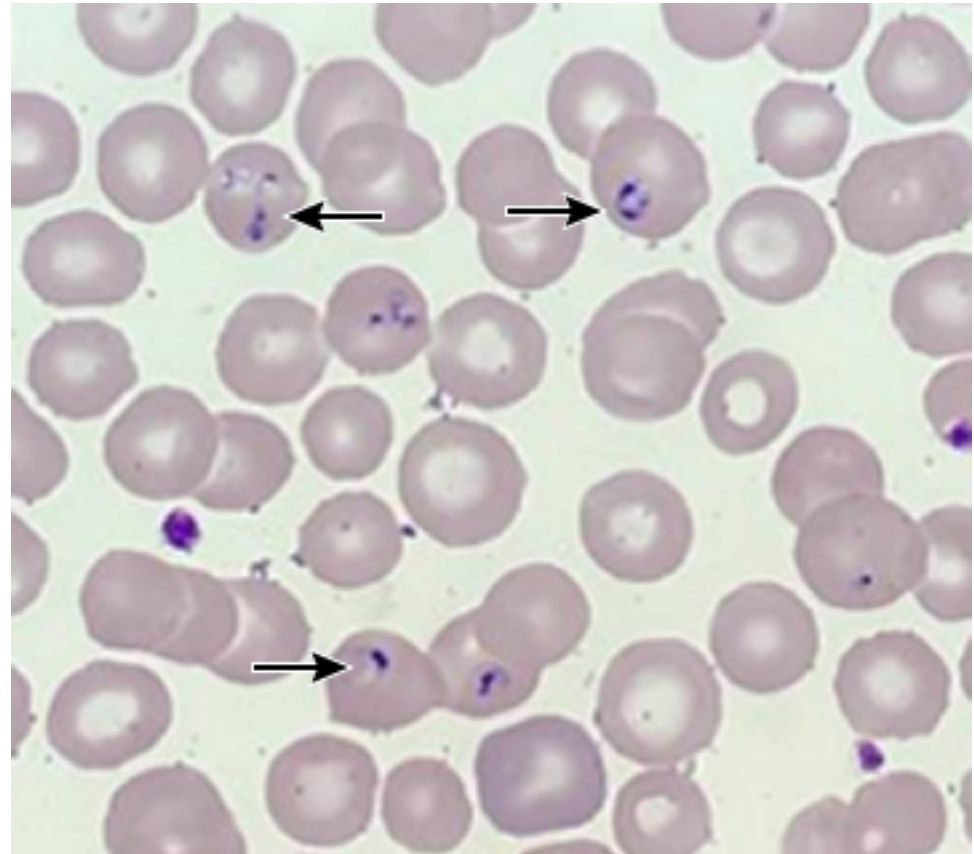
Anaplasmosis

- *Anaplasma phagocytophilum*
- Western Blacklegged Tick
- Symptoms in 1-2 weeks: fever, malaise, myalgia, headache
 - Septic shock rare
 - Rash? Consider co-infection
- Labs: ↓WBC, ↓plts, ↑AST/ALT
- Diagnosis: PCR, paired serology, blood smear (**morulae**)
- Treatment: doxy



Babesiosis

- *Babesia microti*
- Western Blacklegged Tick
- Symptoms in 1-4 weeks: fever, malaise, myalgia, fatigue, cough
 - **Severe/relapsing disease in immunosuppressed, asplenia, older pts**
 - Rash? Consider co-infection
- Labs: **hemolysis**, ↓plts, ↑AST/ALT, ↑creatinine
- Diagnosis: PCR, paired serology, blood smear (**malaria-like**)
- Treatment: azithromycin and atovaquone, exchange transfusion for severe disease

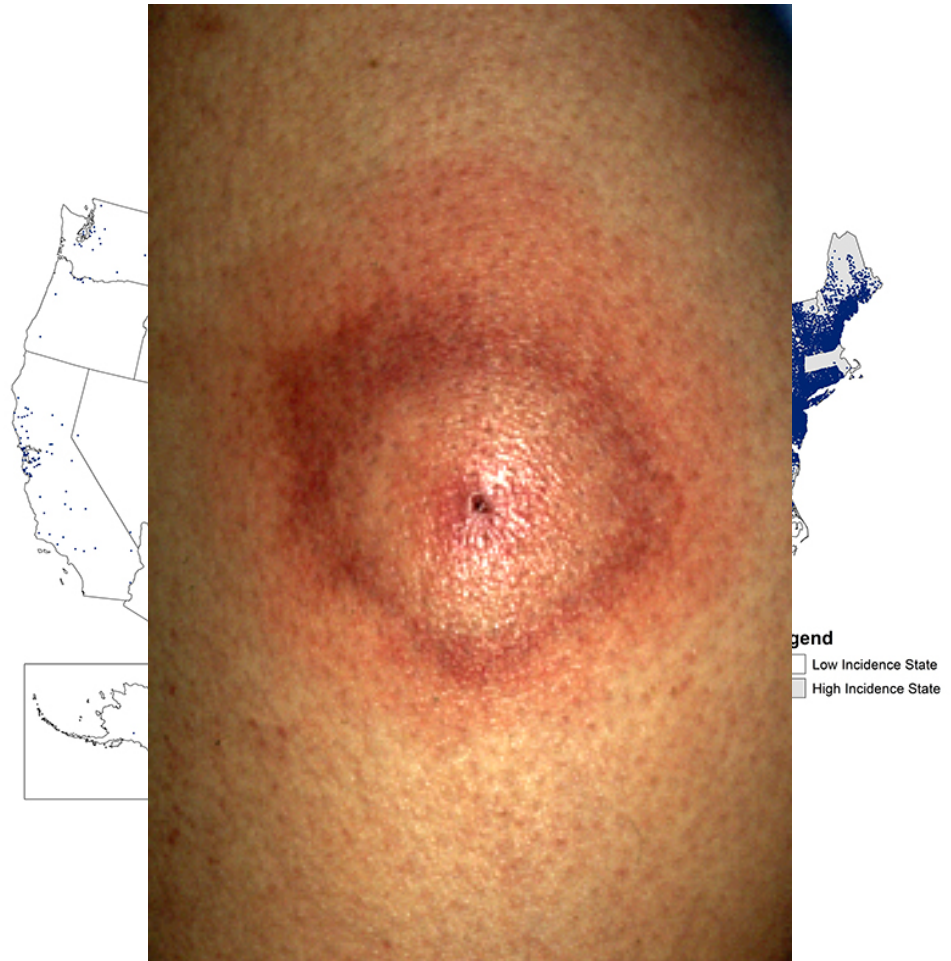


2017 data



Lyme Disease

- *Borrelia burgdorferi*
- Western Blacklegged Tick
- **Erythema migrans** and viral syndrome w/in 1 month
- Early disseminated dz in weeks-months: migratory arthritis > multiple EM > neurologic > cardiac dz
- Late disseminated dz in months-years: mono/oligoarthritis, rare neurologic dz
- Diagnosis: clinical (EM), two-tiered serology + clinical for disseminated dz
- Treatment: doxy, with beta lactams as backup



Sources: <https://www.cdc.gov/lyme/datasurveillance/maps-recent.html>

Hu, L. Clinical manifestations of Lyme disease in adults. UpToDate. Accessed 6/13/22.

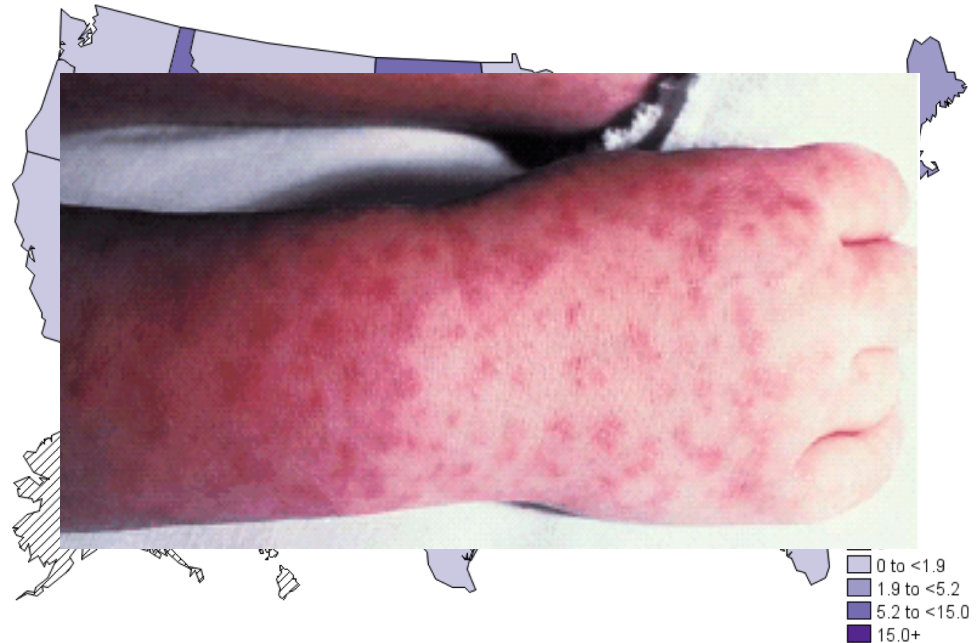
Hu, L. Diagnosis of Lyme disease. UpToDate. Accessed 6/13/22.

Hu, L and Shapiro, ED. Treatment of Lyme disease. UpToDate. Accessed 6/13/22.



RMSF

- *Rickettsia rickettsii*
- American Dog Tick, Brown Dog Tick, Rocky Mountain Wood Tick
- Symptoms within 2 weeks: fever, malaise, myalgia, headache, arthralgias
 - **Rash 3-5 days after fever**
- **Severe dz after day 5:** AMS/coma, ARDS, necrosis, multiorgan failure
- Labs: non-specific, ↓plts
- Diagnosis: paired serology, PCR, but don't wait!
- Treatment: doxy! **Delay associated with mortality**



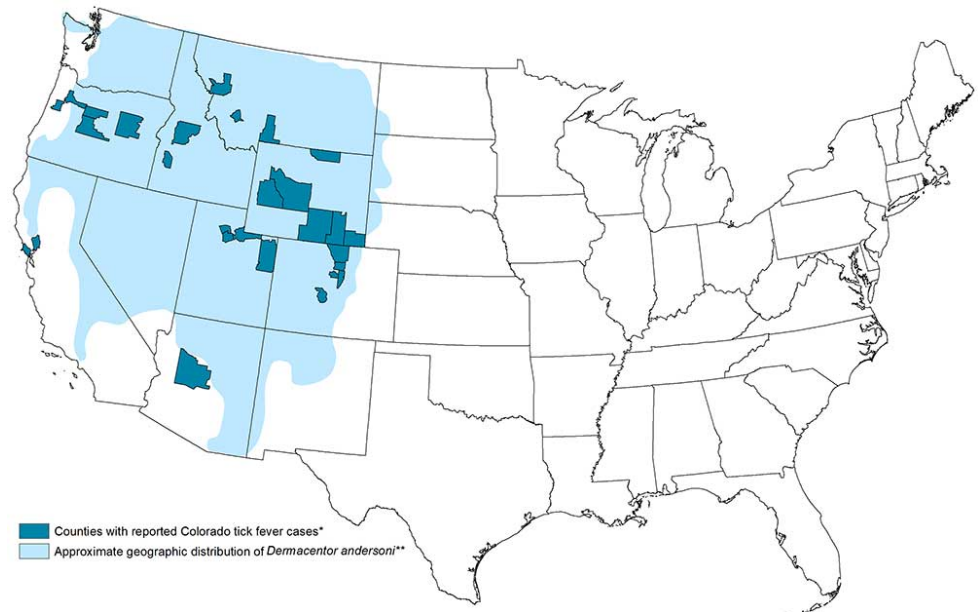
Tularemia

- *Francisella tularensis*
- American Dog Tick and Rocky Mountain Wood Tick
- Symptoms in 3-5 days: fever, chills, malaise, headache
- Ticks most often cause **ulceroglandular disease**
- **Secondary rashes common**
- Labs: non-specific
- Diagnosis: paired serology, culture (notify lab!)
- Treatment: cipro or doxy, gentamicin for severe dz



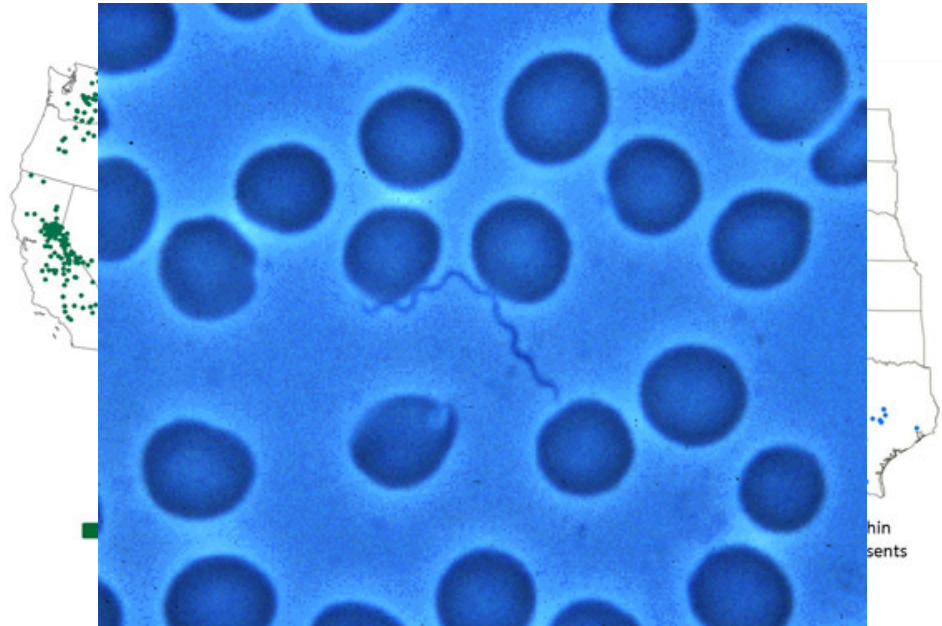
Colorado Tick Fever

- A virus in the genus *Colitivirus*
- Rocky Mountain Wood Tick (**4,000-10,000 ft elevation**)
- Symptoms in 1-14 days: fever, chills, malaise, myalgia
 - **Biphasic illness and prolonged fatigue common**
 - **Maculopapular/petechial rash**
 - Rare severe cases with CNS or other end-organ disease
- Labs: ↓WBC, maybe ↓plts
- Diagnosis: PCR, serology (may take 10-14d to convert)
- Treatment: supportive



Tick-Borne Relapsing Fever


- *Borrelia hermsii*
- *Ornithodoros hermsi* – “soft ticks” – live in **rodent-infested cabins at 3,000-10,000 ft**
- **Bites occur at night, in <30 min**
- Symptoms w/in 2 weeks: **relapsing fever, rigors, myalgia, arthralgia, headache**
- Exam: often splenomegaly, CN palsies, but no rash
- Labs: non-specific
- Diagnosis: thick/thin smears (**spirochete**), PCR
- Treatment: PCN or CTX, doxy as backup
 - Watch for Jarisch-Herxheimer





Tick-borne Relapsing Fever

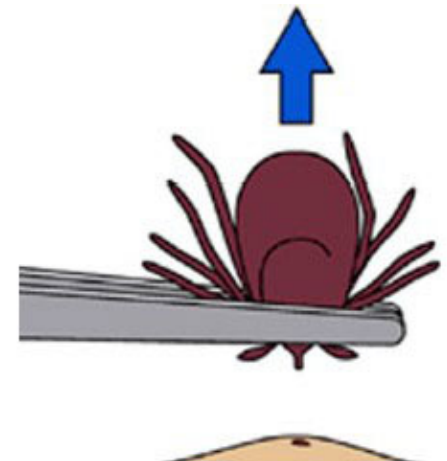
Tick-borne Relapsing Fever

Fact sheet: [Be aware of tick-borne relapsing fever \(TBRE\)](#)  [PDF – 1 page]



Tick Paralysis

- **Not an infection - neurotoxins in saliva affect motor nerves**
- Most associated with Rocky Mountain Wood Tick and American Dog Tick
- Symptoms after 4-7 days of female tick feeding: fatigue, weakness, ataxia
 - Can involve facial/bulbar muscles
 - Paralysis can isolate to face, one limb
 - **Ascending paralysis** leads to respiratory failure, death
- Exam shows a tick – get it!



Summary

- Tick season is now!
- Think about these diseases if people have an outdoor exposure, even if they don't remember a bite
- Many symptoms are similar, but remember the defining features
- When in doubt, doxy!

