

TICKBORNE DISEASES EAST OF THE CASCADES

"Location, Location, Location"

– Anonymous

Oregon STRF cases, 2009-2024, by Exposure and County of Residence (shaded). n=40

Bottom Line Up Front

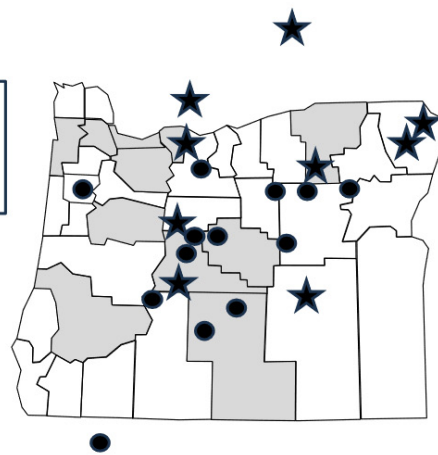
If you're seeing a patient with what looks like a tickborne illness and whose only exposure is east of the Cascades (in Oregon), then please call us at 971-671-1111. Commercial tests for soft tick relapsing fever (STRF) and Colorado tick fever (CTF) are few and far between, and "tick-borne disease panels" generally don't include those tests. We should be able to help.

Background

This is the first of a multi-part series on tickborne diseases most likely to be acquired in Oregon, starting in counties east of the Cascade Mountains. Vector tick populations are quite different east and west of the Cascades, and with a couple of small exceptions, the vector of Lyme disease (LD) is found only on the western side. In this issue, we will refer to LD only with regard to its potential to induce anti-*Borrelia* antibodies that cross react with those of STRF. We'll focus on tick diseases of western Oregon in a later issue.

All of Oregon's tickborne diseases are relatively uncommon, especially those acquired east of the Cascades. This *CD Summary* focuses on soft tick relapsing fever (STRF) and Colorado tick fever (CTF), annual incidence rates of which are 0.8 and 0.3 per million Oregonians, respectively. Only a few cases are reported each year, but we believe many cases are missed due to difficulties in clinical diagnosis and testing.

Areas Exposed



Soft tick relapsing fever (STRF)

STRF is caused by the spirochete *Borrelia hermsii*, which induces antibodies that cross-react with those against *Borrelia burgdorferi*, the agent of LD.¹ The incubation period of STRF is about seven (range 4–21) days, and patients typically present with recurrent febrile episodes lasting around three days separated by afebrile periods of around seven days.² Diagnosis can be challenging, depending on the phase of the illness; a recent case from Central Oregon presented with a seven-week course of fever of unknown origin, whereas a 50-something man from the same area presented to an emergency department with a 3-day history of intermittent drenching sweats with rigors, diarrhea, fatigue and decreased oral intake.^{3,4} During the febrile crisis at the peak of spirochetemia, a simple peripheral blood smear will often reveal spirochetes with approximately 70% sensitivity.⁵ Both aforementioned Oregon patients were blood-smear-positive. PCR testing is also highly

sensitive when performed pre-treatment or early in the treatment course. Serologic (antibody-based) tests can be useful, but many are not standardized and do cross-react with antibodies induced by *Borrelia* species including *B. burgdorferi*. Like any serological test for tickborne diseases, it's important to obtain both acute and convalescent titers, 3–4 weeks apart.

CDC recommends treating both children and adults with doxycycline for 7–10 days.⁶ (Note that doxycycline is now considered safe for children of all ages for durations less than 28 days). Macrolides such as azithromycin have also been used, and when IV antibiotics are needed, Pen G or Ceftriaxone have the best data to support their use.

For pregnant women or those with central nervous system infection, initiating treatment with IV antibiotics (e.g., penicillin G or ceftriaxone) is indicated, and close observation and specialty consultation are warranted. In cases of meningitis, ceftriaxone 2 g IV daily for 10–14 days is recommended.

As is the case with treatment of syphilis, killing of the spirochetes causing STRF can cause a Jarisch-Herxheimer reaction resulting in hypotension, fever, tachycardia, and rash. The reaction is usually mild and lasts only 12–24 hours, but rarely, it can be severe, so it's wise to observe a patient following treatment initiation. Relapse has been documented after treatment, in which case re-treatment and specialty consultation are recommended. Fortunately, STRF usually responds well to treatment, and long-term sequelae are rare. Twenty-two (55%) of 40 Oregon cases during 2009–2024 were hospitalized for a median of two (range 1–7) days. All recovered; however, STRF may be fatal in 5%–10% of untreated cases.

Getting exposure history is critical in diagnosing STRF. Disease onsets can occur any month of the year. Ask about stays in rustic cabins or even multimillion dollar homes, at elevations >1,500' within 21 days of disease onset. Because this disease is caused by "nesting" soft ticks (*Ornithodoros hermsi* in Oregon) that typically use diurnal rodent nests, e.g., golden-mantled ground squirrels, chipmunks, etc., these soft ticks crawl out of the woodwork and are on and off a host in minutes, leaving little evidence of their visitation, unless the victim has the rude awakening of finding them engorged and in their bedsheets scurrying to make it back to their nests. Check out our video of a few of these ticks that were discovered in a central Oregonian's bedsheets: www.oregon.gov/ticks

More than half of our STRF cases are associated with clusters associated with a shared dwelling, oftentimes over a several-year period. Five of nine Oregon STRF clusters have been associated with hunting cabins in Harney, Umatilla, and Wallowa counties; and one hunting cabin in Okanogan County, Washington. Other Oregon patients have been exposed in Whitman County, Washington, as well as a high-elevation camp site in Siskiyou County, California. One STRF case was reported to have stayed in a high-elevation cabin in Polk county, Oregon, but was lost to follow up.

Colorado Tick Fever (CTF)

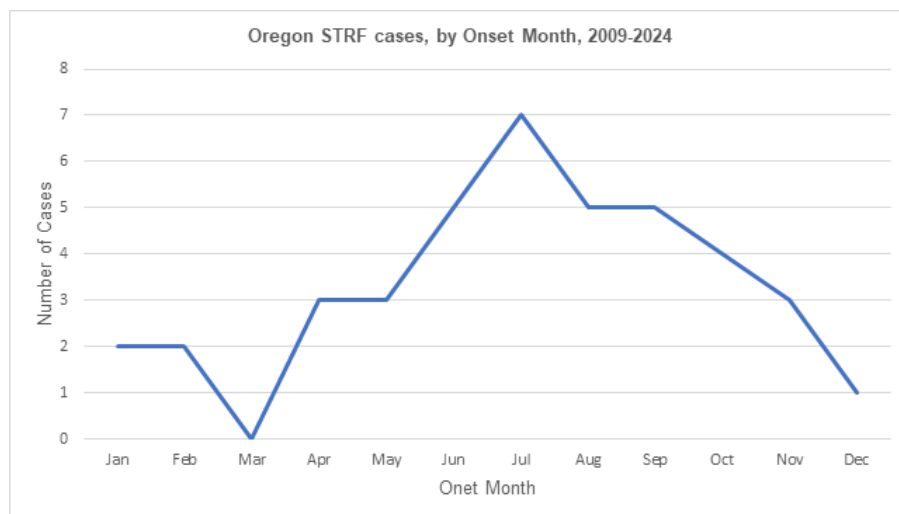
CTF is caused a tickborne virus in the genus *Coltivirus* (family *Reoviridae*) and vectored by the Rocky Mountain wood tick (*Dermacentor andersoni*), endemic to mountainous regions of western North America above 3,200' elevation, including the high desert

areas of Oregon, where it typically quests in mid-spring and early summer.⁷ The CTF incubation period is usually 3–4 (range 1–14) days. Two-thirds of Oregon-acquired CTF cases have disease onsets in April or May, the remaining third in June and July. We have not recorded CTF onsets outside the April–July window.

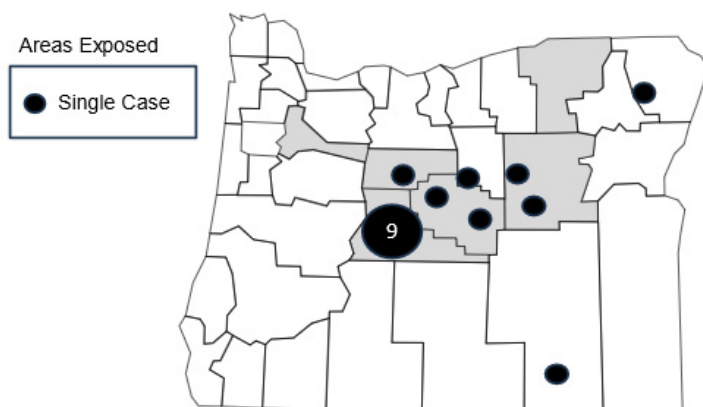
CTF patients usually present with fever, chills, headache, myalgia, fatigue, leukopenia, and thrombocytopenia; about half of patients have a "biphasic" fever, meaning they have several days of fever, feel better for several days, and then have a second short period of fever and illness.⁸ Transmission via blood or bone marrow transfusion is possible. There is no specific treatment. CTF-infected patients should defer blood or bone-marrow donation for 6 months after illness. CDC has a handy CTF pocket guide for download.⁹

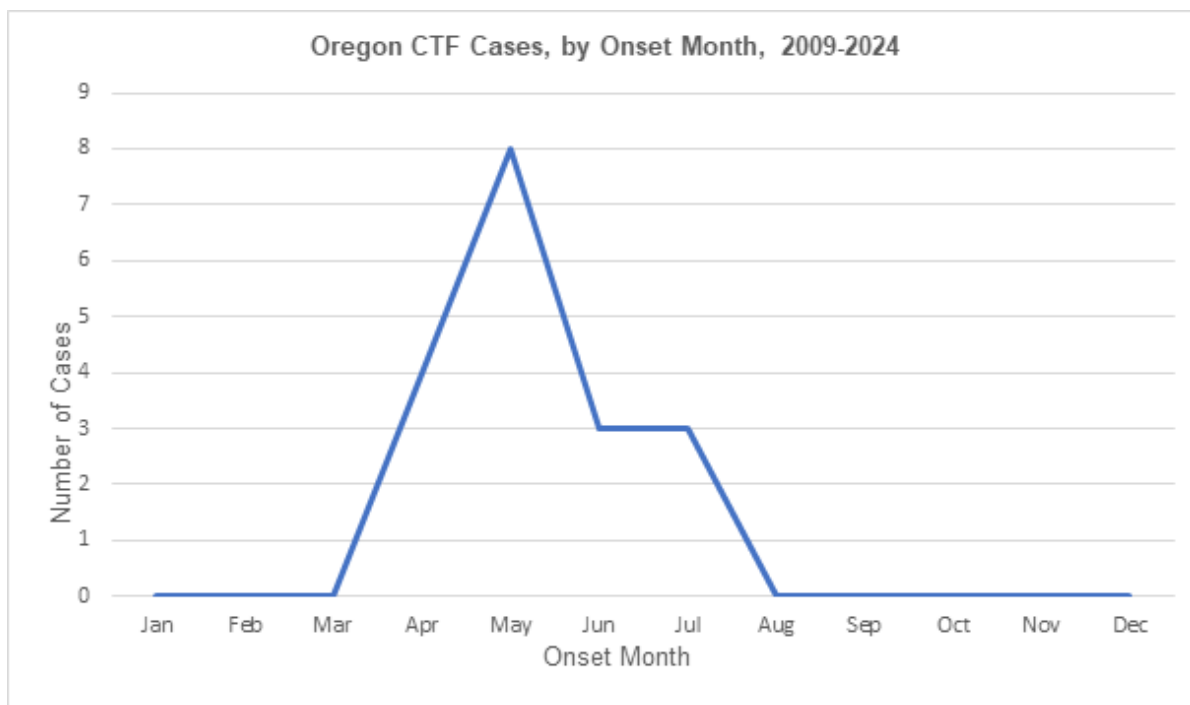
Please call your local public health authority (see www.healthoregon.org/lhddirectory), or the Oregon Health Authority (OHA) Public Health Division at 971-673-1111 for testing guidance testing; many commercial labs don't test for it. Stay tuned for an upcoming issue on the West Side Tick Story, and never hesitate to call us in the meantime to talk ticks.

Bottom line redux: Call your [local public health authority](#), or the OHA Public Health Division at 971-673-1111 for testing guidance testing;



Oregon CTF Cases, 2009 -2024, by exposure and County of Residence (shaded). n=18





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many commercial labs don't test for STRF or CTF.

How to Report

Consider using our on-line reporting page to report any reportable disease: healthoregon.org/onlinemorbidityform.

For more information

OHA's tick webpage: www.oregon.gov/ticks

General Disease Reporting: healthoregon.org/diseasereporting

Citations

1. Beeson AM, Kjemtrup A, Oltean H, et al. Soft Tick Relapsing Fever—United States, 2012–2021. *MMWR* 2023;72:777–81. DOI: <http://dx.doi.org/10.15585/mmwr.mm7229a1>
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3. Mitchell PG, Natsios C, Haag MB, Qin X, Vaz LE. Relapsing fever: a rare cause of pediatric fever of unknown origin. *Clinical Pediatrics*. 2023;62:1285–9. doi:10.1177/00099228231154129
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6. Centers for Disease Control and Prevention. Available at <https://www.cdc.gov/relapsing-fever/hcp/soft-tick-relapsing-fever/index.html> Accessed 25 February 2025
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9. Centers for Disease Control and Prevention. Colorado Tick Fever Pocket Guide. Available at www.cdc.gov/colorado-tick-fever/media/pdfs/adbtickfeverpocketguide.pdf. Accessed 22 February 2025.



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