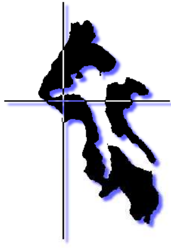

ISLAND COUNTY HEALTH DEPARTMENT
ENVIRONMENTAL HEALTH

Main Office ☎Whidbey (360) 679-7350☎From S. Whidbey (360) 321-5111
☎From Camano (360) 629-4522, Fax (360) 679-7390
Camano Office ☎(360) 387-3443, Fax (360) 387-6161
www.islandcounty.net/health

HEALTH INFORMATION BULLETIN (HIB)

HIB #105 **TICKS**

Topics covered in this HIB:

- Tick-borne Diseases
- Tick Identification
- Tick Testing
- Tick Distribution in Washington

Tick-Borne Diseases in Washington

Relatively little is known about the ecology and epidemiology of tick-borne diseases in Washington State. Six tick-borne diseases are believed to be indigenous in Washington: Lyme disease, relapsing fever (TBRF), tularemia, babesiosis, Rocky Mountain spotted fever (RMSF), and tick paralysis. Relapsing fever is the most common tick-borne disease acquired in Washington, although travel-associated Lyme disease is reported more often. Tick paralysis is not a Notifiable condition, so the frequency of occurrence in Washington is unknown. Rocky Mountain spotted fever and babesiosis very rarely occur here. Two unrelated cases of babesiosis in Washington (1994 and 2002) were caused by previously unknown species of the organism. Tularemia can be tick-borne, although in Washington, it is more commonly associated with exposure to mammals.

Transmission of Lyme disease requires prolonged tick attachment (at least 24-48 hours). Incubation period is 3 to 32 days after tick exposure (mean 7 to 10 days). Lyme disease most often presents with a characteristic “bulls-eye rash” (erythema migrans), accompanied by nonspecific symptoms such as fever, malaise, fatigue, headache, muscle aches (myalgia), and joint aches (arthralgia). The signs of disseminated infection occur days to weeks after the erythema migrans lesion, and may manifest as heart block, neurological disease (lymphocytic meningitis, cranial neuropathy, especially facial nerve palsy, and radiculoneuritis), migratory joint pain, or myocarditis.

Infectious Disease Society of America guidelines for Lyme disease suggest that antibiotic prophylaxis should not be recommended to persons bitten by a tick in Washington State (Washington does not have a demonstrated local rate of infection of ticks with *B. burgdorferi* – approximately 20%). Treatment should be based on the patient’s clinical presentation.

Tick Identification at the Public Health Laboratories

The Department of Health Public Health Laboratories (DOH PHL) and Centers for Disease Control and Prevention (CDC) do **NOT** test ticks for agents of disease (bacteria, viruses). However, DOH PHL will identify species of tick removed from a human. Because the PHL is a clinical laboratory, the tick must be submitted by a health care provider. Results will be sent to the provider in the same way other PHL clinical specimen results are communicated (generally fax or mail).

Tick Identification Protocol

LHJ receiving call from a health care provider:

A health care provider can request tick identification when a tick is removed from a human. The tick should be removed properly to ensure the mouthparts remain intact. If the mouthparts are not intact, identification may not be possible. Guidelines on tick removal can be found on the CDC website: http://www.cdc.gov/ncidod/dvbid/lyme/ld_tickremoval.htm

1. The HCP should contact the LHJ to request tick identification at PHL.
2. LHJ can call Rebecca Baer or another epidemiologist at DOH Communicable Disease Epidemiology at (206) 418-5500 to request tick identification.
3. LHJ must obtain a travel history from the patient before submitting any tick.
4. Ticks approved for identification should be placed in a sealed **unbreakable** container. Ticks can be sent alive or dead and sent with a parasitology form (http://www.doh.wa.gov/EHSPHL/PHL/Forms/Parasitology.pdf) to:

Washington State Public Health Laboratories
Attn: Parasitology
1610 NE 150th St.
Shoreline, WA 98155

Tick Testing

Ticks are not tested for *B. burgdorferi* (the agent of Lyme disease) in Washington through the public health system because the need for treatment should be based on symptoms, not positive or negative results from the tick.

If a tick tests negative, other undetected ticks may have been attached to a person and transmitted the agent of Lyme disease. It is also possible that the results may be a false positive. In addition, the tick could be infected with other agents of disease. If the tick tests positive for *B. burgdorferi*, it is still unknown if the agent was transmitted to the host (keeping in mind that it usually takes at least 24-48 hours for bacteria to be inoculated into the host). Or, the test could be a false positive. For all these reasons, clinicians are encouraged to make treatment and testing decisions based on the clinical presentation of the patient.

However, if a provider wants to test a tick to provide more information, some commercial laboratories provide tick testing for a fee. The most common tests are for *B. burdorferi* and use DFA, IFA, or PCR. Ticks need to be submitted alive for DFA or IFA but can be dead for PCR. Live ticks should be stored in a tightly sealed plastic bag with a slightly moist cotton ball or tissue and stored in a cool place. Dead ticks can be stored in a small jar with alcohol.

Utility of tick identification

Knowing the vector tick can help to determine which pathogens should be considered if a bitten person develops tick-borne disease (Table 1).

Table 1.

Tick-Borne Diseases in the Washington			
Disease	**Causative Agent**	**Classification**	**Major Vector in Washington**
Lyme Disease	*Borrelia bugdorferi*	Bacteria	*Ixdoes*
Relapsing Fever	*Borrelia hermsii*	Bacteria	*Ornithodoros*
Tularemia	*Francisella tularensis*	Bacteria	*Dermacentor*
Rocky Mountain spotted fever	*Rickettsia rickettsii*	Rickettsia	*Dermacentor*
Babesiosis	*Babesia* species	Protozoa	*Ixodes*
Tick paralysis	Neurotoxin	Toxin	*Dermacentor*

Limitations of tick identification

Identification of a tick can provide additional information to a health care provider, however, decisions to test and treat should be based on the patient's symptoms e.g. An asymptomatic patient should not be treated for Lyme disease only because an embedded *Ixodes* tick was identified.

Tick Distribution in Washington

The distribution of ticks, in particular those that are potential vectors for human disease is not well studied and laboratory testing for bacterial agents such as *Borrelia burgdorferi* has not been done on collected ticks. Limited collections done in 1989 (> 2100 ticks), 1999 (<150 ticks) and 2001 (<60 ticks) showed that *Ixodes* species occur in Western Washington and *Dermacentor* species occurs throughout the state (Table 2).

Table 2. Species of hard ticks identified in Washington State, 1989,1999, 2001.

Genus	**Species**	**N**	**% total**
Ixodes	*angustus*	371	15.9
	pacificus	244	10.5
	Unknown	111	4.8
	Other (6 spp.)	51	2.2
Total *Ixodes*		**777**	**33.3**
Dermacentor	*andersoni*	714	30.6
	variablis	691	29.6
	albipictus	29	1.2
	Unknown	123	5.3
Total *Dermacentor*		**1557**	**66.7**
Total		2334	

Reference

Wormser GP et al. The Clinical Assessment, Treatment, and Prevention of Lyme Disease, Human Granulocytic Anaplasmosis, and Babesiosis: Clinical Practice Guidelines by the Infectious Diseases Society of America. Clin Infect Dis. 2006; 43:1089-1134 Available at: http://www.journals.uchicago.edu/CID/journal/issues/v43n9/40897/40897.text.html - fn1#fn1http://www.journals.uchicago.edu/CID/journal/issues/v43n9/40897/40897.text.html - fn2#fn2http://www.journals.uchicago.edu/CID/journal/issues/v43n9/40897/40897.html

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Other Informational Resources

- http://www.islandcounty.net/health

NOTE: The information presented within this Health Information Bulletin (HIB) is provided to assist with the clarification of a detailed and complex process generally involving rules and regulations. The information contained in this HIB may not provide a complete description of all the required elements of a permit process; therefore, it is always recommended that an applicant review the pertinent regulation or discuss their plans with a Health Department representative.