

SCA Protocol for the Prevention of Tick-Borne Illness

Because SCA has experienced increased incidence of embedded ticks and Lyme disease, when working in areas with known high populations of ticks **and based on a job hazard assessment**, the following protocol for the prevention of tick borne illnesses has been developed.

1. Cease or do not engage in service in areas with an unmanageably high exposure to ticks and Lyme disease.
2. Wear and use protective clothing/equipment
 - Long sleeve shirts
 - Long pants
 - Hats (for work not requiring hard hats)
 - Gaiters
3. Use a chemical barrier
 - Treat clothing/equipment (clothing, hats, gaiters, boots) with permethrin to repel and disable ticks.
4. Perform a daily visual inspection
 - Inspect body thoroughly for ticks, paying special attention to the waistband of clothing, back of neck, armpits and groin. It may be helpful to have someone assist in this inspection.
5. Remove ticks as soon as they are seen.
6. Carefully monitor for yourself and others for signs and symptoms of tick borne illnesses.
7. Seek medical attention after signs and symptoms of a tick borne illness appear.

Protocol for Treatment of Clothing with Permethrin

The SCA, similar to the EPA, has determined that the benefits of permethrin outweigh the risks. Permethrin is an extremely effective insecticide relative to ticks, does not have significant implications for human health, and, when used correctly, poses little environmental risk.

SCA participants should treat boots, gaiters, pants, hats (for sites on which hard hats are not required) and shirts with permethrin spray every two weeks, or as directed by the manufacturer.

General Guidelines

- Treat clothing with permethrin in a windless but well-ventilated area, away from water sources and insect populations (particularly bees) to reduce the effects of permethrin on aquatic life and insects
- **Wear latex or vinyl gloves (all applications) and a facemask or bandana over nose and mouth (aerosol application)**
- Wait until clothing is completely dry before wearing

- Retreat clothing after several washes or after a couple of weeks, according to the manufacturer's suggestions.

Background

In many areas in the United States, tick-borne illnesses (such as Lyme disease) are on the rise. In the years between 1992 and 2006, the annual count of incidences of Lyme disease increased 101%.¹ Even though Lyme disease has been reported in 49 of 50 states in the U.S., about 99% of all reported cases are confined to five geographic areas (New England, Mid-Atlantic, East-North Central, South Atlantic, and West North-Central).²

Permethrin Information

The CDC recommends that anyone, including pregnant women and children, traveling in areas where disease-carrying insects are present, use permethrin-containing repellents on clothing, shoes, bed nets, and camping gear to help prevent diseases transmitted by insects. Permethrin is highly effective both as an insecticide and as a repellent for ticks, mosquitoes, and other arthropods.³

Permethrin has been shown to be a safe preventative measure. The CDC states that there appears to be little potential for toxicity from permethrin-treated clothing.⁴ Permethrin "has low mammalian toxicity, is poorly absorbed through the skin and is rapidly inactivated by the body."^{5 6} Exposure to permethrin from wearing permethrin treated garments at the recommended concentrations is unlikely to cause skin sensitization or other skin effects on humans.⁷

Permethrin is used widely in the United States as the active ingredient in shampoos and lotions.⁸ Permethrin is also commonly found in pet flea shampoos, lice shampoos, and on agricultural crops, particularly fruits and vegetables.⁹

¹ Centers for Disease Control and Prevention (CDC): "Surveillance for Lyme Disease, United States 1992-2006" <http://www.cdc.gov/mmwr/preview/mmwrhtml/ss5710a1.htm>

² CDC: "Lyme Disease Statistics" http://www.cdc.gov/ncidod/dybid/lyme/ld_statistics.htm

³ CDC: "Traveller's Health – Yellow Book" <http://wwwn.cdc.gov/travel/yellowBookCh2-InsectsArthropods.aspx>

⁴ CDC: "Traveller's Health – Yellow Book" <http://wwwn.cdc.gov/travel/yellowBookCh2-InsectsArthropods.aspx>

⁵ Kirby C. Stafford III: "Ticks and Tick Control" (June 2007) Connecticut Department of Forestry and Horticulture <http://www.ct.gov/caes/cwp/view.asp?a=2815&q=376736>

⁶ Extension Toxicology Network: "Pesticide Information Profile" <http://pmep.cce.cornell.edu/profiles/extoxnet/metiram-propoxur/permethrin-ext.html>

⁷ Commission on Life Sciences: "Health Effects of Permethrin-Impregnated Army Battle-Dress Uniforms" (1994) http://www.nap.edu/openbook.php?record_id=9274&page=109

⁸ Public Broadcasting System: "Last Battle of the Gulf War" <http://www.pbs.org/wgbh/pages/frontline/shows/syndrome/analysis/pesticides.html>

⁹ EPA: "Permethrin and Resmethrin – TEACH Chemical Summary" (2007) http://www.epa.gov/teach/chem_summ/pyrethroids_summary.pdf

In registering permethrin as an approved insecticide, the EPA “considered post-application exposure to... permethrin treated clothing. All scenarios were below the Agency’s non-cancer and cancer LOCs [level of concern].”¹⁰ The EPA also stated that all postapplication cancer risk estimates for both populations [military personnel and garment workers exposed to permethrin-impregnated clothing] were in the 10⁻⁶ range and do not exceed the EPA’s level of concern.¹¹

Permethrin used as an insecticide to protect agricultural interests is highly toxic to both freshwater and estuarine aquatic organisms.¹² Permethrin is also highly toxic to honeybees, as well as other beneficial insects.¹³ The EPA regulates the use of permethrin when used in emulsifiable concentrates and ready-to-use formulations because of the possible adverse effects on aquatic organisms.¹⁴

In its registration of permethrin as an approved chemical for insect control, the EPA conducted a risk/benefit analysis of use of permethrin and concluded that “given the significance of the use of permethrin and the mitigated nature of the risks of permethrin, the Agency believes, on balance, that the benefits of permethrin outweigh the risks.”¹⁵

Permethrin Risks

Permethrin is a Type I pyrethroid, with the primary target being the nervous system. The neurotoxic effects are consistently characterized by tremors, hyperactivity, and altered functional observation battery observations at high doses. Permethrin is absorbed by all routes; however, it has a low acute toxicity via the oral, dermal, or inhalation route of exposure, and is not an eye or skin irritant and not a skin sensitizer. Following oral administration, permethrin is rapidly absorbed, metabolized, and excreted via urine and feces.¹⁶ Permethrin is classified by the EPA as “likely to be carcinogenic to humans” by the oral route.¹⁷

¹⁰ Environmental Protection Agency (EPA) (June 2006): “Permethrin Facts (Reregistration Eligibility Decision Fact Sheet).” http://www.epa.gov/oppsrrd1/REDs/factsheets/permethrin_fs.htm

¹¹ *Id.*

¹² Environmental Protection Agency (EPA) (June 2006): “Permethrin Facts (Reregistration Eligibility Decision Fact Sheet).” http://www.epa.gov/oppsrrd1/REDs/factsheets/permethrin_fs.htm

¹³ *Id.*

¹⁴ Extension Toxicology Network: “Pesticide Information Profile”
<http://pmep.cce.cornell.edu/profiles/extoxnet/metiram-propoxur/permethrin-ext.html>

¹⁵ Environmental Protection Agency (EPA) (June 2006): “Permethrin Facts (Reregistration Eligibility Decision Fact Sheet).” http://www.epa.gov/oppsrrd1/REDs/factsheets/permethrin_fs.htm

¹⁶ Urban Pesticide Pollution Prevention Project (UP3) (August 2005): “Overview of Permethrin Risk Assessment.”
http://www.up3project.org/documents/Permethrin_PRA_Overview.pdf

¹⁷ Environmental Protection Agency (EPA) (April 2006): Reregistration Eligibility Decision for Permethrin.
http://www.epa.gov/oppsrrd1/REDs/permethrin_red.pdf

Tick Facts

Deer Tick

- carrier of Lyme disease
- Identifying feature – circular dark spot above long mouthparts



(clockwise from top large tick: female, male, larval, nymph)¹⁸

Dog Tick

- Attachment to people is uncommon
- Identifying feature – dark spot above *short* mouthparts



(Dog Tick engorgement sequence)¹⁹

Fiction: Lyme disease always starts with a “bulls eye” wound.

Fact: A circular, outwardly expanding rash can occur at the site of the tick bite 3 to 32 days after being bitten. However, a true bulls eye appears in less than 9% of cases.²⁰



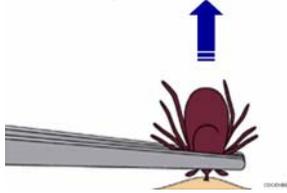
¹⁸ <http://www.tickinfo.com/deertick.htm>

¹⁹ <http://www.tickinfo.com/browndogtick.htm>

²⁰ Wikipedia: “Lyme Disease” http://en.wikipedia.org/wiki/Lyme_disease

Fact: the best way to remove a tick is to use sharp tweezers.

There are a lot of myths about methods of removing ticks, including using matches, petroleum jelly, nail polish, etc. The safest way to remove a tick is to use sharp tweezers. Grasp the tick as close to the skin as possible, and pull away from the skin in a steady motion. Clean the wound with soap and water.²¹



Signs and Symptoms of Lyme Disease

According to the National Institute of Health, in the first stage of Lyme disease (days to weeks after infection), called the early Lyme disease, symptoms can include fatigue, chills and fever, headache, muscle and joint pain, swollen lymph nodes and *erythema migrans* (rash).^{22 23}



In the second stage of Lyme disease (weeks to months after infection), called early disseminated Lyme disease, symptoms can include numbness and pain in arms or legs, paralysis of facial muscles, meningitis, and abnormal heart beat.^{24 25 26}

In the third stage of Lyme disease (weeks, months or years after infection), called late or chronic Lyme disease, symptoms can include chronic Lyme arthritis (60% of untreated patients²⁷), nervous system problems including memory loss and difficulty

²¹ CDC: "Tick Removal" http://www.cdc.gov/ncidod/dvbid/lyme/ld_tickremoval.htm

²² American College of Physicians: "Initiative on Lyme Disease – Patient's Guide"

http://www.acponline.org/clinical_information/resources/lyme_disease/patient/diagnosis.htm

²³ National Institute of Health: "Lyme Disease- The Facts, The Challenge"

<http://www3.niaid.nih.gov/topics/lymeDisease/PDF/LymeDisease.pdf>

²⁴ American College of Physicians: "Initiative on Lyme Disease – Patient's Guide"

http://www.acponline.org/clinical_information/resources/lyme_disease/patient/diagnosis.htm

²⁵ National Institute of Health: "Lyme Disease – The Facts, The Challenge"

<http://www3.niaid.nih.gov/topics/lymeDisease/PDF/LymeDisease.pdf>

²⁶ Centers for Disease Control and Prevention (CDC): "Learn about Lyme Disease"

http://www.cdc.gov/ncidod/dvbid/lyme/ld_humandisease_symptoms.htm

²⁷ *Id.*

concentrating (up to 5% of untreated patients²⁸), chronic pain in muscles and unrestful sleep, heart problems and liver disease.^{29 30}

²⁸ *Id.*

²⁹ American College of Physicians: “Initiative on Lyme Disease – Patient’s Guide”
http://www.acponline.org/clinical_information/resources/lyme_disease/patient/diagnosis.htm

³⁰ National Institute of Health: “Lyme Disease- The Facts, The Challenge”
<http://www3.niaid.nih.gov/topics/lymeDisease/PDF/LymeDisease.pdf>