



Powassan Virus Disease

FACT SHEET 18-005-1115

Just the Facts... Powassan virus disease is a rare, but often serious tick-borne disease caused by the Powassan (POW) virus. The virus causes inflammation of the brain (encephalitis), and can cause severe damage to the central nervous system. POW virus is the only tick-borne encephalitis found in the United States, though many closely-related tick-borne encephalitis viruses are found across Europe and Asia. POW virus is part of a group of viruses called "flaviviruses", and is related to a number of common mosquito-borne diseases including West Nile, dengue, yellow fever, and St. Louis encephalitis viruses.

When was Powassan virus disease discovered?

POW virus was first discovered in 1958 in patients suffering from encephalitis in the town of Powassan in Ontario, Canada. POW virus was detected 12 years later in the United States, where the first case was diagnosed in New Jersey in 1970.

How common are cases of Powassan virus disease?

Cases of POW virus are rare; however, transmission of the virus has been increasing since it was first detected in 1958. According to the Centers for Disease Control and Prevention (CDC), there were 57 reported cases of POW virus between 2004 and 2013. POW virus is most common in the Northeastern and Great Lakes regions of the United States, with disease transmission hot-spots reported in Wisconsin, Minnesota, and New York.

How can I get Powassan virus disease?

POW virus is only transmitted by the bite of an infected tick. The most common POW virus vector is the deer tick or black-legged tick, *Ixodes scapularis*, which readily feeds on humans. Transmission by the bite of a groundhog tick, *Ixodes cookei*, or squirrel tick, *Ixodes marxi*, is possible but rare since these ticks do not typically feed on humans. Studies show that all of these ticks can transmit the disease in as little as 15 minutes of feeding, so preventing tick bites is extremely important.

How serious is Powassan virus disease?

Like other insect- and tick-borne diseases, infection with POW virus may not cause any symptoms (asymptomatic infection), or may cause a mild, flu-like illness. However, if the virus infects the brain, it can cause a condition called encephalitis. Encephalitis caused by POW virus is often associated with significant, long-term illness, and is fatal in about 10 percent of reported cases. Many patients who survive the encephalitis form of the disease suffer permanent brain damage.

What are the symptoms of Powassan virus disease?

Symptoms of Powassan encephalitis appear suddenly and can develop anywhere from 7 to 30 days after a bite from an infected tick. When POW virus attacks the central nervous system, it kills cells and causes the brain to swell. The membranous coverings of the brain and spinal cord (called meninges) can also swell, causing meningitis. This swelling causes a variety of symptoms ranging from mild to severe. Symptoms range from headache, fever, vomiting, confusion, speech difficulty, and memory loss to life-threatening ones including tremors, seizures, difficulty breathing, and paralysis.

How is Powassan virus disease diagnosed and treated?

A medical provider can diagnose POW virus disease based on a combination of symptoms with blood and spinal fluid test results. Both blood and spinal fluid tests detect the antibodies the body makes as it fights the POW virus infection. There are no specific treatments or medications for Powassan virus disease. Medical care is purely supportive, addressing disease symptoms, and could include nursing support, breathing assistance (a ventilator), and intravenous fluids.



Courtesy Graham Snodgrass APHC

Ixodes scapularis, the blacklegged tick (also known as the "deer tick"), is the primary vector of Powassan virus.

What can I do to reduce my risk of becoming infected with Powassan virus disease?

AVOID TICK BITES! The DoD Insect Repellent System is the best method of tick bite protection. It incorporates permethrin repellent on the uniform, DEET or picaridin repellent on exposed skin, a properly worn uniform, and sleeping inside a permethrin-treated bed net.

When in tick habitat (tall grass and weeds, scrubby areas, woods, and leaf litter) routinely check your skin, clothing, and gear for ticks. Do a careful check of your whole body once you come indoors. The CDC recommends taking a shower soon after being outdoors. Ticks can be very small; look for new "freckles" or moving specks of dirt. Remove ticks as soon as they are found.

How do I know if my uniform is treated with permethrin repellent?

Army Combat Uniforms (ACUs) that are factory-treated with permethrin (ACU Permethrin) are now available to all Soldiers. The ACU Permethrin trousers and blouse have a sewn-in label indicating the uniform is factory-treated with permethrin. If not, field-treat uniforms with permethrin using either the IDA Kit (NSN 6840-01-345-0237), which can last up to 50 washings, or use the 0.5% aerosol spray can (NSN 6840-01-278-1336), which should be reapplied after six weeks and the sixth washing. When applying permethrin, always read and follow the label directions. Permanently mark the uniform label with the permethrin field-treatment date. **Never apply permethrin to the skin.** Aerosol products containing 0.5% permethrin and clothing factory-treated with permethrin are also commercially available for civilian use.

What are the standard military insect repellent products available for use on exposed skin?

Approved military insect repellents for use on exposed skin come in a variety of formulations. Always refer to the label to determine frequency of repellent application based on activity. **Do not apply repellent to eyes, lips or sensitive/damaged skin.** Available military repellents are:

- **Ultrathon™** (NSN 6840-01-284-3982) contains 33% controlled-release DEET lotion; one application protects for 12 hr.
- **Ultra 30™** Insect Repellent Lotion (NSN 6840-01-584-8393) contains 30% Lipo DEET; one application protects for up to 12 hr.
- **Cutter® pump spray** (NSN 6840-01-584-8598) contains 25% DEET; one application protects for up to 10 hr.
- **Sunsect** combination sunscreen & repellent (NSN 6840-01-288-2188) contains 20% DEET with SPF 15 sun protection.
- **Natrapel® pump spray** (NSN 6840-01-619-4795) contains 20% picaridin; one application protects for up to 8 hr.



Standard military insect repellents for use on exposed skin come in a variety of formulations (left). All standard skin repellents contain the active ingredient DEET or picaridin and are registered by the USEPA. These products are safe to use and effective at repelling ticks. Photo: VID, APHC

NOTE: Do not apply repellent to the eyes or lips, or to sensitive or damaged skin.

What do I do if a tick is biting me?

Promptly removing ticks is the best way to reduce exposure to tick-borne diseases. Remain calm. If the tick is only crawling on your skin or clothing grab and remove the tick. Ticks cannot transmit diseases by crawling on you. See the picture to the right about safely removing an embedded tick from your skin. You can also visit <http://www.tickencounter.org/> for more information and to see a video about tick removal. Ticks removed from military personnel, their dependents, or DoD civilians can be turned in for identification and disease testing through the Army Public Health Center's DoD Human Tick Test Kit Program:

<http://phc.amedd.army.mil/topics/envirohealth/epm/Pages/HumanTickTestKitProgram.aspx>

Where can I get more information about protecting myself from Powassan virus disease?

- Information on tick-borne diseases from the APHC can be found at: http://phc.amedd.army.mil/PHC%20Resource%20Library/18-028-0107-Tick-Borne_Diseases11.pdf
- More information about the DoD Insect Repellent System can be found at: http://phc.amedd.army.mil/PHC%20Resource%20Library/DoD_Insect_Repellent_System_FS_18-009-0714.pdf
- Additional information can also be obtained from your local, county, or state health departments, your health care provider, or the U.S. Centers for Disease Control and Prevention (CDC): <http://www.cdc.gov/powassan/>

Use of trademarked name does not imply endorsement by the U.S. Army but is intended only to assist in identification of a specific product. For more information please consult the APHC website - <http://phc.amedd.army.mil>

