



Powassan Virus Disease

FACT SHEET 18-005-0817

Just the Facts...

Powassan virus is a rare, but often serious tick-borne disease caused by the Powassan (POW) virus. The virus can cause brain inflammation (encephalitis) and severely damage 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 discovered?

POW virus was first discovered in 1958 in patients suffering from encephalitis in the town of Powassan, 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?

Cases of POW virus are rare; however, the number of cases have increased in recent years. According to the Centers for Disease Control and Prevention (CDC), there were approximately 75 reported cases of POW virus between 2006 and 2015. 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?

POW virus is only transmitted by the bite of an infected tick. The most common POW virus vector is the blacklegged tick ("deer tick"), *Ixodes scapularis*, which readily feeds on humans. Groundhog ticks (*Ixodes cookei*) and squirrel ticks (*Ixodes marxi*) can also transmit POW virus, but neither prefers to feed on humans. Studies show that all three ticks can transmit the disease in as little as 15 minutes of feeding, so preventing tick bites is extremely important. The ticks that carry POW virus are active whenever temperatures are above 37°F; therefore, medical providers should consider POW virus disease in patients with encephalitis symptoms outside of mosquito season.

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. Approximately half of patients who survive the encephalitis form of the disease suffer permanent brain damage.

What are the symptoms of infection with Powassan virus?

Symptoms of Powassan encephalitis appear suddenly and can develop 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 may include headache, fever, vomiting, confusion, speech difficulty, memory loss, tremors, seizures, difficulty breathing, and paralysis.

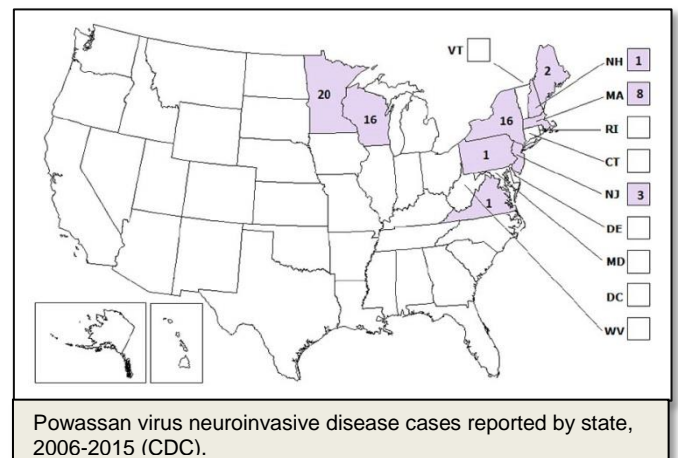
How is Powassan virus disease diagnosed and treated?

A medical provider can diagnose POW virus disease based on symptoms and 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

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, picaridin, or IR3535 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 go 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?

Army Combat Uniforms factory-treated with permethrin (ACU Permethrin) will have a sewn-in label in the trousers and coat indicating the uniform has been factory-treated. If not factory-treated, Soldiers can permanently treat their uniforms with the IDA kit (NSN 6840-01-345-0237), which can last up to 50 washings, or temporarily treat using the 0.5% aerosol spray can (NSN 6840-01-278-1336), which can be reapplied after six weeks and the sixth washing. Never retreat uniforms that have been factory-treated, treated with an IDA kit, or treated using a 2-gallon sprayer. When applying permethrin, always read and follow the label directions. Permanently mark the uniform label with the permethrin treatment date. **NEVER APPLY PERMETHRIN TO THE SKIN!** Civilians can purchase commercially available 0.5% permethrin aerosol products and permethrin factory-treated clothing.

Is it safe for Soldiers who are pregnant, nursing, or trying to get pregnant to wear permethrin-treated ACUs?

The ACU with permethrin is safe to wear; however, if you are pregnant, nursing, or trying to get pregnant, you are authorized to temporarily wear an ACU without permethrin. If your uniform is not treated with permethrin (the maternity uniform or an untreated uniform purchased using a profile) and you and your healthcare provider decide that wearing an ACU with permethrin is the best choice, you can treat your ACU according to the guidance in the question above.

What standard military insect repellent products are available for 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 to sensitive or damaged skin. Available military repellents are:

- **Ultrathon™** (NSN 6840-01-284-3982) contains 34% controlled-release DEET; one application protects for up to 12 hours.
- **Ultra 30™ Insect Repellent Lotion** (NSN 6840-01-584-8393), contains 30% Lipo DEET; one application protects up to 12 hours.
- **Cutter® pump spray** (NSN 6840-01-584-8598) contains 25% DEET; one application protects for up to 10 hours.
- **Natrapel® pump spray** (NSN 6840-01-619-4795) contains 20% picaridin; provides protection for up to 8 hours.
- **Bullseye™ Bug Repellent pump spray** (NSN 6840-01-656-7707), contains 20% IR3535®; provides protection for up to 8 hours.

What do I do if a tick is biting me?

Promptly removing ticks is the best way to reduce exposure to tick-borne diseases. If the tick is only crawling on your skin or clothing, remove the tick. Ticks cannot transmit diseases by crawling on you. See the picture to the right about effectively 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?

- More information about the DoD Insect Repellent System can be found at: https://phc.amedd.army.mil/PHC%20Resource%20Library/DoD_Insect_Repellent_System_FS_18-009-1115.pdf
- Additional information can also be obtained from your local, county, or state health departments, your healthcare provider, or the CDC: <http://www.cdc.gov/powassan/>

