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Hantavirus

(Sin Nombre virus)

in Alberta

Common name

hantavirus, hantavirus pulmonary syndrome (HPS)

Scientific name

a hantavirus, Sin Nombre virus (SNV)

What's Bugging Wild Critters?

Fact sheet #7: Hantavirus

Significance

One of the hantaviruses occurs commonly as a benign inhabitant of deer mice throughout Alberta. Although rare, it can cause significant health concerns, including death, in humans.

What? Where? How?

As with other organisms, viruses can be grouped along lines of shared characteristics. Hantaviruses are one such group, with up to 26 distinct hantaviruses identified or characterized to date. In 1993, a specific hantavirus (*Sin Nombre virus*, SNV) was isolated from a number of sick and dead people in the southwestern United States. The illness was characterized by rapid onset and severe respiratory distress and was later given the name hantavirus pulmonary syndrome (HPS). To date, approximately 300 cases of HPS have been documented from over 30 states in the U.S. including 15 cases in Montana. A few cases (15-20) have been found in western Canada, mainly in British Columbia (one fatal) and Alberta (three fatal). It is generally accepted that hantaviruses have lived in deer mouse populations across North America for many, many years. It just took time for science to recognize that they were here.

Although SNV was the first hantavirus associated with significant morbidity and mortality in humans in North America, other hantaviruses causing HPS have since been isolated from people or wildlife in eastern, central, and southern United States. A variety of small rodents provide suitable habitats for SNV in different parts of North America. Additional hantaviruses associated with HPS occur in South America.

Transmission Cycle

In Alberta and much of the United States and Canada, the deer mouse (*Peromyscus maniculatus*) is the preferred habitat for the hantavirus that causes HPS. Common house mice (*Mus musculus*) are not good habitat for the virus and are not infected. Although the hantavirus does not cause noticeable disease, infected deer mice shed the virus in their droppings, urine, and saliva. In rare circumstances the virus may be passed to humans by means of a bite from an infected deer mouse. Human cases generally occur following contact with contaminated surfaces or food, or from the breathing of air that contains virus particles.

Once inside deer mice, SNV is carried in blood to a variety of tissues and organs where it enters the cells lining the blood vessels. Apparently the virus does not cause significant damage by settling there. The viruses multiply and exit the deer mouse in various body fluids. In humans, SNV enters the cells lining blood vessels in the lungs, where it weakens the vessel walls. Circulating fluid and cells then start to leak into the air spaces and interfere with respiration.

Distribution in Alberta

Sin Nombre virus has been found in deer mice over a fairly wide range in Alberta. Since deer mice are found throughout the province, it is likely that the hantavirus also is widespread.

Deer mice can be identified by their relatively large ears and eyes, and their long tails. Their brown and white colour pattern is very distinctive, particularly because of the sandy brown colour on the head, back and upper tail.

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The entire bottom half of the deer mouse is white, including the feet, legs, chin, chest, belly, and underside of the tail.

Importance for Wildlife Management

The SNV is not a significant wildlife management concern. There are no signs of disease in infected deer mice, no evidence of an effect on the population dynamics of deer mice, and no evidence of adverse effects on predators of deer mice.

Public Significance

The SNV was identified after a pattern of human mortality in a small geographic area was detected. This outbreak occurred in the early 1990s in the southwestern U.S. As such, most of the initial cases involved fatal infections in people. However, as more is known about the virus and the disease, the fatality rate steadily declines.

It appears that many people are exposed and do not become infected. Similarly, of those who do become infected many do not exhibit clinical signs and the infection is resolved without harm. Of the people who exhibit clinical signs, infection is fatal in less than 30%. Care of people with clinical signs is supportive and aimed at preventing fluid accumulation in the lungs.

The public health risk in Alberta is considered low. People of all ages can potentially acquire the disease but it occurs more often in rural than in urban residents. Contact with deer mouse urine, faeces, or nesting material increases the risk of infection. Hikers and campers may be vulnerable when using trail shelters or when camping in other rodent habitats.

Cleaning out seasonally used buildings such as bush camps or crawling under buildings for repaires may also heighten the chance of exposure.

M Pearman Ellis Bird Farm

Deer mice occasionally enter bird boxes; thus, people should wear gloves and avoid inhaling dust and debris when cleaning out bird boxes.

Clinical signs in humans may take one to five weeks to develop after exposure to the virus and may include fever, fatigue, and muscle pain. In addition, headaches, dizziness, nausea, vomiting, and chills are quite common. Within 4 – 10 days acute breathing problems may develop as the lungs rapidly fill up with fluid. There is no evidence that people can acquire the disease from other people infected with SNV.

MJ Pybus Fish & Wildlife Alberta SRD

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For more information on wildlife diseases in Alberta: http://www3.gov.ab.ca/srd/fw/diseases/index.html

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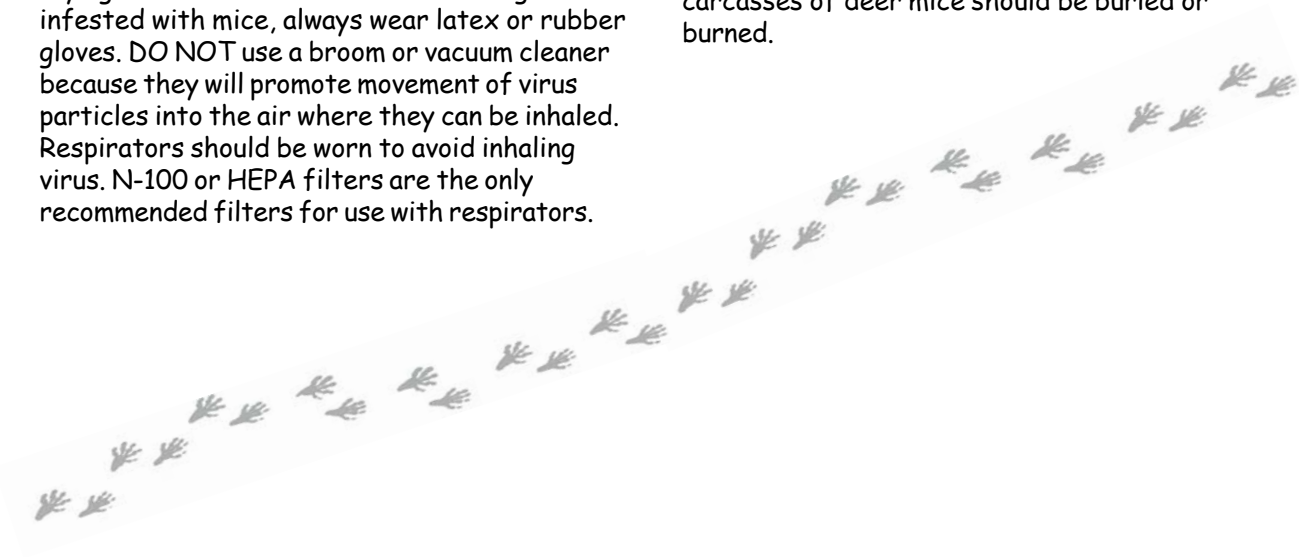
Prevention/Control

There is no specific treatment for HPS although taking a suspected patient to an intensive care unit immediately may lead to better results. The absence of a treatment places added emphasis on prevention and the best prevention is to take steps to discourage deer mice in and around buildings. This includes plugging holes into your house, making garbage inaccessible to mice, keeping food in rodent-proof containers, setting traps to eliminate invading mice, and clearing an area around the house to discourage mice from trying to enter the house. When cleaning areas infested with mice, always wear latex or rubber gloves. DO NOT use a broom or vacuum cleaner because they will promote movement of virus particles into the air where they can be inhaled. Respirators should be worn to avoid inhaling virus. N-100 or HEPA filters are the only recommended filters for use with respirators.

The SNV is not a particularly persistent virus when it is in the environment. It is readily killed with a weak chlorine bleach and water solution, and most full-strength household disinfectants and detergents will deactivate the virus. A mixture of 1½ cups of bleach for each gallon of water is effective. Some public health officials recommend spraying a dead deer mouse or an accumulation of mouse droppings before handling them or cleaning up an area. Once the affected areas are wet, clean up with a mop or rag (or shovel if appropriate), and then apply a second layer of disinfectant. Accumulated droppings or carcasses of deer mice should be buried or burned.



Summary

Hantavirus pulmonary syndrome is an acute often fatal disease condition caused by a specific hantavirus transmitted from deer mice to people. However, infection is rare and most people exposed to the virus do not develop clinical signs. Avoid the risk of infection by keeping living areas free of deer mice and handling dead deer mice with gloves.

Additional Information

Infectious Diseases of Wild Mammals, Third Edition. Edited by Elizabeth S. Williams and Ian K. Barker. 2001. Chapter 14 - Rodent-borne Hemorrhagic Fever Viruses.

Canadian Food Inspection Agency:http://www.inspection.gc.ca/english/anima/heasan/disemala/disemalae.shtml

Alberta, Health and Wellness: http://www.health.gov.ab.ca/public/diseases/index.html

Center for Disease Control and Prevention: http://www.cdc.gov/ncidod/diseases/hanta/hps/index.htm

For more information on wildlife diseases in Alberta: http://www3.gov.ab.ca/srd/fw/diseases/index.html

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