Workplace Health and Safety
Bulletin

Hantavirus: Information for Employers and Workers

Current August 1998

This guideline has been developed to assist employers and workers in minimizing worker exposure to hantavirus, and preventing hantavirus infections. The guidelines and recommendations outlined in this document reflect what is currently known about this disease. Employers of any work location where rodents or rodent droppings are present should consider the control measures outlined in this guideline.

What is Hantavirus?

Hantavirus infection is caused by a virus that is found in some rodents.

Hantavirus infection is caused by a virus that is found in some rodents. The principal carrier is the deer mouse or white-footed mouse which is commonly found in Alberta. As it is possible that other rodents could carry the virus, and it is not easy to determine what kind of mouse a person is exposed to, all rodents should be treated as potential carriers. The virus is rarely transmitted to humans, but when it is, the virus can cause severe illness – even death.

How is it transmitted?

The hantavirus does not appear to cause illness in the rodent hosts, but is shed in their saliva, urine and droppings. The virus is usually spread to humans when particles of infected saliva, urine or feces are inhaled. Inhalation may occur through direct contact with the rodent,

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or from breathing airborne dust particles that are generated when rodent excreta is disturbed. The virus can be spread if infected materials contact broken skin or the membrane lining of the eyelids and eyeball.

Research also indicates that the virus may be spread if:

- a rodent bites you (this is very rare);
- if you touch something that has been contaminated with rodent urine, droppings or saliva, and then touch your nose or mouth;
- if you eat or drink food or water contaminated by rodents.

There is no evidence that the hantavirus is transmitted by any other type of animal or insect besides rodents. There have been no reported cases of human to human spread with the strain found in North America.

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Alberta cases

From 1989 to March 1998, 16 cases of Hantavirus in humans were reported in Alberta. Of these, nine have been farm related. There were three deaths.

Signs and symptoms of infection

The disease caused by Hantavirus is *Hantavirus Pulmonary Syndrome (HPS).* It generally begins as a flu-like illness occurring about 1-5 weeks after having an exposure to mouse droppings (such as cleaning up a warehouse or outbuilding).

Early universal symptoms include:

- fatigue
- fever
- muscle aches – especially the large muscle groups – thighs, hips, back, sometimes shoulders.

About half of patients will experience other symptoms including:

- headaches
- dizziness
- chills
- abdominal problems such as nausea, vomiting, diarrhea and abdominal pain.

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Late symptoms start about 4-10 days later and include:

- coughing
- shortness of breath – which may feel like a tight band around the chest.

Workers with these symptoms should see a physician as soon as possible. The best treatment for this disease is prevention and early diagnosis. Make sure that the physician is aware of you conditions of work and potential exposures.

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Occupational exposure to Hantavirus:

Where is the virus most likely to be encountered?

Most rodents are found in rural and semi-rural areas, however, many are highly adaptable and can be found in homes as well as commercial and industrial buildings,

Cases of Hantavirus in North America have been associated with:

- sweeping out barns and other farm buildings;
- trapping and studying mice;
- using compressed air and dry sweeping to clean up wood waste in a sawmill;
- handling grain contaminated with mouse droppings and urine;
- entering a barn infested with mice;
- planting or harvesting field crops;
- occupying previously vacant dwellings;
- disturbing rodent-infested areas while hiking or camping;
- living in or cleaning dwellings with a sizable indoor rodent population.

Locations where rodents may feed or find shelter include:

Outside

- rubbish piles (i.e. woodpiles);
- infrequently used equipment;
- garbage;
- weeds and long grass.

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Inside

- food storage containers and areas around containers;
- garbage storage areas
- nooks and crannies.

How to prevent exposure?

Rodent control

The most important method of prevention is to minimize contact with rodents by controlling them around the work site. Prevention strategies include:

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(1) Regular inspections for rodents to determine if active rodent control is required.

(2) Sanitation: reduce the number of locations inside the workplace and in the immediate vicinity where rodents may feed or find shelter. Clean up trash, open stores of papers or other areas that may serve as nesting sites for rodents.

(3) Eliminate potential food sources or store food in rodent-proof containers with a tight fitting lid.

(4) Rodent proof by:

- Closing openings where rodents gain entry and establish runways. Mice can gain entry through a hole as small as ¼ inch in diameter. Proofing materials include steel wool, fine mesh screens, mortar and sheet metal, etc.
- Placing metal flashing around the base of buildings in which people work if rodents may be able to get in.
- Using gravel or raised (30 cm) cement foundations in new construction of sheds, out-building or wood piles to discourage rodent burrowing.

(5) Cut grass, brush and shrubbery within 30 metres of buildings.

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(6) Rodent population reduction can be achieved by trapping or poisoning with rodenticides. Kill traps minimize the risk of handling. Rodenticides are hazardous to humans and non-target species, and should be handled by individuals knowledgeable in their safe use.

Work procedures

Safe work procedures will allow employers to minimize worker exposure to hantavirus, and should be tailored to the specific work circumstances. Types of workers who may have to enter buildings, crawl spaces, or other sites that are rodent infested include: telephone installers, maintenance workers, plumbers, electricians, construction trades workers and agricultural workers. In all cases for which specific safe work procedures are developed, have a qualified person assess the work situation and evaluate the risk.

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Assessment of the individual workers activities rather than just the occupation is important in the determination of exposure risk. Following are sample work procedures. Employers should assess risks and develop work procedures specific to their work sites.

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A. Handling rodents:

Persons who frequently handle or are exposed to rodents i.e. pest control workers, are at higher risk for hantavirus infection than the general public because of frequency of exposure.

(1) Workers should wear a NIOSH approved half-face air-purifying respirator or PAPR (powered air-purifying respirator) equipped with HEPA (High Efficiency Particulate Aerosol) filters when removing rodents from traps or handling rodents. Normal low efficiency dust respirators are NOT adequate. Respirator practices should follow the Alberta's *Occupational Health and Safety Code*, Part 18 Personal Protective Equipment, sections 244 to 255

For more information

http://employment.alberta.ca/documents/WHS/WHS-PUB_ppe004.pdf
Guideline for the Development of a Code of Practice for Respiratory Protective Equipment

(2) When handling rodents or traps containing rodents, workers should wear:
- rubber or plastic disposable gloves
- disposable coveralls made of material that will resist the penetration of dust particles, with a snug fit at the wrist and ankles
- eye or face protection to prevent aerosols from coming in contact with the mucous membranes of the eye.

(3) Traps contaminated by rodent urine or feces or in which a rodent was captured should be disinfected with a commercial disinfectant or bleach solution.

(4) Dead rodents should be soaked in a disinfectant solution, double-bagged along with all cleaning materials, labelled and then buried, burned or discarded in an appropriate waste disposal system.

(5) Decontaminate and remove personal protective equipment and clothing in accordance with the *Decontamination Procedure* outlined.

B. Clean up of infested areas:

Workers who are involved in the clean up of areas where rodents or rodent droppings are present should also take precautions:

(1) Clear all unnecessary workers from the area.

(2) Ventilate the area by opening windows and doors, if possible.

(3) Put on disposable rubber or plastic gloves before starting clean up.

(4) Wear a NIOSH approved respirator with a HEPA filter.

(5) If the area has a heavy rodent infestation, the worker should also wear coveralls (disposable, if possible), rubber boots or disposable shoe covers and protective goggles.

(6) Don't stir up dust by sweeping up or vacuuming up dry droppings, urine or nesting materials.

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(7) Thoroughly wet contaminated areas with detergent or liquid to deactivate the virus. Most general purpose disinfectants and household detergents are effective, however a solution prepared by mixing 3 tablespoons of household bleach in 1 gallon of water may be used in place of a commercial disinfectant. When using the chlorine mixture, avoid spilling the mixture on clothing or other items that may be damaged.

(8) Once everything is wet, take up the contaminated materials with a damp towel, and mop or sponge the area with disinfectant.

(9) Dispose of dead rodents as indicated under *Handling Rodents*.

(10) Dispose of all contaminated materials in double plastic bags. Seal the bags and label them to identify the contents. Do not puncture the bags. Bags of waste may be disposed of by burying them in a hole that is at least two feet deep or by incinerating them. Contaminated material may also be disposed of with regular garbage as long as the amount of material can be safely treated by being soaked in a disinfectant solution and the material is in double plastic bags.

(11) Wipe or mop surfaces with a solution of disinfectant and detergent.

(12) Decontaminate and remove personal protective equipment and clothing as outlined under the *Decontamination Procedure.*

C. Decontamination procedures:

After any activity involving the handling of contaminated or potentially contaminated material, and before leaving the immediate work area, the following procedures should be applied.

Note: Do not remove respiratory protective equipment until other decontamination steps are complete.

(1) Remove coveralls at the perimeter of the work area and place them in a disposal bag. Collapse the bag and temporarily seal it.

(2) Move away from the clean-up or contaminated work area to a location where there are no other workers – preferably outdoors – leaving eye and respiratory protection in place.

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(3) Wet wipe exposed reusable respirator surfaces, eyewear, and rubber footwear with a disinfectant solution.

(4) Rinse the outside of gloves in the disinfectant solution. Remove gloves and place them in a plastic bag for disposal.

(5) Place disposable respirators in a plastic bag. Permanently seal the bag and label it. For reusable respirators, tape shut the inlet opening of the respirator cartridges to prevent the release of dusts (cartridges may be reused until breathing becomes difficult), or discard the cartridges. Clean and disinfect the respirator body. Store the respirator in a cool, clean location free from contamination.

(6) Remove eyewear. Clean and disinfect it before storing it, or discard it.

(7) Wash exposed skin surfaces thoroughly with soap.

Precautions for working or camping outside

Workers who are required to work outside or camp out should take special precautions including:

- Avoid coming in contact with rodents.
- Air and then disinfect shelters before using them. Such places often shelter rodents.
- Do not pitch tents or sleeping bags in areas of proximity to rodent droppings or near areas which may shelter rodents or provide food for them i.e. garbage dumps or woodpiles.
- If possible, do not sleep on the bare ground. In shelters, use a cot with the sleeping surface at least 12 inches above the ground. Use tents with floors or a ground cloth if sleeping in the open air.
- Keep food in rodent-proof containers.
- Discard trash in covered containers.
- Use only bottled water that has been disinfected by filtration, boiling, chlorination or iodination for drinking, cooking, washing dishes and brushing teeth.

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Worker training

Under Alberta's *Occupational Health and Safety Regulation*, Section 15(3) to (5):

> *15(3) If a worker may be exposed to a harmful substance at a work site, an employer must*
>
> (a) *establish procedures that minimize the worker's exposure to the harmful substance, and*
>
> (b) *ensure that a worker who may be exposed to the harmful substance*
>
> (i) *is trained in the procedures,*
>
> (ii) *applies the training, and*
>
> (iii) *is informed of the health hazards associated with exposure to the harmful substance.*
>
> *(4) A worker must participate in the training provided by an employer.*
>
> *(5) A worker must apply the training referred to in subsections (1) and (3).*

The employer should provide instruction to workers who may come in contact with rodents or their droppings. Instructions should include:

- the nature of the hazard;
- safe work procedures (including personal protective equipment);
- use of respirators;
- symptoms of the illness;
- the need to seek medical attention as soon as possible if symptoms appear.

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Bibliography

www.cds.gov.ncidod/diseases/hanta/hps/noframes/intro.htm
Centre for Disease Control. (1998) All about hantavirus

Alberta Health, (March 9, 1998). Information Bulletin, *Hantavirus Backgrounder*. auth. Dr. Karen Grimsrud.

- Chisolm, Sandura. (April 1997). *Common questions about hantavirus pulmonary syndrome*. American Journal of Nursing, 97 (4), 68-70.

- Fink, T. Michael & Zeitz, Paul S. (1966). *Hantavirus pulmonary syndrome and field archaeology: guidelines for risk reduction*. Journal of Field Archeology, 23.

- Hart, CA. (January 1997). *Hantavirus infection*. J. Medical Microbiolog, 46, (1), 13-17.

- Hughes, James M., Peters, C.J., Cohen, M.L. & Mahy, B.W. (November 1993). *Hantavirus pulmonary syndrome: an emergency infectious disease*. Science, 262, 850-851.

- Moolenaar, Ronald L., Brieman, Robert F., & Peters, C.J. (March, 1997). *Hantavirus Pulmonary Syndrome*. Seminars in Respiratory Infection, 2, (1), 31-39. Centre for Disease Control and Prevention.

- Pflieger, Anne K. & Khan, Ali. S., (June 15, 1997). *Hantavirus: four years after four corner*s. Hospital Practice. (6), 93-94. Centre for Disease Control and Prevention.

- Workers' Compensation Board of British Columbia: Prevention Division (January 1996). *A hantavirus risk control program for employers and workers*.

- Zeitz, P.S., Graber, J.M., Voorhees, R.A., Kioski, C., Shands, L.A., Ksiazek, T.G., Jenison, S., Khabbaz, R.F. (May 1997). *Assessment of occupational risk for hantavirus infection in Arizona and New Mexico*. J. Occupational Environmental Medicine, 39 (5) 463-467. Epidemic Intelligence Services, Centres for Disease Control and Prevention.

- Zhao, X. & Hay, j. (1997). *The Evolution of Hantavirus*. Immunological investigation, 26 (1 & 2), 191-197 Marcel Dekker Inc.

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http://employment.alberta.ca/whs-ohs

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