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Hantavirus: What is it? What can be done about it?

compiled by Michael Vogel, MSU Extension Housing Specialist,
and Jim Knight, MSU Extension Wildlife Specialist

Hantavirus is a serious cardiopulmonary infection that can cause death. The virus that causes the disease is transmitted to humans by such rodents as deer mice, which are common in Montana. This publication tells what hantavirus is and how it can be prevented.

NOTE

Hantavirus is a serious disease and steps should be taken to avoid exposure to it. However, hantavirus is a *rare* disease that results in fewer deaths than lightning strikes or snakebite or slip-and-falls on ice.

Hantavirus in the US

Hantavirus pulmonary syndrome (HPS for short), an acute and often fatal infectious respiratory disease endemic to North and South America, has lately become a serious concern in Montana and across the United States.

In this country, hantavirus was first recognized during the spring of 1993 after a cluster of previously healthy individuals who lived in the Four Corners area of New Mexico acquired an acute cardiopulmonary illness. As of July, 2003, there have been some 340 confirmed cases of hantavirus pulmonary syndrome in the United States, more than 20 of them in Montana. Of these, there have been 129 deaths, five in Montana. The nationwide fatality rate is just over 38 percent.

How does a person get hantavirus?

Most commonly, people get hantavirus pulmonary syndrome by inhaling airborne particles of urine, feces or saliva from infected rodents. It is also possible, although less common, for transmission to occur when dried materials contaminated by rodent feces are disturbed, directly introduced into broken skin, introduced into mucus membranes (including the eyes and nose), or possibly ingested in contaminated food or water. Very infrequently, people have become infected after being bitten by rodents.

Infected rodents shed the virus in saliva, urine and feces for a period of several weeks, but the time of possible infection is not known. The virus can live for a few days in contaminated dirt and dust.

There is no evidence of person-to-person transmission. Even after extended exposure to patients, health care workers and family members have not contracted the illness.

Cats and dogs are not known to be hosts for hantavirus, but they may bring infected rodents into contact with humans.

What risk factors are associated with hantavirus?

The risk of infection is directly related to the frequency with which people come in contact with infectious rodents, the density of the rodent population, and the prevalence of the infection in rodents.

About three-quarters of the people who have been infected with hantavirus have been residents of rural areas, and most of them have become infected while in or near their homes. People who work, play, or live in closed spaces with active rodent infestation are chiefly at risk.

Most cases in the U.S. have been associated with:

- occupying previously vacant cabins or other dwellings that are or have been infested by rodents;
- sweeping out barns and other ranch buildings;
- planting or harvesting fields, especially by hand;
- handling equipment or machinery that has been in storage;
- handling mice without gloves;
- using compressed air and dry-sweeping to clean up wood waste in a sawmill;

- handling grain contaminated with mouse droppings and urine;
- living in or visiting areas where there has been an increase in rodents, especially a sizable indoor rodent population;
- disturbing rodent-infested areas while hiking or camping; and
- sleeping on the ground.

Who can be affected by hantavirus?

Anybody can be affected by the disease. People who work in the following occupations are at risk because of the likelihood of exposure to rodents and nests:

- farmers and ranchers
- maintenance workers
- plumbers
- field biologists
- mill, grain elevator and feedlot workers
- telephone installers and other utility workers
- electricians
- construction workers
- remodeling contractors, and
- weatherization workers

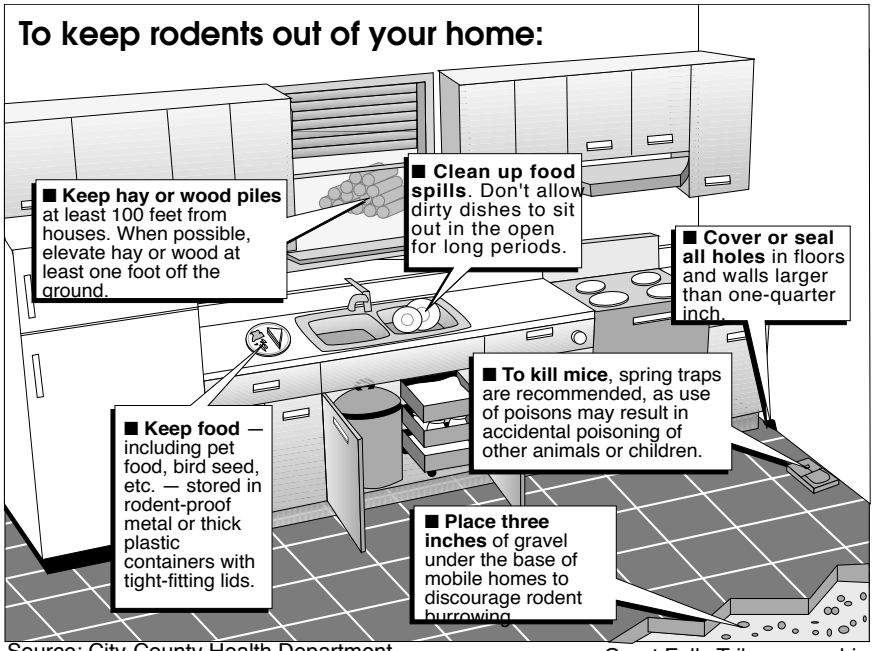
County health department officials can make recommendations as to whether special precautions might be beneficial for people who work in any particular occupation or who camp in particular areas.

Hikers, campers and others who spend a lot of time out of doors need to avoid rodent burrows and cabins or shelters that may have been infested by rodents. Tents should have openings that zip or close tightly and floors. Food and water should be kept in rodent-proof containers. Trash must be discarded in covered trash containers or properly buried.

What are the symptoms of hantavirus infection?

People who contract the virus experience flu-like symptoms including:

- fever (usually ranging from 101° to 104°F) that does not respond to medication
- muscle and body aches
- chills
- cough (usually dry)
- nausea, vomiting and diarrhea
- fatigue



Source: City-County Health Department

Great Falls Tribune graphic

These symptoms typically last from a few hours to several days. **Anybody experiencing these symptoms should seek medical care immediately.** Information about the possibility of the person's exposure to rodents, if known, should be communicated to the health care provider.

The later cardiopulmonary phase of hantavirus brings severe, rapidly progressive respiratory failure. Shortness of breath is an early indicator of this phase.

When do these symptoms appear?

The first hantavirus symptoms typically appear one to six weeks after contact with the virus—usually within two or three weeks of exposure.

People affected by hantavirus in other countries tend to show a slow buildup of symptoms, but the strain that affects people in this country causes an extremely fast buildup of acute respiratory symptoms.

How is hantavirus treated?

There is no "cure" for hantavirus. At present, the only treatment is basically supportive, and is best provided in a hospital's intensive care unit. An antiviral drug called ribavirin (Virazole™) is helpful in combatting certain Asian strains of hantavirus, but research on how effective this drug may be against the hantaviruses encountered in this country is still underway.

How is hantavirus prevented?

The best way to prevent hantavirus infection is to eliminate the rodents that carry the virus. The Centers for Disease Control and Prevention (CDC) make three suggestions for eliminating rodents or lessening the danger of coming into contact with them and the virus they carry.

1 : Prevent rodents from entering the home

Rodent control in and around the home remains the main strategy for preventing infection. Here are some suggestions for rodent control.

- Place metal roof flashing around the base of wooden, earthen or adobe dwellings up to a height of 12 inches and buried in the soil to a depth of six inches.
- Look for and seal up all gaps and holes inside and outside the home that are more than 1⁄4-inch (6 mm) in diameter. Inside the home, look for and seal up all gaps and holes underneath, behind and inside kitchen cabinets; inside closets; around floor air vents and dryer vents; around the fireplace; around windows and doors; behind appliances such as dishwashers, clothes washers and stoves; around pipes under the kitchen and bathroom sinks; around all electrical, water, gas and sewer lines; and beneath or behind water heaters, radiators and furnaces.

Outside the home, seal up all gaps and holes around windows and doors; between the foundation of the home

and the ground; under doors without weather-stripping; around electrical, water, gas, and sewer lines; and around the roof, eaves, gables and soffits.

Keep an eye out for unscreened attic vents and crawl-space vents. In trailers, look for and seal up holes and gaps in the skirting, between the trim and metal siding, around utility lines and pipes and ducts, around roof vents, and around the trailer tongue.

- Seal all entry holes larger than 1⁄4-inch (6 mm) in diameter that are inside and outside the home with any of the following: cement, lath screen or lath metal, wire screening, hardware cloth (less than 1⁄4-inch grate size), or other patching materials. Caulk can be used to reinforce any repairs where lath metal, hardware cloth or steel wool are the primary materials. Caulk or expanding foam alone are usually not adequate to prevent rodent intrusion.

2 : Reduce rodent shelter and food sources within 100 feet of the home

- Use raised cement foundations when constructing sheds, barns and outbuildings
- Store grains and animal feed in rodent-proof containers
- Don't leave pet food in feeding dishes
- Remove food sources from around buildings
- Store garbage and trash in rodent-proof containers. Elevate the containers at least 12 inches off the ground.
- Cut grass, brush and dense shrubbery within 100 feet of the home
- When possible, place wood piles 100 feet or more from the home, and elevate them at least 12 inches off the ground.

3 : Use spring-loaded traps in the home

- Bait the traps with small amounts of chunky peanut butter—pieces the size of a pea. Place the traps perpendicular to the baseboard or wall surface, with the end of the trap containing the bait closest to the baseboard or wall. Place traps in areas where rodents might be entering the home. (*Note*: Spring-loaded traps can be painful and dangerous if they snap on fingers; they should be handled with caution. Keep children and pets away from areas where traps are placed.)
- Continue trapping for at least one additional week after the last rodent is caught. As a precaution against reinfestation, it's a good idea to keep several baited, spring-loaded traps inside the house at all times in locations where rodents are most likely to be found.
- Examine the traps regularly. To dispose of traps or trapped animals, wear rubber, latex, vinyl or nitrile gloves. Spray the dead rodent with a disinfectant or chlorine solution. After soaking the rodent thoroughly, either take it out of the trap by lifting the spring-loaded metal bar and letting the animal fall into a plastic bag or place the entire trap (containing the dead rodent) in a plastic bag and seal the bag. Then place the bagged rodent into a *second* plastic bag and seal it. (*Full instructions on how to dispose of rodents are given on p. 4.*) Contact your county health department for information about other appropriate disposal methods.

  If the trap is to be reused, decontaminate it by immersing and washing it in a disinfectant or chlorine solution and then rinsing it. (*See box,* **Disinfecting solutions**, *at right.)*
- In addition to traps, use an Environmental Protection Agency (EPA)-approved rodenticide in a covered bait station inside the home on an ongoing basis.
- For severe or persistent infestations, contact a pest-control professional for rodent eradication or a building contractor for rodent-proofing.

What if I work in a high-risk environment?

The Centers for Disease Control and Prevention recommend the following:

- Know the symptoms of the disease and make sure you understand all the prevention measures set out here.
- If you develop an illness with fever or respiratory symptoms within 45 days of possible exposure to rodents or their nests, ***seek medical attention immediately.*** The degree of your exposure or likely exposure to rodents, if known, should be communicated to the health care provider.
- When cleaning up rodent-infested areas, and certainly when removing rodents from traps or otherwise handling them, be sure to wear a respirator.

  You'll need a respirator with the OSHA-approved Type 100 filter commonly called a HEPA filter. A negative-pressure tight-seal respirator equipped with Type 100 filters is recommended. Note that people who suffer certain cardiovascular conditions may be at risk when using respirators. Such respirators are typically available at farm and ranch supply stores, hardware stores and paint shops. Your county health department may be able to direct you to other retailers. *Men who wear beards or mustaches must be especially careful to fit the respirator snugly.*
- People who are regularly exposed to rodent-infested areas should wear coveralls (disposable if possible), rubber boots or disposable boot covers, rubber or plastic gloves, and protective goggles and a mask.
- Personal protective gear should be decontaminated upon removal. If the coveralls are not disposable, they should be laundered on site or immersed in liquid disinfectant until they can be washed.

Cleaning up rodent urine and droppings and contaminated surfaces

- During cleaning, wear rubber, latex, vinyl or nitrile gloves.
- Spray rodent urine and droppings with a disinfectant or chlorine solution until thoroughly soaked.
- To avoid generating potentially infectious airborne particles, do not vacuum or sweep rodent urine, droppings, or contaminated surfaces until they have been disinfected.

Disinfecting solutions

Two types of disinfecting solutions are recommended for use in cleaning up rodent materials.

1. General-purpose household disinfectant Prepare according to the label. Almost any agent commercially available in the United States is sufficient providing the label states that it is a disinfectant.

2. Hypochlorite solution This chlorine solution should be freshly prepared by mixing 1-1⁄2 cups of household bleach in 1 gallon of water. This 1:10 solution may be used in place of a commercial disinfectant.

When preparing or using a chlorine solution, wear rubber, latex, vinyl or nitrile gloves. Avoid spilling the mixture.

Chlorine-solution disinfectants should be prepared fresh daily.

- Use a paper towel to pick up the urine and droppings. Put the paper towel in the garbage.
- After the rodent droppings and urine have been removed, disinfect items that might have been contaminated by rodents or their urine and droppings.
- Mop floors with a disinfectant (*see box, p. 3).*
- Disinfect countertops, cabinets, drawers and other durable surfaces with a disinfectant.
- Spray dirt floors with a disinfectant.
- Disinfect carpets with a disinfectant or with a commercial-grade steam cleaner or shampoo.
- Steam-clean or shampoo rugs and upholstered furniture.
- Launder potentially contaminated bedding and clothing with hot water and detergent. Use rubber, latex, vinyl or nitrile gloves when handling contaminated laundry. Machine-dry laundry on a high setting or hang it to dry in the sun.
- Leave books, papers, and other items that cannot be cleaned with a liquid disinfectant in the sunlight for several hours, or in an indoor area free of rodents for approximately one week before cleanup. After that time, the virus should no longer be infectious. Wear rubber, latex, vinyl or nitrile gloves and wipe items with a cloth moistened with disinfectant.
- Before removing your gloves, disinfect them with disinfectant or soap and water. After removing the clean gloves, thoroughly wash your bare hands with soap and warm water.

Cleaning up dead rodents and rodent nests

- Wear rubber, latex, vinyl or nitrile gloves.
- Spray dead rodents and rodent nests with a disinfectant or a chlorine solution, soaking them thoroughly.
- Place the dead rodent or nest in a plastic bag or remove the dead rodent from the trap and place it in a plastic bag. When cleanup is complete (or when the bag is full), seal the bag, place it into a second plastic bag, and seal the second bag. Dispose of the material in the double bag by burying it in a 2- to 3-foot-deep hole, or burning it, or discarding it in a covered trash can that is regularly emptied. *Contact your county health department for information about other disposal methods.*
- Clean up the surrounding area.

For further information

NOTE If you have an immediate concern about hantavirus, contact your physician or your county health department. The number will be listed in the Government pages of your telephone directory under "County: Health and Human Services"

For detailed information about hantavirus, telephone the 24-hour

Hantavirus Hotline : (877) 232–3322

Note: When you reach the Hantavirus Hotline—a recording—you may ask that materials on hantavirus be faxed to you.

or visit—

the Centers for Disease Control and Prevention Web site—

www.cdc.gov/ncidod/diseases/hanta/hps/index.htm

or contact—
Centers for Disease Control and Prevention (CDC)
National Center for Infectious Diseases (NCID)
Special Pathogens Branch, Mailstop A-26
1600 Clifton Road N.E.
Atlanta GA 30333

telephone (404) 639–1510
e-mail **dvd1spath@cdc.gov**
fax (404) 639–1509

Another resource is
MSU Extension Housing & Environmental Quality Office
Mike Vogel, Extension specialist
(406) 994–3451
e-mail **mvogel@montana.edu**

Note Two videos about hantavirus, both produced by the CDC, may be borrowed by arrangement from your tribal or county Extension office. They are, "Preventing Hantavirus" and "A New Hantavirus."

Go to— www.montana.edu/wwwpb/pubs/mt9404.html

Health
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