

Hantavirus Procedures

What is Hanatvirus?

Hantavirus pulmonary syndrome (HPS) is a lung infection caused by viruses found in the saliva, urine, and droppings of some rodents. The illness is rare but can be deadly.

Most cases of HPS in the U.S. are caused by one type of hantavirus found in the deer mouse.

People can become infected by:

- Breathing in tiny airborne particles that come from rodent urine.
- Touching rodent urine, saliva, or droppings.
- Coming in contact with dust contaminated with the virus.
- Being bitten by an infected mouse.



People can become infected with Hantavirus after disturbing or cleaning rodent droppings or nests, or by living or working in rodent-infested settings. An infection with Hantavirus can progress to Hantavirus Pulmonary Syndrome (HPS) which can be fatal.

What are the symptoms of Hantavirus Pulmonary Syndrome (HPS)?

Symptoms begin one to six weeks after inhaling the virus and typically start with 3-5 days of “flu-like” illness including fever, sore muscles, headaches, nausea, vomiting and fatigue. As the disease progresses, it causes shortness of breath due to fluid filled lungs. Hospital care is usually required. It is a serious disease and about one out of three people diagnosed with HPS have died.

What are potential exposures?

- Opening and cleaning previously unused buildings like cabins, barns or other storage facilities that have been closed during the winter.
- Housecleaning activities especially if rodents share the house.
- Work related exposures such as construction, utility, and pest control workers when working in crawl spaces, under houses or in vacant buildings that may have a rodent population.
- Using infested trail shelters or camping in other rodent habitats.

Hantaviruses in the U.S. are mainly transmitted to people when they breathe in air contaminated with the virus. There is no evidence that the disease is transmitted from human to human. In areas where carrier

rodents live, such as the deer mouse, cotton rat or white-footed mouse, take sensible precautions even if you do not see rodents or their droppings.

Cleaning

Take precautions before and during cleanup of rodent-infested areas. Before cleaning, trap the rodents and seal up routes of entry for rodents into the area. Continue trapping for a week. If no rodents are captured, the active infestation has been eliminated and enough time has passed so that any infectious virus in the rodent's urine/droppings or nesting material is no longer infectious.

Before starting cleanup of the space, ventilate the space by opening the doors and windows for at least 30 minutes to allow fresh air to enter the area. Use cross-ventilation and leave the area vacant during the airing-out period.

Clean-up of droppings and urine

When you begin cleaning, it is important that you **do not** stir up dust by sweeping or vacuuming up droppings, urine, or nesting materials.

- Wear rubber, latex, or vinyl gloves when cleaning urine and droppings.
- Spray the urine and droppings with a disinfectant or a mixture of bleach and water and let soak 5 minutes. The recommended concentration of bleach solution is 10:1 solution. That is 1 part bleach to 9 parts water for a total of 10 parts. When using a commercial disinfectant, following the manufacturer's instructions on the label for dilution and disinfection time.
- Use a paper towel to pick up the urine and droppings, and dispose of the waste 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.

Next, clean and disinfect the whole area

- Mop floors and clean countertops with disinfectant or bleach solution.
- Steam clean or shampoo upholstered furniture and carpets with evidence of rodent exposure.
- Wash any bedding and clothing with laundry detergent in hot water if exposed to rodent urine or droppings.

Lastly, remove gloves, and thoroughly wash hands with soap and water (or use a waterless alcohol-based hand rub when soap is not available and hands are not visibly soiled).

Clean-up of Dead Rodents or Nests

Wear rubber, latex, or vinyl gloves when cleaning up dead rodents or nests.

- Spray the dead rodent or nest and the surrounding area with a disinfectant or a mixture of bleach and water.
- Soak rodent, nesting materials or droppings in disinfectant solution for 5 minutes before wiping up with a paper towel or rag.
- Place the dead rodent or nesting materials in a plastic bag and seal tightly. Place the full bag in a second plastic bag and seal.
- Throw the bag into a covered trash can that is regularly emptied.

Remove gloves, and thoroughly wash hands with soap and water (or use a waterless alcohol-based hand rub when soap is not available and hands are not visibly soiled).

Clean Up of Cabins, Sheds, Barns, or Other Outbuildings

Before attempting to clean cabins, sheds, barns, or other outbuildings, open all doors and windows for 30 minutes. This will allow fresh air to enter the work area.

- Wear rubber, latex, or vinyl gloves and clean up all rodent urine, droppings, nests, and dead rodents using disinfectant or a mixture of bleach and water.
- Mop floors or spray dirt floors with a disinfectant or mixture of bleach and water.
- Clean countertops, cabinets, and drawers with a disinfectant or a mixture of bleach and water.
 - Remove gloves, and thoroughly wash hands with soap and water (or use a waterless alcohol-based hand rub when soap is not available and hands are not visibly soiled).

Clean-up of Attics, Basements, Crawlspace, and Other Storage Areas

Before cleaning attics, basements, crawlspaces and other storage areas, it is necessary to completely remove the existing rodent infestation by trapping. When there is no evidence of infestation, wait about 5 days before beginning to clean these areas. Before cleaning the space, ventilate the area by opening the doors and windows for at least 30 minutes to allow fresh air to enter the area and to remove potentially contaminated air from the area. Use cross-ventilation and leave the area during the airing-out period.

When cleaning attics, basements, crawlspaces and other storage areas:

- Wear rubber, latex, or vinyl gloves when cleaning up urine, droppings, or nesting materials. Note that a dust mask may provide some protection against dust, molds, and insulation fibers, but does not protect against viruses.
- Spray any urine, droppings, and nesting materials with either a bleach and water solution (1 part bleach to 9 parts water) or a household disinfectant prepared according to the label instructions for dilution and disinfection time. Soak well. This will inactivate any virus. Use a paper towel or rag to pick up the materials and dispose of them.
- Mop floors after spraying them using bleach/water solution or a disinfectant. Dirt floors can be sprayed with either bleach and water solution or a disinfectant.
- If exposed insulation has become contaminated with urine and droppings, it should be placed into plastic bags for removal.
- To remove any potentially contaminated materials from storage vessels/boxes:
 - First, move the storage vessels/boxes outside and place them in an area that is well-ventilated and exposed to direct sunlight. The outside of the storage vessels/boxes can be disinfected using bleach and water solution or disinfectant solution;
 - Next, remove the potentially contaminated materials while in the sunlit, ventilated area. Remain upwind so that any dust or debris is not blown toward your face. Some contaminated stored materials, such as clothing, books, etc. can be decontaminated by following the recommended methods of disinfection provided in the table below; items that are no longer needed can be discarded.
- Dispose of any cardboard boxes contaminated with urine or droppings. Plastic, glass, or metal containers can be disinfected by spraying with the bleach and water solution or disinfectant. Then, using a rag or paper towel, wipe up the urine or droppings and dispose of the waste.
- Clean countertops, cabinets, and drawers with disinfectant or bleach and water solution.

- Decontaminate gloves with disinfectant or bleach and water solution. Wash hands well with soap and warm water.

Cleaning and Disinfection of Vehicles with Rodent Infestations

Rodents, including squirrels, mice, and rats, may construct their nests in cars, trucks, campers, and other vehicles, especially if such vehicles are used infrequently. Rodent nesting materials can be found in many areas of a vehicle. For more information read [Interim Guidance for Cleaning and Disinfection of Vehicles with Rodent Infestations \(https://www.cdc.gov/rodents/cleaning/guidance-cleaning-vehicle.html\)](https://www.cdc.gov/rodents/cleaning/guidance-cleaning-vehicle.html). Contact the Environmental Health and Safety Department for an evaluation of infested vehicles (208)-282-2310.

Heavy Rodent Infestation

Special precautions should be used for cleaning homes or buildings with heavy rodent infestations. The special precautions may also apply to vacant dwellings that have attracted large numbers of rodents and to dwellings and other structures where hantavirus has been confirmed in the rodent population. Contact the Environmental Health and Safety Department at (208)-282-2310 for an evaluation of rodent infestations and for guidance in safely cleaning up heavy rodent infestations.

Individuals involved in the clean-up of heavy rodent infestations should wear the protective equipment listed here:

- coveralls (disposable, if possible);
- rubber boots or disposable shoe covers;
- rubber, latex, or vinyl gloves;
- protective goggles;
- and an appropriate respirator, such as a half-mask air-purifying (or negative-pressure) respirator with a high-efficiency particulate air (HEPA) filter or a powered air-purifying respirator (PAPR) with HEPA filters. Note that respiratory protection at ISU is overseen by the Environmental Health and Safety Department, and respirator use must be approved by this department.
- Personal protective gear should be decontaminated upon removal at the end of the day. All potentially infective waste material (including respirator filters) from clean-up operations that cannot be burned or deep buried on site should be double-bagged in appropriate plastic bags. The bagged material should then be labeled as infectious (if it is to be transported) and disposed of in accordance with local requirements for infectious waste.

Air Ducts (heating and cooling ventilation systems)

When there is evidence that rodents have access to heating and cooling ventilation, contact ISU Facilities Services at (208) 282-2784.

Prevention of Rodent problems

The best way to prevent a rodent infestation and required contact with rodents or rodent droppings is to remove the food sources, water, and items that provide shelter for rodents. Seal up areas that may provide access to areas by rodents. . Trap and remove rodents in the area. Eliminate any sources of potential rodent food, by keeping area clean and maintaining food in secure containers.

Table 1

CDC Recommended methods of textile decontamination

Clothing, Bedding, Stuffed Animals

Laundry potentially contaminated bedding, clothing, or stuffed animals 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 air dry in the sun.

Laundry detergent breaks down the virus's lipid envelope, rendering it harmless. Additionally, heat generated by the clothes dryer will also ensure that the virus is noninfectious. However, the use of a clothes dryer alone is not recommended as the sole treatment because not all dryers reach the necessary temperature. A temperature of 45 degrees Celsius, or about 115 degrees Fahrenheit, is required to inactivate hantaviruses.

Carpets/Furniture

Shampoo rugs and upholstered furniture with a commercial disinfectant or with a commercial-grade steam cleaner or shampoo.

Books, Papers and other Non-washable items

You may leave books, papers, and other items that cannot be cleaned with a liquid disinfectant or thrown away, outdoors in the sunlight for several hours, or in an indoor area free of rodents for approximately 1 week before cleanup. After that time, the virus should no longer be infectious. Wear rubber, latex, vinyl, or nitrile gloves and wipe the items with a cloth moistened with disinfectant.

Once excreted into the environment by the rodent, hantaviruses can survive in the environment and remain infectious for a period of 2-3 days. Ultraviolet rays in sunlight inactivate hantaviruses.

Reference: Centers for Disease Control and Prevention.

<https://www.cdc.gov/hantavirus/>
https://www.cdc.gov/rodents/prevent_infestations/index.html