

Hantavirus Safety Precautions and Cleaning Procedures

The following paragraphs are the safety precautions and cleaning procedures to protect individuals working with or coming in contact with rodent contamination as found in the Center for Disease Control (CDC) report (Hantavirus Pulmonary Syndrome---United States: Updated Recommendations for Risk Reduction) MMWR 2002; 51[No. RR09]:1-12). Contact your local Army Preventive Medicine Services or State Health Department if unsure of infestation levels or the level of required personal protection equipment (PPE).

Remember that the primary strategy in preventing hantavirus infection is to prevent the contact with rodents and thus limit them from living near or entering the facility or area of operation. Ensure that the installation has a pest management plan to control the rodent population.

1. Cleanup of Rodent Urine and Droppings and Contaminated Surfaces.

- a. Persons working in areas of potential rodent contamination will receive training (see enclosure 2) concerning hantavirus transmission.
- b. During cleaning, wear rubber, latex, vinyl, or nitrile gloves.
- c. **Do not** stir up dust by sweeping, high pressure spraying, or vacuuming droppings, urine, or nesting materials. This will generate potentially infectious aerosols that can be breathed in more easily.
- d. Clean equipment, pallets, and containers outdoors if possible. The risks of hantavirus are lower outdoors than indoors since the ultraviolet rays in sunlight destroys the virus.
- e. Thoroughly wet urine and droppings with a disinfectant (such as Lysol) or a chlorine solution (see paragraph 5 for more information on disinfecting solutions) to deactivate the virus. A 10% hypochlorite solution (1½ cups of household bleach in one gallon of water) may be used in place of commercial disinfectant.
- f. Once wetted, remove contaminated materials with a paper towel. Place the paper towel in the garbage.
- g. After the rodent droppings and urine have been removed, disinfect items (i.e., floors, countertops, cabinets, drawers, and other surfaces) that might have been contaminated by rodents or their urine and droppings.
- h. Finally, disinfect gloves before taking them off with disinfectant or soap and water. Then wash hands with soap and warm water.

2. Cleanup of Dead Rodents and Rodent Nests

- a. Wear rubber, latex, vinyl, or nitrile gloves.
- b. Use insect repellent (containing DEET) on clothing, shoes, and hands to reduce the risk of fleabites that might transmit plague.
- c. Spray dead rodents and rodent nests with a disinfectant or a chlorine solution, soaking them thoroughly.
- d. 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: (1) burying it in a 2- to 3-foot-deep hole; (2) burning it; or (3) discarding it in a covered trash can that is regularly emptied. Contact the local or state health department concerning other appropriate disposal methods.
- e. Clean up the surrounding area as described in paragraph 1 “Cleanup of Rodent Urine and Droppings and Contaminated Surfaces”.

3. Cleaning Sheds and Other Outbuildings. Buildings or structures of this type include supply containers, bunkers, magazines, warehouses, boxcars, and stored vehicles. Buildings, structures, or stored vehicles that are abandoned or are closed up for extended periods (weeks or months) without ventilation pose the greatest risk to employees.

- a. Before cleaning closed sheds and other outbuildings, ventilate the building by opening doors and windows for at least 30 minutes. Use cross ventilation if possible.
- b. Leave the area during the airing-out period. This airing out helps to remove infectious aerosols that might be created when hantavirus-infected rodents urinate.
- c. In substantially dirty or dusty environments, additional protective clothing or equipment may be worn. Such equipment includes coveralls (disposable when possible) and safety glasses or goggles, in addition to rubber, latex, vinyl, or nitrile gloves.

4. Cleaning Buildings with Heavy Rodent Infestation or with Confirmed Hantavirus Infection. Special precautions are indicated for cleaning buildings or areas with heavy rodent infestations. A rodent infestation is considered heavy if piles of feces or numerous nests or dead rodents are observed. These precautions can apply to vacant buildings or structures that have attracted rodents while unoccupied and to dwellings and other structures that have been occupied by persons with confirmed hantavirus infection.

- a. Workers who are either hired specifically to perform the cleanup or asked to do so as part of their work activities will receive training (see enclosure 2) concerning hantavirus transmission and disease symptoms and should be trained to perform the required activities safely.

b. Before cleaning, ventilate the building or facility by opening doors and windows for at least 30 minutes as discussed in paragraph 3 above. Use cross ventilation if possible.

c. Clean up procedures are the same as in paragraphs one, two, and three above.

d. Persons involved in the clean-up will wear coveralls (disposable if possible); rubber boots or disposable shoe covers; rubber, latex, vinyl, or nitrile gloves; protective goggles, and an appropriate respiratory protection device, such as a half-mask air-purifying (or negative-pressure) respirator with an N-100 filter or a powered air-purifying respirator (PAPR) with N-100 filters. The Armed Forces Pest Management Board states in TIM No. 41 (see paragraph 6.e. below) that soldiers may wear the M-40 gas mask since the device protects against inhalation of virus particles.

e. PPE should be decontaminated upon removal at the end of the day. If the coveralls are not disposable, they should be laundered on site. If no laundry facilities are available, the coveralls should be immersed in liquid disinfectant until they can be washed.

f. 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.

g. Persons involved in the cleanup who develop a febrile or respiratory illness within 45 days of the last potential exposure should immediately seek medical attention and inform the attending physician of the potential occupational risk of hantavirus infection. The physician should contact local health authorities promptly if hantavirus-associated illness is suspected. A blood sample should be obtained and forwarded through the state health department for hantavirus antibody testing.

5. Disinfecting Solutions. Why all the fuss about spraying and washing items, structures, and surfaces with bleach, and such? These viruses are surrounded by a lipid (fatty) envelope, so they are somewhat fragile. The lipid envelope can be destroyed and the virus killed by fat solvents like alcohol, ordinary disinfectants and household bleach. That is why one of the most important ways to prevent transmitting the disease is to carefully wet down dead rodents and areas where rodents have been with disinfectant and/or bleach. When you do this, you are killing the virus itself and reducing the chance that the virus will get into the air. Two types of disinfecting solutions are recommended to clean up rodent materials.

a. General-Purpose Household Disinfectant. Prepare according to the label, if not prediluted. Almost any agent commercially available in the United States is sufficient as long as the label states that it is a disinfectant. Effective agents include those based on phenols, quaternary ammonium compounds, and hypochlorite.

b. Hypochlorite Solution. A chlorine solution, freshly prepared by mixing 1½ cups of household bleach in 1 gallon of water (or a 1:10 solution) can be used in place of a commercial disinfectant. When using chlorine solution, avoid spilling the mixture on clothing or other items

that might be damaged by bleach. Wear rubber, latex, vinyl, or nitrile gloves when preparing and using chlorine solutions. Chlorine solutions should be prepared fresh daily.

6. **Hantavirus Information.** Additional information and references can be found at:

- a. The Center for Disease Control and Prevention (CDC) web site:
<http://www.cdc.gov/ncidod/diseases/hanta/hps/index.htm>. Teaching materials such as PowerPoint slide shows, prevention campaign images, and handout cards can be found at:
<http://www.cdc.gov/ncidod/diseases/hanta/hps/noframes/teach.htm>.
- b. CDC. Hantavirus Pulmonary Syndrome---United States: Updated Recommendations for Risk Reduction) MMWR 2002; 51[No. RR09]:1-12.
- c. Brochures, technical manuals, and videos by mail can be found at the CDC's [Special Pathogens Branch \(SPB\) Teaching and Prevention Materials](#) page and learn how you can order prevention materials.
- d. The U.S. Army Center for Health Promotion and Preventive Medicine (USACHPPM), Entomological Sciences Program web site: <http://chppm-www.apgea.army.mil/ento/default.htm>.
- e. The Armed Forces Pest Management Board home site (<http://www.afpmb.org/pubs/tims/tims.htm>) has Technical Information Memorandum No. 41, "Protection from Rodent-borne Diseases" available for download.