

# Update

NPMA LIBRARY UPDATE

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## Disease Associated With Urban Rodents

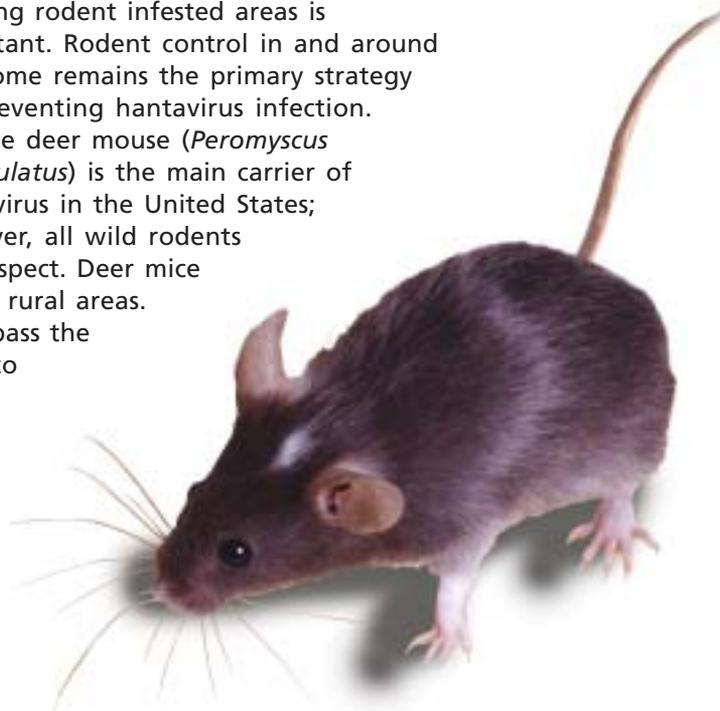
Historically, rodents have been involved in the spread of major disease and epidemics. Their behavior and biology lend them to be excellent "vehicles of disease." It is known that mice can spread more than 20 kinds of organisms that can cause diseases in humans and pets. These include a variety of food poisoning bacteria like *Salmonella*, *Shigella*, *E. coli*, and other disease causing organisms like: tapeworms, mites, ticks, fleas, and rickettsial pox. Other rodents, which are widespread and may also come indoors for the winter such as deer mice, can carry and spread disease organisms like hantavirus and plague.

### Hantavirus

Hantavirus is a group of viruses that are carried by rodents. One of them, Sin Nombre virus, is found in deer mice in North America. Sin Nombre virus is the cause of Hantavirus Pulmonary Syndrome (HPS) in people. HPS is contracted primarily by inhaling airborne particles from rodent droppings, urine or saliva left by infected rodents or through direct contact with infected rodents. The deer

mouse is the most common carrier of hantavirus, but other rodents can be possible carriers without showing any signs of illness. Anyone who comes into contact with an infected rodent is at risk. HPS was first recognized in 1993 and has since been identified throughout the United States. Although rare, HPS is potentially deadly. There is no treatment for hantavirus, so preventing rodent infestations and taking precautions when cleaning rodent infested areas is important. Rodent control in and around the home remains the primary strategy for preventing hantavirus infection.

The deer mouse (*Peromyscus maniculatus*) is the main carrier of hantavirus in the United States; however, all wild rodents are suspect. Deer mice live in rural areas. They pass the virus to each



## Most Frequently Encountered Urban Rodents



House Mice



Norway Rats



Roof Rats



White Footed Deer Mice

### Most Common Diseases and Disease Associated Organisms

- Hantavirus
- Leptospirosis
- Plague
- Food poisoning bacterial agents
- Rabies
- LCMV (Lymphocytic choriomeningitis virus)
- Ectoparasites (ticks, fleas, lice, mites)

other and some of the population is usually infected. The deer mouse can carry and shed the virus without showing any signs of being sick.

In humans, the disease begins with "flu-like" symptoms including fever, sore muscles, headaches, nausea, vomiting, and fatigue. As the disease gets worse, it causes shortness of breath due to fluid filled lungs and hospital care is then required. It is usually a serious infection and about one out of three people diagnosed with HPS have died. There are no cases in the U.S. of the disease being spread from one person to another.

The length of time hantaviruses can remain infectious in the environment is variable and depends on environmental conditions. *The bottom line is that you can't tell how old a dropping is, so all rodent droppings should be handled as if they are infectious. Areas with ongoing rodent infestation are particularly risky and the recommendations for prevention should be followed.*

### Rabies

Small rodents, such as squirrels, rats, mice, and chipmunks, are *almost never found to be infected with rabies and have not been known to cause rabies among humans in the United States*. Bites by these animals are usually not considered a risk of rabies, unless the animal was sick or behaving in any unusual manner and rabies is widespread in your area. However, from 1985 through 1994, woodchucks accounted for 86 percent of the 368 cases of rabies among rodents reported to Center for Disease Control (CDC). Woodchucks or



groundhogs (*Marmota monax*) are the only rodents that may be submitted to state health department because of a suspicion of rabies.

In all cases involving rodents or rodent trapping, the state or local health department should be consulted before a decision is made to initiate post exposure prophylaxis. *Rabies vaccines for urban pest trappers are available and are highly recommended; management should make this decision based upon history and potential for rabies in your area.*

## LCMV (Lymphocytic choriomeningitis)

In May 2005, CDC received reports of four solid organ-transplant recipients with unknown illness. All were infected with lymphocytic choriomeningitis virus (LCMV) from a common organ donor. Three of the four organ recipients died from LCMV infection. The donor is thought to have acquired LCMV from his pet hamster. However, the primary host of LCMV is the house mouse (*Mus musculus*). Pet rodents can become infected after being in contact with wild house mice in breeding facilities, pet stores, or homes.

Humans can develop LCMV infection from exposure to urine, droppings, saliva, or nesting material of infected rodents. LCMV infection can also occur when these materials are inhaled or directly introduced into broken skin or into the nose, eyes, or mouth, and possibly by a bite from an infected animal. Infection can also be spread by inhaling dust or droplets containing LCMV, such as while sweeping infected rodent droppings. A pregnant woman who becomes infected with LCMV can pass the infection to her unborn baby. However, spread of LCMV infection from one person to another is not known to occur otherwise. About 5 percent of adults have a positive blood test that shows they were infected with LCMV at some time in their lives. Some people with normal immune systems have no symptoms during LCMV infection. Others have a mild illness with symptoms such

as headache, fever, chills, and muscle aches. Sometimes, meningitis (inflammation around the brain and spinal cord) will occur. LCMV can be a serious infection in persons with impaired immune systems. Additionally, pregnancy-related infection has been associated with abortion, congenital hydrocephalus and chorioretinitis, and mental retardation.

The good news is that in general, the risk of LCMV infection is low. If you are pregnant or planning to become pregnant, you should avoid contact with rodents, including pets such as hamsters and guinea pigs, and rodent droppings whenever possible. Following these instructions can reduce the risk of LCMV infection.

## Leptospirosis

Leptospirosis is a bacterial disease caused by bacteria of the genus *Leptospira*. In humans it causes a wide range of symptoms, and some infected persons may have no symptoms at all. Typical symptoms of leptospirosis include high fever, severe headache, chills, muscle aches, and vomiting, and may include jaundice (yellow skin and eyes), red eyes, abdominal pain, diarrhea, or a rash. If the disease is not treated, the patient could develop kidney damage, meningitis, liver failure, and respiratory distress. In rare cases death occurs. Many of these symptoms can be mistaken for other diseases. Leptospirosis is confirmed by laboratory testing of a blood or urine sample.

Outbreaks of leptospirosis are usually caused by exposure to water contaminated with the urine of infected animals. Many different kinds of animals carry the bacterium; they may become sick but sometimes have no symptoms. *Leptospira* organisms have been found in cattle, pigs, horses, dogs, rodents, and wild animals. *Humans become infected through contact with water, food, or soil containing urine from these infected*

*animals*. This may happen by swallowing contaminated food or water or through skin contact, especially with the eyes or nose, or with broken skin. The disease is not known to be spread from person to person. If symptoms worsen, a second phase occurs and is more severe; the person may have kidney or liver failure or meningitis. This phase is also called Weil's disease. Without treatment, recovery may take several months.

Leptospirosis occurs worldwide but is most common in temperate or tropical climates. It is an occupational hazard for many people who work outdoors or with animals, for example, farmers, sewer workers, and pest control technicians. It is a recreational hazard for campers. The incidence is also increasing among urban children.

## Plague

Plague is an infectious disease of animals and humans caused by a bacterium named *Yersinia pestis*. People usually get plague from being bitten by a rodent flea that is carrying the plague bacterium or by handling an infected animal. Millions of people in Europe died from plague (*The Black Death*) in the Middle Ages, when human homes and places of work were inhabited by flea-infested rats. Today, modern antibiotics are effective against plague, but if an infected person is not treated promptly, the disease is likely to cause illness or death.

Wild rodents in certain areas around the world are infected with plague. Outbreaks in people still occur in rural communities or in cities. They are usually associated with infected rats or gophers and rat fleas in the western United States. Human plague in the U.S. has occurred as mostly scattered cases in rural areas (an average of 10 to 15 persons each year). Most human cases in the U.S. occur in two regions: 1) northern New Mexico, northern Arizona,

and southern Colorado; and 2) California, southern Oregon, and far western Nevada. Prevention information for Bubonic plague includes avoiding flea bites and practicing urban rodent pest control measures.

## What are the best recommendations for cleaning rodent-infested areas?

- Use cross-ventilation when entering a previously unventilated enclosed room or dwelling prior to cleanup.
- Put on rubber, latex, vinyl, or nitrile gloves.
- Do not stir up dust by vacuuming, sweeping, or any other means.
- Thoroughly wet contaminated areas with a bleach solution or household disinfectant.
- Hypochlorite (bleach) solution: Mix 1 and 1/2 cups of household bleach in 1 gallon of water.
- Once everything is wet, take up contaminated materials with damp towel and then mop or sponge the area with bleach solution or household disinfectant.
- Spray dead carcasses with disinfectant and then double-bag along with all cleaning materials and throw bag out in an appropriate waste disposal system.
- Remove the gloves and thoroughly wash your hands with soap and water, or waterless alcohol-based hand rubs when soap is not available and hands are not visibly soiled.

To learn more about rodents and other pests visit [www.npmapestworld.org](http://www.npmapestworld.org). To learn more about the various mentioned rodent associated diseases visit [www.cdc.gov](http://www.cdc.gov), which was also consulted as a reference in the writing of this article. ●