

# Update

NPMA LIBRARY UPDATE

Insert this update into the NPMA Pest Management Library, which can be purchased from the Resource Center. Phone: 703-352-NPMA (6762); Fax: 703-352-3031

## Rabies

**R**abies (from Latin meaning: “madness, rage, fury”) is a viral disease of the central nervous system (brain and spinal cord), causing acute encephalitis (inflammation of the brain) in mammals; it is almost always fatal. Rabies in humans is very rare in the United States, but rabies in animals, especially wildlife, is common in some parts of the country. In non-vaccinated humans, rabies is invariably fatal after neurological symptoms have developed, but prompt post-exposure vaccination may prevent the virus from progressing.

### How Rabies Is Transmitted

Any mammal may become infected with the rabies virus and develop symptoms, including humans. Rabies is spread when infected animals bite or scratch another animal or human. The virus can also be spread if saliva or tissue from the brain or spinal cord touches broken skin or the lining of the mouth, nose or eyes. Rabies is not spread by petting a rabid animal or contacting dried saliva, blood, urine, or feces from a rabid animal. In fact, rabies virus becomes noninfectious by desiccation and exposure to sunlight. Different environmental conditions affect the rate at which the virus becomes inactive, but in general, if the material containing the virus is dry, the virus is considered noninfectious.

Most animals can be infected by the virus and can transmit the disease to humans. Infected bats, raccoons, foxes, skunks, wolves, dogs or cats provide the greatest risk to humans. Rabies may also spread through exposure to infected domestic farm animals, groundhogs, weasels, rabbits and other wild carnivores. (In general, smaller rodents such as mice, rats, chipmunks, and squirrels, are seldom infected.) The route of infection is usually by a bite. In many cases the infected animal is exceptionally aggressive, may attack without provocation, and exhibits otherwise uncharacteristic behaviors, including excessive salivation from the mouth. Transmission between humans is extremely rare, although it can happen through transplant surgery or, even more rarely, through bites, kisses or sexual contact.



*In 2006, 37.7% of all documented rabies cases in the United States occurred in raccoons. Other major contributors were bats and skunks.*

## Symptoms

Rabies infection varies with the nature and extent of exposure. Bites by some animals, such as bats, can inflict minor injury and thus be very difficult to detect. After a typical human infection by bite, the virus enters the peripheral nervous system and travels to the central nervous system. The peripheral nervous system carries information and impulses from motor and sensory functions including organs to the central nervous system which includes the brain and the spinal cord. Working together, these systems control behavior in humans and many other animals. During this movement phase, the virus cannot be easily detected within the host, and vaccination may still give immunity to prevent the disease. Once the virus reaches the brain, it rapidly causes acute encephalitis. At this point, treatment becomes futile and the outcome can be fatal.

The period between infection and the first appearance of symptoms is normally two to twelve weeks, but can be as long as two years. The first symptoms of rabies may be nonspecific and include lethargy, fever, vomiting, and lack of appetite resulting in weight loss. Signs progress within days to brain dysfunction, nerve dysfunction, weakness, paralysis, seizures, difficulty breathing, difficulty swallowing, excessive salivation, abnormal behavior, aggression, and/or self-mutilation. The production of large quantities of saliva and tears coupled with an inability to speak or swallow are typical during the later stages of the disease; this can result in what is called "hydrophobia" (literally meaning fear of water), where the victim has difficulty swallowing because the throat and jaw become slowly paralyzed; the victim shows panic when presented with liquids to drink, and cannot quench his or her thirst. The disease itself was also once commonly referred to as hydrophobia, because of this symptom. The victim "foams at the mouth" because he cannot swallow his own saliva for days, and it gathers in the mouth until it overflows. Death almost invariably results two to 10 days after the first symptoms onset; the few humans who are known to have survived the disease are all typically left with severe brain damage.

## Current Rabies Incidence in the United States

Rabies in domestic and wild animals has been a reportable disease to the Centers for Disease Control and Prevention (CDC) since 1961. All state health departments, and also those in the District of Columbia and Puerto Rico, are required to report monthly on the number of animal rabies cases, by county of origin and type of animal involved. Annual rabies figures are compiled at the CDC for an annual summary report. Although the criteria for submitting animals suspected as being rabid for testing varies somewhat by state, testing procedures to detect rabies virus antigen use a standard methodology. Thanks to vaccines, rabies is rare in farm animals and pets like cats and dogs and ferrets. However, it is important to make sure that all pets and farm animals stay up to date with their rabies shots to prevent them from getting rabies and spreading it to their owners or other animals.

The most recent published rabies surveillance data is from 2006. Below is a brief summary of the surveillance information for 2006, including a map showing the distribution of rabies in the United States.

*In 2006, 49 states, the District of Columbia, and Puerto Rico tested over 113,000 animals and reported 6,940 cases of rabies in animals and three human cases to CDC; (Hawaii is the only state that is rabies free). The total number of reported cases increased by 8.2% from those reported in 2005 (6,418 cases).*

ANIMAL	# OF CASES	PERCENT OF TOTAL CASES
Raccoons	2,615	37.7%
Bats	1,692	24.4%
Skunks	1,494	21.5%
Foxes	427	6.2%
Cats	318	4.6%
Cattle	82	1.2%
Dogs	79	1.1%
Others	--	3.3%

*Table 1. 2006 U.S. Cases of Rabies by Type of Animal. (Vet Med Today: Public Veterinary Medicine JAVMA, Vol 231, No. 4, August 15, 2007.)*

Approximately 92% of the cases were in wildlife, and 8% were in domestic animals. Relative contributions by the major animal groups were as follows: 2,615 raccoons (37.7%), 1,692 bats (24.4%), 1,494 skunks (21.5%), 427 foxes (6.2%), 318 cats (4.6%), 82 cattle (1.2%), and 79 dogs (1.1%). Compared with numbers of reported cases in 2005, cases in 2006 increased among all groups except cattle. Increases in numbers of rabid raccoons during 2006 were reported by 11 of the 20 eastern states where raccoon rabies exists, and reported cases increased by 3.2% overall, compared with 2005.

On a national level, the number of rabies cases in skunks during 2006 increased by 6.1% from the number reported in 2005. Texas reported the greatest number of rabid skunks and the greatest overall state total of animal rabies cases. Total number of cases of rabies reported nationally in foxes increased 13.6%. The 1,692 cases of rabies reported in bats represented a 14.5% increase, compared with numbers reported in 2005, making bats the second most reported rabid animal behind raccoons. Cases of rabies in cats, dogs, horses and mules, and sheep and goats increased 18.2%, 3.9%, 12.8%, and 22.2%, respectively, whereas cases reported in cattle decreased 11.8%. In Puerto Rico, reported cases of rabies in mongooses increased 9.2%, and rabies in domestic animals, presumably attributable to spillover

infection from mongooses, increased 20%. (Vet Med Today: Public Veterinary Medicine JAVMA, Vol 231, No. 4, August 15, 2007.)

## Advice for the Technician

Technicians can come into contact with potentially rabid animals in many situations. Special care must be exercised to reduce chances of exposure to rabies. Technicians must know the local regulations as to handling and disposal of animals. Some localities prohibit relocation and release; others may require release. There are times when regulations make safety difficult; however, that special care must be exercised for the protection of the technician, the customer, and the animal.

### Wildlife Removal

When removing wildlife, technicians must follow company requirements for working in areas occupied by wildlife especially if the work order is to remove warm blooded mammals. Each company which removes wildlife as a service should have formal training and documented procedures as to how to perform work in infested areas and safety precautions which must be followed. Typically, the equipment required to remove wildlife can be bulky considering that it may include hauling large traps, respiratory protection when required, perhaps bump caps, coveralls, lights, and heavy

gloves, but safety should not be jeopardized in any situation.

When handling small mammals such as bats, technicians should use heavy protective gloves and any other company specified gloves. If mammals such as bats are physically removed by hand rather than by live trapping depending on the location, special care must be taken to make sure that there is a reduced chance of getting bitten. Larger animals in traps should be removed very carefully and with assistance of another technician where needed. Animals should not be removed from portable traps on the customer's property.



Distribution of major rabies virus variants among wild terrestrial reservoirs in the United States and Puerto Rico from 2006 surveillance data. (Vet Med Today: Public Veterinary Medicine JAVMA, Vol 231, No. 4, August 15, 2007.)

If an animal is suspected of being rabid or if there is any concern about rabies, state requirements should be followed for transporting the animal for testing. Wildlife management courses typically presented by state extension services instruct technicians how to transport animals for testing and requirements in those states. Not all state requirements are identical, so understanding the regulations is important.

Any injury to the technician, especially any drawing blood, should be reported immediately to their supervisor. Depending on the circumstances, testing or treatment for rabies may be a prudent course of action after consultation with a physician. If the animal has not been caught, the state may request that the animal be caught and tested.

### Incidental Contact

There are many situations when a technician might be doing work not related to wildlife control and may be exposed to rabies. Most technicians who have been in crawl spaces or attics have experienced coming face to face with an angry mammal as the technician invades their "home." The technician is certainly startled, and may not be prepared to address the animal with specified safety equipment since the technician might have been in a crawl just to treat for ants or to perform a wood destroying insect inspection. Technicians can ask the customer onsite before entering a crawl or attic if they know of any animals in the spaces. It is surprising how many customers know about and tolerate animals living in spaces which may be entered by technicians. Even skunks seem to be tolerated by some customers. Any technician should also look for signs of wildlife entry such as holes, tears, and other damage or wildlife smells such as skunk before entering these areas.

Any technician working in areas which may be inhabited by warm blooded wildlife should be prepared. Using protective gloves and clothing is a safety precaution not only in case of contact with animals but also because of other diseases and safety hazards which may be present in these areas such as glass, nails, electrical lines, etc.

Any technician who may have been injured by an animal should report the incident immediately and directly to their supervisor. If rabies is a concern, the em-

ployee should seek medical evaluation immediately per company procedures.

## Vaccination

Some companies are evaluating vaccination of high risk employees. Usually technicians working in wildlife control and technicians frequenting crawlspaces or attics can be considered higher risk than technicians not working in these areas. Also, employees handling animals at the office after capture may be considered at high risk. It is up to the company as to whether to require vaccination but some companies are taking this preventative proactive approach depending on the risk to the employees usually based on the mix of businesses of the company.

Vaccination requires several inoculations spread over several weeks. For those in extremely high risk responsibilities, boosters are available after an initial vaccination. The company physician should be consulted regarding need for such boosters.

## Post Exposure Management

The most dangerous type of exposure is a bite or scratch from an infected animal, especially if it breaks the skin. Rabies is a medical **urgency not an emergency**, but **decisions must also not be delayed**. Any wounds should be immediately washed with soap and water for at least 10 minutes, and medical attention from a health care professional should be sought for any trauma due to an animal attack before considering the need for rabies vaccination.

The need for rabies vaccination should be evaluated under the advisement of your physician and/or a state or local health department official. Decisions to start vaccination, known as post exposure vaccination will be based on your type of exposure, the animal you were exposed to, as well as laboratory and surveillance information for the area where the exposure occurred.

## Learn More About Rabies

Visit the Web site of the CDC at [www.cdc.gov/rabies/epidemiology.html](http://www.cdc.gov/rabies/epidemiology.html) or consult your individual state's public health department Web site.

*Vet Med Today: Public Veterinary Medicine*  
JAVMA, Vol 231, No. 4, August 15, 2007. 