



# Rabies in North America

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Rabies is a preventable disease, most often contracted when a rabid animal bites a person. Rabies is a viral disease that attacks the central nervous system, ultimately causing death. It can be transmitted to humans from wild and domesticated animals. There are several strains (variants) of rabies, named after the animal that is the host of this strain, such as raccoon, skunk, bat and fox. Hosts of a strain can contract that variant and live, or at least live long enough to transfer the virus to another animal. However, the rabies variant is not limited to these species, and all variants can be contracted by bats, cats, dogs, and humans, to name a few. In fact, all known mammals can become infected by rabies. In the last 50 years, the number of human deaths in the United States caused by rabies has declined to an average of two or three each year. In 2010, the last year of a report by the Center for Disease Control (CDC), 48 states and Puerto Rico reported 6,153 cases of rabies in animals and two human cases to CDC.



*Skunks can be a host to rabies.*

## Symptoms in Humans

The rabies virus is unable to penetrate human skin. Most patients become infected when the saliva of a rabid animal enters the body through a bite; or they can become infected by inhaling or exchanging mucous (spit). It usually takes several weeks (but can be as quick as 10 days or take as long as several months) before the symptoms of rabies begin to show. Once symptoms are noticeable, the disease is almost always fatal. The first symptoms are very similar to influenza, including vomiting and diarrhea. The bite wound can also become itchy or feel tingling. As the disease progresses, victims experience hypersensitivity to stimuli, such as light, sounds, and touch, followed by periods of severe agitation and aggression. Excessive salivation, perspiration, and watery eyes are particularly frightening symptoms. Combined, the sensitivity to touch causes an exaggerated reflex in the throat to water, resulting in fluids being forcefully expelled through the nose and mouth when the victim attempts to swallow. This common symptom is called “Hydrophobia” (fear of water), because the reaction usually causes its victims to develop a very intense fear of drinking and swallowing. The next stage in the disease is a paralytic phase gradually progressing to stages of delirium, stupor and coma, and eventually death.

## Symptoms in Animals

Raccoons are the most common wildlife species to contract the rabies virus, followed by skunks, bats, and foxes. The rabies virus in wild animals causes the animal to exhibit non-normal behavior, with some of the same symptoms as in human victims. Common symptoms include reduced wariness to



*People the work or recreate in caves should be vaccinated against rabies.*

humans, nocturnal animals awake during the day or vice-versa, or a change in behavior such as social animals seeking solitude. One of the first symptoms is paralysis of the lower jaw and throat, resulting in victims drooling with their mouths hanging slightly open. Many people are familiar with the extreme aggressiveness that can become a symptom of rabies in wild animals; however, it is more common that a sick animal becomes quiet and still. In the end, all victims become paralyzed, leading to coma and death. The only way to know for sure if an animal has rabies is to test it after death, usually by a biopsy of brain tissue.

### **How Can Humans Contract Rabies?**

The rabies virus is spread through saliva. It cannot penetrate skin, and therefore is only transmitted through a bite of a rabid animal, or if the saliva of a rabid animal comes in contact with mucous membranes such as the eyes, nose or mouth. For example, people examining caves could inhale airborne mucous (spit) from roosting bats. Humans cannot transmit the virus to another human unless they are showing symptoms of the rabies virus.

### **Medical Treatment for Humans**

If you are bitten or scratched by a bat (or any wild mammal) follow these steps:

1. Wash the wound immediately with soap, water, and antiviral antiseptic for at least 15 minutes.
2. Seek medical attention. Your physician will consult with local public health authorities to determine the appropriate steps to take.
3. Often, rabies vaccination may be required. This is a series of four doses of rabies

vaccine. Since 1980, there have been no documented cases of rabies in the U.S. among patients that have completed this series of vaccinations.

4. If you have been bitten or scratched by a bat, the Center for Disease Control recommends the vaccination series.

### **Medical Treatment for Pets**

All pets should be vaccinated against rabies virus. There is no post-exposure prophylaxis (PEP, a series of shots) for domestic animals exposed to rabies. If they've been bitten by a rabid or suspicious animal they should immediately get re-vaccinated, and kept under strict observation by the owner for 45 days. If a rabid or suspicious animal has bitten an unvaccinated animal, it is recommended that the animal be euthanized immediately, or quarantined for 6 months. Stray animals that are picked up are often quarantined for 3 days until it can be determined if any human exposure has occurred. Wild-domestic animal hybrids should never be kept as pets because one cannot be completely sure the vaccination is successful on many wild species (and because it is usually illegal to keep these animals as pets in many cities and towns). The rules and regulations that veterinarians and medical professionals must follow when dealing with a possible rabies encounter can be highly detailed. The National Association of State Public Health Veterinarians, Inc. (2011) has created a compendium with detailed information about rabies, and the steps and procedures for handling animals to prevent them from getting rabies and to stop the spread of rabies.

### **Reducing Your Risk of Contracting Rabies**

- Get vaccinated against rabies if you work near or with wild animals.
- People spending time in caves where bats may roost should get vaccinated against rabies.
- Do not handle or approach wildlife that is behaving in an unusual way. Contact professional authorities, such as the Utah Department of Wildlife Resources, to handle the animal.
- NEVER touch or hold a bat, for any reason.
- If exposed, seek medical attention immediately to start PEP treatment. With prompt treatment, rabies is preventable.



*Keeping pet food outside attracts wildlife and could aid in disease transmission.*

- Get your pets vaccinated, particularly those that go outdoors – even if they are always leashed.
- Keep pet food inside. It may attract wildlife to around your home, and could lead to a transmission of the virus to your pets.

### **Controlling the Rabies Virus in North America**

The greatest success that we have had in eradicating rabies has come from vaccinating our pets. More than 90% of all animal cases reported annually to CDC now occur in wildlife; before 1960 the majority were in domestic animals. The principal rabies hosts today are wild carnivores and bats.

Additionally, there are federal programs to reduce the rabies virus in wild animals. For example, the United States Department of Agriculture's Wildlife Services has a flagship program, the National Rabies Management Program that monitors rabies outbreaks throughout the U. S. wildlife populations.

This program includes distributing oral vaccines into the environment. The oral vaccines are formulated to appeal to target species such as skunks, coyotes, and foxes. For example, a focus in Texas was successful in eliminating the canine variant of rabies from coyotes by 2000 and created a buffer zone along the Rio Grande River to prevent re-entry from animals coming north from Mexico. There are similar programs in Arizona, for striped skunks, and in Eastern U.S., for raccoons.

Rabies is one of the most fearsome diseases, because of its symptoms and its mortality rate. However, with proper care, possible human exposure to the rabies virus can be minimized, if not eliminated. By using caution around wild animals and vaccinating our pets, we can do our part to help professionals stop the spread of rabies in North America and may be even eradicate it from parts of the continent.

### **References**

- Center for Disease Control. (2015). Rabies. Retrieved from <http://www.cdc.gov/rabies/>
- Conover, M. R., and R. M. Vail. (2015). *Human Diseases from Wildlife*. CRC Press: Boca Raton, Florida.
- National Association of State Public Health Veterinarians, Inc. (2011). *Compendium of Animal Rabies Prevention and Control, 2011*. Retrieved from <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6006a1.htm>
- United States Department of Agriculture. (2015). National Rabies Management Program. Retrieved from <http://www.aphis.usda.gov/wps/portal/aphis/ourfocus/wildlifedamage>

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