

## Rabies in Animals

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Descriptions of rabies go back thousands of years as rabies has classically been one of the most feared infections of all time. It is caused by a bullet-shaped rhabdovirus that is relatively unstable in the environment; establishing infection requires direct contact with infected mucous membranes. In most cases, disease is transmitted by a bite wound. Only mammals are susceptible to infection, wildlife being the primary animal group where infection occurs. When wildlife come into contact with humans or domestic animals, rabies becomes a public health problem. Despite vaccination being readily available, every year the U.S. reports approximately 50 canine deaths, 250 feline deaths, and several human deaths from rabies. Worldwide, some 55,000 human deaths occur annually from rabies, so it remains an important and nearly untreatable illness even now in the 21<sup>st</sup> century.

### Fox



Photo courtesy of U.S. Fish and Wildlife Service

Rabies is nearly untreatable once symptoms begin despite all the resources of modern medicine; it is important to take its threat seriously. It is because of rabies that most municipalities have dog licensing requirements to ensure that the community's dogs (and in some areas, cats as well) are vaccinated.

The most common wildlife species to spread rabies to domestic animals and humans in the Northern Hemisphere are the skunk, bat, raccoon, fox, and coyote. Wildlife (especially bats) are able to gain access to indoor areas where they can come in close contact with both pets and people.

### Many people do not realize how fast death occurs from rabies.

While it may take a long time for the virus to incubate, once even mild symptoms begin, death occurs within 10 days.

### Course of the Disease

Virus in the infected animal's saliva enters the victim's tissues during the bite. The virus attaches to the local muscle cells for a couple of days before penetrating to local nerves and beginning its slow ascent to the brain. Once within nervous tissue, the virus is not accessible to the immune system and may safely proceed towards the brain. The journey is slow and can take up to a year but the average time is 3-8 weeks depending on the species. Virus ultimately reaches the brain and in two to three days more is evident in all body secretions, including saliva. At this point, the disease becomes transmissible and symptoms begin.

**It can take up to a year from the time of the initial bite before symptoms begin to show. In dogs, typical incubation periods are 21-80 days. In cats, it's 28-42 days. Once symptoms show, treatment is nearly impossible.**

### Raccoon



Photo courtesy of U.S. Fish and Wildlife Service

### Coyote



Photo courtesy of U.S. Fish and Wildlife

**Prodromal Stage (The First 2-3 Days After Symptoms Have Started)**

A change in personality is noted. Friendly animals become shy, etc. The larynx begins to spasm and a voice change may be noted (especially true in rabid cattle). Most infected animals will actively lick or scratch the site of the original bite.

**Excitative Stage (Next 1-7 Days)**

Classically, this would be the "mad dog" stage, though in reality most dogs skip this phase altogether. The animal has no fear and suffers from hallucinations. If confined, the animal often attacks the bars of the cage.

**Paralytic or Dumb Stage (Next 2-4 Days)**

Weakness/paralysis sets in. The larynx is paralyzed, resulting in an inability to swallow, thus drooling and "foaming at the mouth" result. The animal dies when the intercostal muscles that control breathing are paralyzed. It is from animals in this stage where most human exposure occurs. There is no treatment for animals or humans once clinical signs appear.

**Skunk**

Photo courtesy of U.S. Fish and Wildlife Service

Once the virus has been released to body secretions, it is again accessible to the immune system; however, the patient dies before an adequate immune response is mounted.

The classical symptoms of rabies described above may not be obviously recognizable, making diagnosis difficult if not impossible in a living animal. Long quarantines are often needed to determine if infection has occurred.

When human exposure to the animal in question is involved, what happens depends on an assortment of criteria. If the animal in question is dead, its brain can be tested for rabies. There is no test for rabies in a living animal but since we know that death follows quickly after the virus becomes contagious, a living animal can be confined for 10 days. If the animal is still alive 10 days after biting a person, then the bite could not have transmitted rabies.

**Prevention**

Happily, rabies prevention is accomplished with vaccination and limiting exposure to wildlife. The standard killed-virus vaccines are available for both dogs and cats and, after the initial dose which is good for one year, subsequent doses are generally good for three years. Because tumors have developed in cats who received killed virus vaccine, a recombinant product is now available that uses a portion of rabies viral DNA cloned into a harmless canarypox virus. This arrangement allows for the pet to realize the benefits of

live virus vaccination without any risk of exposure to living rabies virus.

Rabies vaccination protocols are typically controlled by municipal regulations. Most communities legally require vaccination of all dogs. The American Association of Feline Practitioners recommends rabies vaccination for all cats living in rabies endemic areas.

For pets not current on rabies vaccination that have been exposed to biting wildlife, the Texas Post-Exposure Rabies Prophylaxis Protocol has been particularly helpful. In this situation, the pet should be vaccinated for rabies as soon as possible after the wildlife bite with booster vaccines given 3 weeks post-bite and 8 weeks post-bite. The pet should be strictly isolated for 90 days. This protocol has been extremely successful in preventing rabies symptoms and contagion when normal rabies vaccination had lapsed.

**The Law Regarding Animal Bites (Against Humans)**

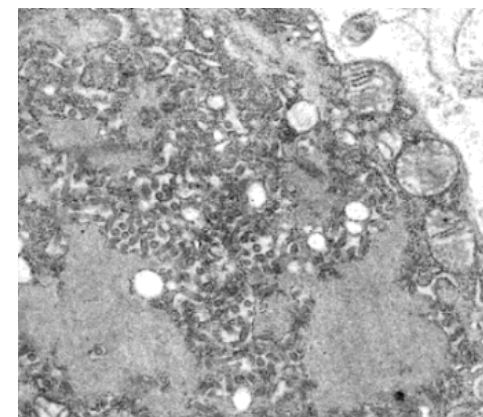
In my area (Los Angeles), if the biting animal has been legally vaccinated against rabies, only routine first aid may be necessary; bacterial infection of the wound may still be possible. If the animal has not been currently vaccinated, it must be confined for 10 days at the owner's expense for observation and then vaccinated at the end of that period.

The purpose of the ten-day period is to determine if rabies virus could have been in the animal's saliva at the time of the bite. An animal infected with rabies and shedding virus will certainly be dead within ten days.

Service

**Bat**

Photo courtesy of U.S. Fish and Wildlife Service



Bullet-shaped rabies virus particles in brain tissue (Photo courtesy of CDC)



This dog is suspected of being rabid as it had been exhibiting signs of restlessness and overall uncharacteristic aggressive behavior, which are two symptoms of rabies. Other symptoms of rabies in pets may include impaired walking, eating and drinking.

Photo courtesy of CDC.

If the biting animal is known to have been exposed to wildlife, the situation is different. A vaccinated animal must be re-vaccinated within 48 hours and confined for observation for 30 days. Unvaccinated animals must either be confined for 6 months or be euthanized and tested for rabies. All bites that break the skin are reportable to the health department. All dogs must be vaccinated against rabies. Wildlife/pet incidents leading to bites on the pet are of no concern to public health officials as long as no humans have been bitten.

**Laws regarding biting dogs and rabies vaccination are highly regional. Check with your veterinarian or local animal regulation department to find out what you need to know.**

### **If You Have Been Bitten by a Potentially Rabid Animal**

A fresh bite wound should be washed out with water quickly as this may wash out viral particles. The time it takes for the virus to reach the brain depends on the amount of virus there is in addition to how close the wound is to the head.

If the animal is dead, the head of the biting animal is submitted to the health department for fluorescent antibody testing for the virus. This process only takes a matter of hours so that any bite victims can know right away if they will require rabies treatment. If the biting animal is living, its vaccination status should be confirmed as soon as possible and it will need to be confined. The bite wound should be reported to the health department as soon as possible. Only rodent and rabbit bites are not reportable; except for woodchucks, rabies is rare enough in those species as to be virtually nonexistent.

Hyperimmune (antibody rich) serum is flushed into the wound in hope of inactivating the virus before it penetrates to the nerves. The patient receives a vaccination on a regular schedule for about a month. In this way, when the virus comes out in secretions, a strong immune response is waiting to put down the infection.

For complete details, the [CDC has information on post-exposure rabies](#).

**Anyone pursuing a career with animals should consider vaccination against rabies.**

Veterinarians, for example, have a rabies exposure risk more than 300 times that of the general population.

### **Quarantines When Traveling**

Great Britain, Hawaii, and several other island areas have successfully eradicated rabies from their territory. These places are EXTREMELY cautious about allowing potential carriers of rabies in. Because of the long incubation period of rabies, a very long quarantine is needed; however, this must be balanced by the expense associated with quarantine and owners' reluctance to be separated from their pets. Most places that have eradicated rabies have protocols for avoiding or minimizing quarantine. Typically, a microchip is implanted in the pet for identification purposes, a rabies antibody titer (a measurement of vaccine-induced protection) must be performed at an approved laboratory, and rabies vaccine documentation is necessary.

For listings of what each state requires for entry, go to the [USDA](#).

For travel to another country check with that country's consulate, but guidelines are also available at [USDA](#).

### **Other Links**

The [CDC's rabies home page](#) has, in addition to basic information, a children's education area that is particularly helpful for families who go camping.

The annual [World Rabies Day](#) calls attention to this problem to raise awareness and provides information about rabies in both humans and animals.

URL: <https://veterinarypartner.vin.com/doc?id=4951479&pid=19239>

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