

Rabies

The Pet Health Care Library

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 through a bite wound. Only mammals are susceptible to infection, and wildlife is the primary animal group where infection occurs. When wildlife comes into contact with humans or domestic animals, rabies becomes a public health problem. Despite vaccination being readily available, every year the U.S. reports hundreds of dog and cat deaths from rabies, not to mention several human deaths. Worldwide some 55,000 human deaths from rabies occur and rabies remains an important and nearly untreatable illness even now in the 21st century.

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



Wildlife photos courtesy of U.S. Fish and Wildlife Service

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. It should be noted in particular that wildlife, bats especially, are able to gain access to indoor areas and potentially infect 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 in nervous tissue, the virus is not accessible to the immune system and may safely proceed, although the journey is slow, taking up to one year (average time between bite and detectable virus in the brain is 20 to 30 days). 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.

ONCE SYMPTOMS SHOW, TREATMENT IS NEARLY IMPOSSIBLE.

PRODROMAL STAGE (the first 1.5 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 2-3 days)

Classically, this would be the "mad dog" stage. 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 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, which 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.

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 assorted 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.

In order to raise awareness of rabies, a World [Rabies Day](#) is scheduled annually to call attention to this problem. More information about rabies in both humans and animals can be found at that website.

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 of an association with tumor development in cats with killed virus vaccine, a recombinant product is now available that uses a portion of rabies viral DNA cloned into a harmless canarypox virus. This vaccine is just as effective as the traditional vaccines but must be administered annually. 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.

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 (in California, the law requires a 180-day isolation period). 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.

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 LOCAL ANIMAL REGULATION DEPARTMENT OR VETERINARIAN TO FIND OUT WHAT YOU NEED TO KNOW.

If you are Exposed

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 rabies 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.

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

Several island areas have successfully eradicated rabies from their territory. These places are EXTREMELY cautious about allowing in potential rabies carriers. Because of the long incubation period of rabies, a long quarantine is needed; however, this must be balanced by the expense associated with quarantine and an owner's reluctance to be separated from the pet. 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, the [USDA](#) has prepared their Web site with the most recent regulations.

For [travel to another country](#) it is best to 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.



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.

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