



# Rabies FACT SHEET

## What is rabies?

Rabies is an incurable, deadly disease caused by a virus. This virus attacks the central nervous system of mammals. With rare exceptions, rabies is always fatal: Only three humans are known to have survived the disease.

## Which animals get rabies?

Any warm-blooded mammal can get rabies. However, some animals are more susceptible to acquiring the virus than others. For example, skunks, foxes, raccoons, bats, wolves, and coyotes are highly susceptible. Cats and dogs, while less susceptible to rabies than many animals, are more likely to transmit the rabies virus from wild animals to humans. Animals rarely afflicted with rabies include rats, mice, squirrels, opossums, hamsters, guinea pigs, gerbils, chipmunks, and rabbits. Because rabies infects only mammals, non-mammals such as birds, amphibians, reptiles, and fish can't get the disease.

## How is rabies transmitted?

The virus, which is present in the salivary glands of infected animals, is usually transmitted through a bite or a break in the skin (such as a scratch or cut). It can also be transmitted through mucous membranes (such as in the eyes), but this is less likely. Aerosol transmission of rabies in laboratory settings and in caves with dense bat populations has also been documented, but this mode poses little risk to the general public. Because the virus shows up only intermittently in saliva, exposure to a rabid animal does not necessarily mean the virus was transmitted.

The highest concentration of the virus is found in the brain, spinal cord, and salivary glands. Blood, urine, and/or other tissues are not generally considered primary transmission risks. The fragile virus can survive for only 10 to 20 minutes in direct sunlight, but may live for up to two hours in saliva on an animal's coat. The rabies virus is readily inactivated by heat, sunlight, detergents, and disinfectants.

## What happens when the virus enters the body?

When rabies enters the body, it replicates in the muscle cells in the wound. During this time, called an incubation period, no symptoms appear. The incubation period—and the likelihood of acquiring the disease—varies depending

on the species, severity of the wound, amount and strength of the virus, susceptibility of the victim, and wound site. The average incubation period for most species is three to eight weeks, although prolonged incubation periods of up to a year have been reported in dogs, cats, horses, and humans.

## How does rabies kill?

When the virus reaches the brain, it multiplies and passes back through the nerves to other organs, particularly the salivary glands where the virus becomes most contagious. Because the first rabies symptoms in humans mimic the flu (weakness, fatigue, lack of appetite, headache, and fever), diagnosing rabies is difficult. Many victims also report a tingling at the exposure site. Symptoms progress to hyperactivity, disorientation, hallucinations, and convulsions. In non-humans, the first visible sign of rabies is a change in behavior, ranging from depression or disorientation to aggression and violence. In both humans and animals, the disease slowly paralyzes its victims. At the final stage, victims typically lapse into a coma and die from respiratory arrest.

## How can you tell if an animal has rabies?

Although it is not possible to determine whether an animal has rabies just by looking at him, some symptoms can strongly indicate rabies. The stereotypical "foaming at the mouth" isn't necessarily the clearest indicator that an animal has rabies. Although people often divide symptoms into two categories, "dumb" (or paralytic) and "furious" rabies, animals can exhibit both forms of rabies as the disease progresses. Animals with "dumb" rabies often appear depressed, lethargic, and uncoordinated. They gradually lapse into complete paralysis. When their throat and jaw muscles are paralyzed, the animals will drool and have difficulty swallowing. Companion animals with "furious" rabies exhibit the classic "mad dog" symptoms. Without provocation, they will act extremely vicious and violent, often snapping at real or imaginary objects. Cats nearly always exhibit the furious form of rabies.

Several other animal diseases may mimic rabies, and this further complicates the diagnosis. For example, distemper, a disease common among coyotes, foxes, dogs, and raccoons, has many symptoms common to rabies, including

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foaming at the mouth, convulsions, and paralysis. Other illnesses that resemble rabies include toxoplasmosis, lead and mercury poisoning, and ethylene-glycol poisoning.

### How is rabies diagnosed?

Because the virus moves through the body inside nerve tissue rather than the blood, the disease triggers no antibodies and thus cannot be detected during its incubation period. Although symptoms may strongly indicate that an animal or human has rabies, the only accurate way to diagnose rabies is through a postmortem (after death) analysis of brain tissue. Brain tissue is examined using special antibodies and a fluorescent microscope in what is called immunofluorescent microscopy.

### Do all animals get the same form of rabies?

There are different strains, or types, of rabies that affect different species in different ways, but the disease they produce is clinically a single one. Although each strain is associated with one or two vector animals, the strain can occur in other animal species as well: This is known as a "spillover effect." So, for example, a rabid fox does not necessarily have the fox strain of rabies. The fox might contract skunk rabies in one part of the country, fox rabies in another, and raccoon rabies in a third.

### Where is rabies found?

Rabies occurs throughout the world. The only rabies-free areas on earth are Antarctica, Australia, New Zealand, Japan, Taiwan, the United Kingdom, and Hawaii. In the United States, epizootic areas include the North Central and South Central states, the East Coast, the state of California, and the Midwest. Most human cases are found in countries where postexposure treatment isn't readily available and where rabies in dogs has not yet been controlled.

### When is a bite or scratch considered a rabies exposure?

If an animal is bitten or scratched by a wild, carnivorous mammal not available for testing, that animal should be regarded as having been exposed to rabies. If a human is bitten, scratched, or otherwise exposed to a wild or domestic animal, each incident is evaluated independently to determine whether it was a rabies exposure. If the animal cannot be located, experts consider the following to determine if a person should receive postexposure vaccination:

(1) the species of the animal; (2) the behavior of the animal; (3) the reason the animal attacked (many healthy animals will bite when provoked); (4) whether the animal was vaccinated against rabies; (5) whether there is rabies in the area; and (6) the type and location of exposure (e.g., bite, scratch, lick, handling). Postexposure treatment is expensive and time-consuming, and doctors are hesitant to treat a patient without solid evidence of exposure. However, all health officials generally choose to err on the side of caution and recommend postexposure treatment if there is any doubt.

### What should people do if they're exposed?

After getting bitten, scratched, or licked by a potentially rabid animal, a victim's first line of defense is soap and water. This alone significantly decreases the risk that rabies will develop. The victim should then contact a physician and the rabies-control authority. If the animal is found to be rabid, or the animal runs away and is determined to be a risk, the victim will undergo treatment. The anti-rabies treatment with vaccine and immunoglobulin has been proven to be 100 percent effective if administered within 14 days of the bite or lick. Postexposure treatment no longer consists of 23 painful shots in the abdomen. Since 1980, postexposure treatment in the United States has consisted of a series of only 5 relatively painless shots of vaccine in the arm and treatment with rabies immunoglobulin.

### What happens to animals who bite humans?

If an owned cat or dog bites a person, the animal should be quarantined or euthanized depending on the incident, vaccination status, and state laws. If the biting animal is vaccinated and was not exposed to a potentially rabid animal, the pet is usually quarantined for ten days. (A dog or cat who remains healthy ten days after biting could not have transmitted rabies at the time of the bite since the virus is shed for only a brief time before clinical illness develops.) If the biting pet is vaccinated but was exposed to a rabid animal, the pet should receive an immediate booster vaccination and, depending on state requirements, be put under confinement and observation. If a pet is exposed to rabies and is not vaccinated, the animal should be euthanized; if the owner is unwilling to have this done, the pet must be strictly isolated for six months at the owner's expense.

Reprints of this fact sheet are available from The Humane Society of the United States at 2100 L St., NW, Washington, DC 20037 for 10 cents each, 100/\$3, 500/\$11, or 1,000/\$20. Please specify "rabies fact sheet" and enclose check or money order made payable to The HSUS.

