

# RABIES

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## GENERAL INFORMATION

Rabies is a serious viral infection of the central nervous system. Rabies virus is contained in the saliva and certain body materials (brain tissue or cerebrospinal fluid, for example) of rabid animals and humans.

The most common way that rabies is transmitted is by bites from rabid animals. A *bite* is any penetration of the skin by teeth. Bites to the face and hands carry especially high risk. Less common ways in which rabies can be transmitted include scratches from animals with contaminated claws and contamination of mucous membranes or scraped skin with infected saliva (as a result of licks, for example) or infected body material, unless the material is dry.

Other types of contact by themselves—such as touching rabid animals or being exposed to their blood, urine, or feces—do not constitute exposure and do not require postexposure treatment with vaccines. However, because bat bites are small and may go unnoticed, postexposure prophylaxis is recommended after *probable* physical contact with bats, even if there is no visible evidence of exposure.

In rare cases, transmission can occur by an airborne route, such as exposure to air in caves that are densely populated with rabid bats. And while the only reported cases of human-to-human transmission have occurred as a result of corneal implants from infected donors, bite or non-bite exposures inflicted by infected persons could theoretically transmit rabies, too.

Always seek treatment after an exposure.

In the United States, the main animals that transmit rabies (vectors) are wild animals—especially skunks, raccoons, bats, coyotes, and foxes; dogs, cats, and ferrets can also transmit rabies. Due to a lack of dog vaccination and control programs, dogs are the major vector in developing countries. Other common vectors are bats, domestic cats, skunks, raccoons, jackals, mongooses, foxes, and, in a few countries, wolves. However, the range of infected animals in developing countries is so wide (including livestock and rodents) that any animal scratch or bite should be medically evaluated for the possibility of rabies.

The incubation period for rabies ranges from 5 days to 1 year or more (with an average of 2 months). A key factor in determining how quickly rabies will develop is how close the virus comes to nerve endings when the bite or other exposure occurs. The farther the bite is from nerve endings, the longer it takes to reach the nervous system and develop an infection; therefore, postexposure treatment with vaccines can still be effective in preventing rabies even if treatment is not immediate. **Always seek treatment after exposure.**

There are usually not any symptoms during the incubation period, and the infection is reversible in this stage. When early symptoms appear, they usually begin with fever, headache, sore throat, nausea, and a feeling of being unwell. Progressively, other symptoms appear: pain, tingling or burning at the infection site; skin sensitivity to temperature changes and drafts; sensitivity to light and sound; and anxiety, depression and/or insomnia.

As rabies infects the central nervous system, the person experiences the following symptoms: extremely painful throat spasms when drinking, which usually result in terror at the mere sight of water; periods of excitability or dementia; muscle spasms; hypersalivation; convulsions; and often paralysis, even extending to the vocal cords.

The final stage of rabies infection is coma, cardiac or respiratory failure, and—almost always—death. There have been only 3 reported rabies survivors.

## DISEASE RISK

The overall risk of exposure for travelers is low, but, as with local populations, risk is determined to a large extent by each individual's level of exposure to unvaccinated domestic animals. Children are at special risk when living in high risk areas since they may be less likely to avoid contact with animals, and they may be afraid to tell you they have been bitten if the bite is not serious enough (in their minds) to need adult or medical care.

## PRIMARY PROTECTION MEASURES

All travelers should avoid direct contact with animals, including strange or wild animals and especially dogs. Always discourage children from petting such animals. Immunization (both preexposure and postexposure), combined with thorough wound cleaning, are the most reliable methods of preventing rabies for exposures that do occur. If bitten, scratched, or in some other way exposed to rabies, thorough cleaning of the wound or exposure site to flush out as much rabies virus as possible, followed by immediate postexposure immunization, is imperative. Preexposure vaccination does not eliminate the need for postexposure vaccination—it just means that fewer postexposure shots are needed. (Exposed persons who were not previously vaccinated require more vaccine doses, plus injections of rabies immune globulin.)

Persons who may have been exposed to rabies should always contact local health authorities for advice about postexposure prophylaxis, as well as their personal physicians or their state or local health departments. If the latter are unavailable, travelers should contact the CDC during normal working hours (Eastern time) at 404-639-1050; or at 404-639-2888 nights, weekends, and holidays.

Not all rabies vaccine products used abroad, especially in developing countries, meet the levels of safety and effectiveness found in U.S. products. When in areas where the availability of safe, effective postexposure immunization products and regimens—or the sterility of the syringes, needles and technique with which they are administered—are in question, travelers should contact the nearest embassy or consulate for assistance in obtaining proper treatment.

Travelers should also consult with the health care provider about the need for a tetanus vaccine booster and antibiotics after a bite or scratch type exposure.

## PREEXPOSURE VACCINATION

The rabies vaccine is an inactivated-virus vaccine. It comes in injectable form, and it is given as a series of 3 injections. Preexposure immunization is used to protect travelers in circumstances where exposure may be inapparent, postexposure therapy may be delayed, or locally available vaccines may pose a high risk of adverse reactions.

## RISKS AND SIDE EFFECTS

Vaccinees may experience redness, swelling and itching at the injection site, as well as headache, nausea, abdominal pain and muscle aches. Also, 1 to 6% of people receiving the series will develop an immune complex-like syndrome 2 to 21 days later with itching, fever, fatigue, joint pain, arthritis, nausea and vomiting. A few rare cases of neurologic complications have been reported from this immunization, but all resolved by themselves.

There is a rare chance that serious problems or even death could occur after receiving any medicine or vaccine. **As with any serious medical problem, if the person has a significant or unusual problem after receiving the vaccine, call a doctor or bring the person to a health care provider promptly.**

## TIMING

The preexposure vaccine is given in a 3-dose series, usually given on days 0, 7, and 21 or 28.

Travelers who will remain at continuous threat of exposure due to high-risk activities or extended visits in high-risk areas should consult with their health care providers every 6 months regarding the need to have their antibody levels checked and/or receive a booster dose of rabies vaccine. Travelers who are at frequent risk of exposure should consult their health care providers every 2 years. Maintenance of high antibody levels is especially important in situations where exposures may be inapparent or there may be delays in getting safe, effective postexposure treatment.

Postexposure treatment consists of rabies vaccine (the number of doses depends on whether you had the preexposure vaccination series) and—if you did not have preexposure vaccine—you will also be given rabies immune globulin.