

Rabies: Which Patients Need Post-Exposure Prophylaxis?

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When presented with a patient who has suffered an animal bite, a vital question is “Does the patient need rabies post-exposure prophylaxis (PEP)?” The answer depends on whether the biting animal was rabid. If the animal’s location is known and the animal is accessible, it should be evaluated. The patient will not need rabies PEP if the animal tests negative for rabies or if it remains healthy throughout a quarantine and observation period. California requires all biting animals to be tested or quarantined (except for reptiles, birds, small rodents, and rabbits).^{1,2} If the animal’s location is unknown, then evaluating the risk for rabies depends on the careful collection of details about the bite incident, combined with an understanding of the geographic distribution of the “rabies virus variants” in animals.

Rabies virus variants are virus subtypes. Each variant is uniquely adapted to one species of animal. For example, in California (starting in Santa Barbara and farther north), a skunk rabies variant is prevalent. Most rabid skunks in the state are detected in these areas.³ This variant spreads most easily between skunks, but it can be transmitted to other animals or people. When a skunk becomes rabid, it can become very aggressive and chase people and animals. As a result, most rabid cats and dogs in California counties are infected through bites from skunks in counties where the skunk variant is found.⁴

In contrast, insectivorous bat variants are prevalent throughout much of California,⁴ including Los Angeles County. Rabid bats tend to display unusual behavior, such as flying in daylight, flying near people and pets, or staying in one place (such as on the ground) for long periods of time. People and pets are not likely to have contact with a rabid bat unless they approach it or the bat lands on them because it is weak or disoriented. Some bat variants may be more infectious than other variants.⁵ At least one bat rabies virus variant has been shown to replicate at cooler temperatures than dog and coyote variants, and is able to multiply better in skin epithelial cells.⁶ Small rabid bats may inflict bite wounds that cannot easily be seen or felt.⁵ Therefore, encounters with bats should be scrutinized to rule out the possibility of direct contact between person and bat, even if no bite was detected.

Evaluating a Patient’s Risk for Rabies

When evaluating the risk of rabies, clinicians should ask the patient key questions, record the answers in the patient’s chart, and also include them on the bite report.

Where is the animal right now? If the animal is deceased, rabies testing should be arranged. A veterinary clinic or animal shelter can prepare and submit the specimen to the LA County Public Health Laboratory. If the animal is still

alive and it is a dog or cat, it may be observed for 10 days to rule out rabies exposure. Once a bite is reported, Public Health or animal control staff will notify the pet owner of the required quarantine and observation period. If the dog or cat remains overtly healthy throughout the quarantine, rabies PEP is not indicated for the bite victim.

What is the species of the biting animal? The highest risk species for rabies in California are bats, skunks, and foxes. Risk is also high for raccoon and coyote bites. Bites from birds, reptiles, and small rodents (including squirrels) present a negligible risk of rabies. Most other wildlife that are not rabies reservoirs (including opossums) fall into a middle level of risk. There have been 11 rabid opossums detected in California over the past 30 years.⁷

How was the animal behaving at the time of the bite? Most rabid animals begin to shed rabies virus in the saliva around the same time that clinical signs begin.⁸ Rabid animals may act more tame or more fearful than normal. They may show “furious” signs (such as restlessness, continuous running or walking, hypersensitivity to sound and touch, tendency to bite animate and inanimate objects, frequent vocalizing, unexplained aggression and anxiety) or “dumb” signs (such as ataxia, unexplained quiet and passivity, ascending paralysis starting in the rear legs, drooping jaw and tongue).⁹ Note, however, that healthy wildlife that are routinely fed by people may act tame or aggressive around people. Rabid animals can sometimes shed virus for a few days before clinical signs start, thus the need for quarantine and observation of a domestic animal after a bite.⁸

Where, geographically speaking, did the bite occur? Rabies risk varies based on the rabies variant circulating in that area. For instance, a person bitten by a normally behaving stray dog or cat in downtown Los Angeles faces minimal risk for rabies, and rabies PEP is usually not indicated unless the animal’s behavior was highly suspicious for rabies, or there was another reason to suspect rabies (such as the animal being recently imported). In contrast, a person bitten by a stray dog or cat in a country where the dog variant of rabies is prevalent (such as China, India, or Mexico) should receive rabies PEP by default unless the animal is proven to remain healthy for 10 days after the bite. A person bitten by a stray dog or cat in the eastern U.S. faces a somewhat higher risk of rabies exposure than a person bitten by a pet in Los Angeles County, because the raccoon variant in the East increases the risk for rabies in pets.

Reporting Animal Bites

Animal bites that break the skin are legally reportable to the Department of Public Health whether they present a high or low risk for rabies. The only exceptions are bites from reptiles, birds, small rodents (squirrels, rats, mice, gophers),

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Rabies Variants and Local Rabies Risk

Locally, bat rabies variants pose the greatest risk. Most bat species native to Southern California are insect-eating bats. Vampire bats are not found in California. The vast majority of bats in nature (>99%) do **NOT** have rabies. Insectivorous bats benefit our ecosystem by eating mosquitoes and other insects. Bats are tested for rabies by the Department of Public Health only when they have had an encounter with people or animals (e.g., a bat found inside the home) or when they are acting unusual. Approximately 10%-20% of bats tested are positive for rabies. During most years, between 8 to 12 rabid bats are detected annually in LA County. However, since 2011, that number has increased: 38 rabid bats were detected in 2011, 56 in 2012, and 33 in 2013. The reason for this increase is unknown.

Other rabies variants in the United States include the raccoon variant throughout the eastern quarter of the nation, skunk variants across the middle of the country, and fox variants in northern Alaska. Hawaii is completely free of rabies. Although rabies is relatively rare in dogs and cats in the U.S., 257 rabid cats and 84 rabid dogs were diagnosed in 2012, with the majority of cases occurring in areas where raccoon and skunk variants are prevalent.¹⁰

Although the raccoon, fox, and coyote variants of rabies have not been found in California, the risk of rabies from bites from all wild animals is still higher than bites from domestic animals. Despite the apparent absence of the fox variant in California, foxes rank as the third most common rabid species in our state.⁴ Rabies-infected wildlife may be transported (intentionally or accidentally) by people into other areas and may not be detected until after local wildlife populations have become infected.

Wildlife that are not rabies reservoirs, such as opossums, present a moderate risk because they can still contract rabies from other animals and subsequently infect humans. The only wildlife bites that are considered to present negligible rabies risk are those from reptiles, birds, small rodents (squirrels, gophers, rats, mice) and rabbits.

The dog variant of rabies is still prevalent in much of the world, including parts of Asia, Africa, Central and South America, and Mexico, causing more than 55,000 human deaths per year.¹¹ This variant was very common in Los Angeles County in the first half of the 1900s, with more than 1,700 rabid dogs identified in 1937. It was eliminated through the careful and consistent enforcement of vaccination and licensing laws for dogs.

and rabbits. These bites do not need to be reported. The bite may be reported online or by faxing a completed animal bite report (see “Reference Poster” on page 7). The information about the animal provided in the report is crucial in determining the risk of rabies.

Public Health physicians (213/240-7941) and veterinarians (213/989-7060) are available to assist clinicians in evaluating rabies risk and the need for rabies PEP. Guidance on reporting bites, seeking consultations, and ordering and administering rabies PEP is available at www.publichealth.lacounty.gov/vet/docs/2013RabiesPEPChecklistPrivPracticePhys.pdf. 

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