

# **RABIES CONTROL MANUAL**

## **TABLE OF CONTENTS**

<a href="#"><u>Introduction</u></a>
<a href="#"><u>History of LAC Rabies</u></a>
<a href="#"><u>Rabies Fact Sheet</u></a>
<a href="#"><u>Rabies in People</u></a>
<a href="#"><u>Clinical rabies</u></a>
<a href="#"><u>Bat rabies</u></a>
<a href="#"><u>Prevention</u></a>
<a href="#"><u>Los Angeles County Law</u></a>
<a href="#"><u>California Law</u></a>
<a href="#"><u>Animal Bites</u></a>
<a href="#"><u>Handling Lab Samples</u></a>
<a href="#"><u>Quarantines</u></a>
<a href="#"><u>Shelter law</u></a>
<a href="#"><u>Vaccination of Animals</u></a>
<a href="#"><u>Vaccination of People</u></a>
<a href="#"><u>Vicious Dogs LA County</u></a>

## **APPENDIX**

<a href="#"><u>How to Avoid Rabies</u></a>
<a href="#"><u>How to Avoid dog bites</u></a>
<a href="#"><u>Dog bites - LA Times</u></a>
<a href="#"><u>Common Questions on Bats</u></a>
<a href="#"><u>Bat proofing Your House</u></a>
<a href="#"><u>Shelter List</u></a>
<a href="#"><u>Zoonoses Manual</u></a>

## **RABIES CONTROL INTRODUCTION**

Throughout human history, few illnesses have provoked as much anxiety as has rabies. Known as a distinct entity since at least 500 B.C., rabies has been the subject of myths and legends across time and cultures. And while the incidence of human cases in the US has declined markedly over several decades, rabies continues to inspire dread today. Amidst this concern is a great deal of misinformation about the disease.

Rabies (or hydrophobia), is a viral disease transmitted via the bite of an infected (rabid) animal or by its lick over an open cut. The rabies virus is present in the infected animal's saliva. After a person is bitten by an infected animal, the virus multiplies at the bite site, and then travels along nerves to the brain. Once in the human brain, inflammation causes delirium, painful muscle spasms in the throat, and usually death. Pet vaccination programs and prompt treatment of animal bites has reduced the number of rabies cases in the United States to 5 per year. There are an estimated 65,000 human rabies cases each year throughout the world.

The incubation period ranges from 10 days to more than a year, depending on the entry site. Rabies infection characteristically produces a rapidly progressive encephalomyelitis (inflammation of the brain and spinal cord), and should be considered as a possible cause of any such illness in humans or other animals. The early symptoms are fever, headache, and loss of appetite which are nonspecific. After a while the patient becomes restless and disoriented and may experience seizures. The term hydrophobia (Greek for "fear of water") comes from the patient's failed attempts to satisfy a characteristic thirst because painful throat spasms prevent swallowing. Coma and death usually follow 3 to 20 days after the onset of symptoms.

Once symptoms have appeared, treatment is limited to sedatives and painkillers. Few people with rabies have survived. If a bite has occurred and there is a risk of rabies, patients are passively immunized with antirabies serum followed by a series of rabies vaccinations. If this routine is begun within two days of the bite, rabies is usually prevented. An animal suspected of being rabid is killed. Veterinarians, animal handlers, some laboratory workers, and persons visiting countries where rabies is a constant threat are routinely vaccinated with an inactivated form of the rabies virus.

Rabies is primarily a disease of non-human animals. It appears that any mammal species can develop rabies. The prevalence of rabies in specific animal species varies greatly by geographical region. Knowing which animals are most likely to be rabid in a given location is essential to implementing appropriate preventive and postexposure measures.

## **Animal Rabies**

Traditionally, rabies exists in two forms in a community. The urban form, propagated chiefly by unimmunized cats and dogs, and sylvatic, propagated in North America by bats, coyotes, foxes, raccoons and skunks. Infection in domestic animals represents a "spillover" from sylvatic reservoirs of infection. In the United States today, wildlife accounts for over 90% of reported cases of animal rabies. Every opportunity should be taken to educate the public on the risks of trauma and infectious diseases associated with contact with wild animals. The control of rabies in bats and terrestrial mammals is very difficult. Selective population reduction may be useful in terrestrial rabies outbreaks, but the success of these efforts depends on the circumstances surrounding each rabies outbreak episode. It is generally not feasible or desirable to attempt wild carnivore or bat population reductions as a means of rabies control. Wildlife vaccination in California is not currently indicated due to the rabies strain types present here and the lack of a spreading epizootic.

Animals with rabies may exhibit telltale signs that something is physically wrong. Excessive salivation, avoidance of food and water, unusual aggression, daytime activity in a nocturnal animal (bat, skunk, raccoon, etc.), impaired locomotion, varying degrees of paralysis (frequently beginning in the hind legs), extreme depression, or bizarre behavior are potential signs of rabies. These signs indicate that extreme caution must be taken when approaching or attempting to interact with the animal. Generally, a lack of fear of humans is also unusual behavior for wild animals. Special procedures are often required to trap animals for observation and/or rabies testing. If wild animals drink or eat out of a pet's bowl, there is little or no risk of rabies virus transmission to the pet. However, the practice should be discouraged because it may expose the pet to other illnesses.

By 1960, mandatory vaccination of dogs in the United States largely controlled canine and human rabies. This immune barrier has been established nationwide at a cost of over \$300 million annually. Cats are also vaccinated for rabies but it is not mandatory and feline rabies is now more common than canine rabies in the United States. With the widespread vaccination of cats and dogs in the United States, most endemic human rabies is a result of contact with rabid wildlife, particularly bats.

## **Animal Rabies Outside of the United States**

Rabies has traditionally been associated with dogs more than any other animal, and in parts of the world where domestic animal control and vaccination programs are limited, dogs remain the most important reservoir of the disease for people. Other domestic and farm animals can be rabid, too, though, and rabies occurs in a variety of wild animal species found in other countries.

Consequently, persons who have been bitten by any animal in another country should be fully evaluated as soon as possible by health authorities in that country and by their personal physician in the US. Local health departments can assist physicians with this evaluation.

### **Animal Rabies Within the United States**

While dog rabies is a major problem in much of the world, in the United States, animal control and vaccination programs assure that rabies remains rare in dogs, cats, and other domestic animals. In this country, over 90% of animal rabies cases occur in wildlife. Rabies has been detected in many different wild animal species. However, certain geographically distinct reservoirs of terrestrial rabies exist, each with its own variants of the virus. The boundaries of these reservoirs shift constantly. Within each area, rabies transmission occurs predominantly within the dominant reservoir species -- with occasional "spillover infection" to other species. There are currently four terrestrial reservoir species in the U.S.: raccoons, skunks, foxes and coyotes. In addition to these reservoirs of terrestrial rabies, indigenous rabid bats have been found in every state except Hawaii.

### **Animal Rabies in California**

In 2001, there were 321 laboratory confirmed cases of rabies in animals. Wildlife accounted for over 99% of the rabid animals. Bats accounted for 52 percent of the rabid animals in California during 2001. Rabies is well established in skunk and bat populations in California. Every opportunity should be taken to educate the public on the risks of trauma and infectious diseases associated with contact with wild animals.

### **Animal Rabies in Los Angeles County**

Bats are the most commonly rabid animal in Los Angeles County. The virus has been identified in several bat species. In 1979 the last rabid skunk was detected and our last case of domestic animal rabies occurred in 1987 when a woman visiting Acapulco, Mexico, adopted a wandering cat who was later bitten by a stray dog. The cat was ill when it arrived at the Los Angeles International Airport and was diagnosed as a rabies suspected within 48 hours by a San Fernando Valley veterinarian.

### **Types of Rabid Animals Within the United States**

The four most common terrestrial reservoir species harboring rabies in the U.S. are: raccoons, skunks, foxes and coyotes. In addition to these terrestrial, indigenous rabid bats have been found in every state except Hawaii.

**Raccoons:** Raccoons remain the most frequently reported rabid animal in the United States. The raccoon rabies reservoir extends throughout the

southeastern, mid-Atlantic, and northeastern states. No other reservoirs of raccoon rabies have been identified. Rabid raccoons occasionally detected outside of the reservoir area have been found to have non-raccoon variants of the rabies virus, suggesting that they were infected by other species.

**Skunks:** Skunks are the second most frequently reported rabid animal in this country. Three virus variants are responsible for rabies in skunks. There are two large geographically distinct reservoirs of skunk rabies due to three different variants of the virus: one in California; the other in the central US from Montana to Texas. Rabid skunks reported in eastern states outside the reservoir areas apparently were infected by raccoons rather than by other skunks.

**Foxes:** Two variants of the rabies virus are associated with persistent reservoirs of rabies in foxes. One long-standing reservoir involves arctic and red foxes in Alaska (and Canada) and to a lesser extent, areas of New York, Vermont, New Hampshire, and Maine. A different variant of the virus has been associated with gray foxes, resulting in reservoirs in Texas and Arizona.

**Coyotes:** A rabies variant found in domestic dogs along the Texas-Mexico border has been seen in coyotes in southern Texas. Northward spread of this reservoir has been limited by an aggressive (and expensive) airdrop vaccination program.

**Bats:** Rabid bats of many different species have been found in all of the 48 contiguous states. To date, only one rabid bat has ever been identified in Alaska -- in the southeastern part of the state. Also, one rabid bat was found in a shipping container in Hawaii. Rabid bats are found yearly in Los Angeles County.

**Rodents/small mammals:** Providers are often asked about the risks associated with small wild mammals -- such as rats, mice, squirrels, chipmunks, rabbits and hares. Rodent bites are common, so rodents are often tested for rabies in the US. Despite the large number of rodents examined, it is exceedingly uncommon for one to be infected with rabies virus. It has been postulated that these animals are so small that they are unlikely to survive an attack of a larger rabid animal (such as a raccoon, skunk, or fox). Furthermore, although there have been several case reports of humans infected by rabid rodents in other countries, no transmission of rabies from a rodent to a human (or any other mammal) has ever been documented in the United States.

**Other wild animals:** Other wild animals in the US are occasionally found to be rabid. Most are infected with virus strains associated with terrestrial animal species, rather than bats. In 2001, 116 rabid non-reservoir wild animals were reported from the 50 states, including 49 groundhogs and 28 bobcats.

## **Rabies in People**

**Worldwide:** At least 50,000 humans develop rabies each year. The overwhelming majority of cases occur in areas where dog rabies is common. Most have a history of having been bitten by a dog. In this country, human rabies is very rare; furthermore, most of the recent human rabies infections in the United States have been caused by variants of the rabies virus associated with bats.

**U.S.:** From 1980 through September 2002, there were 46 human rabies cases reported in the United States. Of those, 14 appeared to have been exposed in other countries. Of the remaining 32 people, two were infected with the canine strain of rabies present along the Texas/Mexico border and one was infected by a rabid skunk. The other 29 cases were caused by bat variants of the virus. A definite history of a bat bite was documented for only two of these 29 cases, and only 13 others had any known contact with a bat; no definite history of an encounter with a bat could be established for the remaining cases.

## **California**

Between 1980 and September 2002, ten people in California died of rabies in California, most diagnosed after death.

## **Los Angeles County**

The last person to die of laboratory confirmed rabies in Los Angeles County was in 1975. A 16-year-old girl from Mexico, who had been living in Los Angeles for eight months, became ill and was hallucinating. When the girl developed hydrophobia rabies was suspected. She was bitten by a dog while in Mexico. The dog later disappeared.

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## **HISTORICAL RABIES EPISODES IN LAC**

### **1898 First Confirmed Case of Animal Rabies in Los Angeles**

An English gentleman, living close to the intersection of Third and Flower Street, told the Health Officer his dog, which was uncontrollable, might have rabies. Confirmatory tests were run in Chicago.

### **City Council Required All Dogs Running at Large on Streets or Other Public Places to Be Muzzled**

### **1899 First Human Rabies Death in the City of Los Angeles**

A Pasadena man was bitten on the nose by his cocker spaniel. A few weeks prior to biting his owner, the dog had left home and was suspected of contracting rabies.

### **1906 Second Outbreak of Canine Rabies**

In the spring, the City Health Officer visited the Soldiers Home, twelve miles west of Los Angeles, where an officer's pet dog acted strangely, biting a man, five horses, several dogs, and hogs. The head of the dog and the man were transported to Chicago for testing and treatment. The dog tested positive and the man was given the Pasteur treatment and survived. Back in Los Angeles, the dogs that were attacked were immediately destroyed and the horses quarantined. Two of the horses and a hog developed rabies.

### **1909 Another Outbreak of Rabies in Los Angeles**

In June, a police officer shot a collie dog with rabies. Within a month, the police officer shot three more suspected rabid dogs found within five blocks of the original dog. Three months later, rabies was diagnosed in a horse by a Pasadena veterinarian. A muzzling ordinance was passed the same month by the board of health.

Some people denied that rabies existed. Strong opposition by a few dog lovers, the humane animal officer, and some members of the board of health resulted in repeal of the ordinance the following week. With the repeal of the muzzle ordinance, rabies spread rapidly in Los Angeles. Numerous rabid dogs were reported in various locations within the city. Four horses and a mule died of rabies.

### **1910 A Child Died of Rabies and the Dog Muzzling Ordinance Was Reinstated**

### **1913 Second Largest Outbreak of Cattle Rabies in Los Angeles County, One Human Death**

One evening, in a small retail dairy on the east side of Los Angeles, a dog with furious rabies ran into a corral attacking eight cows. When the dairyman chased the dog away, it went to a different corral attacking another cow before leaving.

### **1936 Most Rabid Livestock (10 Cattle, 2 Goats, 1 Horse) in Los Angeles County, Detected on 13 Premises**

The livestock Department reported stray, homeless, and occasionally rabid dogs running rampant in all parts of the county south of the mountains, frequently attacking other animals and people.

### **1937 Most Confirmed Rabid Dogs (847) in the City of Los Angeles. Three People Died of Rabies**

In the spring, a 57-year-old man saw a dog attack a group of school children, rushing over, he grabbed the rabid dog and was bitten several times, he held it until police arrived. He later died of rabies. In the fall, an Altadena veterinarian died of rabies.

### **1955 A Rabies Epidemic Occurred in Dogs in the City of Los Angeles**

70 rabid dogs. 52 people were bitten by known rabid dogs (most in the Watts/Compton area) with 1/300 reported dog bites from rabid dogs. No human deaths.

### **1956 Largest Rabies Outbreak in Cattle Occurred at the Spanish American Institute in Gardena**

24 cows and 1 hog were diagnosed with rabies at the charitable home and trade school for boys, operated by the Methodist church. One milk cow chased chickens, others pawed the ground pushing their heads against the fence and corrals. An epidemic of rabies in dogs was occurring at the time and a stray dog had roamed through the boys home earlier.

### **Los Angeles County Required that all dogs within the County be vaccinated against rabies as a prerequisite to licensing**

### **1958 Southern California Veterinary Medical Association Started Public Rabies Vaccination Clinics for Dogs**

Over 30,000 dogs were vaccinated that year at a cost of \$1.50/dog

### **1964 Epidemic of Rabid Skunks (64) in Malibu and San Fernando Valley**

Skunk rabies persisted in the area until the Malibu fire destroyed the population of rabid skunks.

### **Last Case of Rabies in Cattle in Los Angeles County**

A Brahma steer from Mexico, three weeks after entering a feedlot in Newhall, charged other cattle attempting to bite them.

### **1966 Last Locally Acquired Rabies in a Dog**

A Malibu dog had contact with a rabid skunk and later died of rabies.

### **1973 Last rabid raccoon in Los Angeles County**

### **1975 Last Person to Die of Laboratory Confirmed Rabies in Los Angeles County**



A 16-year-old girl from Mexico, who had been living in Los Angeles for eight months, became ill and was hallucinating. She was bitten by a dog while in Mexico. The dog later disappeared.

### **1979 Last Rabid Skunk in Los Angeles County**

The Malibu fire in the early 1970s apparently wiped out the population of rabid skunks.

### **1987 Last Domestic Animal (cat) with Rabies in Los Angeles County**

A woman visiting Acapulco, Mexico, adopted a wandering cat who was later bitten by a stray dog. The cat was ill when it arrived at the Los Angeles International Airport and was diagnosed as a rabies suspected within 48 hours by a San Fernando Valley veterinarian.

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## **RABIES FACT SHEET**

### **What is rabies?**

Rabies is a viral disease that affects the nervous system of mammals. In the last stages of the disease, the virus moves from the brain into the salivary glands and saliva. From there the virus can be transmitted through a bite or by contact with mucous membranes (nose, mouth, and eyes). Rabies is almost always fatal once symptoms occur.

### **How is rabies transmitted?**

Bite of an infected animal.

There are a few documented cases of rabies being contracted in caves where bats reside and in laboratories that work with the virus. It has occasionally been passed with a corneal transplant from a person unknowingly infected rabies.

### **Who can get rabies?**

Any mammal can get rabies, including humans. Rabies is seen in domestic animals such as; dogs, cats, cows, and horses. In North America, wildlife accounts for 99% of the rabies. Wildlife most commonly diagnosed with rabies includes; raccoons, bats, skunks, foxes, and coyotes. However, in Mexico and other Latin American countries, dogs are the common carrier of rabies.

### **What wildlife in Los Angeles County has rabies?**

Rabies is detected yearly in bats. About one out of every 12 bats tested by the health department has rabies. Rabies can occur in other wildlife but has not been detected for over twenty years.

### **What are the symptoms of rabies in people?**

Early symptoms include irritability, headache, fever and sometimes itching or pain at the site of exposure. Early symptoms are rarely diagnostic. The disease eventually progresses to paralysis, spasms of the throat muscles, convulsions, delirium and death.

### **What are the symptoms of rabies in animals?**

Changes in behavior are common in rabid animals: nocturnal animals are seen during the day, animals are not afraid from humans, become aggressive, attack other animals or people without provocation, may have paralysis of the limbs or throat, or just lay down.

### **How soon after infection do symptoms appear?**

The incubation period is variable but is normally 3 to 8 weeks. Incubation periods up to several years have been reported. Patients having severe bites or bites about the head usually have the shortest incubation periods.

### **Can people spread rabies?**

Person to person transmission is extremely rare, however, precautions should be taken to prevent exposure to the saliva of the diseased person.

### **How can I protect my animals and myself?**

The best protection against rabies is vaccination of pets and avoidance of risk. Vaccination of dogs and cats is required by law. Keep your pets indoors and make sure their vaccinations are current.

### **What should I do if my pet gets bitten by a rabid animal?**

If the attacking animal is captured, the brain will be tested for rabies. If your pet is not vaccinated, and the attacking animal was rabid, your pet may be disposed of as required by law.

### **What should I do if I am exposed to rabies?**

If you are bitten or scratched by a suspect rabid animal, or saliva from the animal enters an open wound, or becomes in contact with your nose, mouth, or eyes, wash the wound or contact area with soap and water. Call your physician or the

health department and get medical attention immediately. Remember, rabies is a fatal disease. Post-exposure prophylaxis should be started soon after the exposure. The treatment, when needed, consists of 5 vaccine doses in the arm.

**What is the preventive treatment for a potential rabies exposure (e.g., animal bite or scratch)?**

Preventive treatment requires prompt scrubbing of the bite site with soap and copious amounts of water, followed by the administration of rabies immune globulin (dosage depending on weight) and five doses of human diploid cell rabies vaccine administered into the arm muscle on days 0, 3, 7, 14 and 28 after exposure.

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## **RECENT RABIES IN PEOPLE**

Between 1980 and September 2002, 46 people in the United States died of laboratory confirmed rabies.<sup>1</sup> The majority of cases were diagnosed at postmortem. The presence of hydrophobia or aerophobia was significantly associated with antemortem diagnosis. None of the people received complete postexposure prophylaxis prior to the onset of clinical disease. This is unfortunate as treatment with modern tissue culture vaccines, coupled with the appropriate use of immune globulin, is regarded as essentially 100% effective.<sup>2</sup> Of the 46 human cases, 63 percent were associated with rabies virus variants found in insectivorous bats. Nevertheless, clear evidence of a bite was found in only two of the bat-associated cases.

More people died of rabies in California (10) than any other state and most cases were diagnosed after death (table 1). In California, during 1995, two men died of bat-associated rabies virus. Rabies postexposure prophylaxis was administered to 88 people exposed to the two men.<sup>3</sup> In 1995, four cases of human rabies were documented in the United States. All were associated with insectivorous bats; however, a definite history of bite exposure was not identified. It is likely that human rabies is under reported in the United States. There is little to distinguish rabies from other viral encephalitides. Any patient who presents with encephalopathy of unknown etiology should be considered a rabies suspect, even in the absence of known exposure to the virus through an animal bite. The most helpful clue to the diagnosis of rabies is a history of animal exposure. An early clinical sign suggestive of rabies is the complaint of paresthesia and/or fasciculations at or around the site of virus inoculation.

### **Animal Rabies**

Traditionally, rabies exists in two forms in a community. The urban form, propagated chiefly by unimmunized cats and dogs, and sylvatic, propagated in

North American by bats, coyotes, foxes raccoons and skunks. Infection in domestic animals represents a 'spillover" from sylvatic reservoirs of infection. In California, between January 1 and December 31 of 2001, there were 321 laboratory confirmed cases of rabies in animals. Wildlife accounted for close to 99% of the rabid animals. Bats accounted for 52 percent of the rabid animals in California during 2001.

### **Rabies in Los Angeles County**

By 1960, mandatory vaccination of dogs in Los Angeles County largely controlled canine and human rabies. This immune barrier has been established nationwide at a cost of over \$300 million annually. Cats are also vaccinated for rabies but it is not mandatory nationwide and feline rabies is now more common than canine rabies in the United States. With the widespread vaccination of cats and dogs in the United States, most endemic human rabies is a result of contact with rabid wildlife, particularly bats. Bat rabies is diagnosed yearly in Los Angeles County.

### **Animal Bites**

Bites by wildlife such as: coyotes, foxes, raccoons and skunks are usually obvious and often prompt suspicion of the possibility of rabies. Bats weigh only a few ounces and they have very sharp claws and teeth. Their scratches and bites are difficult to detect. In one instance, a 37-year-old woman was in her bathroom and felt something brush against her bottom. When she turned on the lights there was a bat hanging on the ceiling which flew out the open bathroom window. She looked at her skin and found nothing unusual. Later that day, when her physician scrutinized the area with 6X magnification, he found two pinpoint punctures about one-half centimeter apart. <sup>4</sup>

During the past 20 years, the only rabid wildlife detected in Los Angeles County has been bats. The last domestic animal with laboratory confirmed rabies was a cat in 1987 (table 2). Any bite of a wild carnivore should be considered a possible source of rabies until proven otherwise. In April of 1998, an opossum was found under the hood of a Orange County employee's car. When the employee went to remove the opossum, he was bitten numerous times. The opossum tested positive for rabies. Rabies in opossums had not been diagnosed in Orange County for over thirty years.

### **Prevention**

Rabies precautions should be taken with all animal bites, particularly wildlife. Pre-exposure vaccination of high risk people is recommended (animal handlers, cave explorers, laboratory workers and veterinarians). A healthy domestic cat or dog that bites a person should be confined and observed for 10 days and evaluated by a public health veterinarian at the first sign of illness during confinement or

before release. Signs of rabies in wildlife cannot be interpreted reliably. If wildlife bites or scratches a person, the animal should be immediately tested for rabies.

Bat rabies is enzootic in the United States. Since 1980, indigenously human rabies in the United States has been caused primarily by insectivorous bats. Contact with a bat should be taken seriously. Bats should not be captured, handled, or kept as pets. Human and domestic animal contact with bats should be minimized. The physical exclusion of bats from human dwellings should be standard practice.

In the past, the Centers for Disease Control (CDC) recommended rabies post-exposure vaccinations be given to anyone with an obvious bite mark or scratch from a potentially rabid animal. CDC has revised its guidelines to include a recommendation that vaccination be given to anyone who has slept in a room where a bat was known to be present, even if a bite is not visible.<sup>5</sup>

### References

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2. Childs JE, Noah DZ, Rupprecht: Rabies. Infectious Diseases (Gorbach SL, Bartlett JG, Blacklow NR editors) Second Edition. Saunders. p. 1545-59. 1997
3. Human Rabies - California, 1995. *MMWR* 45(17):354-56. 1996
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**Table 1. Between 1980 and 2002 seven people in California died of laboratory confirmed rabies\***

<b>CALIFORNIA CASES</b>				
<b>1980-2002</b>				
<b>Year</b>	<b>Exposure History</b>	<b>Variant</b>	<b>Type</b>	<b>Diagnosis</b>
1984	Dog - Guatemala	dog	exotic	postmortem
1987	unknown	dog	exotic	postmortem

1992	Dog - India	dog	exotic	antemortem
1993	Dog - Mexico	dog	exotic	antemortem
1994	unknown	dog	exotic	postmortem
1995	unknown	bat	indigenous	antemortem
1995	unknown	bat	indigenous	postmortem
2000	unknown	bat	indigenous	antemortem
2001	unknown	dog	exotic	postmortem
2002	unknown	bat	indigenous	antemortem

\*Noah DL, Drenzek CL, Smith JS, et al: Epidemiology of Human Rabies in the United States, 1980 to 1996. *Annals of Internal Medicine*. 128(11):922-930. 1998

CDC. Human rabies - California, Georgia, Minnesota, New York and Wisconsin, 2000. *MMWR* 49(49):1111-5. 2000

CDC. Human rabies - California, 2002. *MMWR* 51(31):686-688. 2002

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## CLINICAL FEATURES OF RABIES

Rabies is caused by members of the RNA virus genus *Lyssavirus*, family *Rhabdoviridae*. Rabies infection characteristically produces a rapidly progressive encephalomyelitis (inflammation of the brain and spinal cord), and should be considered as a possible cause of any such illness in humans or other animals.

### **Rabies in Humans**

The incubation period in humans is typically between 20 and 90 days, although incubation periods as short as 4 days and longer than 6 years have been documented. This variation is probably related to the site of inoculation, the severity of the wound, and the amount of virus introduced. It is thought that the closer the inoculation is to well-innervated areas and to the brain, the more severe the wound, and the more virus introduced, the shorter the incubation period.

Early symptoms of rabies are non-specific, but often include pain or paresthesia at the inoculation site. The disease progresses to an acute neurologic phase

characterized by delirium, convulsions, muscle weakness, and paralysis. Spasms of the swallowing muscles can lead to a fear of water (hydrophobia), and may be precipitated by blowing on the patient's face (aerophobia). *Not all persons exposed to rabies virus develop disease*, but if symptoms do occur, rabies is almost invariably fatal -- usually within 10 days. There are case reports of three people who survived the disease in the 1970s. All three had received some pre- or post-exposure treatment with the duck embryo vaccine or suckling mouse brain vaccine (vaccines that are no longer used in this country). A fourth documented case was reported in 1992 in a boy who received partial postexposure treatment.

**Diagnosing Rabies in Humans:** Because rabies is often not considered during the evaluation of patients with acute encephalitides, human rabies cases are usually identified after death. Antemortem diagnosis is possible, however, by analyzing the saliva, cerebrospinal fluid, skin (from the posterior neck), and serum of a symptomatic patient. Brain biopsy material can also be examined for rabies. Providers wishing to submit specimens for testing should contact the Acute Communicable Disease Control at (213) 240-7941.

### **Rabies in Other Animals**

The clinical features of rabies in other animals are highly variable and resemble a number of toxic and infectious illnesses of the central nervous system. In dogs, a common viral disease known as canine distemper often produces seizures and neurological disease resembling rabies. Rabid animals can appear aggressive, known as "furious rabies" or lethargic, known as "dumb rabies". Aggressive rabies is common in cats but seldom seen in bats. As the disease progresses over a matter of days, the rabid animal typically develops difficulty with coordination. This is usually followed by generalized paralysis and death. Rabies can not be diagnosed reliably by an evaluation of behavior or clinical signs alone. Laboratory testing of the brain is essential.

All cases of suspected rabies in animals should be reported immediately to Veterinary Public Health at (323) 730-3723.

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## **BATS AND RABIES**

Bat rabies is enzootic in the United States and detected yearly in Los Angeles County. However, it is neither feasible nor desirable, however, to control rabies in bats by programs to reduce bat populations. Bats should be excluded from houses and adjacent structures to prevent direct association with human beings. Such structures should then be made bat-proof by sealing entrances used by bats. Since 1980, indigenously human rabies in the United States has been caused primarily by insectivorous bats. Contact with a bat should be taken

seriously. Bats should not be captured, handled, or kept as pets. Human and domestic animal contact with bats should be minimized.

Bats weigh only a few ounces and they have very sharp claws and teeth. Their scratches and bites are difficult to detect. Bites by wildlife such as: coyotes, foxes, raccoons and skunks are usually obvious and often prompt suspicion of the possibility of rabies. In one instance, a 37-year-old woman was in her bathroom and felt something brush against her bottom. When she turned on the lights there was a bat hanging on the ceiling which flew out the open bathroom window. She looked at her skin and found nothing unusual. Later that day, when her physician scrutinized the area with 6X magnification, he found two pinpoint punctures about one-half centimeter apart.

Between 1980 and 2002, 29 people in the United States died of rabies associated with bats. The majority of cases were diagnosed at autopsy. None of the people received complete post-exposure prophylaxis prior to the onset of clinical disease. This is unfortunate as treatment with modern tissue culture vaccines, coupled with the appropriate use of immune globulin, is regarded as essentially 100% effective. Clear evidence of a bite was found in only two cases.

In the past, the Centers for Disease Control (CDC) recommended rabies post-exposure vaccinations be given to anyone with an obvious bite mark or scratch from a potentially rabid animal. CDC has revised its guidelines to include a recommendation that vaccination be given to anyone who has slept in a room where a bat was known to be present, even if a bite is not visible.

**Capturing a bat:** Bats are not aggressive but may bite if grabbed. They should not be handled with bare hands. Wear leather or other heavy gloves whenever contact with the animal is possible. Only one person should be in the room when attempting to capture a bat. Wait for the bat to land, then cover the animal with an empty coffee can (or similar container). Slide a piece of cardboard between the container and the surface on which the bat is resting, trapping it inside. Secure the covering to the can (by heavy tape, for example) so that the bat cannot escape.

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## PREVENTION

Rabies in humans can be prevented either by eliminating exposures to rabid animals or by providing exposed persons with prompt local treatment of wounds combined with appropriate passive and active immunization. This can be done by: 1) reducing encounters between humans and potentially rabid animals; 2) immunizing domestic animals; 3) providing pre-exposure immunization to people at high risk for being exposed to rabies; and 4) giving post-exposure preventive



therapy to people who -- despite these other efforts -- may have been exposed to the virus.

Appropriate management of those who may have been exposed to rabies infection depends on the evaluation of the risk of infection (type of exposure, location of wound, rabies vaccination status of biting animal, etc.) and the efficacy and risk of prophylactic treatment. All available methods of systemic prophylactic treatment are complicated by instances of adverse reactions. These are rarely severe. Decisions on management must be made immediately; the longer treatment is postponed, the less likely it is to be effective. The urgency for treatment must be tempered by recognition that human rabies is an extremely rare event.

Although the purpose of animal code enforcement is focused upon rabies prevention, reporting animal bites is directly aimed at prevention of this disease. Anyone having knowledge of an animal biting or scratching so as to break the skin is required by California State Law to report the incident to the local health authority. Children should be cautioned to never play with wild animals, especially bats in Los Angeles County.

Local governments should initiate and maintain effective programs to ensure vaccination of all dogs, cats, and ferrets and to remove strays and unwanted animals. Local health departments and animal-control officials can enforce the removal of strays more effectively if owned animals are confined or kept on a leash. Strays should be impounded for at least 3 days to give owners sufficient time to reclaim animals and to determine if human exposure has occurred. Such procedures in the United States have reduced laboratory confirmed rabies cases in dogs from 6,949 in 1947 to 89 in 2001. Since more rabies cases are reported annually involving cats than dogs, vaccination of cats should be required. The control of rabies among wildlife reservoirs is difficult. Vaccination of free-ranging wildlife or selective population reduction may be useful in some situations, but the success of such procedures depends on the circumstances surrounding each rabies outbreak.

## **RABIES VACCINATION OF ANIMALS**

**1. Rabies Vaccination of Dogs and Cats:** All owners or harborers shall have their dog(s) currently vaccinated against rabies by a California licensed veterinarian. All owners or harborers shall ensure that the dog(s) is wearing the vaccination tag at all times. Dogs can be vaccinated for rabies starting at four months of age and revaccinated according to California law. It is recommended that cats also be vaccinated.

**2. Livestock:** It is neither economically feasible nor justified from a public health standpoint to vaccinate all livestock against rabies. However, consideration

should be given to the vaccination of livestock, especially animals that are particularly valuable and/or may have frequent contact with humans beings.

**3. Wildlife:** No parenteral rabies vaccine is licensed for use in wild animals. Because of the risk of rabies in wild animals (especially raccoons, skunks, coyotes, foxes, and bats), Veterinary Public Health strongly recommends the enactment of state laws prohibiting the importation, distribution, relocation, or keeping of wild animals or hybrids as pets.

**4. Maintained in exhibits and in zoological parks:** Captive animals not completely excluded from all contact with rabies vectors can become infected. Moreover, wild animals may be incubating rabies when initially captured; therefore, wild-caught animals susceptible to rabies should be quarantined for a minimum of 180 days before exhibition. Employees who work with animals at such facilities should receive pre-exposure rabies immunization. The use of pre- or post-exposure rabies immunizations of employees who work with animals at such facilities may reduce the need for euthanasia of captive animals.

## **MANAGEMENT OF ANIMALS THAT BITE PEOPLE**

**1. A healthy dog, cat,** that bites a person should be confined and observed for 10 days; it is recommended that rabies vaccine not be administered during the observation period. Such animals should be evaluated by a public health veterinarian at the first sign of illness during confinement. Any illness in the animal should be reported immediately to the local health department. If signs suggestive of rabies develop, the animal should be euthanized, its head removed, and the head shipped under refrigeration (not frozen) for examination of the brain by a qualified laboratory designated by the local or state health department.

**2. Any stray or unwanted dog, cat,** may be quarantined at the local animal shelter. Other biting animals which might have exposed a person to rabies should be reported immediately to the local health department. Prior vaccination of an animal may not preclude the necessity for euthanasia and testing if the period of virus shedding is unknown for that species. Management of animals other than dogs, cats, and ferrets depends on the species, the circumstances of the bite, the epidemiology of rabies in the area, and the biting animal's history, current health status, and potential for exposure to rabies.

**3. Any unowned, unvaccinated dogs, cats,** exposed to a rabid animal should be euthanized immediately. If the owner is unwilling to have this done, the animal should be vaccinated and then placed in strict isolation for 6 months. Animals with expired vaccinations need to be evaluated on a case-by-case basis. Dogs, cats, and ferrets that are currently vaccinated should be revaccinated immediately, quarantined for 30 days, and then kept under the owner's control for an additional two months.

**4. Any animal bitten or scratched by either a wild, carnivorous mammal or a bat** that is not available for testing should be regarded as having been exposed to rabies. Indigenous rabid bats have been reported from every state except Hawaii and have caused rabies in at least 29 humans in the United States.

**5. All species of livestock are susceptible to rabies; cattle and horses are among the most frequently infected.** Livestock exposed to a rabid animal and currently vaccinated with a vaccine approved by USDA for that species should be revaccinated immediately and observed for 45 days. Unvaccinated livestock should be slaughtered immediately. If the owner is unwilling to have this done, the animal should be kept under very close observation for 6 months.

If the animal is slaughtered within 7 days of being bitten, its tissues may be eaten without risk of infection, provided liberal portions of the exposed area are discarded. Federal meat inspectors must reject for slaughter any animal known to have been exposed to rabies within 8 months.

Neither tissues nor milk from a rabid animal should be used for human or animal consumption. However, because pasteurization temperatures will inactivate rabies virus, drinking pasteurized milk or eating cooked meat does not constitute a rabies exposure.

It is rare to have more than one rabid animal in a herd, or herbivore to herbivore transmission; therefore, it may not be necessary to restrict the rest of the herd if a single animal has been exposed to or infected by rabies.

## **PRE-EXPOSURE VACCINATION OF PEOPLE**

Pre-exposure vaccination should be offered to persons among high-risk groups, such as veterinarians, animal handlers, certain laboratory workers, and persons spending time (e.g., 1 month) in foreign countries where canine rabies is endemic. Other persons whose activities bring them into frequent contact with rabies virus or potentially rabid dogs, cats, skunks, raccoons, bats, or other species at risk of having rabies should also be considered for pre-exposure prophylaxis.

Pre-exposure prophylaxis is given for several reasons. First, it may provide protection to persons with inapparent exposures to rabies. Second, it may protect persons whose post-exposure therapy might be delayed. Finally, although pre-exposure vaccination does not eliminate the need for additional therapy after a rabies exposure, it simplifies therapy by eliminating the need for human rabies immuno globulin (HRIG) and decreasing the number of doses of vaccine needed - a point of particular importance for persons at high risk of being exposed to rabies in areas where immunizing products may not be available or where they may carry a high risk of adverse reactions.

**Intramuscular (IM) Primary Vaccination:** Three 1.0-ml injections of human diploid cell vaccine (HDCV) or rabies vaccine adsorbed (RVA) should be given intramuscularly (deltoid area), one each on days 0, 7, and 21 or 28.

**Intradermal (ID) Primary Vaccination:** A regimen of three 0.1-ml doses of HDCV, one each on days 0, 7, and 21 or 28, is also used for pre-exposure vaccination. The ID dose/route has been recommended previously by the Advisory Committee on Immunization Practices (ACIP) as an alternative to the 1.0-ml IM dose/route for rabies pre-exposure prophylaxis with HDCV.

### **Booster Doses of Vaccine**

Persons who work with live rabies virus in research laboratories or vaccine production facilities (continuous risk category) are at the highest risk of inapparent exposures. Such persons should have a serum sample tested for rabies antibody every 6 months.

Booster doses (IM or ID) of vaccine should be given to maintain a serum titer corresponding to at least complete neutralization at a 1:5 serum dilution by the Rapid Fluorescent Focus Inhibition Test (RFFIT). The frequent risk category includes other laboratory workers, such as those doing rabies diagnostic testing, spelunkers, veterinarians and staff, animal-control and wildlife officers in areas where animal rabies is epizootic, and international travelers living or visiting (for >30 days) in areas where canine rabies is endemic. Persons among this group should have a serum sample tested for rabies antibody every 2 years and, if the titer is less than complete neutralization at a 1:5 serum dilution by the RFFIT, should have a booster dose of vaccine.

Alternatively, a booster can be administered in lieu of a titer determination. Veterinarians and animal control and wildlife officers working in areas of low rabies enzooticity (infrequent exposure group) do not require routine pre-exposure booster doses of HDCV or RVA after completion of primary pre-exposure vaccination.

## **POST-EXPOSURE PROPHYLAXIS (PEP) OF PEOPLE**

There are three components to PEP: 1) local treatment of wounds; 2) provision of passive immunity with purified specific immunoglobulin; and 3) the induction of active immunity with rabies vaccine. All three components are critical to the effective prevention of rabies.

**1) Local treatment of wounds:** Immediate and extensive washing of all bite wounds, scratches, or other sites of potential exposure for 10 minutes with soap and water is arguably the most important measure for preventing rabies following an exposure to a rabid animal. Experiments done in animals suggest that thorough and vigorous cleansing to the depth of the wound with a 20% soap

solution can reduce the risk of developing rabies by up to 90%<sup>13</sup>. Tetanus booster vaccine (Td) should be given if indicated.

**2) Immunoglobulin Administration:** Purified human anti-rabies immunoglobulin (HRIG) provides rapid protection against rabies for one to two weeks after exposure -- while the more lasting vaccine-induced immune response is developing. HRIG should be given to any previously unvaccinated person regardless of their age, type of exposure, or time since exposure. HRIG can be given through the seventh day following administration of the first dose of vaccine but should not be given after this time because it could interfere with the antibody response to the vaccine. HRIG is *not* given for preexposure prophylaxis. *Nor should HRIG be given as part of PEP in a person who has previously been vaccinated with HDCV, RVA, or PCECV or who has a documented rabies antibody titer to any vaccine.*

The recommended dose of HRIG is 20 IU/kg body weight (0.06 ml/lb body wt). *As much of the dose as is anatomically feasible* should be infiltrated in the area around the wound(s). The remaining volume is administered intramuscularly at a site distant from vaccine inoculation, such as the gluteal area.<sup>14</sup>

**3) Vaccine Administration:** Primary post-exposure immunization with HDCV, RVA, and PCECV is given intramuscularly (IM) in a regimen of five 1-ml doses. The first dose is given as soon after exposure as possible (day 0). The remaining four doses are given on days 3, 7, 14 and 28 following the first dose.

For adults and older children, the vaccine should be injected into the deltoid muscle. For small children and infants, the muscles of the antero-lateral thigh can be used. *Vaccine should never be given in the gluteal area or in the same anatomical site as HRIG.* If an individual misses any vaccine doses during the first two weeks of the regimen, providers should consult the vaccine manufacturer. The schedule should be adjusted to ensure that four doses of vaccine are received during the first 14 days. The fifth dose can be given on day 28. *Persons who have already received pre-exposure prophylaxis still require two booster doses of vaccine on day 0 and day 3.*

#### **ASSESSING THE NEED FOR POST-EXPOSURE ANTI-RABIES TREATMENT:**

The need for post-exposure treatment should be based on careful consideration of four basic areas: TYPE OF EXPOSURE, ANIMAL BEHAVIOR, ANIMAL SPECIES, and LABORATORY TEST RESULTS.

**Type of Exposure:** Rabies can only be transmitted when the saliva or neural tissue of an infected animal is introduced into an open cut or wound (less than 24 hours old) in a person's skin or contacts the mucous membranes in such areas as the eyes, nose, or mouth. Categories of exposure are:

1) **Bite** - Any penetration of the skin by an animal's teeth. Bites in general are high-risk exposures. Bites to the head and neck carry the highest risk.

2) **Non-bite** - Scratches or abrasions received from an animal, or the contamination of open cuts or wounds with an animal's saliva or neural tissue.

3) **Non-exposure** - Animal contact by itself, such as being in the vicinity of, petting, or handling an animal; or coming into contact with the blood, urine, or feces of an animal does not constitute exposure and, therefore, does NOT require post-exposure rabies treatment.

**Animal Behavior:** Consideration should be given to whether the animal appeared to be behaving normally or whether there were signs of rabies such as unusual aggression, impaired locomotion, varying degrees of paralysis (frequently beginning in the hind legs or throat), excessive salivation (foaming at the mouth), avoidance of water or food, extreme depression, or bizarre behavior such as no fear of humans by a wild animal or daylight activity by a normally nocturnal species. Consideration should also be given to whether the attack was provoked or unprovoked.

1) **Provoked Attack** - An attack is considered to be "provoked" if an animal (dog/cat) is placed in a situation such that an expected reaction would be to bite or attack. This includes, but is not limited to, invasion of an animal's territory; attempting to pet or handle an unfamiliar animal; startling an animal; running or bicycling past an animal; assisting an injured or sick animal; trying to capture an animal; or removing food, water, or other objects in the animal's possession.

2) **Unprovoked Attack** - An "unprovoked" attack or bite occurs when a domestic animal strikes for no apparent reason. The behavior should be unusual for the particular animal. A confirmation of chronic aggressive behavior in a domestic animal can often be made by interviewing the animal's owner. This will assist in determining whether the attack was indeed "unprovoked."

**Animal Species:** The risk of rabies is very much dependent upon the species of biting animal.

**High Risk Animals** - Bats and carnivorous wild animals (skunks, raccoons, foxes, coyotes, and bobcats) are the animals most commonly infected with rabies in California. Exposures from these animals are considered to carry a high risk of rabies. Rabid bats are detected routinely in Los Angeles County.

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## Los Angeles County Title 11 - HEALTH AND SAFETY

### Chapter 11.04 Communicable Disease Control

## Part 2. Rabies Control and Vicious Animals

### Sections

11.04.200 Persons bitten by certain animals -- Report required -- Treatment.

11.04.210 Confinement of biting animals -- Procedure generally.

11.04.220 Confinement of biting animals -- Alternate procedures.

11.04.225 Fee for Confinement of Biting Animals.

11.04.230 Owner of biting animal -- Report required -- Examination of confined animal.

11.04.240 Owner of biting animal -- Quarantine requirements -- Examination of dead animal.

11.04.250 Destroying quarantined animal prohibited -- Exception.

11.04.260 Suspected rabid animals -- Owner report and confinement duty.

11.04.270 Quarantine of animals coming in contact with rabid animals.

11.04.280 Vicious animals -- Identification procedure -- Confinement requirements.

11.04.290 Vicious animals -- Appeal from quarantine requirement -- Hearing procedures.

### **Expanded Codes** **11.04.200 Persons bitten by certain animals -- Report required -- Treatment.**

It shall be the duty of each physician to report to the director any case coming to the physician's attention in which a person has been bitten by, or otherwise exposed to, an animal of a species subject to rabies, giving the full name, age and address of the person who has been bitten. If no physician is in attendance on said case, said report shall be made by the person bitten or otherwise exposed, or, in the case of a minor, by his parent or guardian. The director shall ascertain that said individual is treated as the director, in his opinion and discretion, deems necessary for the protection of said individual, and the director shall order the quarantine and observation of the biting animal until it is established by the director that such animal does not have symptoms of rabies. (Ord. 10728 § 1 (part), 1973; Ord. 7583 Part 2 § 218, 1959.)

### **11.04.210 Confinement of biting animals -- Procedure generally.**

The biting animal shall be quarantined, confined and observed for at least 14 days (dogs and cats, 10 days) after the day of infliction of the bite, with the exception that the following alternative to the 10-day isolation of dogs and cats is permitted: dogs or cats which have been isolated in strict confinement, under proper care and under observation of a licensed veterinarian, in a pound, veterinary hospital or other adequate facility, in a manner approved by the local health officer, may be released from isolation by the local health officer after five days of veterinary observation if, upon conducting a thorough physical examination on the fifth day or more after infliction of the bite, the observing veterinarian certifies that there are no clinical signs or symptoms of any disease. (Ord. 10728 § 1 (part), 1973; Ord. 7583 Part 2 § 219, 1959.)

#### **11.04.220 Confinement of biting animals -- Alternate procedures.**

A. The quarantine described in Section 11.04.210 may be made on the property of the person having charge, custody or control of such animal when adequate quarantine facilities are available; or, at the discretion of the director, such animal may be placed under quarantine and observation in any licensed boarding kennel.

B. Should the animal be relinquished by the owner to the director to be disposed of upon release from quarantine, the director may, at his discretion, impound such animal in an approved animal control facility. (Ord. 10728 § 1 (part), 1973; Ord. 7583 Part 2 § 220, 1959.)

#### **11.04.225 Fee for Confinement of Biting Animals.**

A. Under the conditions described in subsection B of this section, the county shall recover a fee of \$50.00 for the costs incurred by the department in the confinement of a biting animal as described in Sections 11.04.200, 11.04.210 and 11.04.220. The county shall also recover any related costs, including care and feeding of the confined animal, and any reasonable costs that it may incur in connection with the collection of such fees.

B. The fee shall be assessed when:

1. The director or his designee confines an animal described in Section 11.04.200 on the owner or custodian's premises and the victim of the bite is not the owner or custodian of the animal; and
2. The victim was not engaged in an illegal activity against the person or on the property of the owner or custodian.

C. Notwithstanding the above, the fee shall not be assessed when the animal is a police dog or guide dog as defined in California Health and Safety Code Sections 1919 and 1919.1.



D. The director or his designee may waive, in full or in part, the above fee, if necessary to accomplish the protection of animal or public health, safety or welfare. (Ord. 93-0055 §11, 1993.)

**11.04.230 Owner of biting animal -- Report required -- Examination of confined animal.**

Whenever the owner or person having charge, custody or control of any animal observes or learns that such animal has bitten or otherwise exposed a human being, such owner or person having charge, custody or control of such animal shall report the incident at once to the director and shall confine such animal in an enclosure, or shall securely hold and restrain said animal, by chain or other device, for examination and observation by the director. No owner or person having charge, custody or control of such animal shall fail, refuse or neglect to allow the director to make an inspection or examination of such animal for the purpose of determining whether such animal has symptoms of rabies. (Ord. 10728 § 3 (part), 1973: Ord. 7583 Part 2 § 221, 1959.)

**11.04.240 Owner of biting animal: Quarantine requirements - Examination of dead animal.**

No owner or person having charge, custody or control of any animal biting or otherwise exposing a human being shall fail, refuse or neglect to confine in an enclosure, or securely hold and restrain such animal by chain or other device, upon the premises of the owner or person having charge, custody or control of such animal, for the period of quarantine as shown in Section 11.04.210. Should such animal die while under quarantine and observation, the owner or person having charge, custody or control of such animal shall surrender the carcass of such animal or such portion of the carcass as may be demanded by the director. (Ord. 10728 § 3 (part), 1973: Ord. 7583 Part 2 § 222, 1959.)

**11.04.250 Destroying quarantined animal prohibited -- Exception.**

It is unlawful for any owner or person having charge, custody or control of any animal that has bitten or otherwise exposed a human being or is suspected of having rabies to destroy such animal, or have such animal destroyed, during the quarantine period, unless permission is granted by the director. (Ord. 10728 § 3 (part), 1973: Ord. 7583 Part 2 § 223, 1959.)

**11.04.260 Suspected rabid animals -- Owner report and confinement duty.**

Whenever the owner or person having charge, custody or control of any animal learns or observes that such animal has shown symptoms of rabies or has acted in a manner which would give said person or owner reason to believe that said animal has rabies, it shall be unlawful for such owner or person having charge, custody or control of such animal to fail, refuse or neglect to notify the director at

once and to confine such animal in an enclosure, or to securely hold and restrain such animal by chain or other device until it shall be established that such animal does not have symptoms of rabies, or to fail, refuse or neglect to allow the director to inspect or examine such animal for symptoms of rabies. (Ord. 10728 § 3 (part), 1973: Ord. 7583 Part 2 § 224, 1959.)

#### **11.04.270 Quarantine of animals coming in contact with rabid animals.**

Animal contacts of a known rabid or suspected rabid animal shall be quarantined in a place and manner, and for a period of time, designated by the director. (Ord. 10728 § 3 (part), 1973: Ord. 7583 Part 2 § 225, 1959.)

#### **11.04.280 Vicious animals -- Identification procedure -- Confinement requirements.**

A. It shall be the duty of the director, upon receipt of an affidavit from any person who has been bitten by an animal or from a person who has witnessed such an occurrence, to investigate and, upon reasonable indication of the animal's viciousness, to notify the owner or custodian of such animal, in writing, to keep such animal at all times confined strictly to the premises of said owner or custodian in such a manner that the animal may not do bodily harm to any person having legitimate reason to be upon the premises of said owner or custodian.

B. Permanent Quarantine. After the receipt by the owner or custodian of such animal of the notice as provided in subsection A of this section, the owner or custodian shall at all times thereafter keep such animal, or cause such animal to be kept, on the property or premises where such owner or custodian resides, in the manner specified in subsection A above. Such animal shall not be moved from the place of quarantine or disposed of in any manner without the permission of the director, and in the event of the death of the animal, the carcass of the animal shall be surrendered by the owner or custodian to the director on demand, as proof of the death of the animal. (Ord. 10728 § 2 (part), 1973: Ord. 7583 Part 2 § 226, 1959.)

#### **11.04.290 Vicious animals -- Appeal from quarantine requirement -- Hearing procedures.**

Any person whose animal has been declared vicious and placed on permanent quarantine may petition the director for a hearing. Such a petition shall be in writing, signed by the applicant, and shall set forth in detail the facts and reasons upon which his petition is based. If the director finds that the facts upon which he based his order of quarantine no longer exist, he shall rescind the quarantine. Otherwise, he shall set the matter for a public hearing not less than 60 days after the filing of the petition and, in writing, either by registered or certified mail, postage prepaid, or in the manner required for the service of summons in civil

actions, not less than five days prior to the hearing, notify the applicant of the time and place thereof.

The director shall give the petitioner and all other persons who desire to be heard an opportunity to testify and to present any relevant facts. The director may place any witness under oath. The director, when he deems it necessary, may continue the hearing at any time and shall give notice thereof at the hearing or as required when the matter is first set for hearing. At the close of the hearing or within 10 days thereafter, from the evidence presented, the director shall determine the facts and shall take the action required thereby, continue the quarantine, set aside the quarantine, or such other action as is required by law under the facts. He may notify the petitioner at the close of the hearing as to his ruling if the petitioner is present, either in person or by counsel. Otherwise, he shall notify the petitioner of his action by a notice in writing served by first class mail, postage prepaid, or in the manner required for the service summons in a civil action. (Ord. 10728 § 4, 1973; Ord. 7583 Part 2 § 227, 1959.)

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## **California Code of Regulations Health and Safety Code**

### **Division 105. Communicable Disease Control**

#### **Chapter 1 Rabies Control**

##### **Sections**

121575 Rabies defined.

121580 Quarantine defined.

121585 "Rabies area" defined.

121595 Preliminary investigation of rabies.

121600 Quarantine, animals; area.

121605 Investigation.

121610 Regulations in lieu of quarantine.

121615 Duty to enforce.

121620 Power to destroy or detain animals.

121625 Power to enter and examine premises.

121630 Violation; punishment.

121635 Rabies treatment and eradication fund.

121640 Dog license tax; deposit in fund; use for other purposes.

121645 Special dog license tax.

121650 Rate of special tax.

121655 Termination of special tax.

121660 Disposition of fines.

121665 Special control measures.

121670 Expenditures; payment from fund.

121675 Expenditures in excess of fund; payment from general fund; repayment

121680 Guide dogs for blind persons.

121685 Law enforcement agency dogs; quarantine after biting people; availability for examination; notice of abnormal behavior.

121690 Regulation and control of dogs; maintenance of pound and rabies control. programs; vaccination clinics; issuance of license, duration.

121695 Construction of chapter.

121700 Persons and firms to whom vaccines deliverable.

121705 Concealment of information; misdemeanor.

121710 Violation of isolation or quarantine order; misdemeanor; penalty.

### **Expanded Codes**

#### **121575 Rabies defined.**

"Rabies," as used in this chapter, includes rabies, and any other animal disease dangerous to human beings that may be declared by the department as coming under this chapter.

#### **121580 Quarantine defined.**

"Quarantine," as used in this chapter, means the strict confinement, upon the private premises of the owner, under restraint by leash, closed cage, or paddock, of all animals specified in the order of the department.

**121585 "Rabies area" defined.**

"Rabies area" shall mean any area not less than a county as determined by the director within a region where the existence of rabies constitutes a public health hazard, as found and declared by the director. A region shall be composed of two or more counties as determined by the director. The status of an area as a rabies area shall terminate at the end of one year from the date of the declaration unless, not earlier than two months prior to the end of the year, it is again declared to be a rabies area in the manner provided in this section. If however, the director at any time finds and declares that an area has ceased to be a rabies area its status shall terminate upon the date of the declaration.

**121595 Preliminary investigation of rabies.**

Whenever any case of rabies is reported as existing in any county or city, the department shall make, or cause to be made, a preliminary investigation as to whether the disease exists, and as to the probable area of the state in which the population or animals are endangered.

**121600 Quarantine, animals; area.**

If upon the investigation the department finds that rabies exists, a quarantine shall be declared against all animals as are designated in the quarantine order, and living within the area specified in the order.

**121605 Investigation.**

Following the order of quarantine the department shall make or cause to be made a thorough investigation as to the extent of the disease, the probable number of persons and animals exposed, and the area found to be involved.

**121610 Regulations in lieu of quarantine.**

The department may substitute for the quarantine order regulations as may be deemed adequate for the control of the disease in each area.

**121615 Duty to enforce.**

All peace officers and boards of health shall carry out the provisions of this chapter.

**121620 Power to destroy or detain animals.**

During the period for which any quarantine order is in force any officer may kill or in his or her discretion capture and hold for further action by the department any animal in a quarantine area, found on public highways, lands, and streets, or not held in restraint on private premises as specified in this chapter.

**121625 Power to enter and examine premises.**

Any proper official within the meaning of this chapter may examine and enter upon all private premises for the enforcement of this chapter.

**121630 Violation; punishment.**

Except as provided in Sections 121705 and 121710, every person who possesses or holds any animal in violation of the provisions of this chapter is guilty of an infraction, punishable by a fine not exceeding one thousand dollars (\$1,000).

**121635 Rabies treatment and eradication fund.**

For the purpose of providing funds to pay expenses incurred in connection with the eradication of rabies, the rabies treatment and eradication fund is continued in existence in each county or city in this state.

**121640 Dog license tax; deposit in fund; use for other purposes.**

All money collected for dog license taxes shall be deposited to the credit of this fund with the treasurer of the county or city; but funds now collected from any dog tax may continue to be collected and used for other purposes specified by local ordinances.

**121645 Special dog license tax.**

Upon the determination by the department that rabies exists in any county or city, a special dog license tax shall immediately become effective, unless a dog tax is already in force the funds from which are available for the payment of expenditures in accordance with this chapter.

**121650 Rate of special tax.**

This tax shall be levied as follows: An annual tax of one dollar and fifty cents (\$1.50) for each male, two dollars and fifty cents (\$2.50) for each female, and one dollar and fifty cents (\$1.50) for each neuter dog. It shall be collected by the proper authority at the same time and in the same manner as other taxes are collected; except that at the first collection the proportion of the annual tax as corresponds to the number of months the tax has been in operation plus one year advance payment shall be collected.

### **121655 Termination of special tax.**

After this dog license tax has been established in a county or city, it shall be continued in force until an order has been issued by the department declaring that county, or the portion of that county as may be deemed advisable, to be free from rabies or further danger of its spread.

### **121660 Disposition of fines.**

One half of all fines collected by any court or judge for violations of this chapter shall be placed to the credit of the rabies treatment and eradication fund of the county or city where the violation occurred.

### **121665 Special control measures.**

Whenever it becomes necessary in the judgment of the department, to enforce this chapter in any county or city, the department may institute special measures of control to supplement the efforts of the local authorities in any county or city whose duties are specified in this chapter.

### **121670 Expenditures; payment from fund.**

All expenditures incurred in enforcing the special measures shall be proper charges against the special fund referred to in this chapter, and shall be paid as they accrue by the proper authorities of each county or city where they have been incurred; but all expenditures that may be incurred after the issuance of the order establishing the tax and before the first collection of the tax, shall be paid as they accrue from the general fund of the county or city.

### **121675 Expenditures in excess of fund; payment from general fund; repayment.**

All expenditures in excess of the balance of money in this fund shall likewise be paid as they accrue from the general fund. All money thus expended from the general fund shall be repaid from the special fund when the collections from the tax have provided the money.

### **121680 Guide dogs for blind persons.**

Notwithstanding any other provision of this chapter a guide dog serving a blind master shall not be quarantined, in the absence of evidence that he or she has been exposed to rabies, unless his or her master fails: (a) To keep him or her safely confined to the premises of the master. (b) To keep him or her available for examination at all reasonable times.

**121685 Law enforcement agency dogs; quarantine after biting people; availability for examination; notice of abnormal behavior.**

Notwithstanding any other provision of this chapter, a dog used by any state, county, city, or city and county law enforcement agency shall not be quarantined after biting any person if the bite occurred while the dog was being used for any law enforcement purpose. The law enforcement agency shall make the dog available for examination at any reasonable time. The law enforcement agency shall notify the local health officer if the dog exhibits any abnormal behavior.

**121690 Regulation and control of dogs; maintenance of pound and rabies control programs; vaccination clinics; issuance of license, duration.**

In rabies areas, all of the following shall apply:

(a) Every dog owner, after his or her dog attains the age of four months, shall no less than once every two years secure a license for the dog as provided by ordinance of the responsible city, city and county, or county. License fees shall be fixed by the responsible city, city and county, or county, at an amount not to exceed limitations otherwise prescribed by state law or city, city and county, or county charter.

(b) Every dog owner, after his or her dog attains the age of four months, shall, at intervals of time not more often than once a year, as may be prescribed by the department, procure its vaccination by a licensed veterinarian with a canine antirabies vaccine approved by, and in a manner prescribed by the department.

(c) All dogs under four months of age shall be confined to the premises of, or kept under physical restraint by, the owner, keeper, or harbinger. Nothing in this chapter and Section 120435 shall be construed to prevent the sale or transportation of a puppy four months old or younger.

(d) Any dog in violation of this chapter and any additional provisions that may be prescribed by any local governing body, shall be impounded, as provided by local ordinance.

(e) It shall be the duty of the governing body of each city, city and county, or county to maintain or provide for the maintenance of a pound system and a rabies control program for the purpose of carrying out and enforcing this section.

(f) It shall be the responsibility of each city, county, or city and county to provide dog vaccination clinics, or to arrange for dog vaccination at clinics operated by veterinary groups or associations, held at strategic locations throughout each city, city and county, or county. The vaccination and licensing procedures may be combined as a single operation in the clinics. No charge in excess of the actual cost shall be made for any one vaccination at a clinic. No owner of a dog shall be



required to have his or her dog vaccinated at a public clinic if the owner elects to have the dog vaccinated by a licensed veterinarian of the owner's choice. All public clinics shall be required to operate under antiseptic immunization conditions comparable to those used in the vaccination of human beings.

(g) In addition to the authority provided in subdivision (a), the ordinance of the responsible city, city and county, or county may provide for the issuance of a license for a period not to exceed three years for dogs that have attained the age of 12 months or older and have been vaccinated against rabies. The person to whom the license is issued pursuant to this subdivision may choose a license period as established by the governing body of up to one, two, or three years. However, when issuing a license pursuant to this subdivision, the license period shall not extend beyond the remaining period of validity for the current rabies vaccination. A dog owner who complies with this subdivision shall be deemed to have complied with the requirements of subdivision (a).

#### **121695 Construction of chapter.**

Nothing in this chapter and Section 120435 is intended or shall be construed to limit the power of any city, city and county, or county in its authority in the exercise of its police power or in the exercise of its power under any other provisions of law to enact more stringent requirements, to regulate and control dogs within the boundaries of its jurisdiction.

#### **121700 Persons and firms to whom vaccines deliverable.**

121700. Rabies vaccines for animal use shall not be supplied to other than a veterinary biologic supply firm, a person licensed to practice veterinary medicine under Chapter 11 (commencing with Section 4800) of Division 2 of the Business and Professions Code, or a public agency.

#### **121705 Concealment of information; misdemeanor.**

121705. Any person who willfully conceals information about the location or ownership of an animal subject to rabies, that has bitten or otherwise exposed a person to rabies, with the intent to prevent the quarantine or isolation of that animal by the local health officer is guilty of a misdemeanor. Any person who violates this section is guilty of a misdemeanor.

#### **121710 Violation of isolation or quarantine order; misdemeanor; penalty.**

121710. Any person who, after notice, violates any order of a local health officer concerning the isolation or quarantine of an animal of a species subject to rabies, that has bitten or otherwise exposed a person to rabies or who, after that order, fails to produce the animal upon demand of the local health officer, is guilty of a misdemeanor, punishable by imprisonment in the county jail for a period not to

exceed one year, or by fine of not less than one hundred dollars (\$100), nor more than one thousand dollars (\$1,000)per day of violation, or by both fine and imprisonment.

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## **BITING ANIMALS**

Injuries to humans by biting animals are significant public health problem. Serious injury, viral and bacterial infections, psychological trauma, and even death can be complications of animal bites. The number of animal bites can be reduced if the public practices responsible pet ownership, by controlling stray animals, and by enforcement of animals control laws and ordinances.

Most animal bites wounds that come to the attention of medical and/or public health practitioners will consist of puncture wounds, scratches and abrasions. Severe attacks may produce crushing injuries to bones, especially in children. One of the most steps in preventing rabies and other infections following an animal bite is vigorously wash bite wounds with soap and water for 15 minutes. A tetanus booster is often given to previously immunized victims if more than 5 years have elapsed since the last administration. If no history of tetanus vaccination the individual is often vaccinated.

Young children are especially vulnerable to animal bites and should be properly protected. Rabies is a viral infection of the nervous system that may affect almost any warm-blooded animal. In Los Angeles County, this disease is commonly present in bats. About 10 percent of the bats tested by the health department have rabies. The last rabid skunk in Los Angeles County was detected in 1979. The last domestic animal with rabies was a cat which came from Mexico in 1987.

Man is usually exposed to rabies by direct contact (bites) with rabid wildlife or by contact with dogs or cats which have acquired the infection from rabid wildlife.

Although rabies is almost always fatal, vaccination is highly effective in preventing it. Control of rabies depends on public awareness of the signs and hazards of the disease, stringent enforcement of animal control regulations, and upon immunization of dogs and cats.

## **Common Questions**

### **When a known rabid animal bites a dog or a cat what should be done?**

Unvaccinated dogs and cats bitten by a known rabid animal should be destroyed immediately. If the owner is unwilling have this done, the animal should be vaccinated and placed in strict isolation for 180 days. If the dog or cat has been vaccinated within one year, it should be revaccinated immediately, quarantined

for 30 days and then restrained by the owner (leashing and confinement) for an additional 60 days.

### **When a dog or cat bites a person what should be done?**

Unvaccinated and vaccinated dogs and cats that bite a person, must be quarantined for 10 days. If the dog or cat was infective at the time of the bite, sign of rabies in the animal will usually follow rather quickly and certainly within 10 days.

### **When a wild animal is involved in an attack on a person what should be done?**

The animal should be euthanized immediately and the head should be submitted to the lab for rabies testing.

### **When a person has been exposed to a rabid animal what should be done?**

The person should contact their physician and explain the situation. If the physician feels that the person is at risk of contracting rabies, he/she will begin anti-rabies treatments on the person.

### **Who should be treated for rabies?**

Person who are bitten by, or have significant exposure to the saliva or nervous tissue of a confirmed rabid animal should begin treatment as soon as possible. Persons exposed to a suspected rabid animal should begin treatment, if the animal is not available for quarantine or testing.

### **What is the treatment for a person exposed to a rabid animal?**

The person is given rabies vaccines and rabies immunoglobulin. The rabies vaccine and anti-serum in current use have excellent safety records and when given early are highly effective. The immunoglobulin is called the Human Anti-Rabies Immunoglobulin or HRIG (dosage depends on weight) given on day 0. The rabies vaccine is given on day 0, 3, 7, 14, and 28.

Since the chances of developing the disease are much greater than the chances of adverse reaction to the vaccine, anti-rabies treatment should be administered in all cases of known or uncertain exposure.

### **What is the most important measure in preventing infection of an animal bite?**

Immediate and thorough washing of any bite or scratch wound with soap and water. Simple local wound cleaning has been shown to markedly reduce the

likelihood of rabies in animal experiments. Tetanus and antibiotic prophylaxis should be given as indicated.

### **Investigation of Animal Bites**

All animal bites must be investigated in California. In general, data on the biting animal, the victim, the circumstances of the bite, the name of the animal's owner (if any), and the rabies vaccination status of the biting animal should be collected. The circumstances of the bite are especially important for determining if the bite was provoked. Provoked bites are considered to be of lower rabies risk, all things being equal, than an unprovoked bite.

A rapid investigation of the bite should be completed in order to identify and capture, if possible, the biting animal and to determine whether rabies post-exposure prophylaxis for the victim is needed.

Although the bites of rodents, rabbits, etc. are at extremely low risk for transmitting rabies, such bites still need to be attended to in order to prevent infections with other diseases.

### **Management of Animals that Bite People**

A healthy dog, cat, or ferret that bites a person should be confined and observed for 10 days; it is recommended that rabies vaccine not be administered during the observation period. Such animals should be evaluated by a public health veterinarian at the first sign of illness during confinement. Any illness in the animal should be reported immediately to the local health department. (Los Angeles County Veterinary Public Health: 323-730-3723) If signs suggestive of rabies develop, the animal should be euthanized, its head removed, and the head shipped under refrigeration (not frozen) for examination of the brain by a qualified laboratory designated by the local or state health department. All biting animals which might have exposed a person to rabies should be reported immediately to the local health department. Prior vaccination of an animal may not preclude the necessity for euthanasia and testing if the period of virus shedding is unknown for that species. Management of animals other than dogs, cats, and ferrets depends on the species, the circumstances of the bite, the epidemiology of rabies in the area, and the biting animal's history, current health status, and potential for exposure to rabies.

For legal authority see [Los Angeles County law](#) and [California law](#).

### **Evaluation of Encounters with Rabies Suspects**

When a person or domestic animal has encountered a potentially rabid animal, an evaluation is necessary to determine: 1) whether a true exposure occurred;

and 2) whether the potentially rabid animal should be quarantined or tested for rabies.

### **Has a true exposure occurred?**

Encounters with a rabid animal can lead to rabies transmission when virus from the animal's saliva, brain tissue, or spinal fluid enters open cuts or wounds in skin or mucous membranes. Therefore, not every encounter with a rabid animal is a true exposure requiring intervention. Treatment is often provided unnecessarily to people who have encountered but had no true exposure to a potentially rabid animal.

**Bite exposure** is considered any penetration of the skin by an animal's teeth. Local wound care should be performed immediately on anyone bitten by an animal. A health care provider should be consulted to determine whether or not other measures are necessary. Animal bites are reportable in California.

**Non-bite exposures** include any scratches, abrasions, or contamination of mucous membranes by an infected animal's saliva, brain tissue, or spinal fluid. Other types of contacts (such as with the blood, urine, feces, or fur of an animal) would not by themselves be considered exposures capable of transmitting rabies even if the animal were known to be rabid. The virus is not hardy; once dry, saliva containing rabies virus is considered non-infectious.

### **If a true exposure occurred, should the potentially rabid animal be quarantined or be tested?**

Whether to a) quarantine or to b) test an animal depends on the type of animal involved. These guidelines are derived from the Advisory Committee on Immunizations Practices (ACIP) and the recommendations of National Association of State Public Health Veterinarians.

**Dogs and cats:** A dog (excluding dog-wolf hybrids) or cat that has bitten, scratched, or otherwise exposed a human should be confined and observed for **10 days** under local health department supervision, regardless of whether or not the animal is currently vaccinated. Any dog or cat that is sick at the time it exposed a human should be evaluated by a veterinarian immediately.

In most places in Los Angeles County, such an animal can be confined at home by its owner. *Rabies vaccination should not be administered to the animal during this period.* If the confined animal develops any illness during the 10 days, a veterinarian should evaluate it immediately.

If signs of rabies are present, the local health department should be contacted, and the animal euthanized and tested for rabies. A dog or cat that develops no

signs of rabies during this observation period did not have *transmissible* rabies at the time the exposure occurred.

Note that the 10 day observation applies only to dogs or cats that have exposed a human. Quarantine periods for animals that have themselves been potentially exposed to rabies are much longer.

**All other animals:** All other animals that expose humans should be reported to the local health department immediately. No observation periods have been established for such animals (including wolf hybrids). If the animal is available, laboratory testing may be indicated depending upon the circumstances of the exposure (such as whether it was provoked or not) and the species involved. The risks associated with different animals varies from place to place.

**Bats:** A bat that bites or otherwise exposes a human should be safely captured, euthanized, and submitted to the Public Health Laboratories (PHL) for rabies testing..

Determining whether an exposure to a rabid bat occurred is often difficult. Bats are small and have small teeth, so their bites may be difficult to recognize. Exposure may have taken place when there is reasonable probability that such contact unknowingly occurred (e.g., a sleeping person awakes to find a bat in the room or an adult witnesses a bat in the room with a previously unattended child, mentally disabled or intoxicated person, or incompletely vaccinated pet). When available the bat should be tested immediately. The presence of a bat inside a building is not by itself sufficient to result in rabies transmission.

### **If an unvaccinated animal is bitten by a rabid animal what should be done?**

When the exposed animal is unvaccinated, euthanasia is recommended. Alternatively, the owner has the option of arranging for a 6-month strict confinement. Confinement must be strict because of the special public health risks associated with these animals (i.e., those potentially incubating rabies), and the need to prevent human and other animal exposures from occurring should rabies symptoms develop.

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## **SUBMISSION OF ANIMALS FOR RABIES TESTING**

When the decision is made either to euthanize an animal or submit a dead animal for rabies examination, several procedures must be followed to obtain quick and accurate results. Many times rabies prophylaxis of an individual is dependent on these results. Contact Los Angeles County Veterinary Public Health (323-730-3723) for information on appropriate sample handling and to

arrange for specimen pick-up. The rabies specimens will be transported to the Public Health Laboratory.

### **Animals that bite humans**

#### *Wild carnivores & bats*

In California, wildlife account for close to 99% of the rabid animals. Any wild carnivore that bites a person should be immediately tested for rabies. The four most common terrestrial reservoir species harboring rabies in the U.S. are: raccoons, skunks, foxes and coyotes. In addition to these terrestrial, indigenous rabid bats have been found in every state except Hawaii.

#### *Healthy cats and dogs*

A healthy dog, cat, or ferret that bites a person should be confined and observed for 10 days. Such animals should be evaluated by a veterinarian at the first sign of illness during confinement. If signs suggestive of rabies develop, the animal should be euthanized, its head removed, and the head shipped under refrigeration (not frozen) for examination of the brain by the Public Health Laboratory.

### **Collection and submission of animal specimens for rabies testing**

This information is supplied to facilitate the handling and to provide the most accurate and rapid diagnosis of specimens submitted for rabies testing. The Public Health Laboratory accepts specimens for rabies testing from private veterinarians or animal shelters who adhere to the following guidelines.

A. Listed below are animals that will be tested for rabies.

1. Domestic mammals that bite/expose humans (except fully-vaccinated dogs, cats, and caged animals raised indoors).
2. All wild carnivores that bite humans. Signs of rabies in wildlife cannot be interpreted reliably.
3. All bats should be tested regardless of human exposure. The bite of a bat is so minuscule that often the individual is not aware of it. Also, because rabies is endemic in bats, we test them for surveillance purposes to determine the prevalence of bat rabies.
4. Ill animals with signs of rabies.

B. Listed below are animals that will NOT be accepted for rabies testing:

1. Cage raised pets will NOT be tested. These include all gerbils, guinea pigs, and hamsters.
2. Rodents and rabbits will NOT be tested, except when a Veterinary Public Health Veterinarian deems that extraordinary circumstances exist which indicate rabies infection is likely.
3. Baby bats submitted with the mother will NOT be tested regardless of exposure history. Only the mother will be tested if an exposure has occurred.
4. No live animals will be accepted for testing.

### **Guidelines to Ensure Proper Rabies Testing of Specimens**

1. Avoid damage to the brain by shooting or other traumatizing procedures.
2. Have a qualified person separate the suspect animal's head from the body immediately after death. Submit only the head of the animal.
3. If only the brain is submitted rather than the entire head, be sure to include parts of the cerebellum, hippocampus, and brain stem. Specimens that do not include at least two of these three areas of the brain will be considered unsatisfactory due to a lack of sufficient material. DO NOT FORMALIN FIX BRAIN TISSUE.
4. Pour chloroform over the specimen or use flea spay in sufficient quantity to kill any fleas which may be present. Wrap the specimen in several layers of newspaper. Place wrapped specimen in a plastic bag, seal the bag and attach completed lab transmittal form to the outside of the plastic bag. Place this entire package inside a second plastic bag to protect the lab slip. Seal the bag.
5. Keep the head refrigerated until time to deliver to the laboratory. Do not freeze.
6. Brains submitted from larger animals such as livestock nominally should include labeled portions from the hippocampus, cerebral cortex, cerebellum and brain stem from both sides of the brain.
7. Bats should be submitted whole.

### **Routine and emergency laboratory processing of rabies specimens**

The processing of rabies specimens is performed daily. Results are telephoned or faxed to the submitter. Positive results are also telephoned to Acute Communicable Disease Control (ACD) and Veterinary Public Health.

#### **Routine Processing:**



Processing is initiated on all specimens submitted to the laboratory by 1:00 p.m. of that day, smears are made and fixed overnight for direct immunofluorescent antibody (IFA) staining the following morning. Results are ready before noon of the day following submission.

### **Emergency Processing:**

Specimens deemed to be of an emergent nature are processed including staining on the same day of submission. These results are ready within six hours of specimen receipt in the laboratory. Special arrangements must be made for emergency testing by contacting Veterinary Public Health (323-730-3723) before the laboratory can proceed with testing. All IFA results done by six hour fixation are considered to be preliminary, therefore retesting of brain material will be performed on the next regular laboratory work day, using slides that had at least an overnight fixation.

## **Questions on Laboratory Testing for Rabies**

### **What animals will be tested by the Public Health Laboratory (PHL)?**

In general, the following animals will be tested.

1. Mammals that bite/expose humans (except fully-vaccinated dogs, cats, ferrets, and caged animals raised indoors).
2. Ill animals with signs of rabies.
3. All bats.

### **What test is performed for rabies at the Public Health Laboratory (PHL)?**

The test of choice for detecting rabies in animals is the direct immunofluorescent antibody (IFA) test. A slide containing fresh brain tissue is reacted with fluorescein labeled anti-rabies virus antibody. When viewed under a fluorescence microscope, rabies virus antigen will fluoresce. *Any animal excreting virus in its saliva should have detectable virus in its brain.*

### **What types of specimens are required for IFA testing?**

Rabies IFA testing requires fresh, unfixed brain tissue.

### **What does PHL accept for testing?**

No living animal will be accepted for rabies testing. For testing of bats, the entire animal should be sent to the PHL. For other species, just the animal's head and upper neck should be submitted.

**Euthanizing a bat that needs to be tested:** Captured bats should be euthanized before being shipped to the PHL. Many local veterinarians or animal shelters can safely and humanely euthanize bats.

### **Who should remove the head for testing?**

Because the brain, spinal cord, salivary glands, and saliva may contain rabies virus, only veterinarians, animal control officers, or others who have been appropriately trained (and adequately vaccinated) should remove animal heads. This work should be done in a properly ventilated area using adequate protective gear.

### **How should specimens be shipped to the PHL?**

Wrap the specimen in several layers of newspaper. Place wrapped specimen in a plastic bag, seal the bag and attach completed lab transmittal form to the outside of the plastic bag. Place this entire package inside a second plastic bag to protect the lab slip. Seal the bag. Keep the head refrigerated until time to deliver to the laboratory.

### **What are the possible outcomes of the testing?**

Rabies IFA testing at the PHL can result in the following outcomes:

**Positive:** A "positive" specimen is one in which rabies virus antigens have been detected. Any animal with a confirmed positive rabies IFA test is considered capable of transmitting rabies. The IFA test is highly specific for rabies (other diseases do not cause a positive test).

**Negative:** A "negative" specimen is one in which adequate brain tissue was examined yet no rabies antigens were detected. A negative IFA test performed with an adequate specimen reliably rules out the possibility that the animal tested was capable of transmitting rabies.

**Unsatisfactory:** An "unsatisfactory" test is one in which the specimen submitted was inadequate for testing.

In addition, non-specific or indeterminate fluorescence patterns are found rarely. In such instances, additional studies will be performed.

### **What is the turnaround time for test results?**

Processing is initiated on all specimens submitted to the laboratory by 1:00 p.m. of that day, smears are made and fixed overnight for IFA staining the following morning. Results are ready before noon of the day following submission.

## How are the test results disseminated?

Results are telephoned or faxed to the submitter. Positive results are also telephoned to Acute Communicable Disease Control (ACD) and Veterinary Public Health.

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## QUARANTINES

**QUARANTINE INTERNATIONAL:** CDC regulates the importation of dogs and cats into the United States, but current PHS regulations (42 CFR No. 71.51) governing the importation of such animals are insufficient to prevent the introduction of rabid animals into the country. All dogs and cats imported from countries with endemic rabies should be currently vaccinated against rabies as recommended in this Compendium. The appropriate public health official of the state of destination should be notified within 72 hours of any unvaccinated dog or cat imported into his or her jurisdiction. The conditional admission of such animals into the United States is subject to state and local laws governing rabies. Failure to comply with these requirements should be promptly reported to the Division of Quarantine, CDC, 404-639-8107.

**INTERSTATE:** Prior to interstate movement, dogs, cats, and ferrets should be currently vaccinated against rabies.

### Los Angeles County

#### 11.04.210 Confinement of biting animals -- Procedure generally.

The biting animal shall be quarantined, confined and observed for at least 14 days (dogs and cats, 10 days) after the day of infliction of the bite, with the exception that the following alternative to the 10-day isolation of dogs and cats is permitted: dogs or cats which have been isolated in strict confinement, under proper care and under observation of a licensed veterinarian, in a pound, veterinary hospital or other adequate facility, in a manner approved by the local health officer, may be released from isolation by the local health officer after five days of veterinary observation if, upon conducting a thorough physical examination on the fifth day or more after infliction of the bite, the observing veterinarian certifies that there are no clinical signs or symptoms of any disease. (Ord. 10728 § 1 (part), 1973; Ord. 7583 Part 2 § 219, 1959.)

#### 11.04.220 Confinement of biting animals -- Alternate procedures.

A. The quarantine described in Section 11.04.210 may be made on the property of the person having charge, custody or control of such animal when adequate quarantine facilities are available; or, at the discretion of the director, such animal

may be placed under quarantine and observation in any licensed boarding kennel.

B. Should the animal be relinquished by the owner to the director to be disposed of upon release from quarantine, the director may, at his discretion, impound such animal in an approved animal control facility. (Ord. 10728 § 1 (part), 1973; Ord. 7583 Part 2 § 220, 1959.)

#### **11.04.225 Fee for Confinement of Biting Animals.**

A. Under the conditions described in subsection B of this section, the county shall recover a fee of \$50.00 for the costs incurred by the department in the confinement of a biting animal as described in Sections 11.04.200, 11.04.210 and 11.04.220. The county shall also recover any related costs, including care and feeding of the confined animal, and any reasonable costs that it may incur in connection with the collection of such fees.

B. The fee shall be assessed when:

1. The director or his designee confines an animal described in Section 11.04.200 on the owner or custodian's premises and the victim of the bite is not the owner or custodian of the animal; and
2. The victim was not engaged in an illegal activity against the person or on the property of the owner or custodian.

C. Notwithstanding the above, the fee shall not be assessed when the animal is a police dog or guide dog as defined in California Health and Safety Code Sections 1919 and 1919.1.

D. The director or his designee may waive, in full or in part, the above fee, if necessary to accomplish the protection of animal or public health, safety or welfare. (Ord. 93-0055 §11, 1993.)

#### **11.04.230 Owner of biting animal -- Report required -- Examination of confined animal.**

Whenever the owner or person having charge, custody or control of any animal observes or learns that such animal has bitten or otherwise exposed a human being, such owner or person having charge, custody or control of such animal shall report the incident at once to the director and shall confine such animal in an enclosure, or shall securely hold and restrain said animal, by chain or other device, for examination and observation by the director. No owner or person having charge, custody or control of such animal shall fail, refuse or neglect to allow the director to make an inspection or examination of such animal for the

purpose of determining whether such animal has symptoms of rabies. (Ord. 10728 § 3 (part), 1973: Ord. 7583 Part 2 § 221, 1959.)

**11.04.240 Owner of biting animal: Quarantine requirements - Examination of dead animal.**

No owner or person having charge, custody or control of any animal biting or otherwise exposing a human being shall fail, refuse or neglect to confine in an enclosure, or securely hold and restrain such animal by chain or other device, upon the premises of the owner or person having charge, custody or control of such animal, for the period of quarantine as shown in Section 11.04.210. Should such animal die while under quarantine and observation, the owner or person having charge, custody or control of such animal shall surrender the carcass of such animal or such portion of the carcass as may be demanded by the director. (Ord. 10728 § 3 (part), 1973: Ord. 7583 Part 2 § 222, 1959.)

**11.04.250 Destroying quarantined animal prohibited -- Exception.**

It is unlawful for any owner or person having charge, custody or control of any animal that has bitten or otherwise exposed a human being or is suspected of having rabies to destroy such animal, or have such animal destroyed, during the quarantine period, unless permission is granted by the director. (Ord. 10728 § 3 (part), 1973: Ord. 7583 Part 2 § 223, 1959.)

**11.04.260 Suspected rabid animals -- Owner report and confinement duty.**

Whenever the owner or person having charge, custody or control of any animal learns or observes that such animal has shown symptoms of rabies or has acted in a manner which would give said person or owner reason to believe that said animal has rabies, it shall be unlawful for such owner or person having charge, custody or control of such animal to fail, refuse or neglect to notify the director at once and to confine such animal in an enclosure, or to securely hold and restrain such animal by chain or other device until it shall be established that such animal does not have symptoms of rabies, or to fail, refuse or neglect to allow the director to inspect or examine such animal for symptoms of rabies. (Ord. 10728 § 3 (part), 1973: Ord. 7583 Part 2 § 224, 1959.)

**11.04.270 Quarantine of animals coming in contact with rabid animals.**

Animal contacts of a known rabid or suspected rabid animal shall be quarantined in a place and manner, and for a period of time, designated by the director. (Ord. 10728 § 3 (part), 1973: Ord. 7583 Part 2 § 225, 1959.)

**California**

**121580 Quarantine defined.**

"Quarantine," as used in this chapter, means the strict confinement, upon the private premises of the owner, under restraint by leash, closed cage, or paddock, of all animals specified in the order of the department.

**121600 Quarantine, animals; area.**

If upon the investigation the department finds that rabies exists, a quarantine shall be declared against all animals as are designated in the quarantine order, and living within the area specified in the order.

**121605 Investigation.**

Following the order of quarantine the department shall make or cause to be made a thorough investigation as to the extent of the disease, the probable number of persons and animals exposed, and the area found to be involved.

**121610 Regulations in lieu of quarantine.**

The department may substitute for the quarantine order regulations as may be deemed adequate for the control of the disease in each area.

**121615 Duty to enforce.**

All peace officers and boards of health shall carry out the provisions of this chapter.

**121620 Power to destroy or detain animals.**

During the period for which any quarantine order is in force any officer may kill or in his or her discretion capture and hold for further action by the department any animal in a quarantine area, found on public highways, lands, and streets, or not held in restraint on private premises as specified in this chapter.

**121625 Power to enter and examine premises.**

Any proper official within the meaning of this chapter may examine and enter upon all private premises for the enforcement of this chapter.

**121630 Violation; punishment.**

Except as provided in Sections 121705 and 121710, every person who possesses or holds any animal in violation of the provisions of this chapter is guilty of an infraction, punishable by a fine not exceeding one thousand dollars (\$1,000).

**Quarantine Guidelines for Biting Animals**

One essential component of effective rabies control is the management of dogs and cats known to or suspected to have been exposed to rabid (or suspect rabid) animal, or to have bitten or exposed a person. Based upon the circumstances involved in the bite and the vaccination status of the animal involved, one of the following quarantine plans will be required at the discretion of the animal control officer involved.

#### **QUARANTINE PLANS:**

**Close Observation** the animal is kept on owner's premises and the owner shall be informed of potential rabies. The owner shall be required to notify enforcing agency of unusual behavior or change in health status of pet.

**Strict Confinement** the animal shall be kept on designated property - in the house, garage, or other escape-proof building or enclosure approved by the local director of health. The animal shall be leash-walked under immediate control of an adult on property designated for confinement. The owner shall be informed of potential rabies and given instructions in writing. The owner is required to notify immediately enforcing agency of unusual behavior or change in health status of pet.

**Quarantine** Animal shall be confined off owner's property in a designated facility, i.e., animal shelter, veterinary hospital or qualified commercial kennel. Strict quarantine on owner premises shall be possible at discretion of animal control.

In case of death of quarantined animal, contact local animal control or health official. **DO NOT DISPOSE OF ANIMAL!**

Facility used for quarantine shall be verifiable (i.e., subject to unannounced periodic spot checks).

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## **Los Angeles County Animal Care & Control**

### **Laws, Services & Programs**

#### **PET LAWS**

##### **Licensing (10.20.190)**

Dogs four months of age and older must be currently licensed. Licenses are available through the LA County Department of Animal Care & Control and are valid for a one-year period from July 1 through June 30. Licenses not renewed by June 30 of each year are subject to a \$20 penalty. Dogs are required to be vaccinated against rabies for the entire licensing period. Vaccinations are

provided at low cost rabies clinics held locally every year in July or from a veterinarian. Reduced license fees are offered when the dog has been spayed or neutered. A Certificate of Sterility and rabies vaccination certificate must be presented when purchasing a license. For information on low cost spaying and neutering, contact your private veterinarian.

### **The Leash Law (10.32.010)**

Prohibits dogs from running at large on any public street, park or other public areas or upon private property other than that of the dog owner. A dog must be restrained by a substantial leash not exceeding six feet and be in the control of a competent person when off property.

### **Cat Registration**

Cat licensing is made available through the L.A. County Department of Animal Care & Control for \$10 for unaltered cats and only \$5 for spayed or neutered cats. Registration includes tag which is connected to the County's 24-Hour Lost Pet Hotline. Although cat registration is strictly voluntary, every cat deserves the protection a tag provides.

### **Dogs in Open Vehicles (Vehicle Code Sec. 23117)**

It is illegal to transport any dog in or on the back or bed of any open trucks or other open vehicle while traveling on any county road, street, highway, land or alley. Exception: Dogs may be transported if each animal is cross-tethered securely or the side of the open vehicles are built up to a height of 46 inches (3110ff).

### **Nuisances (10.40.060)**

Animal defecation on public property or upon private property other than the owner's property is prohibited.

### **Barking (10.40.065)**

Animal noises which disturb the peace, quiet and comfort of any residential neighborhood prohibited. Complaints may be registered with animal control.

## **Most Frequently Asked Questions...**

### **What should I do if I see an injured animal?**

Call your local animal control agency immediately or the Police, who will call the animal control agency. For your safety and to prevent further injury to the animal, do not attempt to move it.



### **What should I do if someone is bitten by a dog?**

Immediately after caring for the wound, contact the County Health Department Rabies Control Section (323-730-3723). If the biting dog is a stray and the owner is not known, your local animal control agency should also be called.

### **What should do if I see a wild animal on my property?**

If a wild animal comes onto your property or if you see one that is injured, contact your local animal control agency immediately. Do not approach the animal.

### **What should I do If I find a lost pet?**

If the dog or cat has a license or an ID tag, you can call the phone number listed on the tag to make contact with the owner. If you cannot contact the owner or if the animal is not wearing a tag, the law requires that you turn in the animal to the animal control agency that serves the area where you found the animal, so that the owner will have a better chance of finding his or her lost pet. many well-meaning people keep lost pets at their homes, not realizing the animal's owner is looking for the stray pet at the animal shelter.

### **When and how should I look for my lost pet?**

If your pet is wearing a current license of ID tag, animal control will make every effort to notify you and reunite you with your pet. Be sure to visit your local animal shelter to look for your lost pet. Be sure to check all areas of the shelter and ask about any injured animals that may have been taken to a veterinarian or that were picked up dead off the street. Be sure to leave information about your lost pet on the shelter's lost/found bulletin board...bring a current photo, if you have one.

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## **VACCINATION OF ANIMALS**

In California, all dogs four months or older are required to be vaccinated for rabies. It is also recommended that cats be vaccinated for rabies. It is neither economically feasible nor justified from a public health standpoint to vaccinate all livestock against rabies. However, consideration should be given to the vaccination of livestock, especially animals that are particularly valuable and/or may have frequent contact with humans beings.

The control of rabies among wildlife reservoirs is difficult. There are no approved vaccines for wildlife. Because of the risk of rabies in wild animals (especially raccoons, skunks, coyotes, foxes, and bats), it is strongly recommend they not be kept as pets. Vaccination of free-ranging wildlife or selective population

reduction may be useful in some situations, but the success of such procedures depends on the circumstances surrounding each rabies outbreak. This is done with various baits and has been used in Texas and on the east coast.

Captive wildlife and zoo animals not completely excluded from all contact with rabies vectors can become infected. Moreover, wild animals may be incubating rabies when initially captured; therefore, wild-caught animals susceptible to rabies should be quarantined for a minimum of 180 days before exhibition. Employees who work with animals at such facilities should receive pre-exposure rabies immunization. The use of pre- or post-exposure rabies immunizations of employees who work with animals at such facilities may reduce the need for euthanasia of captive animals.

### **Domestic Animal Rabies Vaccination:**

**Rabies Vaccine Administration (HSC 121690, 121700):** Animal rabies vaccine may be administered only by a California-licensed veterinarian, or by veterinary technicians under the direct supervision (ie. veterinarian on premise) of a California-licensed veterinarian. This policy serves to assure the public that the animal has been properly vaccinated. In addition, the sale of animal rabies vaccines is restricted to licensed veterinarians or government agencies conducting rabies control programs.

**Accidental Human Exposure to Rabies Vaccine:** Accidental inoculation may occur during administration of an animal rabies vaccine. Such exposure to inactivated rabies vaccine represents no rabies hazard. Human rabies has not resulted from exposure to licensed modified live virus vaccine in this country. Currently, no modified live virus products are licensed for use in the United States.

**Canine Rabies Vaccination (HSC 121690, 17 CCR 2606.4):** The owner of every dog over the age of four months shall ensure that his or her pet is currently vaccinated for rabies by a licensed veterinarian and secure a license for the pet as provided by local city or county ordinance.

By 30 days post-primary immunization, a peak rabies antibody level is achieved. At this time, the animal can be considered immunized. Dogs less than four months of age must be confined at home or kept under close leash supervision by the owner. Dogs over four months of age entering the State must be accompanied by a current rabies vaccination certificate.

Regardless of the age of the animal at primary immunization, a second rabies vaccination should be given one year later, and the three year booster schedule followed thereafter.

**Canine Rabies Vaccines Approved for Use in CA (17 CCR 2650):** Only canine rabies vaccines licensed by USDA and approved by the Department of Health Services can be used in the California Rabies Control Program (see Part III of the compendium).

**Route of Inoculation:** Unless otherwise specified on the product label or package insert, all canine rabies vaccines must be administered intramuscularly at one site in the thigh. Subcutaneous administration of IMRAB 3, RABVAC 3, DEFENSOR 3, and RABDOMUN just behind the upper shoulder is approved according to the package insert. For species other than the domestic dog, refer to the vaccine label.

**Livestock Rabies Vaccination** There are limited economic or public health justifications to vaccinate all livestock against rabies. However, vaccination of horses and livestock should be considered in areas where wildlife rabies is highly endemic, especially for valuable animals, for horses kept in boarding stables or racetracks, or for other animals having frequent contact with humans.

**Wildlife Vaccination and "Hybrids":** Vaccination of non-domestic animals or wildlife is not routinely recommended since no rabies vaccine is licensed for use in animal species other than dogs, cats, cattle, horses, sheep, and ferrets in the United States. The effectiveness of rabies vaccination in other species including domestic-wild animal hybrids is unknown. Because of their susceptibility to rabies, wild or nondomestic carnivores, and bats should not be kept as pets. Newly imported exhibit animals that are susceptible to rabies should be quarantined for at least 180 days. Such wild animals may be incubating rabies when captured. Due to the special rabies risk, the trapping, transport, sale or exchange of skunks in California is prohibited. Certain carnivore and bat species representing a high risk for rabies may not enter California without an import permit from the Department of Health Services.

Vaccination of the offspring of domestic dogs or cats bred to wild animals (e.g., wolf hybrids, civet-cat hybrids) and their subsequent generations may afford some rabies protection to the animal. However, no rabies vaccine is currently licensed for use in wild animals or in wild-domestic animal hybrids. Complete rabies vaccine challenge and viral shedding studies have not been conducted with these animals. Vaccination of these animals is considered an extra label use of a biologic. There is no definitive evidence that the vaccine is effective in these animals.

State law does not prohibit the use of canine rabies vaccines in domestic dog-wolf hybrids. However, it is illegal to license these animals **as dogs** under the California Rabies Control Program. A rabies vaccine certificate issued for a vaccinated hybrid must identify the animal as a "wolf hybrid." Local jurisdictions are free to institute wolf hybrid licensing programs and issue such licenses in order to identify these animals in the community. Canine or feline hybrids

previously rabies vaccinated cannot be recognized as "rabies immunized" in the event of a human bite or contact with a rabid or suspect rabid animal. The hybrid will be considered a "wild animal" under these circumstances, and managed accordingly.

**Canine Licensing and Vaccination Procedure (17 CCR 2606.4):** The vaccination of all dogs four months of age or older is a prerequisite to licensing. Completion of the licensing procedure consists of issuing a license tag or vaccination tag bearing the license data only after presentation of a current valid official rabies vaccination certificate. Official rabies vaccination certificates must show the following:

(a) Name, address and phone number of the dog's owner; (b) description of the dog, including breed, color, age, and sex; (c) date of immunization; (d) type of rabies vaccine administered; (e) name of the manufacturer, product, and lot number of the rabies vaccine used.

Each certificate must bear the signature of the veterinarian administering the vaccination or a signature authorized by him or her. The certificate must be stamped, printed or typed with the vaccinating veterinarian's name, address and telephone number.

**Rabies Immunization Exemptions:** A rabies immunization exemption may be issued by the local health officer upon the written recommendation of a California-licensed veterinarian where illness or a veterinary medical condition in a dog warrants. The exempted animal shall be maintained in strict rabies quarantine, under conditions that are at the discretion of the local health officer, until such time as the medical condition has resolved, and the animal can be rabies immunized.

**"Actual Cost" Rabies Vaccination Clinics (HSC 121690):** Each city, city and county, or county shall provide or arrange for canine rabies vaccination clinics in the community. No charge in excess of actual cost may be made for vaccination administration. The current Department of Health Services approved "Actual Cost" vaccination fee is \$5.00.

### **Feline Rabies:**

Cats are now the most frequently reported domestic rabid animals in the United States. Because of the rabies risk to cats and their owners, feline rabies vaccination is strongly recommended for ALL cats. An approved feline triennial rabies vaccine should be administered at three months of age (four months of age in unincorporated areas of Los Angeles County), twelve months later, and every 36 months thereafter. (See Part III of the Compendium). Feline licensing and identification programs at the local level are strongly endorsed by VPHS.

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## RABIES PROPHYLAXIS OF PEOPLE

Persons can be protected against rabies through a vaccine -- the vaccine which is currently being used is Rabies Human Diploid Cell Vaccine (HDCV). The pre-exposure series can be given intradermally (ID) or intramuscularly (IM). The post-exposure series must be given intramuscularly.

Rabies vaccine is a sterile, stable, inactivated cell-culture rabies vaccine for human use by injection. The vaccine is derived from material that is grown in rabbit brain. It is refined and cultured with the Human Diploid Cell strain to create the vaccine.

Pre-exposure Vaccine should be given to high-risk groups so that these individuals do have some protection if they come in contact with an infected animal. This group includes:

Veterinarians (a large animal practice probably provides more risk than a small animal clinic), animal handlers, certain lab workers, persons living in countries where rabies is a threat, and persons who work with potentially rabid animals -- zoo keepers, trappers, etc..

There are three doses of pre-exposure vaccine given IM or ID on Day 0, Day 7, and Day 21 or 28. The administration of the inactivated rabies vaccine stimulates rapid production of specific antibodies. In pre-exposure trials involving more than 2,000 volunteers, at least 99% of the recipients developed antibodies after 3 injections over a four-week period. Serological testing (or titers of the antibodies in the blood that can fight rabies virus), is performed 3 weeks after the pre-exposure series of HDCV or after a primary post-exposure series to ensure that antibodies to rabies have been acquired.

Booster doses of Vaccine are recommended every two years for those individuals who continue to be at increased risk of contracting rabies and whose rabies antibody titer is less than 1:5. Repeat booster doses increase the risk of allergic reaction to rabies vaccine by 6%. Therefore, a titer is recommended prior to receiving a booster dose of rabies HDCV vaccine. If the titer is 1:5 or greater, a booster dose is not indicated. A titer should be repeated again in two years.

Post-exposure vaccine is given to individuals who have exposure to rabies virus through bites of an infected animal, through abrasions, etc. The number of doses required is determined by the previous immunization status of an individual.

An immunized person is "any person who has received a complete intramuscular (IM) or intradermal (ID) pre-exposure or intramuscular post-exposure series of human diploid cell rabies vaccine regardless of follow-up serology, or a person

who has received a pre-exposure or post-exposure regimen of any rabies vaccine administered by IM or ID who has had a rabies antibody titer of 1:5 or greater at any time in the past".

An unimmunized person will be given a series of five total injections of IM HDCV on Day 0, 3, 7, 14 and 28 of the exposure. In addition, rabies immune globulin (RIG) will be given according to your weight on Day 0. This injection will provide some protection from the virus, while the antibodies to the vaccine are being produced.

**Rabies Post-exposure Prophylaxis:** The essential components of rabies post-exposure prophylaxis are immediate local wound treatment and the administration of both Human Rabies Immune Globulin (HRIG) and rabies vaccine. Persons who are bitten by, or have significant exposure to the saliva or nervous system tissue of a confirmed rabid animal should begin treatment as soon as possible (within 24 hours of exposure). Persons so exposed to a suspected rabid animal should begin treatment if rabies testing on the animal is not immediately available.

Post-exposure prophylaxis should not be denied due to a prolonged time interval between exposure and starting treatment. There have been many instances in which treatment was not begun until many months after exposure due to delays in recognition of the exposure. Incubation periods well in excess of one year have been reported.

**Local Treatment of Wounds:** Immediate and thorough washing of any bite or scratch wound with soap and water may be the most important measure in preventing rabies. Simple local wound cleaning has been shown to markedly reduce the likelihood of rabies in animal experiments. Tetanus and antibiotic prophylaxis should be given as indicated.

**Active Immunization - Vaccine:** Either Rabies Vaccine Adsorbed (RVA) or Human Diploid Cell Vaccine (HDCV) is administered in conjunction with HRIG at the beginning of post-exposure treatment. A regimen of five 1-ml doses of RVA or HDCV is given intramuscularly. The first dose should be given as soon as possible following an exposure. The other doses are given on days 3, 7, 14 and 28 after the first dose. Vaccine should always be administered by the IM route in the lateral deltoid area. For children, intramuscular administration in the anterolateral aspect of the thigh is acceptable. Rabies vaccine should never be administered in the gluteal region. Administration in the gluteal area may result in lower or inadequate neutralizing antibody titers.

Post-exposure rabies prophylaxis should always include both vaccine and HRIG except in persons who have previously received complete prophylaxis regimens (pre- or post-exposure prophylaxis) with a cell culture vaccine, or persons previously vaccinated with other types of vaccine that have had documented

protective rabies antibody titers. These persons should immediately receive a 1-ml booster vaccination of RVA or HDCV administered intramuscularly, and a second booster three days later.

Because antibody response in persons receiving post-exposure prophylaxis has been universally satisfactory, post-treatment serological testing is not routinely recommended. Serology testing may be indicated in unusual circumstances, as when the patient is known to be immunosuppressed. Immunosuppressive agents should not be administered during post-exposure prophylaxis unless essential for the treatment of other conditions. Acute Communicable Disease Control (213-240-7941) may be contacted for recommendations in these cases.

### **Passive Immunization - HRIG:**

HRIG is given only once at the beginning of treatment to provide immediate antibodies while active immunization from vaccination is developing. If HRIG is not given with the first dose of vaccine, it can be given through the seventh day following administration of the first vaccine dose. Beyond the seventh day, an active immune response is presumed to have occurred. HRIG should be administered at a dose of 20 IU/kg body weight for all age groups. No more than the recommended dose should be used due to a potential partial suppression of active immunization by HRIG. If anatomically feasible, the full dose should be infiltrated in the area around the wound. Any remaining HRIG is administered intramuscularly at a site distant from vaccination administration. HRIG should never be administered in the same syringe or at the same anatomical site as vaccine.

The combination of HRIG and vaccine is recommended for both bite and non-bite exposures regardless of the interval between exposure and initiation of treatment.

**Pre-exposure Prophylaxis:** In California, pre-exposure vaccination should be offered to persons at increased risk of rabies exposure. This "frequent risk" category includes veterinarians, animal handlers, animal control officers, laboratory workers, and persons traveling to and spending time (e.g., >1 month) in foreign countries where canine rabies is endemic. Pre-exposure vaccination should be considered for other persons whose vocations or avocations bring them into frequent contact with potentially rabid dogs, cats, skunks, bats or other species at risk of having rabies.

Pre-exposure vaccination for persons at risk has several potential advantages. Most importantly, it may protect persons with unrecognized exposures to rabies. Second, it simplifies and saves money on required treatment following a rabies exposure by eliminating the need for HRIG and decreasing the number of vaccine doses to be given. Finally, pre-exposure vaccination may protect persons exposed in areas where immunizing products are not available, carry a

high risk of adverse reactions, or where treatment may be delayed (e.g., travelers).

### **Primary Preexposure Vaccination:**

**Intramuscular Primary Immunization:** Three 1.0 ml injections of HDCV or RVA should be given intramuscularly in the lateral deltoid on days 0, 7, and 21. Development of antibodies in patients vaccinated using this regimen has been 100% successful in several studies conducted. Based on results of these studies, routine post-primary immunization serological testing is not necessary except for persons suspected of being immunosuppressed. Persons who are immunosuppressed due to medication or illness should postpone preexposure vaccination if possible. Immunosuppressed persons who are at risk of rabies exposure can be vaccinated and should have their antibody titers checked.

**Intradermal Primary Immunization:** Three 0.1 ml intradermal injections of HDCV have also been recommended as an alternative to the intramuscular primary immunization regimen. Intradermal (ID) injections of IMOVAXR- ID are accurately administered over the lateral deltoid region on days 0, 7 and 21 or 28. The 1.0 ml HDCV vial is not approved for multi-dose ID use and should not be administered in this way. RVA is not to be given by the ID route.

Chloroquine phosphate and related antimalarial drugs (e.g., mefloquine) used for malaria chemoprophylaxis may interfere with the antibody response to HDCV. HDCV should not be administered by the intradermal route to persons receiving such drugs for malaria chemoprophylaxis. For further information, please refer to the Recommendations on Rabies Prevention published by the Advisory Committee on Immunization Practices [MMWR January 8, 1999;48(RR-1):1-21].

### **Booster Vaccination:**

Persons classified as having "frequent risk" for rabies exposure include rabies diagnostic laboratory workers, spelunkers, veterinarians and their staff, animal control officers, wildlife officers and international travelers visiting areas where canine rabies is endemic. Such persons should receive pre-exposure immunization and have a serum sample tested for rabies antibody every two years. If the titer is less than complete neutralization at 1:8 by the Rapid Fluorescent Focus Inhibition Test (RFFIT), the person should receive a booster dose of rabies vaccine. Alternatively, a booster can be administered in lieu of titer determination. Two commercial sources for RFFIT testing are currently (December 2002) available at a cost of approximately \$25.00 - \$30.00 per sample:

**Instructions for submission of samples are available by calling the numbers below:**



Department of Veterinary Diagnostics, Veterinary Clinical Science Building,  
Kansas State University, (785) 532-4483

Department of Pathobiology, Virology Lab, 261 Greene Hall, Auburn University,  
(334) 844-2659

Atlanta Health Associates, Inc., (770) 205-9091

Maryland State Rabies Lab, Maryland Department of Health, (410) 767-6177

### **Rabies Immunizing Products Available in the United States:**

**Human Rabies Vaccine** Produces an active immune response including production of neutralizing antibodies. This antibody develops in approximately 7-10 days and usually persists for at least 2 years.

**Human Diploid Cell Vaccine (HDCV) - Intramuscular (IMOVAX) and Intradermal (IMOVAX I.D.)** HDCV is prepared from the Pitman-Moore rabies virus strain grown in MRC-5 human diploid cell culture. The vaccine is concentrated by ultrafiltration and inactivated with beta propiolactone. IMOVAX and IMOVAX I.D. are distributed by Aventis Pasteur, Inc. [(800) VAC-CINE {822-2463}].

**Intramuscular (IM) administration:** A single dose vial containing lyophilized vaccine (IMOVAX) that is reconstituted with diluent to a volume of 1.0 ml just before administration. The average wholesale price for IMOVAX as of 1/1/2000 is approximately \$151 per dose.

**Intradermal (ID) Administration:** A single dose syringe containing lyophilized vaccine (IMOVAX I.D.) that is reconstituted to a volume of 0.1 ml just before administration. The average wholesale price for IMOVAX I.D. as of 1/1/2000 is approximately \$91 per dose.

**Rabies Vaccine Adsorbed (RVA).** RVA is prepared from the Kissling strain of Challenge Virus Standard rabies virus adapted to fetal rhesus lung diploid cell culture. The vaccine is inactivated with betapropiolactone and concentrated by adsorption to aluminum phosphate to form a final 1.0 ml liquid dose. RVA is manufactured and distributed by Bioport Corporation, Phone (517) 327-1500. The average wholesale price for RVA as of 1/1/2000 is approximately \$138 per dose.

The two types of vaccine are considered equally efficacious and safe when used as indicated. The 1.0 ml dose of either RVA or IMOVAX can be used for both pre-exposure and post-exposure prophylaxis. Imovax<sup>R</sup> I.D. has been approved for intradermal administration for pre-exposure vaccination only, and is not to be

used in post-exposure rabies prophylaxis. The intramuscular dose (IMOVAX) should NOT be split into multiple doses for intradermal administration.

The safety and efficacy of RVA administered by the intradermal route has not been studied; therefore, RVA is not to be used intradermally.

**Rabies Immune Globulin - Human:** Provides immediate passive immunity that persists only a short time (half-life of approximately 21 days).

**BayRab, IMOGRAM®** Human rabies immune globulin (HRIG) is available from Bayer Corporation, Pharmaceutical Division, Biological Products (Bayrab), phone (800) 288-8370; and from Aventis Pasteur, Ince (Imogam Rabies HT) phone (800) VAC-CINE or (800) 822-2463.

HRIG is an antirabies gamma globulin concentrated by cold ethanol fractionation from plasma of hyperimmunized human donors. Rabies neutralizing antibody content is standardized to 150 international units (IU) per ml. HRIG is supplied in 2-ml and 10-ml vials for pediatric and adult use, respectively. The average wholesale price for Bayrab as of 1/1/2000 is approximately \$750 per 10 ml vial, and \$168 per 2 ml vial. The average wholesale price for IMOGRAM as of 1/1/2000 is approximately \$775 per 10 ml vial, and \$155 per 2 ml vial.

Both HRIG preparations are considered equally efficacious and safe when used as indicated.

Adverse Reactions to Rabies Immunizing Products:

**Human Diploid Cell Rabies Vaccine:** Reactions after vaccination with HDCV and RVA are less serious and common than with previously available vaccines. Local reactions such as pain, erythema, and swelling or itching at the injection site were reported in 30-70 percent of patients receiving a three dose post-exposure regimen of HDCV. Mild systemic reactions such as headache, nausea, abdominal pain, muscle aches, and dizziness have been reported in 5-50 percent of recipients. Anaphylactic, encephalitic or neuromuscular events are extremely rare, but have been reported.

An "immune complex-like" reaction occurs in approximately 6% of persons receiving booster doses of HDCV. The illness, characterized by onset 2-21 days postbooster, presents with a generalized urticaria and may also include arthralgia, arthritis, angioedema, nausea, vomiting, fever, and malaise. In no cases were the illnesses life-threatening. This reaction occurs much less frequently in persons receiving primary immunization. The reaction appears to be associated with the presence of betapropiolactone-altered human serum albumin in HDCV and the development of IgE to this allergen.

**Rabies Immune Globulin, Human:** Local pain and low-grade fever may follow receipt of HRIG. Although not reported specifically for HRIG, angioneurotic edema, nephrotic syndrome, and anaphylaxis have been reported after injections of immune globulin (IG). These reactions have occurred predominantly in persons receiving large and frequent doses of IG for various dysgammaglobulinemias. These reactions occur so rarely that the causal relationship between IG and these reactions is not clear.

There is no evidence that hepatitis B virus, human immunodeficiency virus or other viruses have ever been transmitted by commercially available HRIG in the United States.

### **Management of Adverse Reactions:**

Once initiated, rabies prophylaxis should not be interrupted or discontinued because of local or mild systemic adverse reactions to rabies vaccine. Usually such reactions can be successfully managed with non-steroidal anti-inflammatory and antipyretic agents (ibuprofen or acetaminophen, for example). For more severe reactions, consideration should be given to switching from one product to another.

When a person with a history of hypersensitivity must be given rabies vaccines, antihistamines may be given; epinephrine should be readily available to counteract anaphylactic reactions, and the person should be carefully observed immediately after immunization.

Systemic anaphylactic or neuroparalytic reactions occurring during the administration of rabies vaccines, though rare, pose a serious dilemma for the attending physician. A patient's risk of developing rabies must be carefully considered before deciding to discontinue vaccination. Moreover, the use of corticosteroids in the treatment of life-threatening neuroparalytic reactions carries the risk of inhibiting the development of active immunity to rabies. It is especially important in these cases that the serum of the patients be tested for rabies antibodies following vaccination.

All serious systemic neuroparalytic or anaphylactic reactions to a rabies vaccine should be immediately reported to the Division of Communicable Disease Control, California Department of Health Services (510) 540-2566 during working hours or (510) 540-2308 at other times, or the Division of Viral and Rickettsial Diseases, Center for Infectious Diseases, CDC ([404] 639-1050 during working hours, or [404] 639-2888 at other times).

### **References:**

Rabies Prevention - United States, 1999. Recommendations of the Immunizations Practices Advisory Committee (ACIP). MMWR January 8, 1999;48(RR-1):1-21.

California Department of Health Services Division of Communicable Disease Control Veterinary Public Health Section (916) 327-0332 January, 2003

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## **VICIOUS DOGS**

Both the County and City of Los Angeles have ordinances to control vicious dogs. Other municipalities also have ordinances on vicious dogs. We enforce the County code. The City defines a dangerous animal as an animal that poses the potential to attack another animal or person. A vicious animal is an animal that has attacked another animal or person.

### **Los Angeles County Title 11 - Health and Safety**

#### **Chapter 11.04 Communicable Disease Control - Part 2. Rabies Control and Vicious Animals**

##### **11.04.280 Vicious animals -- Identification procedure -- Confinement requirements.**

A. It shall be the duty of the director, upon receipt of an affidavit from any person who has been bitten by an animal or from a person who has witnessed such an occurrence, to investigate and, upon reasonable indication of the animal's viciousness, to notify the owner or custodian of such animal, in writing, to keep such animal at all times confined strictly to the premises of said owner or custodian in such a manner that the animal may not do bodily harm to any person having legitimate reason to be upon the premises of said owner or custodian.

B. Permanent Quarantine. After the receipt by the owner or custodian of such animal of the notice as provided in subsection A of this section, the owner or custodian shall at all times thereafter keep such animal, or cause such animal to be kept, on the property or premises where such owner or custodian resides, in the manner specified in subsection A above. Such animal shall not be moved from the place of quarantine or disposed of in any manner without the permission of the director, and in the event of the death of the animal, the carcass of the animal shall be surrendered by the owner or custodian to the director on demand, as proof of the death of the animal. (Ord. 10728 § 2 (part), 1973: Ord. 7583 Part 2 § 226, 1959.)

#### **11.04.290 Vicious animals -- Appeal from quarantine requirement -- Hearing procedures.**

Any person whose animal has been declared vicious and placed on permanent quarantine may petition the director for a hearing. Such a petition shall be in writing, signed by the applicant, and shall set forth in detail the facts and reasons upon which his petition is based. If the director finds that the facts upon which he based his order of quarantine no longer exist, he shall rescind the quarantine. Otherwise, he shall set the matter for a public hearing not less than 60 days after the filing of the petition and, in writing, either by registered or certified mail, postage prepaid, or in the manner required for the service of summons in civil actions, not less than five days prior to the hearing, notify the applicant of the time and place thereof.

The director shall give the petitioner and all other persons who desire to be heard an opportunity to testify and to present any relevant facts. The director may place any witness under oath. The director, when he deems it necessary, may continue the hearing at any time and shall give notice thereof at the hearing or as required when the matter is first set for hearing. At the close of the hearing or within 10 days thereafter, from the evidence presented, the director shall determine the facts and shall take the action required thereby, continue the quarantine, set aside the quarantine, or such other action as is required by law under the facts. He may notify the petitioner at the close of the hearing as to his ruling if the petitioner is present, either in person or by counsel. Otherwise, he shall notify the petitioner of his action by a notice in writing served by first class mail, postage repaid, or in the manner required for the service summons in a civil action. (Ord. 10728 § 4, 1973; Ord. 7583 Part 2 § 227, 1959.)

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### **HOW TO AVOID RABIES**

1. Have your pets vaccinated. Any pet that comes in contact with wild animals is at risk.
2. Since rabies in this country is primarily a disease of wildlife, an important element of rabies prevention is avoiding wild animals. Do not feed or handle wild animals, especially those that appear aggressive or sick.
3. Bats are the animal most likely to be rabid in Los Angeles County. Bat proof your home. Bats should be excluded from houses and adjacent structures. Such structures should then be made bat-proof by sealing entrances used by bats. Bats should not be captured, handled, or kept as pets.

4. It is illegal to keep skunks, raccoons, coyotes, foxes, or bats as pets in California. Never keep wild animals as pets. California law prohibits the importation of any such animals into the state.
  5. Pre-exposure vaccine is recommended for travelers planning to be more than 30 days in an area of the world where rabies is a constant threat.
  6. Immunization is also recommended for individuals whose occupations or activities place them at frequent risk of exposure. These include hunters, forest rangers, taxidermists, laboratory workers, stock breeders, veterinarians, spelunkers and slaughterhouse workers.
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### **HOW TO AVOID DOG BITES**

1. The most important thing is to learn how to avoid dog bites. Typical warning signs of unfriendly dogs are a) snarling or a stiff stance b) ears laid back and fur on back standing up.
2. Train your dog not to bite. Train your dog to obey simple commands (sit, stay, come, no).
3. Don't play aggressive games like wrestling or tug-of-war with your dog.
4. Don't leave children unattended with dogs. More than ½ of the bites involve children under 12.
5. Talk to your children about avoiding strange dogs and growling dogs.
6. Teach children not to take food and toys away from dogs.
7. Don't run past a dog. They naturally love to chase and catch things. More attacks are seen with joggers and people out walking.
8. Some people carry a stick when walking to protect themselves from dogs.
9. If dogs are fighting don't try to break up by hand. Spray with water, yell at or make loud noises.
10. Senior citizens are also at increased risk of dog bites. It is more difficult for them to move away due to arthritis, weak muscles and poor eyesight.
11. Obey leash laws. Dogs on a public street, park or other property must be restrained by a leash.

12. Neuter your dog, as neutered dogs are less likely to bite.

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## **DOGBITES - LOS ANGELES TIMES**

**Los Angeles Times - Valley Section** October 12, 1998 p. B1

### **Man's Best Friend a Worst Nightmare**

**Pets:** 'Land sharks,' dogs bred for protection or fighting, are blamed for rise in attacks on humans. Southland in particular favors aggressive breeds. By MARTHA L. WILLMAN, Times Staff Writer

ENCINO--All across America, and particularly in Southern California, there is a growing epidemic of "land sharks"--vicious dogs ready to pounce on the next human that looks them in the eye, some animal workers contend.

More than likely, the unsuspecting human is a child, even an infant.

The causes are twofold, the professionals say: More people are selecting household pets for protection rather than companionship, and illegal dog fighting is spreading.

"We have an affinity here in Southern California for large, aggressive breeds of dogs that is unparalleled anywhere else in the nation," said Gini Barrett, director of the American Humane Assn.'s Western regional office in Encino. "Crimes and a fear of crimes is a part of our culture."

Statistics are incomplete, but the issue was a major subject last week at a conference in Anaheim of 700 animal protection professionals. The largest conference of its kind in the nation, it was called "to start to educate the public about the realities of the dog bite problem and to start to explain to the public the things they can do to protect their children," Barrett said.

"It's rampant, but because we haven't been talking about it, [dog bite] victims feel that they are the only ones," Barrett said. "This is actually happening everywhere."

A survey by the Centers for Disease Control and Prevention in Atlanta concludes that dogs bite nearly 2% of the U.S. population--more than 4.7 million people--annually. The survey also found that 304 people in the United States, mostly children, died as a result of dog attacks from 1979 through 1996, including 30 in California.

Animal workers attribute the apparent rise in incidents, in part, to a mushrooming industry of breeders--totally apart from the show dog variety--working to develop muscular dogs with powerful jaws, used for illegal dog fighting.

"Breeders are breeding these land sharks for fighting," said Dan Knapp, general manager of the Los Angeles Department of Animal Services. The pups that don't make it into the fighting pits often wind up in households or in homeless packs roaming the streets, he said.

Most alarming, Knapp added, is that many of the fighting dogs now being bred show none of the warning signs--such as snarling or a stiff stance--typically displayed by a dog before it attacks.

"These dogs are impervious to pain and give no warning," Knapp said. "Consequently, you don't know what will trigger them."

Barrett, a five-year member of the city Animal Regulation Commission, said sample surveys of dogs at city shelters indicate 40% to 45% are pit bulls or pit bull mixes and 20% stem from Rottweiler or chow breeds--the most popular mixes for fighting dogs.

In response to growing complaints, the Los Angeles City Council in April urged officials to expand efforts to stop dog fighting. But local and state officials say they lack the personnel and resources to stem its growth.

"There are literally hundreds of dogs out there that pose a real danger to children," said Frank Andrews, director of the county's Department of Animal Care and Control. The department in July formed a nine-member "safety squad" to round up packs of dogs throughout the county. "If we stay with it for a year, we should make a dent in some of the problem," Andrews said.

Animal workers, law enforcement agencies and educators are beginning to work together to combat the problem. The Anaheim conference launched a drive to educate parents, teachers and pet owners about steps that can be taken to prevent and avoid bites.

Insurance companies, hit with what they say are large increases in claims stemming from dog bites, have launched their own attack, with some charging a premium or refusing to issue homeowners policies to those who keep potentially dangerous dogs.

The Insurance Information Institute reports that about a third of all homeowner claims involve dog bites.

The number of dog bite injuries dwarfs the reported cases of mumps, measles and whooping cough combined, said Dr. Jeffrey Sacks of the CDC, who has



called for a nationwide prevention effort similar to those that have virtually wiped out those previously common childhood diseases.

In an eight-year span ending in 1994--the most recent year for which the CDC compiled such information--the number of dog bites requiring medical attention increased 37%. In 1994 alone, more than 800,000 dog bites nationwide required medical attention, according to the CDC study.

Statistics on dog bites in Los Angeles County have not been kept since 1995 because of lack of funding, county health department officials said. However, the county in June issued a public health warning about dog attacks.

"It is becoming a major health issue here," said Dr. Patrick Ryan, the county's chief of veterinary health. He attributes much of the problem to closer contact between people and dogs and the inability of many people to properly train their pets.

"A lot of people think it's macho to have an animal that bites." Ryan said. "They don't want a wimp for a dog."

Los Angeles Police Department officials report aggressive dogs are increasingly being used by criminals. In the first 10 months this year, 43% of all police shootings involved dogs, up from 30% in 1997 and 8.8% in 1993, according to the department.

Firm statistics are sketchy nationally, because bites occurring in the household often are not reported and because many areas lack agencies to collect the data, said Martha Armstrong, a vice president for companion animals of the Humane Society of the United States.

Erick Navarro, a 6-year-old Panorama City boy, was mauled by a pit bull in March, requiring surgery to close a dozen bites on the back of his head, neck and shoulder. He was walking along a Pacoima neighborhood street with his 83-year-old baby sitter when he was suddenly attacked by the 80-pound unneutered dog.

The baby sitter, Guadalupe Molina, and Victor Panos, a 16-year-old neighbor, also were bitten after they lifted the injured boy onto the roof of a car to prevent further attack.

The dog's owner said the animal was "riled up" from playing roughly with an adult. Animal control officials ordered the dog destroyed. Its owner was allowed to keep her Chihuahua, but was banned from owning any other dogs in the city for the next three years.

Erick's mother, Raquel Navarro, said her son often wakes up screaming in the night, dreaming that he is being attacked by a pack of dogs. Whenever he sees one, he grabs the hand of his 4-year-old sister and scrambles to climb with her on top of any object. He undergoes 30 minutes of private counseling once a week at school.

On Friday, Erick will undergo plastic surgery to eliminate the scars on his neck and head. "He is very afraid of every kind of dog," his mother said, "even those Chihuahua ones." Times staff writer Richard Marosi contributed to this story.

## **Animal Safety**

Animal workers say there is a nationwide outbreak of dog bites. A survey by the national Centers for Disease Control and Prevention in Atlanta concludes that dogs bite nearly 2% of the U.S. population-more than 4.7 million people annually. A particularly dangerous combination: fighting dogs and small children.

### **Facts:**

In the U.S. from 1979 through 1988, dog attacks claimed an average of an average of 15 human lives annually.

From 1979 to 1996, 304 people in the U.S died from dog attacks, including 30 in California.

Most deaths occurred in children

### **Breeds involved in most attacks**

\* Pit Bulls \* Rottweilers \* German Sheperds \* Chows

### **Preventing Animal Bites**

July and August--when most kids are enjoying summer vacation and people are more likely to let their dogs outside--are the peak months for dog bites, according to the American Humane Assn.

Each year about 20,000 people are bitten by dogs in Los Angeles County, compared with about 4.5 million nationally. Of the 585,000 bites that required medical attention nationally in one year, 64% of the victims were children.

Cats bite nearly 400,000 people nationwide, annually. Boys are more likely to be bitten by dogs; girls are more likely to be bitten by cats.

### **Warning signs from dogs**

Ears laid back Fur on back standing up

Snarling with teeth showing

Barking and growling

Legs stiff

Tail up

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## FREQUENTLY ASKED QUESTIONS ABOUT BATS

### **What are bats?**

Bats are the only flying mammals. They have well-furred bodies with naked, transparent wings. Their wings are a membrane spread across elongated arm bones and fingers. An average wingspread is six inches. They also have tail membranes. Some species can fly distances up to 200 miles. To start flying, a bat drops from its perch. If it is on the ground it usually crawls to some height until it can drop into the air.

### **What is the most abundant bat in North America?**

The little brown bat which weight about ½ ounce and 3 ½ inches long when full grown. It huts insects in the air and while crawling on the ground may catch beetles, crickets and other insects.

### **We have all heard the old saying, "*Blind as a bat.*" How blind are bats?**

All bats can see, some see better than us. Some tropical, nectar feeding bats have very large eyes that enable them to see flowers and fruit at night. In most bats, vision and smell are the predominant senses. Many bats are able to detect objects as thin as human hair in total darkness. They have a sophisticated echolocation system. These bats emit high-frequency sounds that bounce back to their ears, enabling them to detect objects in total darkness.

### **How do bats hunt for food?**

Several bats communicate and navigate with high-frequency sounds. Hunting bats may detect prey by echolocation. While flying, bats emit a continuous series of supersonic sounds through their nose or open mouth. The sounds bounce off objects and are picked up by the bats' sensitive ears. Using sound alone, these

bats "see" everything but color, and in total darkness can detect objects as small as mosquitoes which they feed on.

### **Are bats solitary animals?**

No. Most bats are highly social and live in colonies. Sexual cycles are synchronized and most mating occurs over a period of a few weeks.

### **Where are bats during the day?**

During the day bats sleep in trees, rock crevices, caves, and buildings. Bats are nocturnal (active at night), leaving daytime roosts at dusk. Upon leaving their roost, bat fly to a stream, pond, or lake where they dip their lower jaw into the water while still in flight and take a drink. After drinking bats forage for insects.

### **When is the best time to see bats?**

Bats are seen a dawn and dusk or can be detected by the presence of their feces, which readily disintegrate into tiny, shiny fragments of insect pieces. Mouse droppings, in contrast, remain formed.

### **What do bats in the United States eat?**

With the exception of three species of nectar-feeding bats that live along the Mexican border of Arizona and Texas, all bats in the United States and Canada are insectivorous. Worldwide, bats are the major predators of night-flying insects such as mosquitoes. Some bats can catch up to 600 mosquitoes in an hour and consume their weight in insects in one night.

### **What part of the world do most bats live?**

The majority of bats inhabit tropical forests. About 70% of bats eat insects and many tropical species feed exclusively on fruit or nectar. A few are carnivorous, hunting small vertebrates, such as fish, frogs, mice, and birds.

### **How many species of bats are in the United States and Canada?**

Some 40 species live in the United States and Canada. Worldwide there are 900 species of bats.

### **Where do most bats live in the United States?**

Bats can be found living in almost any conceivable shelter, though they are best known for living in caves. Many species have adapted to living in buildings as their natural habitat has been destroyed.

### **How many offspring does a female bat have in a year?**

Bats, for their size, are the slowest reproducing mammals on earth. On average, a female bat rears only one young yearly. Most bats that live in the United States mate in the fall just before entering hibernation. The young have reached adult size by three months of age.

### **How old do bats live to be?**

Bats are long-lived with a life-span of over 20 years.

### **What is the most effective control method for bats?**

The only effective control method is exclusion. Effective bat proofing requires placement of fine mesh over entry and exit sites, so that the netting serves as a one-way exit or by caulking.

### **Where do bats enter buildings?**

Bat colonies living in buildings often enter through predictable routes. Any space as large as a quarter of an inch wide by an inch and a half or more long is a possibility. Close inspection of suspected entry points usually will reveal brown stains from body oils where the bats squeeze in and out and possibly a few mouse-like droppings adhering to the building just below.

### **Are there vampire bats that suck your blood?**

There are only three species of vampire bats that live in Central and South America. They do not suck blood, instead they make a small incision with their razor sharp teeth and then lap up the blood.

### **Do bats carry rabies?**

Yes, rabid bats have been found in every state except Hawaii. Bats are the animal most likely to be rabid in Los Angeles County. About 10% of the bats tested by the Los Angeles County Department of Health Services have rabies. However most bats tested by the Department of Health Services are sick.

### **How can the risk of bat rabies be reduced?**

Avoiding bats is essential to reducing the risk of rabies in humans. Bats should not be picked up or otherwise handled.

Remember, bats are very beneficial by nightly eating their weight in insects. They prey on several species of pest insects including wasps, mosquitoes, and moths.

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## **BATPROOFING YOUR HOUSE**

Individual bats occasionally enter buildings accidentally, particularly during the spring and fall as they move between roosts. However, groups of bats may also establish colonies in houses or other buildings. Bats are nocturnal animals. They may be found in dark areas such as attics, basements, closets or unlit shelters. Seeing a bat outdoors during the day is unusual and could be a sign that it is ill.

A simple way to tell if your house has bats is, at dusk, to watch for bats flying out of your house. If you see bats, note where they are leaving the house. They will return to the same openings at dawn. Bats can be kept out of buildings by closing openings that allow them entry. The only permanent way to get rid of a bat colony is to exclude them from the building by plugging their entrance holes (bat proofing). After you have established where the bats are exiting and entering the building, seal all openings (as small as 1/4" wide) the bats are using.

Bats play an important role in our ecosystem. For example the average bat is estimated to eat its weight in insects every night. It is neither practical nor desirable to eliminate bats from the environment. In Los Angeles County, bats are the most common source of rabies and avoiding bats is essential to reducing the risk of rabies in humans. Bats should not be picked up or otherwise handled.

There are various pest control businesses that are able to batproof your house and several "how to" booklets.

See websites:

[Batproofing - Rabies Prevention in Washington State: A Guide for Practitioners](#)

[Bat Conservation International](#)

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## **ANIMAL CONTROL AGENCIES AND HUMANE SOCIETIES**

### **IN LOS ANGELES COUNTY**