

Rabies Prevention in **Oklahoma**

Guidelines for the Management of Animal Bite incidents and Possible Rabies Exposures in Humans and Animals

2005 Edition



Communicable Disease Division
Oklahoma State Department of Health
1000 NE 10th Street
Oklahoma City, OK 73117
<http://www.health.state.ok.us>



TABLE OF CONTENTS

Introduction	1
I. Rabies Biology, Transmission, and Pathogenesis	2
Animal Diseases that Resemble Rabies	4
II. Animal Rabies Cases In Oklahoma: A Statistical Overview	6
III. Management of Animals that Bite Humans	7
Dog, Cat, or Ferret	7
Wolf-dog Hybrids	8
Domesticated Livestock and Owned Exotic Animals	9
Wild Animals	10
IV. Submission of Samples to the State Public Health Laboratory for Rabies Testing	11
V. Human Exposure Assessment and the Decision for Antirabies Treatment	14
Type of Exposure	14
Type of Animal Involved in Bite Incident	15
Circumstances of Biting Incident and Vaccination Status of Exposing Animal	17
Epidemiology of Rabies in Geographical Locale	18
VI. Rabies Immunizations for Humans	19
Currently Licensed Rabies Immunizing Products (USA)	19
Rabies Postexposure Prophylaxis (PEP)	20
Preexposure Prophylaxis for Persons at High Risk for Rabies	
Exposure	22
Serologic Testing	23
Adverse Reactions to Rabies Biologics	25
VII. Management of Animals Exposed to a Rabid Animal	26
VIII. Text of Oklahoma State Department of Health Zoonotic Disease Control Rules, OAC Title 310, Chapter 599	27

Appendix:

Figure 1.	Distribution of Major Terrestrial Reservoirs of Rabies in the U.S.
Table 1T.	Incidence of Terrestrial Animal Rabies by County, 1990 -1999
Table 1B.	Incidence of Bat Rabies by County, 1990 - 1999
Figure 2.	Rabies Laboratory Form (ODH Form 460)
Figure 3.	Animal Bite Algorithm for Animal Control Personnel
Figure 4.	Rabies Exposure Assessment Algorithm for Health Care Providers
Table 2.	Contacts and Information for Animal-Related Questions
Table 3.	Phone Numbers for County Health Departments

INTRODUCTION

Rabies as a disease was described and recorded by Democritus as early as 500 B.C.. The rabies virus is a lyssavirus in the genus Rhabdovirus. “Lyssa” is the Greek word for madness, and for most of antiquity, rabies has been associated with “mad dogs” and the potential encephalopathy that could ensue in a person if bitten by a rabid dog. There are few diseases today that can still produce such fear and anxiety as rabies. Most of us retain a very vivid recollection of the sequence of events that befell “Ol’ Yeller” in the classic Disney movie of the same name.

Rabies still remains a zoonotic threat today, but tremendous advancements in rabies research, animal disease surveillance, stray animal control programs, and rabies immunizing products have greatly reduced the incidence of human rabies in the United States. Between 1995 and 2004, there were an average of 3 human cases of rabies reported annually in the U.S. compared to an average of 22 cases in 1950.

This manual is a compilation of educational materials developed by the Communicable Disease Division of the Oklahoma State Department of Health to assist persons charged with the control of rabies in Oklahoma and health care professionals with human exposure assessment and prophylaxis. The guidelines are based on the 1999 Advisory Committee on Immunization Practices (ACIP) for Human Rabies Prevention—United States, the most recent edition of the Compendium of Animal Rabies Control published annually by the National Association of State Public Health Veterinarians, and other peer-reviewed publications. All portions of this manual and other information pertaining to rabies are also available from our web site at www.health.state.ok.us/program/cdd. Our intent is to dispel common misconceptions about rabies and transform unnecessary anxiety about this disease into practical and effective preventive strategies for rabies.

Kristy K. Bradley, D.V.M., M.P.H., Dipl. ACVPM
State Public Health Veterinarian, Oklahoma
May 25, 2005

I. RABIES BIOLOGY, TRANSMISSION, AND PATHOGENESIS

A. Rabies Virus and Properties

The rabies virus is an RNA virus and a rhabdovirus of the genus Lyssavirus. A lipoprotein envelope surrounds the helical-shaped core of the virion. Spike-like projections of G protein are imbedded into the lipid envelope. Monoclonal antibody typing and PCR techniques can differentiate between different strains of the virus associated with different animal reservoirs and geographical regions. [Refer to Figure 1 in Appendix.] The virus is immediately inactivated when dried and does not survive for any appreciable time in the environment.

B. Transmission

The most likely mode of transmission for the rabies virus is by introduction of saliva containing virus into a bite wound. Rabies transmission can also occur if saliva or central nervous system tissue from a rabid animal contacts a fresh wound or mucous membrane lining (eyes, nose, mouth, genitalia). Aerosol transmission of the virus has occurred under unusual circumstances in bat caves or laboratories where high concentrations of aerosolized virus were present in a confined area. A few human infections have also resulted from the transplantation of infected corneas and solid organs.

C. Definition of “Exposure”

For a true exposure to rabies to have occurred, saliva, cerebrospinal fluid (CSF) or brain tissue from a rabid animal must have contacted a fresh bite wound or the lining of the eyes, nose, or mouth. Contact with blood, urine, feces, or milk from an animal does NOT constitute an exposure because none of these substances have been shown to contain the rabies virus. Similarly, just being in the vicinity of a rabid animal or touching the fur is not an exposure. A scratch from a claw alone is not considered a potential exposure to rabies.

D. Pathogenesis

When rabies virus has been introduced into a wound or onto a mucous membrane, multiplication of the virus at the site of inoculation is the first step that must occur. The virus must then gain access to the peripheral nervous system to migrate and ascend to the central nervous system.

E. Susceptibility

All mammals are capable of being infected with rabies, but there are varying degrees of susceptibility between different types of mammals. For example, foxes, coyotes, wolves, skunks, bats, cats, and cattle are considered highly susceptible to rabies. However, some animals are very resistant to infection with the virus, and these animals are considered at low risk for rabies virus infection. Laboratory research has demonstrated the dose of rabies virus required to cause disease in opossums is 50,000 times that needed to infect a fox.

F. Incubation Period

The incubation period is the time interval between exposure to the virus and onset of the first symptoms of disease. The length of the incubation period is determined by several factors including dose of virus, site of virus deposition, age of animal, and many other host factors.

Typical Range of Rabies Incubation Period by Species

Cats	3-8 weeks
Dogs	3-8 weeks
Ferrets	3-10 weeks
Cattle	2-12 weeks
Horses	3-8 weeks
Skunks	5-20 weeks
Humans	4-12 weeks

G. Symptoms of Rabies

In animals, the symptoms of rabies are variable but generally take on one of two forms. In the furious form, the animal is easily over-excited or angered. Animals in this stage of rabies will often charge and bite at other animals or inanimate objects. Persistent vocalization may also be observed. In the dumb form, the rabid animal looks very withdrawn and may stumble as if lame or incoordinated.

In human beings, the early signs of rabies are often headache, fever, malaise, and apprehension. Numbness or sensory irritation is often experienced at the site of a preceding animal-bite wound. Excitability and aerophobia are also frequent symptoms. The disease then progresses to paresis or paralysis, delirium, and seizures. Death is generally the result of respiratory paralysis. Once symptoms of rabies have begun, there is no effective treatment or cure.

H. Infectious Period (Period of Communicability)

The time during which a rabid animal is shedding virus in its saliva and is therefore capable of transmitting rabies to another animal or person is the infectious period. Since virus must be inhabiting the brain before it can be excreted in the saliva, most rabid animals are infectious just a few days before the onset of noticeable symptoms and during the course of the disease. In dogs and cats, communicability is usually 3-7 days before the onset of symptoms (rarely over 4 days) and until the death of the animal. In studies with skunks, some skunks shed virus up to 18 days prior to observable signs.

The infectious period is NOT the same as the incubation period! Persons or animals that have just come into contact with a potentially rabid animal are not themselves immediately contagious with the virus.

I. Animal Diseases that Resemble Rabies

A multitude of diseases and conditions exist that can clinically resemble rabies. Therefore, professional evaluation of an animal by a veterinarian is clearly required to differentiate and eliminate the possibilities.

Canine Distemper – caused by a virus antigenically similar to human measles. Species that can be affected by this virus include dogs, raccoons, coyotes, foxes, skunks, mink, and ferrets. While distemper virus can affect nearly every body system, infected animals often display neurologic signs that can easily be confused with rabies. These signs include abnormal behavior, aggressiveness, disorientation, twitching, convulsions, and paralysis. Canine distemper does not pose a threat to public health, but is a serious disease of unimmunized dogs and susceptible wildlife and zoo animals.

Visceral Larva Migrans (VLM) – caused by the aberrant migration of roundworm larva in unnatural, coincidental hosts. The larval migration results in cyst formation in the brain, eye, and other internal organs. Ingestion of fecal material of raccoons, dogs, and cats containing roundworm larva or eggs by humans, chickens, rabbits, groundhogs, and other rodents may result in VLM. Migration of the parasitic larva to the brain and eye results in nervous disorders such as head tilt, circling, blindness, or paralysis.

Toxoplasmosis – The protozoan parasite *Toxoplasma gondii* can infect most mammals and cause lesions in the heart, lung, liver, and brain. The disease is usually nonfatal in adult animals, and is most often contracted by ingesting an infective stage of *T. gondii* (bradyzoite or cystozoite) in raw meat. Most infected cats do not exhibit clinical signs, but pass the oocysts in their feces – posing a danger to other animals and people through the contaminated soil or litter. The clinical symptoms may resemble distemper or rabies.

Toxin ingestion – Several elements and chemicals may produce toxicological symptoms mimicking rabies. Lead poisoning not only has a toxic effect on red blood cells and hemoglobin, but will also produce neurologic signs such as blindness, tremors, and convulsions. Intoxication most commonly occurs from ingestion of old paints, lead plates from storage batteries, and mechanical lubricants. Mercury poisoning also targets nervous tissue, producing blindness, ataxia, abnormal reflexes and paresis. Intoxication most commonly results from ingestion of mercury-containing fungicides. Ethylene glycol (antifreeze) poisoning usually occurs from pets or raccoons drinking spilled or drained antifreeze from vehicles. The sweet taste of antifreeze attracts animals and ingestion leads to neurologic signs, kidney failure, and death. Organophosphate poisoning and intoxications by other pesticides often produce CNS signs as can toxicosis with strychnine, chlorinated hydrocarbons, some toxic plants and even natural toxins in toads and lizards. Rabies should, however, always be included in the differential diagnosis of suspected CNS toxicoses if the animal roams outdoors and is unvaccinated.

Listeriosis – The bacteria *Listeria monocytogenes* is an important cause of foodborne illness in the United States. Usually a noncontagious disease of farm animals (primarily ruminants), listeriosis may infect other mammals, including man and the red fox. Decaying vegetable matter may serve as a source of infection and signs are consistent with other kinds of meningitis or encephalitic diseases, particularly circling, head tilt, stupor, and paresis. Neurologic symptoms in farm animals are usually unilateral.

Herpesvirus infections – Many wildlife and domesticated animal species are infected with herpesviruses. They are species-specific and may be fatal in young animals. The simple fever blisters of man that occasionally lead to encephalitis is an example of a herpes virus infection.

West Nile virus encephalitis – West Nile virus (WNV) has emerged in the U.S., impacting primarily birds, horses and humans. The virus may interfere with normal central nervous system functioning and cause inflammation of the brain. Although a small number of cats and dogs have been shown to have neurological symptoms associated with WNV, it is unlikely that most pet owners would notice any unusual symptoms or behavior in these pets if infected. In addition, other wild animals, including a small number of squirrels have tested positive for WNV encephalitis.

Other Encephalitides – Most arboviral encephalitis infections of man and mammals can be expected to present clinically as a suspected rabies case. Eastern equine encephalitis (EEE) is being diagnosed more commonly in pets and exotic species. Several dogs and swine were found with the disease in recent years in the southeastern U.S. This fatal disease of horses, often referred to as “Sleeping Sickness”, is extremely difficult to differentiate clinically from rabies. Other arthropod-borne encephalitis infections exhibit similar signs once they exit their normal, subclinical endemic life cycles of mosquito-bird, mosquito-rodent, or mosquito-reptile.

Neuropathies of Uncertain Etiology – Several other conditions can mimic rabies and alarm pet owners. Feline Vestibular Syndrome presents as a subacute syndrome in which cats become ataxic, incoordinated, wobbly, and exhibit nystagmus. No specific etiologic agent or cause has been identified, but high doses of corticosteroids generally relieve symptoms after approximately 10 days. Horner’s Syndrome of cats, with one pupil dilated and the other constricted as the classical sign, will similarly resolve with appropriate veterinary treatment. In dogs, Idiopathic Trigeminal Neuropathy can frighten owners because the dog can not close its jaws, and drools similar to a rabid animal with pharyngeal paralysis. Although Bovine Spongiform Encephalopathy (“Mad Cow Disease”) has not been found in the U.S., Transmissible Mink Encephalopathy and Chronic Wasting Disease of deer and elk are present in this country. Although they are largely confined to the northwestern U.S., they are high on the differential list for rabies suspects in areas enzootic for these diseases.

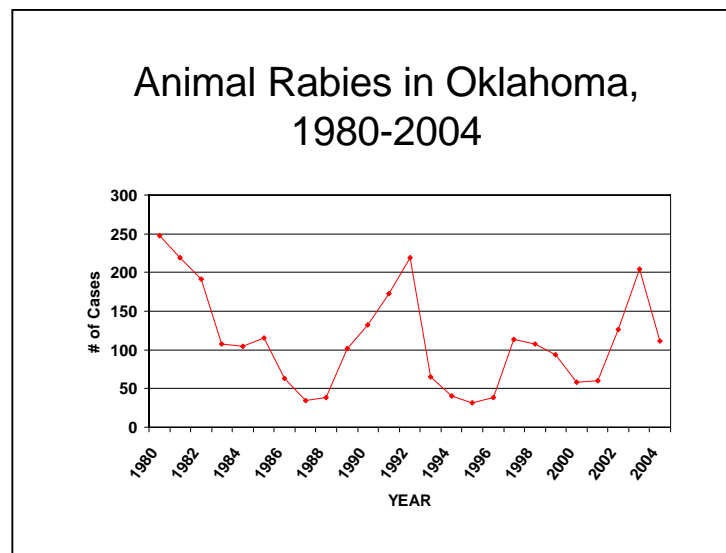
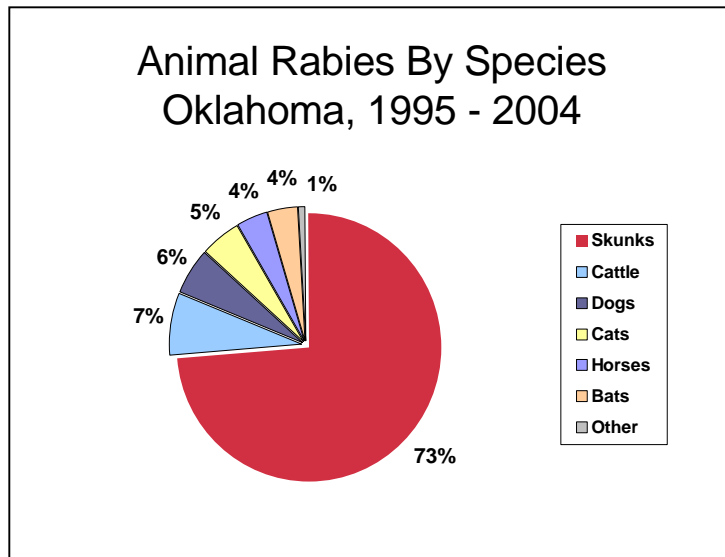
Localized Lesions and Obstructions – Viral and mycotic infections of the mouth, and foreign objects (bones, sticks, fish hooks) lodged in the mouth or throat generally cause an animal to drool excessively causing a suspicion of rabies. As a precaution, gloves should be worn when examining such animals, especially when trying to look into or open an animal’s mouth.

Other -- Localized cancerous tumors affecting the central nervous system can also produce a variety of neurologic signs, as does hepatic and renal failure due to the accumulation of metabolic toxins.

II. ANIMAL RABIES CASES IN OKLAHOMA: A STATISTICAL OVERVIEW

In a typical year, approximately 50-100 cases of animal rabies will be diagnosed by laboratory testing in Oklahoma. The skunk is the major animal reservoir of rabies in the state. When the skunk population increases (approximately every 6 years), a rise in the number of animal rabies cases usually follows. On the “upside” of the population cycle, as many as 240 cases of rabies may be identified in one year.

A few cases of rabies usually occur each year in bats, horses, cattle, cats and dogs.



III. MANAGEMENT OF ANIMALS THAT BITE HUMANS

Animal bites, particularly dog bites, are a huge public health problem. In 2001, an estimated 368,245 persons were treated in U.S. hospital emergency departments for nonfatal dog bite-related injuries.¹ Most bite victims are children under the age of 10 and potentially suffer disfiguring physical injuries and emotional distress. Eighteen to twenty people die each year in the U.S. from dog attacks.¹ Animals bite to express aggression, fear, territoriality, possession, or a need to escape. Therefore, an animal bite does not necessarily equal a rabies exposure. The spectrum of rabies risk associated with an animal bite ranges from an unvaccinated animal displaying unusual behavior posing the highest risk to a strictly indoor, vaccinated pet at the lowest risk for a rabies exposure.

Dog and cat bites occurring within city limits should be reported to the municipal animal control department for investigation and management. Dog and cat bites occurring outside city jurisdiction and bites from livestock, wildlife, or exotic animals should be reported to the respective county health department. See Table 3 in the Appendix section for a phone listing of all county health departments. Also refer to Figure 3 for a summary pictorial algorithm of animal bite management.

Those animals involved in a bite to a human will be managed according to:

- ◆ type of animal inflicting the bite
- ◆ vaccination status of the animal (when applicable)
- ◆ nature and circumstances of the bite
- ◆ relationship of the animal owner to the bite victim

A. DOG, CAT, OR FERRET

➤ ***Routine Circumstances***

An owned dog, cat, or ferret that is currently vaccinated by a licensed veterinarian with an approved antirabies vaccine and has not inflicted severe injury (multiple deep bites, broken bones or lacerations requiring multiple sutures) may be allowed to be placed in a home quarantine until the end of a ten (10) day period from the bite.

An owned dog, cat, or ferret that bites a member of the immediate family (first party relationship) and is apparently healthy at the time of the bite incident shall be allowed to be confined and observed on the owner's property regardless of vaccination status. The owner should be required to update the rabies vaccination on any unvaccinated pets after completion of the ten (10) day home observation period.

An owned dog, cat, or ferret that has never been vaccinated or is overdue on its rabies vaccination should be placed in quarantine at a veterinary facility or recognized

¹ Gilchrist J, Gotsch K, Annest J. Nonfatal dog bite-related injuries treated in hospital emergency departments-United States, 2001. MMWR 2003;52:605-610.

animal control facility for a period of ten days measured from the day of the bite. Prior to discharge from the veterinarian's supervision, the animal will be vaccinated against rabies.

A stray or unwanted dog, cat, or ferret that has bitten a human may either be quarantined for ten days at a veterinary facility or a recognized animal control facility; or the animal may be euthanized and the brain tissue submitted to the State Department of Health Laboratory for rabies testing. If the animal is quarantined, upon successful completion of the (10) ten day observation period, the stray may be vaccinated against rabies and placed for adoption at the discretion of the animal control authority.

➤ ***Special Circumstances***

When an animal bite report involves special circumstances, consult the Communicable Disease Division (CDD) of the Oklahoma State Department of Health (OSDH) by calling (405) 271-4060 for direction on case management. Minor or superficial "nips" or puncture wounds to the face can be managed routinely as described above. Special circumstances include, but are not limited to:

- ◆ Bites resulting in broken bones or deep lacerations requiring multiple sutures, a moderate or severe bite to the face or neck, or multiple bite wounds
- ◆ Service dogs or search and rescue dogs
- ◆ Female dog with a litter of unweaned puppies
- ◆ Biting animal not identifiable in a group or litter
- ◆ Biting animal transported out-of-state

If a dog, cat, or ferret placed under rabies observation begins to demonstrate any signs of illness during those 10 days, it should be reported immediately to the local health department and the CDD. When the signs of illness are determined to be incompatible with rabies, the animal can be treated appropriately by the veterinarian presiding over the animal's care and remain under observation. If signs suggestive of rabies develop in the animal, it should be humanely killed, and its head removed and shipped under refrigeration (cold packs) for examination by the OSDH Public Health Laboratory as soon as possible. Except for shipping and any veterinary fees, there is no cost to the public for rabies testing of the suspect animal.

B. WOLF-DOG HYBRIDS

Several local ordinances restrict or prohibit ownership of wild animals, or domestic animals crossbred with wild animals. Nonetheless, the popularity of owning a wolf-dog hybrid appears to be increasing. Between 1979 and 1998, 14 dog bite-related fatalities in the United States involved wolf-dog hybrids (Dr. Jeffrey Sacks, CDC). Because these animals are "part wild", they pose a higher risk of inflicting a vicious and severe attack, especially to an unattended child. All wolf-dog hybrid bites should be reported to the county health department for investigation and disposition.

The Oklahoma Zoonotic Disease Control rules do permit veterinarians to vaccinate wolf-dog hybrids against rabies using a standard canine rabies vaccine. Although vaccination would be expected to protect the animal from developing rabies if exposed, there are no USDA-approved animal rabies vaccines presently labeled for use in wolves or wolf-crosses. Therefore, a currently vaccinated wolf-dog hybrid is not treated the same as a currently vaccinated domestic dog.

There are two possible dispensations for wolf-dog hybrids that bite a person that is not a member of the owner's household:

- 30-day quarantine at a veterinary hospital or recognized animal control facility, or
- euthanasia with brain submitted for rabies testing.

An order of quarantine or euthanasia will be served by a public health specialist from the respective county health department.

C. DOMESTICATED LIVESTOCK AND OWNED EXOTIC ANIMALS

This category includes a broad range of animals from horses, goats, and Vietnamese pot-bellied pigs to more exotic animals kept as pets or on display to the public, such as lions and monkeys. The Oklahoma State Department of Health has the authority to determine the disposition of any livestock animal or owned exotic animal that bites a person. Therefore, all bite reports involving this category of animal should be forwarded to the respective county health department, or the CDD at (405) 271-4060 (24-hour number) as soon as possible.

The risk of a rabies exposure will be determined by behavior of the animal at the time of the bite, rabies vaccination status (if applicable), potential for prior exposure of the animal to a rabies vector, and the epidemiology and risk of rabies in the species of animal causing the bite.

- If the biting livestock or exotic animal is determined to pose a significant risk of a rabies exposure, the State Commissioner of Health will order the animal to be humanely killed and the brain submitted to the OSDH Laboratory for rabies testing.
- If the biting animal is determined to pose a very low risk of rabies transmission, the animal will be ordered to a quarantine and observation period of 30 days supervised by a licensed veterinarian.

D. WILD ANIMALS

Carnivorous wild animals (skunks, foxes, coyotes, bobcats) and bats are the categories of wild animals considered most likely to be involved in the transmission of rabies, and are considered the cause of most indigenous cases of human rabies in the United States since 1960. *A bite exposure to a carnivorous wild animal, or any type of direct contact with a live bat is considered a serious event.* Every attempt should be made to apprehend the animal and submit the brain tissue for rabies testing.

If the animal is available for testing, it is not necessary to begin rabies postexposure treatment unless the laboratory results indicate the animal is rabid.

In cases where the animal is under the care of a wildlife rehabilitator, in a zoo, or being kept as a pet, the disposition of the animal should be determined by the OSDH following a standard bite investigation. When a wild animal is unavailable for rabies testing, consultation with an epidemiologist regarding recommendations for antirabies treatment may be obtained by calling (405) 271-4060.

Raccoons are native to Oklahoma, and bites are relatively common as people hunt, trap, and attempt to make pets of these animals. The epidemiology of rabies in raccoons varies greatly depending on the region of the U.S. and the variant of rabies virus present. The raccoon variant of rabies is found primarily in the eastern U.S. and is not found in Oklahoma [Refer to Figure 1 in Appendix]. Over the past 25 years, 1,845 raccoons have been tested for rabies and only four have tested positive (0.21%). Therefore, a raccoon bite in Oklahoma does not necessarily equal a rabies exposure. Although the risk of rabies resulting from a raccoon bite in Oklahoma is low, consult the OSDH, CDD by calling (405) 271-4060 for direction on case management.

Small rodents (such as squirrels, hamsters, guinea pigs, gerbils, chipmunks, gophers, rats, and mice), opossums, and lagomorphs (such as rabbits and hares), have only rarely found to be infected with rabies, and have never been implicated as the source of human rabies. Consequently, these types of animals are considered as extremely low transmission risk and in most cases, do not require submission of the animal for testing. Bites from small rodents, squirrels, rabbits, or opossums will almost never warrant rabies postexposure treatment. However, if there are unusual circumstances surrounding the bite incident, such as bizarre animal behavior, consult the OSDH, CDD by calling (405) 271-4060 for assistance.

IV. SUBMISSION OF SAMPLES TO THE STATE PUBLIC HEALTH LABORATORY FOR RABIES TESTING

REQUIRED INFORMATION

Please provide all requested information on RABIES ODH Form 460 (sample form included in Figure 2 of the Appendix,). Domestic animal exposure without any human exposure still meets the criterion for rabies testing, so be sure to document factual exposure information (human or animal) and any special circumstances on the accompanying rabies lab form. Testing of specimens received without exposure information will be delayed until such information is received.

SPECIMEN PREPARATION

Trained personnel are expected to perform the preparation of specimens for rabies testing in most instances. At minimum, gloves should always be worn when handling animals or their tissues to prevent contact with potentially infectious substances. Eye protection is also recommended. To ensure that brain tissue specimens are acceptable for rabies testing, they must be prepared and handled as follows:

- ◆ Live animals cannot be submitted to the laboratory for examination. Animals must be euthanized (preferably by a veterinarian) prior to shipment.
- ◆ No animal should be killed by clubbing or shooting the head since the intact brain is needed for accurate examination.
- ◆ The head must be removed from the body (except for bats and other small animals which measure 12 inches or less in length, exclusive of the tail), placed in a plastic bag, and then placed in a leak-proof container. If the head has sharp protuberances (shattered bone, quills, etc.), first wrap the specimen in several layers of newspaper before placing in a plastic bag.
- ◆ Remove the brain from all cattle, horses, and other larger animals for specimen submission. Ensure that the cerebellum and proximal spinal cord are included.
- ◆ Submit all specimens promptly under conditions, which will prevent decomposition of the brain tissue during transport. Keep the brain tissue at refrigeration temperature at all times.
- ◆ If the head or animal carcass has already been frozen, do NOT thaw. Ship specimen as frozen. Repeated freeze-thaw cycles will compromise the viability of the tissue for testing.

- ◆ Do not send specimens preserved in formalin or other chemical preservative to the OSDH Laboratory unless prior arrangements have been made. In some cases where fresh brain tissue is unavailable for testing, histologic sections may be forwarded to an outside laboratory for PCR testing.

SHIPPING INSTRUCTIONS

Shipping containers for animal heads other than cattle and horses are furnished to local health departments and veterinarians upon request. These containers are made of an inner leak-proof plastic bag with cold packs in an insulated cardboard carton. All persons who submit animal heads to the State Public Health Laboratory are encouraged to call (405) 271-5070 to request the standard shipping container. When submitted in the proper container, the “rabies box” is automatically returned to the sender for future use. If a shipping container other than that provided by the OSDH Laboratory is used, please be sure to mark “ATTENTION: RABIES LABORATORY” on the outside of the box.

The brain tissue of cattle, horses, and other larger animals must be removed by a veterinarian prior to shipping. Whole heads from these animals will not be accepted by OSDH.

All shipping containers must have a leak-proof inner bag which contains the animal head or brain tissue, refreezable coolant (cold packs) to provide proper refrigeration during transport (do not use wet ice), and an outer container for transport. “ATTENTION: RABIES LABORATORY” should be clearly printed on the shipping container to facilitate proper handling and timely delivery to the OSDH Laboratory.

Specimens should be hand-carried or shipped by a courier service to:

Rabies Laboratory, Oklahoma State Department of Health, 1000 Northeast 10th Street, Oklahoma City, Oklahoma, 73117-1299. **Do not ship specimens through the U.S. Mail service, Federal Express, or by Parcel Post or bus.**

During **working hours** (8:00 a.m. to 4:30 p.m., Monday-Friday), animal heads are received in Room B-78 of the OSDH building. **After hours** and on **weekends and holidays**, specimens must be received and logged in by the security guard. To locate the security guard, enter the building through the loading dock, on the east side of the building facing Stonewall Avenue. One Rabies Form ODH 460 must be completed and accompany each specimen.

EMERGENCY TEST REQUESTS

All brain tissue specimens must arrive at the Rabies Laboratory by 11:00 a.m., Monday through Saturday, to be tested that same day unless special arrangements are made. Rabies tests may be performed on an emergency basis on Sundays and holidays through prior arrangements and consultation with the epidemiologist-on-call, who can be reached by calling (405) 271-4060 (24/7).

LABORATORY REPORTS

Laboratory testing is performed Monday through Saturday. Reports on animal heads received by 11:00 a.m. are usually available by 4:00 p.m. of the same day. Reports on brain specimens received after 11:00 a.m. are available by 4:00 p.m. of the next day. Telephone reports to all appropriate parties are made routinely on all positive and unsatisfactory results. Written reports are mailed on all specimens (negative, positive, and unsatisfactory) when each examination is complete. Reports on negative animal heads are telephoned collect and only when specifically requested on RABIES ODH Form 460. For information regarding specimens and laboratory reports, call: (405) 271-5070, from 8:00 a.m. to 4:30 p.m., Monday through Friday.

TEST INTERPRETATION

Testing of animals suspected of having rabies is done at the OSDH Laboratory by Fluorescent Rabies Antibody examination (FAT). Results can be interpreted by the following guide:

Negative: No evidence of rabies was found; therefore, the animal was not infectious for rabies.

Positive: Evidence of rabies was found; therefore, the animal should be considered as infectious for rabies. An epidemiologist from the Communicable Disease Division will notify the veterinarian and sender immediately upon receipt of the results and conduct a full rabies exposure assessment.

Unsatisfactory: Specific brain tissue could not be identified as a result of the animal's brain being decomposed or the skull being crushed. Therefore, the OSDH Laboratory may neither confirm nor deny the presence of rabies in this animal. An epidemiologist from the Communicable Disease Division will notify the sender and assist with the rabies risk assessment.

V. HUMAN EXPOSURE ASSESSMENT AND THE DECISION FOR ANTIRABIES TREATMENT

TREATMENT RATIONALE

Physicians must individually evaluate each human exposure to a potentially rabid animal. These are rarely black and white issues, because the decision must take into account a variety of factors. The following factors should always be evaluated and communicated with the patient before specific antirabies treatment is initiated: 1) type of exposure, 2) type of animal species involved, 3) vaccination status of the animal, 4) circumstances leading to the bite or other exposure, and 5) presence of rabies in the region. Local or state public health officials should be consulted if questions arise about the need for rabies prophylaxis. **Due to periodic nationwide shortages of human rabies immune globulin, the potential for adverse reactions to immunizations, and the costs of treatment, rabies biologics should be used appropriately and judiciously.**

A "Rabies Risk Assessment Algorithm" is provided in Figure 4 of the Appendix section. Copies of this algorithm on card stock paper may also be obtained by contacting the CDD, (405) 271-4060. It is especially recommended that the algorithms be posted or filed in hospital emergency departments for quick reference and guidance.

A. TYPE OF EXPOSURE

Rabies is transmitted to humans only by directly introducing the virus into open cuts or wounds in the skin, or by introducing the virus onto mucous membranes. If no exposure has occurred, postexposure prophylaxis is not indicated. The likelihood that rabies infection will result from exposure varies with the nature and extent of exposure. *All bites represent a potential risk of rabies transmission.* Nonbite exposures from terrestrial animals rarely cause rabies. Undetected bite exposures to bats are increasingly being linked to human rabies cases in the United States.

Bite

Any penetration of the skin by teeth.

Nonbite

Scratches, abrasions, open wounds, or mucous membranes which have been contaminated with saliva or neural tissue (brain, spinal cord, etc.) from a rabid animal are considered exposures.

Blood, urine, and feces are not infectious for rabies. Therefore, contact with these substances alone does not constitute a potential rabies exposure. Casual contact, such as petting a rabid animal, does NOT constitute an exposure, nor does a claw scratch by a domestic animal and neither are indications for prophylaxis.

There have been two instances of airborne rabies that were acquired in the laboratory, and two probable airborne rabies cases acquired in a heavily bat-infested cave in Texas. The airborne route of transmission is exceedingly rare and is not expected to occur during typical bat-associated events.

Secondary exposure or “contact-transfer”

Secondary exposure scenarios (i.e. dog or cat fights with skunk and then transports infectious material from the skunk to human contact) are hypothetical and very unlikely to transmit rabies.

These situations are common, but are unlikely to require rabies postexposure treatment unless there is clear indication that neural tissue or copious amounts of saliva from a rabid animal were transferred by the pet to eventually contaminate a fresh (less than 24 hours old) skin wound or mucous membrane.

Rabies virus is very fragile outside of the nervous tissue of the rabid animal and does not survive for appreciable amounts of time on environmental surfaces. Postexposure prophylaxis is generally NOT indicated under these secondary exposure incidents. Consultation with an epidemiologist in the Communicable Disease Division at (405) 271-4060 is encouraged for discussion of specific cases.

ACCIDENTAL HUMAN EXPOSURE TO ANIMAL VACCINE

Accidental inoculation may occur during administration of animal rabies vaccine. Such exposure to inactivated vaccine constitutes no rabies hazard. However, a new category of animal rabies vaccines are vaccinia-vectored. Because vaccinia virus can infect humans and pose a risk for immunocompromised individuals, accidental exposures to this type of rabies vaccine should be reported to the Oklahoma State Department of Health by calling (405) 271-4060.

B. TYPE OF ANIMAL INVOLVED IN BITE INCIDENT

Dogs, Cats, and Ferrets

Bites from dogs, cats, and ferrets pose a potential risk of rabies transmission. The driving strategy for managing bite incidents involving these animals is to locate the animal for observation or testing. A healthy domestic dog, cat, or ferret that bites a person may be confined and observed for 10 days. No decision for postexposure prophylaxis is necessary while the animal is being observed. Dogs, cats, and ferrets with veterinary record of current rabies vaccination status pose an extremely low risk and may be managed through home confinement and observation. Pets with no current history of rabies vaccination by a veterinarian must be quarantined at a veterinary hospital or recognized animal control facility according to state rabies control regulations (OAC 310:599-3-1).

- ◆ **If a biting dog, cat, or ferret is unavailable for testing or observation, the recommendation for rabies postexposure prophylaxis is determined on a case-by-case basis. As long as the bite wounds are not extremely severe, it is reasonable to delay the decision for postexposure prophylaxis for up to 72 hours following the bite event to allow time for apprehension of the animal.**

Wild Animals

Some animals are much more likely to be infected with rabies virus than others. For example, carnivorous wild animals (especially skunks, foxes, coyotes, bobcats) and bats are the animals most commonly infected with rabies.

- ◆ **Rabies testing of higher risk wild animals is usually the primary objective. Occasionally, the wild animal has been caged under human care and observation (e.g. zoo, wildlife rehabilitator, pet) and a rabies quarantine may be imposed.**

It is preferred that postexposure prophylaxis be delayed pending the outcome of rabies test results. (*see p. 12 for emergency test requests*) Whenever treatment has been initiated and subsequent testing shows that the exposing animal is negative for rabies, treatment can be discontinued.

When a wild animal is unavailable for testing, circumstances leading to the bite and epidemiology of rabies in the animal species of question, should be evaluated.

Livestock and Other “Domesticated” Animals

Livestock, such as horses, cows, pigs, and “domesticated” wild animals, such as monkeys and llamas, may be infected with rabies, but are considered less likely to be involved in the transmission of rabies. In almost all of these types of bite events, the animal will be confined and readily available for investigation and a rabies risk assessment.

- ◆ **Human rabies postexposure prophylaxis need not be initiated pending completion of a thirty (30) day quarantine and rabies observation period, or results of rabies testing are known.**

Small Rodents, Opossums and Lagomorphs

Small rodents (such as squirrels, hamsters, prairie dogs, gerbils, chipmunks, gophers, rats, mice, etc.) and lagomorphs (such as rabbits and hares) are only rarely found to be infected with rabies and have not been known to cause human rabies in the United States. The reason for this appears to be that these small animals are unlikely to survive an attack from a rabid animal to subsequently develop the disease. From 1980 through 2004, 3,596 small rodents, rabbits, and squirrels were submitted for rabies testing at the State Public Health Laboratory. None of these animals were found to be rabid.

Large rodents like groundhogs or muskrats, however, are more likely to be infected with rabies. Opossum bites are relatively common events in Oklahoma. Despite their size, opossums have been shown to have a high resistance to infection with the rabies virus and are considered low risk animals for the spread of rabies.

- ◆ **In most cases, bites or other exposures from small rodents and rabbits do not require testing the animal or rabies postexposure prophylaxis.**

In unusual cases where the rodent or lagomorph exhibits unusual aggression or displays neurologic symptoms, the CDD should be consulted regarding the decision for testing or human postexposure treatment. Wild rodents and lagomorphs that have bitten humans may be submitted for rabies testing. Cage-raised animals (hamsters, gerbils, mice, rats, rabbits, etc.) that have been totally confined to an indoor cage are not routinely tested.

Bats

Bats are increasingly implicated as significant wildlife reservoirs for strains of rabies virus transmitted to humans. Recent epidemiological data suggests that transmission of rabies virus may occur from minor or seemingly insignificant physical contact with bats. In all instances of potential human exposures involving bats, the bat in question should be safely collected if possible, and submitted for rabies testing.

- ◆ **Rabies postexposure prophylaxis is recommended for all persons with bite, scratch, or mucous membrane exposure to a bat, unless the bat is available for testing and is negative for rabies.**

Postexposure prophylaxis may be appropriate even in the absence of a demonstrable bite, scratch, or mucous membrane exposure, particularly in situations in which there is *reasonable probability* that such exposure to a bat may have occurred. Some examples are: a sleeping individual awakes to find a bat in the room, or an adult witnesses a bat in the room with a previously unattended child, mentally challenged person, or intoxicated individual.

Human to Human

Only exposures to a human clinically ill with rabies theoretically could transmit rabies. However, no cases of rabies acquired in this way (except for corneal and organ transplants) have been documented. Persons who are receiving antirabies immunizations, or who have been recently exposed to a known or suspected rabid animal are **NOT** capable of transmitting rabies.

C. CIRCUMSTANCES OF BITING INCIDENT AND VACCINATION STATUS OF EXPOSING ANIMAL

An **unprovoked** attack is more likely than a provoked attack to indicate that the animal is rabid. A **provoked** incident occurs when a person creates a situation that makes an animal feel threatened and causes them to react by biting or scratching.

- ◆ **Provocation is judged from the animal's perspective.** An animal will be provoked by infringement on its territory, menacing gestures, handling its young, or fear of injury. Bites inflicted on a person attempting to feed or handle an apparently healthy animal should generally be regarded as provoked.
- ◆ A currently vaccinated dog, cat, ferret, horse, or sheep is unlikely to become infected with rabies.

D. EPIDEMIOLOGY OF RABIES IN A GEOGRAPHICAL LOCALE

Incidence of animal rabies does vary within the state of Oklahoma. When evaluating animal rabies incidence, differences are also present between terrestrial animal rabies and bat rabies. Based on the previous ten years of laboratory data, Pottawatomie, Pontotoc, Payne, Oklahoma, Carter, Atoka, and Lincoln counties have the highest case numbers of skunk rabies. The greatest numbers of reported cases of bat rabies in the past decade have originated from Tulsa, Oklahoma, and Ottawa counties.

Most Oklahoma counties with the lowest historical rate of animal rabies incidence tend to be located in the panhandle and northeastern quadrant of the state. Refer to Table 1T. and 1B. in the Appendix for statistics of all counties within the state. Information regarding the current status of rabies activity in Oklahoma is available through the OSDH web site at www.health.ok.gov/program/cdd/rabies.htm or by calling the OSDH, CDD at (405) 271-4060.

VI. RABIES IMMUNIZATIONS FOR HUMANS

A. CURRENTLY LICENSED RABIES IMMUNIZING PRODUCTS (USA)

RABIES BIOLOGICS

Two types of rabies immunizing products are available for human use in the United States:

- ◆ Rabies vaccines induce an active immune response that includes the production of neutralizing antibodies. This antibody response requires approximately 7-10 days to develop and generally persists for more than two years.
- ◆ Rabies immune globulin (RIG) provides a rapid, passive immunity that persists for only a short time (half-life of approximately 21 days)

SOURCE

HUMAN RABIES VACCINE

- Rabies vaccine, human diploid cell (HDCV)
Intramuscular.....*Imovax[®] Rabies*
Aventis Pasteur, Inc.,
Swiftwater, PA
Phone: (800) VACCINE (822-2463)
- Rabies vaccine, purified chicken embryo cell (PCEC)
Intramuscular.....*RabAvert[™]*
Chiron Behring GmbH & Co
Phone: (800) CHIRON8 (244-7668)

RABIES IMMUNE GLOBULIN (RIG)

- Rabies immune globulin, human (HRIG).....*Imogam[®] Rabies- HT*
Pasteur-Merieux Serum et Vaccins.
Aventis Pasteur, Inc.
Phone: (800) 822-2463
- Telecris Biotherapeutics.....*HyperRAB[™] S/D*
Phone: (800) 243-4153

Note: The Oklahoma State Department of Health and the County Health Departments do not provide rabies post exposure prophylaxis. Human rabies vaccine and RIG may be ordered by health care providers.

B. RABIES POSTEXPOSURE PROPHYLAXIS (PEP)

TREATMENT OF WOUNDS

Immediate and thorough washing of all bite wounds and scratches with soap and water and a virucidal agent, such as povidone-iodine solution irrigation are important measures for preventing rabies. In studies of animals, thorough wound cleansing alone without other postexposure prophylaxis (PEP) has been shown to markedly reduce the likelihood of rabies infection. Tetanus prophylaxis and measures to control bacterial infection also should be administered as indicated. The decision to suture large wounds should take into account cosmetic factors and the potential for bacterial infections.

PEP FOR PERSONS NOT PREVIOUSLY VACCINATED

There are two regimens for rabies postexposure prophylaxis depending upon whether or not the exposed patient has previously completed a preexposure series of rabies vaccine, or has received postexposure treatment for a prior rabies exposure event. If the individual at significant risk of a rabies exposure has not received adequate preexposure immunizations, then the postexposure protocol is:

1. RIG – 20 IU/kg body weight on Day 0. Infiltrate as much volume as possible into region of bite wound, placing remaining volume at distant intramuscular site(s).
2. HDCV or PCEC vaccine – 1.0 ml **IM deltoid** on days 0, 3, 7, 14, and 28

RIG

RIG is administered only once - at the beginning of antirabies postexposure prophylaxis - to provide immediate antibodies until the patient's own immune system responds to immunization. ***If RIG was inadvertently not given when rabies vaccination was begun, it can be given up to the seventh day after the dose of vaccine was given.*** After the seventh day, RIG is contraindicated because an active antibody response to the vaccine has presumably occurred. The recommended dose of RIG is 20 IU/kg or 9.09 IU/lb of body weight. If anatomically feasible, the full dose should be infiltrated around the wound(s). When anatomically limited, as much volume as possible should be injected at the wound site and any remaining volume should be administered intramuscularly at an anatomical site(s) distant from vaccine administration. RIG should not be administered in the same syringe as the vaccine or at the same site as vaccine. As the RIG may partially suppress active production of antibody, no more than the recommended dose should be given.

Rabies Vaccine (HDCV or PCEC)

Any of the two rabies vaccines currently available in the United States can be administered in conjunction with RIG at the beginning of postexposure therapy. A regimen of five 1-mL doses of HDCV or PCEC should be administered intramuscularly. The first dose of the five-dose course should be administered as soon as possible after exposure. Additional doses should be administered on days 3, 7, 14, and 28 after the first vaccination. For adults, the vaccination should always be administered intramuscularly in the deltoid area. For small children, the anterolateral aspect of the thigh is preferred. The gluteal area should never be

used for HDCV or PCEC injections because administration in this area results in lower neutralizing antibody titers.

The schedule for the vaccine doses should be adhered to as closely as possible, especially the first three. The timing of the first three doses plus RIG is most critical. However, a one-day variation in the schedule is not likely to be clinically significant. If a patient is off-schedule by greater than 2 days, timing for the remaining schedule should be evaluated on a case-by-case basis. Under no circumstances should the series be re-started or any additional RIG given.

PEP FOR PERSONS PREVIOUSLY VACCINATED

According to the 1999 ACIP Recommendations for Human Rabies Prevention, “previously vaccinated” refers to any person with a history of preexposure vaccination with a cell culture vaccine (HDCV, RVA, or PCEC); prior postexposure prophylaxis; or previous vaccination with any other type of rabies vaccine and a documented history of antibody response. The recommended regimen for a previously vaccinated individual is:

1. **No RIG**
2. HDCV or PCEC – 1.0 ml **IM deltoid** on days 0 and 3.

Intradermal administration of HDCV is NOT appropriate for postexposure prophylaxis. If Duck Embryo Vaccine (DEV) had been given as the preexposure vaccine and the antibody titer status of that person is not known, full primary post-exposure antirabies treatment (RIG + 5 doses of vaccine) is advised. This recommendation is based on the fact that many individuals did not respond immunologically to some of the earlier vaccines, and will, therefore, not have an amnestic response to booster vaccines. In such cases, if antibody can be demonstrated in a serum sample collected before the vaccine is given, treatment can be discontinued after at least 2 doses of vaccine.

C. PREEXPOSURE PROPHYLAXIS FOR PERSONS AT HIGH RISK FOR RABIES EXPOSURE

Preexposure vaccination should be offered to persons in high-risk groups, such as veterinarians, veterinary technicians, animal control officers, and certain laboratory workers employed in rabies enzootic areas. Preexposure vaccination should also be considered for other persons whose activities bring them into frequent contact with potentially rabid animals, such as taxidermists, trappers, wildlife biologists, etc. International travelers are recommended to receive preexposure vaccinations if they are likely to come into contact with animals in countries where canine rabies is enzootic and immediate access to appropriate medical care, including biologics, might be limited.

Preexposure prophylaxis is given for two primary reasons. First, to provide protection against unrecognized or inapparent exposures to rabies. Secondly, to simplify postexposure therapy by eliminating the need for rabies immune globulin (RIG) and by decreasing the number of doses of vaccine required.

PREEXPOSURE IMMUNIZATION DOES NOT ELIMINATE THE NEED FOR PROMPT POST-EXPOSURE PROPHYLAXIS FOLLOWING AN EXPOSURE; IT ONLY REDUCES THE POST-EXPOSURE REGIMEN.

RABIES PREEXPOSURE PROPHYLAXIS GUIDE

Risk category	Nature of risk	Typical populations	Preexposure recommendations
Continuous	Virus present continuously, often in high concentrations. Specific exposures likely to go unrecognized. Bite, non-bite, or aerosol exposure.	Rabies research laboratory workers, rabies biologics production workers.	Primary course. Serologic testing every 6 months; booster vaccination if antibody titer falls below acceptable level.
Frequent	Exposure usually episodic, with source recognized, but exposure also might be unrecognized. Bite, non-bite, or aerosol exposure.	Rabies diagnostic lab workers, spelunkers, veterinarians and staff, animal control and wildlife workers in rabies-enzootic areas.	Primary course. Serologic testing every 2 years; booster vaccination if antibody titer falls below acceptable level.
Infrequent (greater than the population at large)	Exposure nearly always episodic with source recognized. Bite or non-bite exposure.	Veterinarians and animal control workers in areas with low rabies rates. Veterinary students. Travelers to rabies enzootic areas without appropriate medical care and biologics.	Primary course. No serologic testing or booster vaccination.
Rare (population at large)	Exposure always episodic w/ source recognized. Bite/nonbite.	U.S. population at large, including persons in rabies-epizootic areas.	No vaccination necessary.

PREEXPOSURE VACCINATIONS

Preexposure prophylaxis may be administered either intradermally (0.1 ml) with Imovax ID[®], or intramuscularly (1.0 ml) in the deltoid region with HDCV or PCEC. The initial regimen consists of three doses of vaccine administered on Days 0, 7, and 21 or 28. Intradermal administration offers considerable cost savings, but presently only one manufacturer is licensed to produce an intradermal vaccine. The 1.0 ml vial is not approved for multidose ID use.

Intramuscular administration is preferable for those individuals in the following categories: rabies laboratory workers; persons taking chloroquine for malaria prevention at the same time as rabies vaccination; persons anticipating travel to a rabies epidemic area within 30 days of the last preexposure immunization; and persons who are immunosuppressed due to disease or medical treatment.

BOOSTER DOSES OF VACCINE

Routine rabies boosters are no longer recommended for those previously immunized. Instead, rabies antibody titers should be checked regularly according to risk category (see previous table), and a booster vaccination administered only when the rabies antibody titer falls below 0.5 International Units.

D. Serologic Testing

Routine serologic testing following the primary preexposure series is not necessary due to the excellent antibody response following the recommended regimen. However, persons in the high risk category, such as rabies diagnostic laboratory workers, are recommended to receive regular serologic evaluation of their rabies antibody titer. It is also now advised that persons in the frequent exposure risk category (veterinarians, animal control officers) have serum antibody titers monitored every two years instead of receiving routine boosters.

Quantitation of antibody level to rabies virus in humans and animals is currently available commercially at four laboratories in the United States. Each lab uses the Rapid Fluorescent Focus Inhibition Test (RFFIT). An acceptable antibody titer is considered to be 1:5 or greater. When a titer is measured at less than 1:5, a booster dose of rabies vaccine is recommended. Two types of test options are generally offered. In a **screen** test, the serum is tested at two dilutions only and simply tells the patient if a booster dose of rabies vaccine is indicated. An **end-point titer** test is used to measure the exact titer level. For this test, the serum is tested at serial dilutions until an end-point is reached. All labs require 2 mls of refrigerated serum. Contact the laboratory by phone or through a website address to receive the proper forms and shipping instructions.

Laboratories Offering RFFIT Test

Patrick Hayes, PhD
Veterinary Medical Center
Kansas State University
Manhattan, KS 66506
(785) 532-4483
www.vet.ksu.edu/depts/rabies

Mary Yeager
Atlanta Health Associates
309 Pirkle Ferry Road, Suite D300
Cumming, GA 30040
(770) 205-9091 or (800) 717-5612
www.atlantahealth.net

Krystyna Minc
Dept. of Pathobiology, Virology Lab
261 Greene Hall
Auburn University, AL 36849-5519
(334) 844-2659
<http://www.vetmed.auburn.edu/index.pl/virology>

E. ADVERSE REACTIONS TO RABIES BIOLOGICS

Treatment with rabies vaccine and rabies immune globulin is not completely risk free. As with any biological, adverse reactions may occur following the administration of approved human rabies vaccines or RIG. Although life-threatening reactions are very rare, decisions on the necessity for rabies postexposure prophylaxis in nonbite exposures need to include consideration of the risk of the treatment. Health care providers are referred to the 1999 ACIP Guidelines for Human Rabies Prevention (CDC. MMWR;1999:Vol. 48, No. RR-1) for more details on types of adverse reactions that can occur and recommendations for their management.

In general, reactions are more likely to occur in persons receiving preexposure boosters than in those receiving postexposure treatment. Depending on the type of reaction, switching to another manufacturer's rabies vaccine may reduce the reaction during future immunizations. Studies have revealed a higher rate of post-vaccinal reactions to HDCV as compared to RVA and PCEC in both primary and booster vaccinations. Immunosuppressive therapy, such as corticosteroids, should never be used to prophylactically treat rabies vaccination reactions, because it may reduce the success of the postexposure treatment. If corticosteroids are inadvertently used, a serum sample for rabies antibody testing should be collected 14-28 days after the final vaccine dose to verify response to postexposure treatment.

Pregnancy

Because of the potential consequences of inadequately treated rabies exposure and because there is no indication that fetal abnormalities have been associated with rabies vaccination, pregnancy is not considered a contraindication to postexposure prophylaxis. If the risk of exposure to rabies is substantial, preexposure prophylaxis might also be indicated during pregnancy.

VII. MANAGEMENT OF ANIMALS EXPOSED TO A RABID ANIMAL

DOGS, CATS, AND FERRETS

An epidemiologist with the Communicable Disease Division, OSDH, will conduct an assessment of potential animal exposures to a laboratory-confirmed rabid animal. Management of animals found to have exposure will be determined by type of exposed animal and vaccination status (see Oklahoma Zoonotic Disease Control Rules, Sect. 3-5 and 3-6). Animal owners should note that Oklahoma Administrative Law requires all dogs, cats, and ferrets over four months of age be currently immunized against rabies.

Currently vaccinated

- ◆ Revaccinate as soon as possible, confine, and observe animal at owner's property for 45 days.

Not vaccinated or past-due on rabies vaccination

- ◆ Immediate euthanasia and disposal.
OR
- ◆ Strict quarantine at a veterinary facility for 6 months; administration of postexposure rabies vaccinations.

Veterinarians or animal owners with questions on how to properly manage pets exposed to a skunk, bat, or a suspiciously acting carnivore that is unavailable for rabies testing and thus, an uncertain rabies status, should contact the State Public Health Veterinarian or epidemiologist in the Communicable Disease Division for consultation.

LIVESTOCK

The Oklahoma State Department of Agriculture will manage all cases of livestock exposed to potentially rabid animals. Herbivore-to-herbivore animal transmission of rabies, or having more than one rabid animal in a herd is rare, so restriction on a whole herd if one animal tests positive for rabies is usually not required.

Horses or livestock animals currently vaccinated with a rabies vaccine approved for that species and exposed to a rabid animal should be revaccinated as soon as possible and closely observed for 45 days. Unvaccinated livestock can be safely slaughtered within 7 days of being bitten by a rabid animal. If the owner is unwilling to have this done, the exposed animal can be restricted and kept under close observation for 6 months.

OWNED EXOTIC ANIMALS

Other types of mammals bitten by a rabid animal will likely be subject to euthanasia. Rare or threatened animal species will be evaluated on a case-by-case basis.

**VIII. TEXT OF OKLAHOMA STATE DEPARTMENT OF HEALTH
ZONOTIC DISEASE CONTROL RULES, OAC TITLE 310,
CHAPTER 599
EFFECTIVE BY PERMANENT RULES ADOPTION 7/13/00**

SUBCHAPTER 1. GENERAL PROVISIONS

310:599-1-1. Purpose

Pursuant to the authority contained in 63 O.S., Supp. 1996, Section 1-508 et seq., the purpose of these sections is to protect the public health by establishing uniform rules for the prevention and control of zoonotic diseases in the state of Oklahoma.

310:599-1-2. Definitions

The following words and terms, when used in this chapter, shall have the following meanings, unless the context clearly indicates otherwise:

“**Animal**” means any warm-blooded mammal.

“**Cat**” means any *Felis catus*.

“**Currently vaccinated**” means properly immunized by or under the supervision of a licensed veterinarian with an antirabies vaccine licensed and approved by the United States Department of Agriculture for use in that animal species, or meeting conditions specified in OAC 310:599-3-8. Vaccine must have been given at appropriate time interval(s) for the age of the animal and type of vaccine administered.

“**Department**” means the Oklahoma State Department of Health.

“**Department designee**” means an employee of the Oklahoma State Department of Health, or a county health department, who is acting within their scope of rabies control authority designated through the Commissioner of Health.

“**Dog**” means any *Canis familiaris*, excluding hybrids.

“**Domestic animal**” means a companion animal including dogs, cats, and ferrets; an equine animal; or a livestock animal.

“**Euthanize**” means the humane killing of an animal generally performed by a veterinarian, or personnel at an animal control facility under the indirect supervision of a veterinarian.

“**Exposure to rabies**” means a bite or physical contact with the saliva or other potentially infectious tissues from an animal confirmed or suspected of being infected with rabies.

“**Ferret**” means any *Mustela putorius furo*.

“**First party ownership**” means a situation where the owner of a biting animal is directly related to the bite victim, that is parent-child, sibling-sibling, grandparent-child; or when the legal residence of the animal owner and the bite victim are the same.

“**Home quarantine**” means confinement and observation of an animal allowed at the animal owner’s property for a specified time period, where one of the following acceptable methods of confinement for a dog are used: (a) complete indoor housing, (b) caging or kenneling in an enclosure with a securely latched door, or (c) yard confinement with perimeter fencing that the dog is unable to climb over or dig under. Acceptable methods of confinement for a cat or ferret are: (a) complete indoor housing, or (b) caging in an enclosure that prevents escape. The animal’s needs for ambient temperature control, water, nutrition, elimination, and space to comfortably stand up and lie down must be adequately provided by the selected confinement method. Should the animal exhibit neurologic signs, die, or disappear during the specified period, an Oklahoma licensed veterinarian and the Department shall be immediately notified.

“Hybrid” means an offspring of wild animals crossbred to domestic dogs or cats; considered to be wild animals in the enforcement of OAC 310:599.

“Quarantine” means physical confinement of an animal during a specified time period when the animal is monitored for the development of disease. During this time period, the animal is prevented from having contact with other animals, and human contact is limited to as few caretakers as possible.

“Rabies” means an acute disease of humans and warm-blooded mammals caused by the rabies virus (genus *Lyssavirus*) that affects the central nervous system and is almost always fatal.

“Recognized animal control facility” means any facility operating for the purpose of stray animal control and/or animal welfare that is under contract or letter of agreement which identifies a licensed veterinarian responsible for animal quarantines.

“Recognized zoological park” means any member of the American Association of Zoological Parks.

“Severe injury” means any physical injury that results in broken bones or lacerations requiring multiple sutures or cosmetic surgery. [4 O.S. Supp. 1991, 44 (3)]

“Wild animal” means an animal considered as wildlife; any animal not normally adapted to live in intimate association with humans nor raised for consumption by humans.

“Zoonotic disease” means a disease that is transmissible from animals to humans under natural conditions.

310:599-1-3. Disposal of remains of a disease suspect animal

When a veterinarian provides the service of head removal and preparation of any animal specimen for testing of a zoonotic disease regulated under this chapter, it shall be the responsibility of the veterinarian to properly dispose of the body remains of the disease suspect animal in a manner that will prevent any potential future exposure by any person or other animal to that animal’s tissues. The veterinarian is entitled to charge and collect the usual and customary fees for the disposal service.

310:599-1-4. Responsibility for costs incurred

Payment of fees incurred for daily boarding, euthanasia, preparation and transport of specimens for laboratory testing, or any other costs incurred to comply with Chapter 310:599 shall be the responsibility of the person or entity owning, keeping, or harboring the animal. If the animal is a stray or wild animal without a custodian, the bite victim or their legal guardian shall be responsible for payment.

SUBCHAPTER 3. RABIES CONTROL

310:599-3-1. Management of dogs, cats, or ferrets that bite a person

- a) Any person or entity owning, harboring, or keeping a dog, cat, or ferret which in the preceding ten (10) days has bitten any person, shall upon receipt of written notice by the local animal control authority or Department designee, place such animal in quarantine under the supervision of a licensed veterinarian for a period of ten (10) days from the date the person was bitten. The impoundment and observation of the dog, cat, or ferret shall be conducted at the veterinarian’s facility, or a recognized animal control facility. Unvaccinated animals shall be vaccinated against rabies on the final day of the ten (10) day observation period prior to discharge from the veterinarian's supervision.
- b) Exceptions to this rule include the following circumstances:
 1. Dogs, cats, or ferrets involved in a first party ownership may be allowed to be placed in a home quarantine for a ten (10) day period immediately following the bite.

2. Dogs, cats, and ferrets meeting the criteria of currently vaccinated against rabies, and not inflicting a severe injury, shall be placed in a home quarantine until the end of a ten (10) day period from the bite. In some instances, a certification of animal health obtained after examination by a licensed veterinarian of the tenth day may be required by the Department or local animal control authority.
3. Animals in service to the blind or hearing-impaired, and search and rescue dogs or other animals used for police enforcement duties shall be exempt from the quarantine when a bite exposure occurs and proper record of immunization against rabies is presented. A certification of animal health obtained after examination by a licensed veterinarian at the end of 10 days may be required by the Department.
4. Stray or unwanted dogs, cats, or ferrets that have bitten any person may either be quarantined for ten (10) days at a veterinary facility or a recognized animal control facility; or immediately euthanized and the brain tissue submitted to the State Department of Health Laboratory for rabies testing. Upon successful completion of the ten (10) day period, a stray animal may be placed for adoption at the discretion of the animal control authority.
5. In rare instances, other good and valid health reasons of the owner or the animal may be considered for justification to home quarantine (e.g., a bitch with a litter of very young puppies, an animal with a contagious disease, etc.) Approval for home quarantine will be determined by the Department or its designee.

310:599-3-2. Supervising veterinarian's responsibility

It shall be the duty of the veterinarian in whose supervision the dog, cat, or ferret is placed to keep the animal isolated and secured in a separate cage or kennel and under observation for any symptoms of rabies. The veterinarian shall report immediately to the Department designee any changes occurring in the condition of the dog, cat, or ferret. In the event the animal being observed dies, or develops rabies-like symptoms within the specified period of confinement, the head of the animal shall be removed immediately and packed in a shipping container in accordance with instructions published on the rabies laboratory form, ODH Form 460, and sent to the State Department of Health Laboratory, 1000 N.E. Tenth Street, Oklahoma City, Oklahoma 73117-1299, for rabies testing.

310:599-3-3. Severe bite wounds inflicted

In special circumstances involving a bite to any person, the Commissioner of health, or a specifically designated representative, may require the immediate euthanasia of a specified animal for the performance of rabies diagnostics. "Special circumstances" refers to multiple and severe bite wounds, or deep punctures or lacerations to the face, head, or neck. Such requirement for euthanasia will be made following investigation of the bite report by the Department designee.

310:599-3-4. Management of other animals that bite a human

- a) The final decision for animal destruction, quarantine, or other disposition of any animal other than a dog, cat, or ferret that bites a person, or otherwise potentially exposes a person to rabies shall be determined through the Department. The decision will consider, but not be limited to:
 1. The epidemiology and risk of rabies in the species of animal in question;
 2. Possible prior exposure to a rabies vector;
 3. Behavior of the animal at the time of the bite;
 4. Prior rabies vaccinations; and
 5. Other circumstances that may exist.

- b) In some situations, the Department will consider the initiative and willingness of the individual so exposed to submit to postexposure antirabies immunization after being adequately informed of all potential risks.
- c) Any biting animal determined to be at significant risk for the transmission of rabies shall upon written order by the Commissioner of Health, or a specifically designated representative, be humanely killed and the brain tissue submitted to the State Department of Health Laboratory for rabies testing.
- d) The Department may order the quarantine of an animal, determined to be at very low risk for the transmission of rabies, for a thirty (30) day observation period as an alternate method to euthanasia and testing.

310:599-3-5. Vaccinated domestic animals exposed to a rabid animal

Any domestic animal which is currently vaccinated against rabies and is exposed to a rabid animal shall be revaccinated within three (3) days of notification and isolated, by leashing or confinement under the owner's supervision, for a period of at least forty-five (45) days.

310:599-3-6. Unvaccinated domestic animals exposed to a rabid animal

- a) Any dog, cat, or ferret which is not currently vaccinated against rabies and is exposed to a rabid animal shall be:
 - 1. Euthanized immediately either by a veterinarian of the owner's choice, or the local animal control officer or his/her agent; or
 - 2. Placed in strict quarantine and observed for a period of six (6) months under the supervision of a licensed veterinarian, either at a veterinary facility or a recognized animal control facility. The exposed animal shall be immediately vaccinated against rabies upon entry into quarantine and then given booster vaccinations at the third and eighth week of the quarantine period. Animals less than 16 weeks of age at the time of entry into quarantine may be required to receive a booster vaccine in addition to the above protocol.
- b) Any livestock or equine animal which is not currently vaccinated and is exposed to a rabid animal will be managed according to the most current Compendium of Animal Rabies Control published by the National Association of State Public Health Veterinarians, Inc., and any State Department of Agriculture guidelines that may apply.

310:599-3-8. Record of recognized rabies vaccination

- a) Record of vaccination by a veterinarian must be provided to determine that animal to be currently vaccinated against rabies. Veterinarians shall be required to keep a record of a rabies vaccination for a minimum period of three (3) years. This record must include: name, address, and telephone number of the owner of the animal; date of vaccination; animal identification; brand name of vaccine used, vaccine expiration date, and producer of vaccine.
- b) Three year immunity conferred by the second or subsequent boosters with a three year rabies vaccine will be recognized in the enforcement of OAC 310:599.

310:599-3-9. Administration of rabies vaccine

- a) It is prohibited for anyone to administer rabies vaccine to any animal unless said vaccine is licensed for use in the particular animal species in question. Exceptions to this include:
 - 1. The vaccination of wolf-dog hybrids with a rabies vaccine approved for dogs; or
 - 2. Use at recognized nonprofit zoological parks, or research institutions; or
 - 3. Special approval by the Commissioner of Health permitting the vaccination in a particular species where the preponderance of scientific literature suggests vaccine efficacy, and vaccine usage is determined to protect public health and safety.

- b) Animals vaccinated per these exceptions will still be considered as a wild animal species if involved in a bite to a person, and will be handled according to OAC 310:599-3-4.
- c) Rabies vaccines presently licensed are listed in the most current Compendium of Animal Rabies Control published annually by the National Association of State Public Health Veterinarians. Copies shall be available from the Communicable Disease Division, Oklahoma State Department of Health, 1000 N.E. Tenth Street, Oklahoma City, Oklahoma 73117-1299.

310:599-3-9.1. Required immunization of dogs, cats, and ferrets

- a) The owner or custodian of a domestic dog, cat, or ferret shall cause the animal to be vaccinated against rabies by the time the animal is four months of age and at regular intervals thereafter according to the label directions of an approved rabies vaccine for use in that species, or as prescribed by ordinances or rules adopted by a municipality within whose jurisdiction the animal owner resides.
- b) A veterinarian who administers or supervises the rabies vaccination of a dog, cat, or ferret shall issue to the animal's owner/custodian a vaccination certificate that meets the minimum standards set forth in OAC 310:599-3-7. Animal identification including, but not limited to species, gender, age, and predominant breed and coloring must be indicated on the vaccination certificate.

310:599-3-12. Consumer notification required for over-the-counter rabies vaccine sales

Each supplier or retailer of over-the-counter (OTC) animal rabies vaccine for administration by any person other than a licensed veterinarian shall post notification to the consumer that only the records of a licensed veterinarian will be acceptable documentation of a rabies vaccination in the application of requirements in OAC Chapter 310:599. The standard written notice shall be obtained from the Department and posted directly over, or near the retail location of the OTC rabies vaccine in a manner that the text of the notice is easily visualized by consumers.

APPENDIX

RABIES PREVENTION IN OKLAHOMA 2005 Edition

Distribution of Major Terrestrial Reservoirs of Rabies in the United States



Figure 1. Different “strains” of rabies virus are present in different regions of the United States. All mammals are susceptible to infection with any strain of rabies virus, but a particular strain adapts to one kind of animal which allows it to persist in nature. Therefore, the highest incidence of rabid raccoons occurs where the raccoon rabies viral variant is found (eastern U.S.); whereas skunks are the most frequent rabid animal in the central U.S.

Table 1T. Incidence of Terrestrial Animals Rabies by County, 1995-2004

County	95	96	97	98	99	00	01	02	03	04	Total	%	Rank
Adair			1					1	1		3	0.33	26
Alfalfa	1		1				1		3	1	7	0.77	22
Atoka			2	7	12	2	1	2	5		31	3.41	5
Beaver										2	2	0.22	27
Beckham									16	6	22	2.42	11
Blaine							1	1	3	2	7	0.77	22
Bryan	2	1	5		1			1	7	2	19	2.09	14
Caddo	1		1		1		2		1	1	7	0.77	22
Canadian	9			4		1	1	2	3	7	27	2.97	8
Carter	1	6	6	3	6	1	2	2	3	2	32	3.52	4
Cherokee											0	0.00	
Choctaw			7	2	2	3		4	4		22	2.42	11
Cimarron											0	0.00	
Cleveland					5	2	1	3	5	5	21	2.31	12
Coal			1		2				1		4	0.44	25
Comanche					1				1		2	0.22	27
Cotton					1	1				1	3	0.33	26
Craig									1	2	3	0.33	26
Creek			2	5	2		1		1	1	12	1.32	18
Custer					2	1	1		3		7	0.77	22
Delaware	1	1	2	3					1	1	9	0.99	20
Dewey									2	1	3	0.33	26
Ellis									3	6	9	0.99	20
Garfield	1						2	10	8	7	28	3.08	7
Garvin		5	13	2	1	1			1	7	30	3.30	6
Grady	1	2	2	2	1	4	3	1	2	2	20	2.20	13
Grant						1		3	1		5	0.55	24
Greer						1	1	1	1		4	0.44	25
Harmon							1		1	2	4	0.44	25
Harper									1		1	0.11	28
Haskell			4	6		2	2	1	1		16	1.76	15
Hughes			1	2	1	2	1	1	2		10	1.10	19
Jackson						1		3	1	2	7	0.77	22
Jefferson	2		3	1	1						7	0.77	22
Johnston	1	1	6	4	3			6	4	1	26	2.86	9
Kay			2	1			1	1			5	0.55	24
Kingfisher	1	1	1	1	1	2		4		1	12	1.32	18
Kiowa									1		1	0.11	28
Latimer					1		1	1		1	4	0.44	25
LeFlore	1	1	4	2	3		2	9	2	1	25	2.75	10

Table 1T. Incidence of Terrestrial Animals Rabies by County, 1995-2004

County	95	96	97	98	99	00	01	02	03	04	Total	%	Rank
Lincoln		1	5	9		3		5	7	1	31	3.41	5
Logan		1	3	1	3	2	4	8	3		25	2.75	10
Love			1	1	1	3		2	1		9	0.99	20
McClain		1	3	3	2	1	3	2	1		16	1.76	15
McCurtain					1	4		2	1	1	9	0.99	20
McIntosh					1					1	2	0.22	27
Major				1				1	9	2	13	1.43	17
Marshall			3	1			1		1	1	7	0.77	22
Mayes										1	1	0.11	28
Murray	1	3	3	1	3	1			2	1	15	1.65	16
Muskogee											0	0.00	
Noble			1		1		1	2		1	6	0.66	23
Nowata	2			2					1	1	6	0.66	23
Okfuskee			1	1	1			1	1	3	8	0.88	21
Oklahoma		1	4	4	2	2	5	7	7	7	39	4.29	3
Okmulgee				1	2	1			1		5	0.55	24
Osage				1		1		1	3	1	7	0.77	22
Ottawa											0	0.00	
Pawnee											0	0.00	
Payne		4	9	6	2	2	3	2	8	3	39	4.29	3
Pittsburg			1	4	3	1	6	3	9	1	28	3.08	7
Pontotoc		3	6	6	4	4	4	3	10	1	41	4.51	2
Pottawat.			1	9	12	3	3	8	6	5	47	5.16	1
Pushmat.				1	2		1	3	3	2	12	1.32	18
Roger Mills									15	1	16	1.76	15
Rogers					1						1	0.11	28
Seminole			2	1	3	1		9	3		19	2.09	14
Sequoyah								1	3		4	0.44	25
Stephens	4	2	3	6					1		16	1.76	15
Texas									1		1	0.11	28
Tillman						2			3		5	0.55	24
Tulsa										1	1	0.11	28
Wagoner											0	0.00	
Washing.	1			2			1			3	7	0.77	22
Washita	1								1	1	3	0.33	26
Woods								1	3	1	5	0.55	24
Woodward		1							3	6	10	1.10	19
Total	31	35	110	106	91	56	57	118	197	110	910		

RABIES

SEE INSTRUCTIONS ON BACK

Please Print

Complete this form to the **LABORATORY USE ONLY AREA** as completely and accurately as possible since a copy will be returned to you as a laboratory report.

SENDER _____	VETERINARIAN _____
Address _____	Address _____
City _____ Zip _____	City _____ Zip _____
County _____ Telephone (____) _____	County _____ Telephone (____) _____
After-Hours Telephone (____) _____	After-Hours Telephone (____) _____
OWNER (if different from Sender) _____	
Address _____	City _____ Zip _____
County _____ Telephone (____) _____	After-Hours Telephone (____) _____

SENT VIA: Courier Hand Carried By _____ Other _____
 Date Sent: _____ # animals enclosed _____

ANIMAL Please check appropriate box

- Cat
- Cow Gender/Breed _____
- Dog Breed _____
- Horse Gender/Breed _____
- Skunk
- Other _____

Age of Animal _____

Dates of Vaccination _____

Vaccination History

Please check appropriate box

Rabies _____

EEE/WEE
 (Horses Only)

Was animal sick? No Yes If Yes How long? _____
 Details of Illness (symptoms) _____

Date Animal Died: _____

Exposure Information is Required Before Test Will Be Performed

LIST ANY PERSON OR ANIMAL BITTEN OR OTHERWISE IN CONTACT WITH SALIVA OR NEUROLOGIC TISSUE

Name of Exposed	Address	Phone	Age	Type of Exposure

Send Report to:

Sender Veterinarian Owner

DO NOT WRITE BELOW THIS LINE LABORATORY USE ONLY

Results

- Negative** No evidence of rabies was found by the fluorescent rabies antibody test.
- Positive** Evidence of rabies was found by the fluorescent rabies antibody test.
- Unsatisfactory**
 - Skull crushed
 - Brain decomposed
 - Other _____

Laboratory No. _____
Date Tested _____
Date Reported _____

Remarks _____

Figure 2.

DIRECTIONS FOR THE COLLECTION AND SUBMISSION OF ANIMAL HEADS TO THE LABORATORY FOR RABIES EXAMINATION

SPECIMEN PREPARATION

1. Live animals must not be submitted to the laboratory for examination.
2. **NO ANIMAL SHOULD BE KILLED BY CLUBBING OR SHOOTING IN THE HEAD SINCE THE INTACT BRAIN IS NEEDED FOR EXAMINATION.**
3. The head must be removed from the body (except for small animals which measure 12 inches or less in length, exclusive of tail) and placed in a leak-proof container. If the head has sharp protuberances (shattered bone, quills, etc.) first wrap the specimen in several layers of newspaper before placing in a plastic bag.
4. Specimen should be shipped within 24 hours of euthanasia. All specimens should be refrigerated before and during shipment. Frozen cold pack maybe used to provide refrigeration during transport.

If commercial transportation to the Oklahoma State Department of Health will not be available for more than 24 hours, the following procedures are recommended:

- a. A private individual following instructions above may bring the specimen to OSDH.
 - b. If alive, euthanasia of the suspect animal may delayed until shortly before pick up.
5. One Rabies Form 460 should be sent for each animal.
 6. **DO NOT SEND** specimens preserved in formalin or other chemical preservative to the Public Health Laboratory since examination of histological sections are not performed.

Caution: FREEZING SPECIMENS FOR RABIES TESTING IS NOT RECOMMENDED. The freeze-thaw process may delay testing and soften the brain resulting in an unsatisfactory report.

SHIPPING INSTRUCTIONS ***SHIP BY MOST RAPID METHOD AVAILABLE***

Shipping containers for animal heads other than cattle and horses* are furnished to the local health departments and veterinarians upon request. The OSDH Rabies shipping containers consist of:

1. A cardboard box with a leak-proof plastic bag liner.
2. Re-freezeable cold packs. **DO NOT PACK WITH WET ICE.**
3. Insulation material and an outer sleeve for transport.

***The brain from large animals such as cattle and horses should be removed before transport.**

Specimens should be hand-carried or shipped by Ala Carte Courier Service** or Beaver Express** to:

Rabies Laboratory
Oklahoma State Department of Health
1000 Northeast 10th Street
Oklahoma City, Oklahoma 73117

Shipping charges to be paid by sender. DO NOT SHIP SPECIMENS BY PARCEL POST or by bus. During working hours (8:00 a.m.- 4:30 p.m.) animal heads are received in Shipping and Receiving area Room B-37. After hours, weekends, and holidays, specimens must be received and logged in by the Security Guard. Enter the building through the loading dock on the east of the building facing Stonewall Avenue to locate Room B78, or the Security Guard. For after-hours delivery, use the buzzer alarm button next to the door on the loading dock to summon the guard on duty.

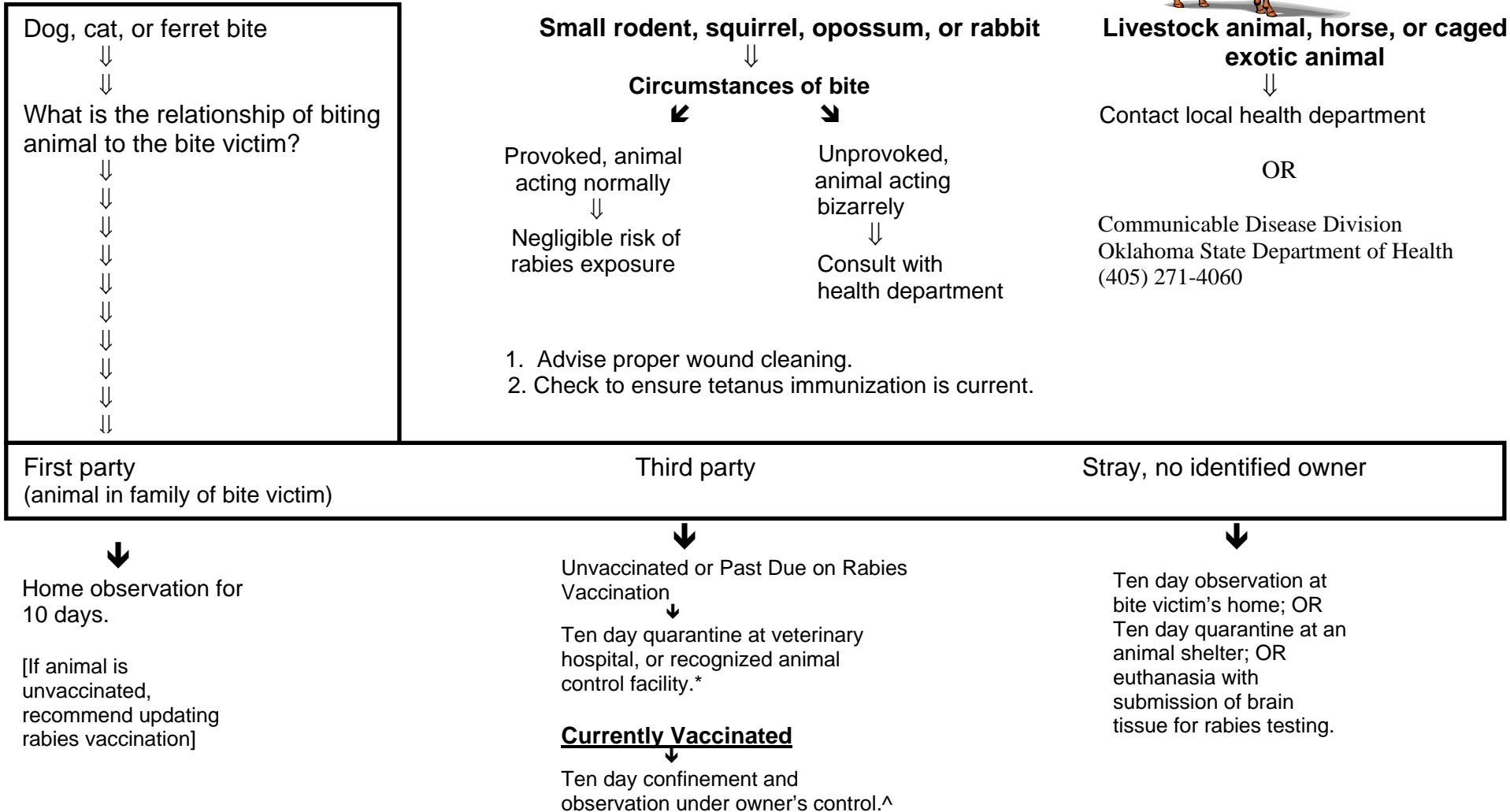
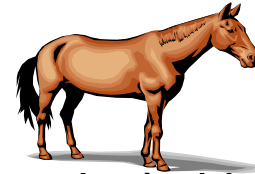
**Use of trade name is for identification only and does not constitute endorsement by the Oklahoma State Department of Health.

LABORATORY REPORTS

Routine laboratory testing is performed Monday- Saturday. Reports on animal heads received by 11:00 a.m. are usually available by 4:00 pm-4: 30 p.m. of the same day. Reports on heads received after 11:00 a.m. are available by 4:00 p.m. to 4:30 p.m. of the next working day. Telephone reports are made routinely on all positive specimens and on all specimens that were unsatisfactory for testing. Written reports are mailed on all specimens when each examination is complete. Telephone reports on negative animals are made when requested on Rabies ODH Form 460. Negative reports are telephoned collect. For information regarding specimens and laboratory reports call: 405-271-5070, from 8:00 a.m.- 4:30 p.m., Monday through Friday and 405-271-4060 after working hours, nights, weekends, and holidays.

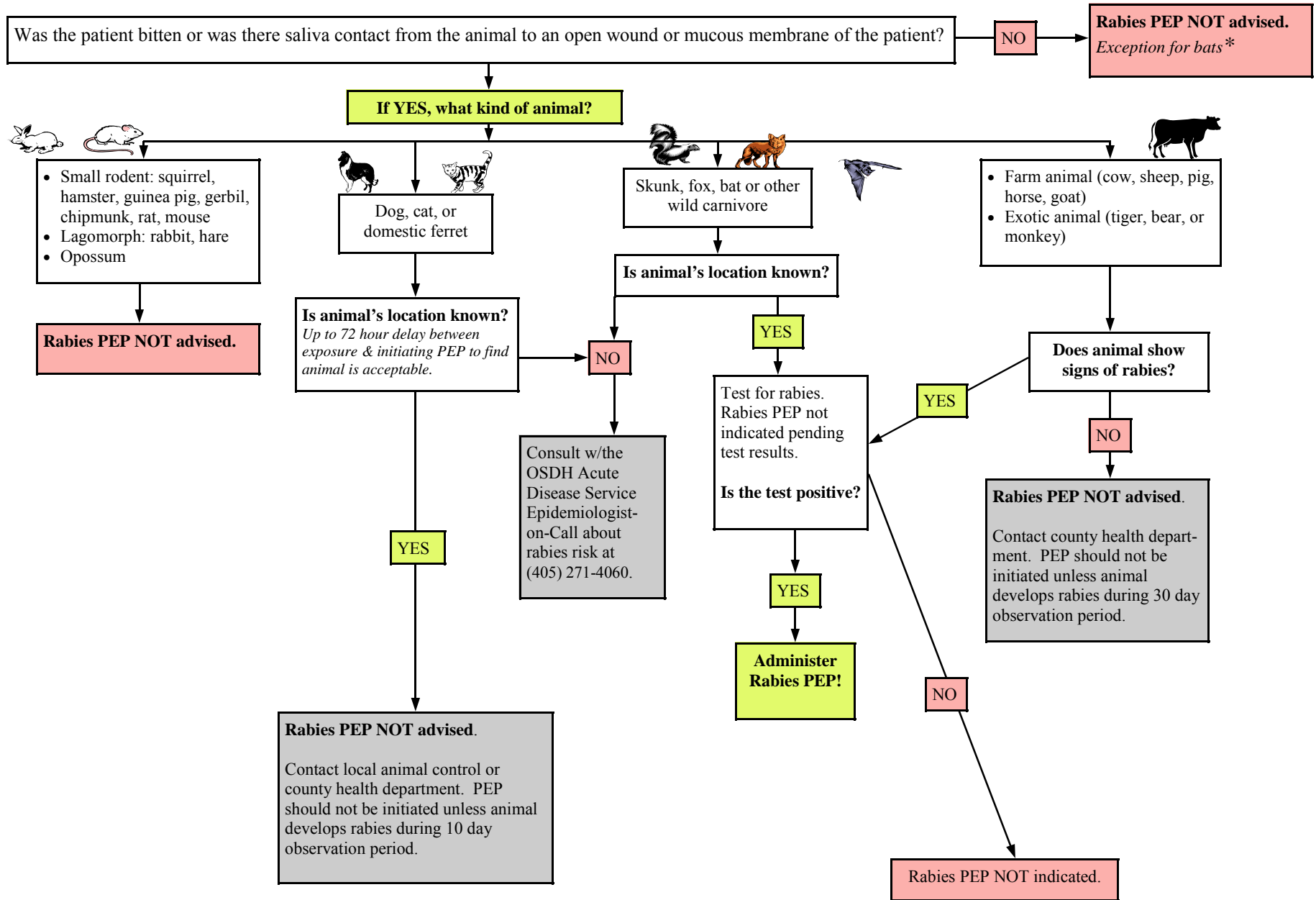
Figure 3:

ANIMAL BITE ALGORITHM FOR ANIMAL CONTROL PERSONNEL



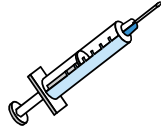
* Dogs involved in severe and deeply penetrating bites above the shoulders may be required to be euthanized for rabies testing in lieu of the 10-day quarantine.
^ Animals inflicting severe bites must be quarantined at a veterinary hospital or recognized animal control facility at minimum.

RABIES POSTEXPOSURE PROPHYLAXIS (PEP) ASSESSMENT ALGORITHM



* Bats pose particular risks and rabies transmission has occurred in the absence of a recognized bite. Therefore, every effort should be made to capture and test the bat involved in the exposure incident. If the patient can provide adequate history that no direct exposure occurred, then no treatment is necessary. If the patient is an unobserved child, or a person who was asleep, intoxicated, or mentally challenged, then PEP may be indicated. Consult w/ the OSDH Acute Disease Service Epidemiologist-on-Call by calling (405) 271-4060.

RABIES BIOLOGICS FOR POSTEXPOSURE PROPHYLAXIS, UNITED STATES, 2008



Human Rabies Vaccine

Rabies Vaccine, human diploid cell vaccine (HDCV)
Intramuscular..... Imovax®Rabies

Rabies vaccine, purified chicken embryo cell (PCEC)
Intramuscular..... Rabavert®

Rabies Immune Globulin (RIG)

Rabies immune globulin, human (HRIG)
..... Imogam®Rabies - HT

..... HyperRab™ S/D

Manufacturer

Sanofi Pasteur
Phone: 800-822-2463
www.vaccineplace.com/products

Novartis Vaccines and
Diagnostics
Phone: 800-244-7668
www.rabavert.com

Sanofi Pasteur
Phone: 800-822-2463
www.vaccineplace.com/products/

Talecris Biotherapeutics
Bayer Biological Products
Phone: 800-243-4153
www.talecris-pi.info.



RABIES POSTEXPOSURE PROPHYLAXIS SCHEDULE

Vaccination Status	Treatment	Regimen*
Not Previously Vaccinated	Local wound cleansing HRIG Vaccine	All postexposure treatment should begin with immediate thorough cleansing of all wounds with soap and water. If available, a virucidal agent such as a povidone-iodine solution should be used to irrigate the wounds. 20 IU/kg body weight. If anatomically feasible, the full dose should be infiltrated around the wound(s) and any remaining volume should be administered IM at an anatomical site distant from vaccine administration. Also, HRIG should not be administered in the same syringe as vaccine. Because HRIG may partially suppress active production of antibody, no more than the recommended dose should be given. HDCV or PCEC 1.0ml, IM (deltoid area ±), one each on days 0, 3, 7, 14, and 28.
Previously Vaccinated Δ	Local wound cleansing HRIG Vaccine	All postexposure treatment should begin with immediate thorough cleansing of all wounds with soap and water. If available, a virucidal agent such as a povidone-iodine solution should be used to irrigate the wounds. HRIG should not be given. HDCV or PCEC 1.0 ml, IM (deltoid area±), one each on days 0 and 3.



For further information, call or visit us on the World Wide Web.
Acute Disease Service
Oklahoma State Department of Health
Phone (405) 271-4060
<http://ads.health.ok.gov>

* These regimens are applicable for all age groups, including children.
± The deltoid area is the only acceptable site of vaccination for adults and older children. For younger children, the outer aspect of the thigh may be used. Vaccine should never be administered in the gluteal area.
Δ Any person with a history of pre-exposure vaccination with HDCV or PCEC; prior postexposure prophylaxis with HDCV, RVA, or PCEC; or previous vaccination with any other type of rabies vaccine and a documented history of antibody response to the prior vaccination

Table 2. Contacts and Information for Animal-Related Questions

For information on animal diseases transmitted to humans:

OK State Dept. of Health, State Public Health Veterinarian
Kristy K. Bradley, DVM, MPH (405) 271-4060

For questions about interstate/international movement of animals, testing requirements, and health certificates:

Animal Industry Services, Oklahoma Department of Agriculture (405) 522-6134

For listing of wildlife rehabilitators or questions about wildlife:

Oklahoma Department of Wildlife Conservation (405) 521-2739

To report illegal wildlife activities or unpermitted confinement:

Operation Game Thief (800) 522-8039
Law Enforcement Division, OK Dept. of Wildlife Conservation (405) 521-3719

For reporting of adverse reactions to animal rabies vaccine:

USDA Veterinary Biologics and Diagnostics Hotline 1-800-752-6255

For educational materials on dog bite prevention or safe livestock handling:

Oklahoma Veterinary Medical Association (405) 478-1002
American Veterinary Medical Association www.avma.org

For animal damage control (starlings, cattle egrets, etc.):

OK Dept. of Agriculture, Animal Damage Control Division (405) 521-3864

For information on shipping pets on airlines:

USDA Voice Response Service (800) 545-8732

For toxicology inquiries:

ASPCA National Animal Poison Control Center Hotline (888) 426-4435
(Fee of \$50 charged per case. Only credit cards are accepted for payment; any follow-up calls on the same case are included in the fee.)

National Pesticide Telecommunications Network (800) 858-7377

Pet Loss Support Hotlines:

614-292-1823; e-mail: petloss@osu.edu – Staffed by the Ohio State University veterinary medicine students

1-888-ISU-PLSH (1-888-478-7574) – Staffed by Iowa State University veterinary medicine students and volunteers

217-244-2273 (CARE) or 877-394-2273 – Staffed by University of Illinois veterinary students



TABLE 3

County Health Department	City	Phone
ADAIR COUNTY HEALTH DEPARTMENT	Stilwell	(918) 696-7292
ALFALFA COUNTY C/O GARFIELD COUNTY	Enid	
ATOKA COUNTY HEALTH DEPARTMENT	Atoka	(580) 889-2116
BEAVER COUNTY HEALTH DEPARTMENT	Beaver	(580) 625-3693
BECKHAM COUNTY HEALTH DEPARTMENT	Sayre	(580) 928-5551
	Enid	(580) 225-1173
BLAINE COUNTY HEALTH DEPARTMENT	Watonga	(580) 623-7977
BRYAN COUNTY HEALTH DEPARTMENT	Durant	(580) 924-4285
CADDO COUNTY HEALTH DEPARTMENT	Anadarko	(405) 247-2507
CANADIAN COUNTY HEALTH DEPARTMENT	Ek Reno	(405) 262-0042
	Yukon	(405) 354-4872
CARTER COUNTY HEALTH DEPARTMENT	Ardmore	(580) 223-9705
	Healdton	(580) 229-1291
CHEROKEE COUNTY HEALTH DEPARTMENT	Tahlequah	(918) 456-8826
CHOCTAW COUNTY HEALTH DEPARTMENT	Hugo	(580) 326-8821
CIMMARON COUNTY HEALTH DEPARTMENT		Call Texas CHD
CLEVELAND COUNTY HEALTH DEPARTMENT	Norman	(405) 321-4048
	Moore	(405) 794-1591
COAL COUNTY HEALTH DEPARTMENT	Coalgate	(580) 927-2367
COMANCHE COUNTY HEALTH DEPARTMENT	Lawton	(580) 248-5890
COTTON COUNTY HEALTH DEPARTMENT	Walters	(580) 875-6121
CRAIG COUNTY HEALTH DEPARTMENT	Vinita	(918) 256-7531
CREEK COUNTY HEALTH DEPARTMENT	Sapulpa	(918) 224-5531
	Drumright	(918) 352-9581
	Bristow	(918) 367-3341
CUSTER COUNTY HEALTH DEPARTMENT	Clinton	(580) 323-2100
	Weatherford	(580) 772-6417
DELAWARE COUNTY HEALTH DEPARTMENT	Jay	(918) 253-4511
DEWEY COUNTY HEALTH DEPARTMENT	Dewey	Call Blaine CHD
ELLIS COUNTY HEALTH DEPARTMENT		Call Woodward CHD
GARFIELD COUNTY HEALTH DEPARTMENT	Enid	(580) 233-0650
GARVIN COUNTY HEALTH DEPARTMENT	Pauls Valley	(405) 238-7346
	Lindsay	(405) 756-2928
GRADY COUNTY HEALTH DEPARTMENT	Chickasha	(405) 224-2022
GRANT COUNTY HEALTH DEPARTMENT	Medford	(580) 395-2906
GREER COUNTY HEALTH DEPARTMENT	Mangum	(580) 782-5531
HARMON COUNTY HEALTH DEPARTMENT	Hollis	(580) 688-3348
HARPER COUNTY HEALTH DEPARTMENT	Laverne	(580) 921-2029

County Health Department	City	Phone
	Buffalo	(580) 735-6100
HASKELL COUNTY HEALTH DEPARTMENT	Stigler	(918) 967-3304
HUGHES COUNTY HEALTH DEPARTMENT	Holdenville	(405) 379-3313
JACKSON COUNTY HEALTH DEPARTMENT	Altus	(580) 482-7308
JEFFERSON COUNTY HEALTH DEPARTMENT	Waurika	(580) 228-2313
JOHNSTON COUNTY HEALTH DEPARTMENT	Tishomingo	(580) 371-2470
KAY COUNTY HEALTH DEPARTMENT	Ponca City	(580) 762-1641
	Blackwell	(580) 363-5520
KINGFISHER COUNTY HEALTH DEPARTMENT	Kingfisher	(405) 375-3008
KIOWA COUNTY HEALTH DEPARTMENT	Hobart	(580) 726-3316
LATIMER COUNTY HEALTH DEPARTMENT	Wilburton	(918) 465-5673
LeFLORE COUNTY HEALTH DEPARTMENT	Poteau	(918) 647-8601
	Talihina	(918) 567-2141
LINCOLN COUNTY HEALTH DEPARTMENT	Chandler	(405) 258-2640
LOGAN COUNTY HEALTH DEPARTMENT	Guthrie	(405) 282-3485
LOVE COUNTY HEALTH DEPARTMENT	Marietta	(580) 276-2531
McCLAIN COUNTY HEALTH DEPARTMENT	Purcell	(405) 527-6541
	Blanchard	(405) 485-3319
McCURTAIN COUNTY HEALTH DEPARTMENT	Idabel	(580) 286-6620
McINTOSH COUNTY HEALTH DEPARTMENT	Eufaula	(918) 689-7774
	Checotah	(918) 473-5416
MAJOR COUNTY HEALTH DEPARTMENT	Fairview	(580) 227-3362
MARSHALL COUNTY HEALTH DEPARTMENT	Madill	(580) 795-3705
MAYES COUNTY HEALTH DEPARTMENT	Pryor	(918) 825-4224
MURRAY COUNTY HEALTH DEPARTMENT	Sulphur	(580) 622-3716
MUSKOGEE COUNTY HEALTH DEPARTMENT	Muskogee	(918) 683-0321
NOBLE COUNTY HEALTH DEPARTMENT	Perry	(580) 336-2257
NOWATA COUNTY HEALTH DEPARTMENT		Call Rogers CHD
OKFUSKEE COUNTY HEALTH DEPARTMENT	Okemah	(918) 623-1800
CITY-CO HEALTH DEPT OF OKLAHOMA CO	Oklahoma City	(405) 427-8651
OKMULGEE COUNTY HEALTH DEPARTMENT	Okmulgee	(918) 756-1883
	Henryetta	(918) 652-8250
	Beggs	(918) 267-3606
OTTAWA COUNTY HEALTH DEPARTMENT	Miami	(918) 540-2481
PAWNEE COUNTY HEALTH DEPARTMENT	Pawnee	(918) 762-3643
	Cleveland	(918) 358-2546
PAYNE COUNTY HEALTH DEPARTMENT	Stillwater	(405) 372-8200
	Cushing	(918) 225-3377
PITTSBURG COUNTY HEALTH DEPARTMENT	McAlester	(918) 423-1267
PONTOTOC COUNTY HEALTH DEPARTMENT	Ada	(580) 332-2011

County Health Department	City	Phone
POTTAWATOMIE COUNTY HEALTH DEPARTMENT	Shawnee	(405) 273-2157
PUSHMATAHA COUNTY HEALTH DEPARTMENT	Antlers	(580) 298-6624
	Clayton	(918) 569-7973
ROGER MILLS COUNTY HEALTH DEPARTMENT		Call Beckham CHD
ROGERS COUNTY HEALTH DEPARTMENT	Claremore	(918) 341-3166
SEMINOLE COUNTY HEALTH DEPARTMENT	Wewoka	(405) 257-5401
	Seminole	(405) 382-4369
SEQUOYAH COUNTY HEALTH DEPARTMENT	Sallisaw	(918) 775-6201
STEPHENS COUNTY HEALTH DEPARTMENT	Duncan	(580) 252-0270
TEXAS COUNTY HEALTH DEPARTMENT	Guymon	(580) 338-8544
TILLMAN COUNTY HEALTH DEPARTMENT	Frederick	(580) 335-2163
TULSA CITY-COUNTY HEALTH DEPARTMENT	Tulsa	(918) 582-9355
WAGONER COUNTY HEALTH DEPARTMENT	Wagoner	(918) 485-3022
	Coweta	(918) 486-2845
WASHINGTON COUNTY HEALTH DEPARTMENT	Bartlesville	(918) 335-3005
WASHITA COUNTY HEALTH DEPARTMENT		Call Beckham CHD
WOODS COUNTY HEALTH DEPARTMENT	Alva	(580) 327-3192
WOODWARD COUNTY HEALTH DEPARTMENT	Woodward	(580) 256-6416