



MANUAL FOR RABIES CONTROL AND BITE MANAGEMENT

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References:

1. *Compendium of Animal Rabies Prevention and Control, 2016*
2. *Human Rabies Prevention- United States, 2008; Recommendations of the Advisory Committee on Immunization Practices (ACIP) US Department of Health and Human Services, Centers for Disease Control and Prevention*

DEFINITIONS

Confirmed Rabies Case: An animal which has tested positive for the rabies virus by direct fluorescent antibody test (dFA) at the Arizona State Public Health Laboratory, a public health laboratory in another state, a university laboratory, or the Centers for Disease Control and Prevention Rabies Laboratory:

Positive dFA rabies test: Confirmed rabies infection.

Negative dFA rabies test: Did not show evidence of rabies virus in the brain tissue when tested.

Euthanasia/Euthanize: Humane killing of an animal.

Rabies Exposures:

- 1) Bite- wound from a tooth that penetrates the skin.
- 2) Non-bite contact- getting saliva, brain tissue, or cerebral spinal fluid from a potentially rabid animal into an open wound or in the eyes, nose, or mouth.

Incubation Period: Incubation period is the time from exposure to a disease (such as rabies), until the development of clinical signs or symptoms. The incubation period of rabies is longer and more variable among different species and individuals than in other viral diseases. The incubation period in rabies may depend on the virus variant, susceptibility of the exposed species, the location and amount of inoculum, and post exposure management. The incubation period for rabies in domesticated animals is the basis for the 45-day (for vaccinated domestic animals) and 180 day (for unvaccinated animals) quarantine times after a pet or livestock animal has been exposed to a potentially rabid animal (see Arizona Administrative Code, Title 9, Chapter 6, Article 5 "Rabies Control").

Rabies Virus "Shedding Period" (infectious stage): The rabies viral shedding period is the time that an animal excretes rabies virus in its saliva. During this period, an animal can transmit rabies to another animal. Viral shedding tends to occur only during the late stage of the disease, after rabies has affected the brain (just before death).

Shedding Time and Quarantine/Observation: The maximum infectious stage of rabies in dogs and cats in the United States is ten days. If a dog or cat remains healthy for 10 days after biting a person, it is safe to assume that rabies was not transmitted. This quarantine/observation period is extended to 14 days for ferrets, and dogs and cats when the bite occurs in a country with endemic canine rabies. Rabies shedding periods in wild animals are not known, and they should be tested for rabies rather than quarantined if they expose a person.

Quarantine: Confinement of an animal to a limited, enclosed area in order to restrict exposure of that animal to other animals and to humans, and to facilitate observation of the animal for signs of rabies.

INTRODUCTION

This manual is intended for use by veterinarians, animal control personnel, wildlife biologists, wildlife rehabilitators, and local health agencies for rabies control purposes. These recommendations are based on the *Compendium of Animal Rabies Prevention and Control, 2016*; *Human Rabies Prevention- United States, 2011* (recommendations of the Advisory Committee on Immunization Practices); and Arizona’s laws (Arizona Revised Statutes - Article 6 sections 11-1001 through 11-1027, and Arizona Administrative Code - Communicable Disease Rules R9-6-501-503).

Rabies in Arizona - Epidemiology

The number of confirmed cases of rabies in animals in Arizona has increased dramatically over the past few years. The most commonly infected species in Arizona include bats, skunks, and foxes (Table 1). Occasionally coyotes, bobcats, ringtails, javelina and domestic livestock or pets are infected as a result of interaction with the most commonly infected wildlife species.

Table 1. Confirmed Positive Rabies Cases by Year and Species in Arizona

Species	Year									
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Bat	96	115	89	69	36	48	46	43	81	51
Skunk	16	13	51	144	66	13	14	18	60	47
Fox	22	24	21	51	5	8	1	4	8	4
Bobcat	3	6	7	8	4	1	0	4	1	2
Coyote	1	1	4	2	0	0	0	1	0	2
Horse	0	0	1	3	0	0	0	0	0	0
Cat/Dog	1 cat	0	1 dog	1 cat	0	0	0	0	0	0
Other	1 Mt. lion	0	1 coati 1 Mt. lion	1 Ringtail 1 cow	2 javelina 1 coati	2 javelina	1 ringtail 1 Mt. lion	0	0	0
Total	140	159	176	280	114	72	63	70	150	106

Rabies in the United States

Recorded cases of rabies in wild animals throughout the U.S. have increased dramatically over the past twenty years. For more than three decades, wildlife has been the most important potential source of rabies infection in the U.S. for both humans and domestic animals, representing more than 90% of confirmed rabies cases in animals.

Over the past 50 years, the incidence of human rabies cases has declined markedly in the United States, paralleling the decrease of rabies in domesticated animals. Widespread vaccination of pet dogs and cats, animal control efforts to reduce stray animals and effective rabies post-exposure prophylaxis for humans are largely responsible for that progress.

BIOLOGY OF RABIES

Characteristics

The rabies virus (Family *Rhabdoviridae*, genus *Lyssavirus*) is fragile and easily inactivated by desiccation, ultra-violet radiation, and detergents. It is rapidly destroyed by temperatures above 50 Centigrade (122° F) and destroyed within a few hours at room temperature. However, the rabies virus may persist for years when frozen.

Transmission

Rabies may be transmitted when infected saliva, central nervous system tissue, or cerebral spinal fluid penetrates the skin or mucosa of a susceptible mammal. Rabies is usually transmitted by bite wounds, but may involve saliva contact with mucous membranes or a fresh break in the skin. Rabies is not transmitted by contact with blood, urine, feces, petting or touching fur, or being sprayed by a skunk.

Pathogenesis

There is still much to be learned about the pathogenesis of rabies in mammals, particularly with respect to species variations during the incubation period, the natural cycles in wildlife, and salivary shedding (infectious) periods. After inoculation, the rabies virus progresses from the subcutaneous tissue or muscle into peripheral nerves. The virus then migrates along nerves to the spinal cord and brain. The victim exhibits behavioral changes and clinical signs when the virus reaches the brain. At this point the incubation period is over and the clinical period begins. The virus continues to spread in the infected host, via the nerves, to the salivary glands and in the final phase, rabies may be transmitted to other mammals through infectious saliva.

The infected animal usually dies within a few days after onset of clinical signs. Factors that may contribute to the transmission, incubation period and development or prevention of rabies infection include: the amount of viral inoculum (amount of rabies virus introduced into the body); the anatomic location of the bite or saliva exposure; and post-exposure wound management (washing the wound, rabies immune globulin and vaccination). Head and neck wounds as well as wounds in highly innervated areas such as fingers generally have shorter incubation periods due to the proximity of the viral inoculation to nerve tissue.

Incubation Period and Duration of Disease in Dogs and Cats*

- Incubation Period - Average 2-9 weeks; range 9 days - 8.5 months (not >6 months in U.S.)
- Prodromal/Initial stage - 1-3 days
- Excitation (furious) stage - average 1-7 days. Some animals do not exhibit this stage.
- Paralytic stage - 1-4 days duration

*If a dog or cat has not shown any signs of abnormality on the tenth day after inflicting a bite, it is safe to assume that the animal was not shedding virus in its saliva at the time of the bite.

Table 2. Incubation Period and Duration of Disease in Other Species

Species	Incubation period	Duration of clinical disease
Horses/mules	Average 3-14 weeks, range <6 months	2-8 days
Cattle	Average 2-15 weeks, range <6 months	Usually 1-6 days, rarely as long as 14 days
Sheep/goats	2-17 weeks	5-7 days
Wild/exotic animals	Unknown	Unknown
Humans	Average 3-16 weeks, range weeks to 6 years	2-21 days

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Prevention

Prevention of human and pet rabies depends on the following:

- Vaccinating dogs, cats, horses and ferrets, control of stray pets, and leash law enforcement.
- Promoting educational messages to the public to reduce exposures to wild and stray animals.
- Providing exposed persons with prompt wound care and appropriate post-exposure prophylaxis.

CLINICAL SIGNS OF RABIES IN ANIMALS

Signs of rabies in individual animals, even of the same species, can vary widely. They can be either subtle or obvious and occasionally an animal will die suddenly after exhibiting few or no symptoms. Signs of rabies include:

- **Initial- lethargy, fever, vomiting, anorexia**
- **Progressive- cerebral dysfunction (including ataxia, difficulty walking, tremors, disorientation, seizures), weakness, paralysis, difficulty breathing or swallowing, excessive salivation, aggression, self-mutilation, abnormal behavior and vocalization.**
- **Death usually occurs from three to seven days after onset.**

Other Diseases or Conditions Which May Resemble Rabies

Many diseases and conditions occur in both wild and domesticated species that may mimic rabies. Some of the more common diseases/conditions in domestic animals can be found in Table 3.

Table 3. Differential diagnoses for rabies in domestic animals

Ferret	Canine/Feline	Bovine/Equine
Distemper	Distemper	Toxicoses
Insulinoma	Encephalitides (Viral, Bacterial, Protozoal/Parasitic)	Encephalitides (Viral, Bacterial, Protozoal/Parasitic)
	Neuropathy- Vestibular Syndrome	Herpes Virus
	Head/Spinal Cord Trauma	Tetanus
	Brain Tumor	Brain Abscess
		Listeriosis
		Localized Lesions/Obstruction

RABIES IN DOMESTIC ANIMALS

Pets can be exposed to rabies through wildlife encounters. Even urban pets can be exposed, since rabid bats are found throughout Arizona. The documented number of cases of rabies in cats in Arizona is small ([Table 1](#)); however cats are more likely than other pets to roam and hunt, and therefore be exposed to wildlife. It is strongly recommended that all cats be vaccinated against rabies.

Dog owners are required by [Arizona Revised Statutes](#) to have their dogs vaccinated against rabies and licensed. (Refer [ARS Title 11, Chapter 7 Article 6. 11-1010](#)) In Arizona, domestic animal bites are followed up by animal control agencies. More dog bites occur than cat bites leading to more testing of dogs than cats. In a twenty year span from 1990 to 2009, four unvaccinated dogs and seven unvaccinated cats were diagnosed with rabies in Arizona.

Recommended Dog and Cat Rabies Vaccine Schedule

Consult the current [Compendium of Animal Rabies Prevention and Control, 2016](#) for the most recent animal vaccination recommendations.

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Per the [Compendium of Animal Rabies Prevention and Control, 2016](#), dogs and cats should be initially immunized at three months of age, re-immunized 12 months after the first vaccination, with a booster every three years if they are vaccinated with a licensed rabies vaccine and the label indicates three years duration of immunity. If an animal is vaccinated with a one-year rabies vaccine (label indicates one year duration of immunity), then a booster is needed annually. In order to improve rabies vaccination coverage, use of three-year rabies vaccines is encouraged for dogs and cats. However, there is no laboratory or epidemiologic data to support the annual or biennial administration of three-year vaccines following the initial series.

Three months is considered to be the minimum age for primary vaccination. As of September 2003, [Arizona Revised Statute Title 11, Chapter 7 Article 6.11-1012](#) was changed so that dogs at large over the age of three months (instead of four months) must be licensed, and thus vaccinated for rabies.

Ferrets, horses, and cattle should be vaccinated annually against rabies. The first vaccination of ferrets is recommended at 3 to 4 months of age.

Any animal that has an unknown, undocumented or questionable vaccination history should be vaccinated immediately and then again in 12 months.

For information on vaccine names, manufacturers, schedules, and dosages available for species for which a vaccine has been approved (dogs, cats, cattle, horses, ferrets and sheep) please refer to the current [Compendium of Animal Rabies Prevention and Control, 2016](#).

Assessing Current Vaccination Status

An animal is considered currently immunized against rabies if the following criteria are met:

- The animal was vaccinated with a product that was approved for use in the species.
- The vaccine was listed in the current [Compendium of Animal Rabies Prevention and Control, 2016](#)
- A licensed veterinarian administered the vaccine, and the licensed veterinarian administering the vaccine signed a certificate.
- Vaccines were given at the recommended schedule.
- It is at least 28 days past administration of the first rabies immunization.

Quarantine/Observation of Dogs and Cats that Have Bitten or Exposed a Person

See [Arizona Revised Statutes, Title 11, Chapter 7, Article 6. 11-1014](#)

Any dog or cat (vaccinated or unvaccinated) that bites a person must be confined/observed for ten days. If signs of rabies develop or the animal dies during the observation period, the animal should be tested for rabies. A veterinarian should evaluate the animal at the first sign of illness.

NOTE: Appropriate quarantine times have been established for dog, cats, and ferrets. However, other animals (except livestock and rodents) that expose humans to potential rabies infections may need to be tested for rabies to determine if post-exposure treatment for the victim is warranted.

Observe the animal for ten days. The quarantine period starts on the day of the bite or exposure.

If the dog or cat is currently vaccinated against rabies, a home quarantine is permitted at the discretion of the animal control official. Owners should be given clear instructions including the clinical signs of rabies to be reported.

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If the animal is not currently vaccinated or has an unknown vaccination status, the quarantine may be done in an animal control facility or veterinary clinic.

If the animal does not die or develop clinical signs of rabies infection during the quarantine period, the dog/cat did not have rabies virus in its saliva at the time of the exposure, and there is no further risk to the person. The person should not receive post-exposure treatment.

If an animal develops signs of rabies infection during the quarantine period, humanely euthanize the animal and submit the head for testing.

If an animal dies during the quarantine period, submit the head for rabies testing.

If the animal tests positive for rabies infection, start post-exposure prophylaxis for the exposed person(s) immediately and notify animal control or health department officials.

Protocol for Dogs and Cats that Have Been Exposed to a Potentially Rabid Animal

Refer to Arizona Administrative Code, Title 9 Chapter 6 Article 5. Rabies Control.

When a domestic animal has direct contact with a rabid or potentially rabid wild animal, it is considered to have had a potential exposure to rabies. It is very important to capture and submit the wild mammal for rabies testing if possible. Wild mammals that are not available for laboratory testing should be presumed rabid. Domestic animals that bite other domestic animals are not usually considered as potentially rabid unless they are exhibiting signs compatible with the disease.

Determine whether the dog or cat is vaccinated against rabies.

1. Find out if the wild animal to which the dog/cat was exposed is available for rabies testing.
2. If the wild animal is not available for testing, presume the wild animal is positive.
3. If the wild animal tests positive for rabies (or presumed positive), proceed as follows:

If the dog/cat is currently vaccinated against rabies:

1. Notify local animal control.
2. Immediately take the dog/cat to a veterinarian for a booster rabies vaccination.
3. Confine the dog or cat under the owner's control and observe closely for 45 days. The animal should be kept in a building, pen, or escape proof enclosure. The animal should only be removed from confinement on a leash and under supervision of a responsible adult (Some town or county ordinances may be more restrictive than state law and not allow home quarantine).
4. At the first sign of illness or behavioral change, the animal should be taken to a veterinarian, and the health department and animal control should be contacted IMMEDIATELY.

If the exposed dog/cat has is overdue for a booster vaccination but has appropriate documentation the animal has a previous history of vaccination:

1. Notify local animal control.
2. Immediately take the dog/cat to a veterinarian for medical evaluation and booster vaccination.
3. Owner needs to provide veterinarian with appropriate documentation that show the animal has been previously vaccination with a USDA-licensed rabies vaccine (See Part I B.5 of *Compendium of Animal Rabies Prevention and Control, 2016*).
4. Confine the dog or cat under the owner's control and observe closely for 45 days. The animal should be kept in a building, pen, or escape proof enclosure. The animal should only be removed from confinement on a leash and

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under supervision of a responsible adult (Some town or county ordinances may be more restrictive than state law and not allow home quarantine).

If the exposed dog/cat has *never been* vaccinated against rabies:

1. Notify local animal control.
2. Consider immediate humane euthanasia OR;
3. Animal control will quarantine the animal for 120 days (4 months) in an approved facility run by either a veterinarian or an animal shelter (this is a new quarantine period set in Part 1 Section B.5 of the *Compendium of Animal Rabies Prevention and Control, 2016*).
4. The owner is responsible for payment of all expenses related to the quarantine.
5. A veterinarian should vaccinate the animal against rabies upon entry into isolation or one month prior to release to comply with pre-exposure vaccination recommendations (See Part I B.5 of *Compendium of Animal Rabies Prevention and Control, 2016*).
6. The quarantine is completed 120 days after the exposure.

If the exposed dog/cat has is overdue for a booster vaccination but does not have documentation indicating the animal has a previous history of vaccination:

1. Notify local animal control. Overdue animals for vaccinated should be handled on a case-by-case basis with local animal control agencies as well as local health agencies.
2. If dog/cat is without appropriate documentation of previous rabies vaccination:
 - a. Animal can be treated as unvaccinated, humanely euthanized Or;
 - b. Given immediate booster vaccination and place in 120 day (4 months) strict quarantine.
3. The 2016 Compendium provides a new alternative (See Part I B.5 of *Compendium of Animal Rabies Prevention and Control, 2016*). Before giving the animal a booster vaccine the attending veterinarian may request guidance from local public health authorities for the use of serologic monitoring. This involves:
 - a. Collecting paired blood samples to test for antibody titers indicating prior vaccination . These are used to determine appropriate antibody response to booster vaccination.
 - b. If an adequate response is documented in the animal it is considered to be overdue for booster vaccination and treated if currently vaccinated; i.e., subject to 45 day quarantine (see above).
 - c. If an adequate response is documented in the animal it is considered to be unvaccinated and subject to 120 day (4 months) quarantine or euthanasia (see above).

RABIES IN FERRETS

Ferrets are susceptible to rabies. During the period from 1958 through 1996, more than 22 ferrets were confirmed with rabies infections in the U.S. Common clinical signs of rabies in ferrets include: hyper or hypothermia, ataxia (staggering), lack of appetite, paraparesis (weakness in hind limbs), paralysis, lethargy. Less common signs include vocalization and aggression. There is a licensed rabies vaccine for ferrets. Ferrets should be vaccinated annually. A booster vaccine should be administered immediately if a vaccinated ferret is exposed to a rabid or potentially rabid animal.

If a ferret bites a human, regardless of its rabies vaccination status, it should be quarantined and observed for signs of rabies or sudden death for 14 days (Arizona Revised Statute Title 11 Chapter 7 Article 6 11-1014 C). It is recommended, if signs of rabies develop or the ferret dies during the quarantine period, the ferret should be tested for rabies. Your local health agency can always be consulted to help determine if a ferret should be submitted for testing.

If an unvaccinated ferret is exposed to a rabid or suspect rabid animal:

1. Submit the suspected rabid animal for testing:
 - a. If results are negative, no further action is needed.

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- b. If results are positive or the suspect rabid animal is not available for testing:
 - i. Euthanize the ferret or
 - ii. Place the ferret under 180-day quarantine in a veterinary hospital or animal control facility at the owner's expense.

If a currently vaccinated ferret is exposed to a rabid or suspect rabid animal:

- 1. Submit the suspected rabid animal for testing if available:
 - a. If results are negative, no further action is needed.
 - b. If results are positive or the suspect rabid animal is not available for testing:

Revaccinate the ferret immediately and place it under quarantine for 45 days. NOTE: A ferret is considered currently vaccinated if it has received a rabies vaccination within the prior 12 months and the vaccine used was approved for use in ferrets.

If a ferret is overdue for a booster vaccination is exposed to a rabid or suspect animal, the case should be evaluated on a case-by-case basis (see [*Compendium of Animal Rabies Prevention and Control, 2016*](#)).

RABIES IN LIVESTOCK

Rabies vaccines are available for cattle, horses, and sheep (see [*Compendium of Animal Rabies Prevention and Control, 2016*](#)). There are no rabies vaccines currently licensed for use in swine, goats, camelids (llamas, alpacas), bison, red deer, fallow deer, elk or exotic species of livestock, however rabies vaccines may be used off-label by licensed veterinarians. A veterinarian and livestock owner should decide whether rabies vaccinations are warranted in a herd or in valuable individual animals. In Arizona, livestock maintained in areas with epizootic rabies activity in foxes or skunks should be considered for vaccination.

Horses: Occasional cases of rabies in horses occur in Arizona. Recent cases include two horses in Santa Cruz County in 2009 (south central skunk variant) one horse in Maricopa County in 2009 (imported north central skunk variant), and one horse in Maricopa County in 2008 (bat-associated variant) ([Table 1](#)).

Cattle: One cow in Santa Cruz County developed rabies in 2009 (south central skunk variant). Two steers developed rabies in 1999. Both had recently been imported from Mexico, and they were infected with vampire bat rabies virus.

Llamas: Three llamas on one farm in Yavapai County developed rabies in 2002. They were housed in an area with active wildlife corridors and were infected with the Arizona gray fox variant of rabies virus.

Livestock with behavioral/ neurologic abnormalities that are not explained by an identified disease should be considered for rabies testing, especially if human or animal exposure has occurred. Livestock maintained on rural pastures or grazing land may contract rabies from exposure to wild animals.

Livestock that have recently been shipped to Arizona from out of state may be incubating rabies, and should be tested if unexplained neurologic disease develops.

A 14-day quarantine/observation period is required when livestock bite or expose a person.

If clinical signs develop or the animal dies during the 14-day quarantine/observation period, the animal should be euthanized and submitted for rabies testing.

Reports of rabies or suspect rabies infection in livestock, and the quarantine of livestock that bite humans, are handled by the [United States Department of Agriculture's Wildlife Services](#) in Phoenix; telephone (602) 542-4293.

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RABIES IN RODENTS

In the US, forty-three groundhogs and beavers, one squirrel and one rabbit tested positive for rabies in 1999. All of these animals were in the northeastern United States and were associated with the ongoing raccoon rabies epizootic. Rodents and rabbits in Arizona are at extremely low risk for rabies infection. There has never been a rodent in the state of Arizona that has tested positive for rabies. Rodents and rabbits should not be submitted for rabies testing unless there was human exposure AND the rodent/rabbit was exhibiting neurologic signs.

Domesticated rodents (i.e. guinea pigs, hamsters, gerbils, mice, and white rats) purchased from pet shops, raised in controlled captive breeding situations, and never exposed to carnivorous animals or bats do not pose a risk of rabies infection. Wild rodents in Arizona are at very low risk of rabies infection. Quarantining rodents for rabies observation is unwarranted and rabies testing of wild rodents is offered only in limited circumstances. Call your [local animal control agency](#) or [local health agency](#) with questions.

Bites to humans inflicted by rabbits, squirrels, chipmunks, rats, and mice seldom if ever call for rabies prophylaxis. All animal bites should be thoroughly cleaned and watched for infection. As with other puncture wounds, tetanus immunization may be warranted.

RABIES IN EXOTIC ANIMALS

Mink

Mink have contracted rabies in the U.S. There is no vaccine licensed for use in mink, and no quarantine time has been established.

Non-human Primates

At least sixteen cases of rabies in non-human primates have been confirmed in the United States. Of these, two are suspected to be the result of vaccination with a live attenuated rabies vaccine. Currently, there are no rabies vaccines licensed for use in non-human primates. Primates may carry and transmit many diseases to humans (and vice versa). Macaque monkeys are carriers of a herpes virus that is often fatal in humans. All bites inflicted on people by non-human primates should be assessed by a physician and reported to local animal control agencies and the [Arizona Game and Fish Department](#).

Other exotic mammals

There is no rabies vaccine licensed for use in other exotic mammals, and quarantine times have not been established.

Reptiles, amphibians, birds, and fish are not susceptible to natural rabies infection.

Canine/Wolf-Hybrids and Feline Hybrids

Offspring of wildlife and domestic species that bite a person will be considered wildlife and therefore rabies testing (euthanasia and examination of the brain) will be required. Currently, there is no rabies vaccine approved for wildlife, including wolf/dog and wild cat/domestic cat crosses. However, even though the efficacy of the vaccine has not been proven through challenge tests and there are only a limited number of published reports on serologic responses, killed or vectored vaccines may be used in hybrids and have been found to be safe in wolves and other wildlife species held in zoological collections. Veterinarians administering such vaccines should inform owners of the issues regarding the off-label use of such products as well as the repercussions and responsibilities of owning hybrids.

It is the owner's responsibility to prevent any situation where their hybrid may expose a person to its saliva. Studies have not been done on how long wolf or feline hybrids may excrete virus in their saliva in the advanced stages of rabies. Therefore, quarantine periods for wolf or feline hybrids after they have bitten a person, have not been established. Until more data are

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available, a wolf or feline hybrid should be handled the same as a wild animal in the event of a human exposure, regardless of its vaccination history.

If a hybrid bites a human (regardless of the hybrid's vaccination history):

1. Humanely euthanize the hybrid and submit the head for rabies testing.
 - a. If the result is negative, no further action is required.
 - b. If the result is positive, start human post-exposure rabies vaccinations for the bite victim.
 - c. If the wolf-hybrid is not available for testing, consider post-exposure treatment for the bite victim.

If a hybrid is exposed to a suspected rabid animal:

1. Submit the suspect rabid animal for rabies testing if available.
 - a. If the result is positive, immediately euthanize the hybrid.
 - b. If the result is negative, no further action is required.
 - c. If the other wild animal is not available for testing, it should be considered potentially rabid and the wolf hybrid should be euthanized immediately. *Also, consult the *Compendium of Animal Rabies Prevention and Control, 2016* for the most current recommendations concerning wolf hybrids.

RABIES IN WILDLIFE

Bats, Skunks, Foxes, Coyote, Bobcats, Ringtails, Raccoons, Coatis

The public should be encouraged to respect and protect native wildlife. The message should include a warning to the public not to touch, feed, provoke, or attempt to help wildlife. Handling wild animals may lead to a potential rabies exposure, and the animal will have to be humanely killed. The public should call the Arizona Game and Fish Department, wildlife rehabilitators or the local Animal Control Department with reports of wild animals that are injured or behaving strangely.

For purposes of rabies exposure assessments, wild animals that have not been tested for rabies must be considered as potentially infected with rabies. Since wild animals incubate and excrete rabies virus for unknown periods, they cannot be considered free of rabies even if purchased from a pet shop, acquired as a baby, or held for a long period of time.

If a wild mammal other than a rodent is submitted to a veterinary clinic or animal shelter, a thorough history of potential human and animal exposures should be taken before any decision is made about the animal's treatment. Rehabilitation should not be attempted on animals that have potentially exposed humans or other animals to rabies.

If a sick or injured wild animal is reported and there has not been any contact with another animal or person, the animal may be turned over to a rehabilitator. Sick or injured bats should not be rehabilitated in Arizona because of the high risk of rabies. If a sick or injured wild animal bites or exposes a person or a pet to its saliva, it is not appropriate to rehabilitate or quarantine it. These animals should be humanely killed and immediately tested for rabies.

If a wild animal (other than a rodent) bites or exposes a human:

1. Humanely kill the animal and submit it for rabies testing.
 - a. If the animal is not available for testing, recommend post-exposure rabies prophylaxis for the bite victim.
 - b. If the wild animal is or may be endangered, protected, threatened or rare, the Arizona Game and Fish Department and the Arizona Department of Health Services (602) 364-4562 will consult with local officials on the situation. If it is a zoo animal, the zoo veterinarian will also be consulted.

If a wild animal (other than a rodent) bites or exposes a pet or livestock animal:

1. Humanely kill the wild animal and submit it for rabies testing.
 - a. If the wild animal is not available for testing, quarantine or euthanize the exposed animal.

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Bats

In Arizona there are 28 species of bats. Some bats are migratory and some are year-round inhabitants of the state. The percentage of bats in the wild that are infected with rabies is very low (less than 1%), but the infection rate is higher in sick and injured bats. In Arizona, an average of 11% of the bats tested at the Arizona State Public Health Laboratory are positive for rabies.

The public should be discouraged from handling bats that are exhibiting abnormal behaviors. Animal control officers, Arizona Game and Fish Department officers, rehabilitators, and veterinarians should carefully assess each situation when deciding whether or not to submit a bat for testing. Whenever a member of the public finds a bat, a very thorough exposure history should be taken. The possibility of rabies infection should be considered in bats exhibiting the following:

- Grounded, unable to fly (frequently these are flapping around or laying on the ground)
- Erratic behavior (flying around a person or pet during the day or crashing into objects)
- Anorexia (not eating)
- Partial or complete paralysis
- Death

Laboratory Testing: Bats should be submitted to the [Arizona State Public Health Laboratory](#) for rabies testing immediately when:

- There has been direct contact with a human, or rabies contact cannot be ruled out.
- Children have been playing with or near a bat.
- A bat is found in a room with a sleeping individual, a child, an individual under the influence of alcohol or drugs, or someone with sensory or mental impairment.
- A domestic animal has had contact or potential contact with a bat.

Public Education: The most important message to disseminate to the public is to leave bats alone. Bats are not aggressive animals, and most exposures are preventable. Bats should not be maintained in or near human dwellings or schools. Consult pest control agencies that are licensed by the Arizona Game and Fish Department for exclusion techniques that will not harm the bats. Bats which are seen roosting naturally on buildings, trees, etc. and have not exposed a person or pet should be left alone. Bats that are hanging on buildings, bridges, or natural surfaces (trees, caves, eaves, etc), or flying in the evening should not be disturbed.

Capture: To safely capture a bat in a room, close the windows and doors, and turn on the lights. Wait for the bat to land. Wearing heavy gloves cover the bat with a coffee can or other container. Slide a piece of cardboard between the wall or floor and the container trapping the bat. Tape the cardboard tightly to the container. Immediately contact a local animal control or health official to determine if the bat should be submitted for rabies testing.

Exposure: If someone is bitten or exposed to a bat, wash the wound with soap and water and seek medical assistance immediately. Refer to "[Human Exposures](#)" section of this manual for rabies prophylaxis indications concerning bat exposures.

Skunks

Rabies is cyclic in skunk populations in southern Arizona. Although the average annual number of skunks confirmed with rabies statewide is usually less than 20, in epizootic years, more than 80 skunks have tested positive. From 2004 to 2013, 426 skunks tested positive for rabies. The most common areas in Arizona for rabies in skunks include Santa Cruz, Cochise, Pima and Pinal counties. In 2001, a very unusual outbreak of rabies in skunks was detected in Flagstaff. The skunks were infected with a bat-associated rabies variant. In 2008, this same variant was again found in skunks and caused an outbreak in foxes. Skunk variants of rabies have been found in cats, badger, horses, and cattle.

Foxes

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Arizona has a unique variant of rabies virus that is associated with the Arizona gray fox. Foxes are distributed throughout the state, and rabid foxes have been found in every county except Mohave. The fox variant of rabies is often transmitted to other species including coyotes, bobcats, llamas, horses, javelina, badger, and dogs. Rabies epizootics in foxes occasionally occur in the state.

Raccoons

A group of raccoons, some of which were incubating rabies, were translocated from Florida to West Virginia and Virginia in the 1970's. This initiated an epizootic of raccoon rabies that has spread throughout the eastern United States. The eastern raccoon rabies epizootic is responsible for thousands of rabies infections in wild animals annually, with spillover into domestic animals (especially cats) and to some large rodents like woodchucks. Raccoons are native to non-desert areas of Arizona, but the raccoon variant of rabies found in the eastern U.S. has not been found in Arizona. The last reports of rabies in raccoons in Arizona took place between 1968 and 1974 when two raccoons tested positive. In 2005, one raccoon from Pima County tested positive for the south central U.S. skunk variant. On average, ten raccoons are submitted for rabies testing to the Arizona State Health Lab annually.

Coatimundi (Coatis)

Rabid coatis are not unusual in Arizona. During the period of 1968-77, for example, eight were reported.

Coyote

From 2006 to 2016, 11 coyotes were confirmed with rabies in Arizona ([Table 1](#)). For those coyotes that were typed, all were found to be infected with the Arizona gray fox variant.

Bobcat

From 2006 to 2016, 36 bobcats tested positive for rabies in Arizona ([Table 1](#)). For those bobcats that were typed, all were found to be infected with the Arizona gray fox variant.

Ringtail

In 2009 a ringtail submitted from Coconino County tested positive for rabies. This ringtail was found to be infected with bat-associated rabies virus. Rabid ringtails were reported 2009 and 2012 as well. Both were from Coconino County. There have been also been sporadic cases of rabies in this species in southern Arizona historically.

Javelina

Historic examples of rabid javelina include a hunter who was attacked and bitten in 1986 in Gila County and a javelina in 2002 found chewing the edge of a private porch also in Gila County. Between 2004 and 2013 two rabid javelina were reported in 2010 from Pima County while another two were reported in 2011, one each in Maricopa and Yavapai Counties. All of these animals were found to be infected with the Arizona gray fox variant of rabies except the Yavapai County case who variant in unknown.

Wild rodents and rabbits

There has never been a wild rodent or rabbit confirmed with rabies infection in Arizona. These small mammals are at low risk of contracting or transmitting rabies. Rodents that bite people do not need to be routinely tested for rabies. Rodents may be submitted for rabies testing if:

1. There has been an unprovoked human exposure AND
2. The rodent is exhibiting signs of possible rabies infection AND
3. The rodent is from a rabies epizootic area.

Other wild animals

Historically, other wild animals infected with rabies in Arizona include a badger, a bear, and a mountain lion.

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ORAL WILDLIFE RABIES VACCINES

An oral rabies vaccine that is covered with flavored bait has been developed for use in some wild carnivores. At this time, the vaccine does not effectively immunize skunks, and oral rabies vaccines are not being considered for this specific purpose at this time. However, oral rabies vaccine has been used recently in Northern Arizona to immunize foxes that were associated with an unusual epizootic involving bat-associated rabies virus variant. The oral vaccine is not available commercially.

DETERMINING HUMAN EXPOSURE

Exposure

Any bite, scratch, or other incident in which saliva, central nervous system (brain or spinal cord) tissue, or cerebral spinal fluid of a potentially rabid animal enters an open, fresh wound, or comes in contact with mucous membranes by entering the eye, mouth, nose. The species of the animal involved must be considered when determining if an exposure has occurred. For instance, a bite from a healthy caged rodent is not considered a rabies exposure while a bite or saliva into wound contact from an untested or rabies positive skunk, bat, or wild carnivore is always considered an exposure. Children that have had direct contact with a bat or have been sleeping in a room with a bat should be considered as exposed unless the bat tests negative for rabies at the Arizona State Health Laboratory. People who have been bitten by or exposed to dogs in countries that are endemic for canine rabies should consider prophylaxis unless the dog has tested negative for rabies or a 14-day quarantine has passed and the dog remained healthy. Consult your [local health agency](#) if you have any questions regarding a potential rabies exposure.

Not an Exposure

1. Petting or touching the body/fur of a potentially rabid animal (as long as contact with the head is ruled out).
2. Touching an inanimate object that has had contact with a rabid animal does NOT constitute an exposure unless wet saliva or CNS tissue entered a fresh, open wound or contacted a mucous membrane.
3. Being sprayed by a skunk.
4. Having contact with blood, urine, or feces of a rabid or suspect rabid animal does not constitute an exposure.
5. Being in the vicinity of a rabid animal; rabies is not transmitted by aerosols.

Bat exposures

Bats are increasingly implicated as significant wildlife reservoirs for variants of rabies transmitted to humans in the U.S. Recent epidemiologic data suggest that seemingly insignificant physical contact with bats may result in viral transmission, even without a clear history of animal bite. In all instances of bat-human contact where rabies transmission is under consideration, the bat in question should be collected if possible, and submitted for rabies testing.

Rabies post exposure prophylaxis is recommended for all individuals with bite, scratch, or mucous membrane exposure to a bat, unless the bat tests negative for rabies. The inability of health care providers to solicit information surrounding potential exposures may be influenced by the limited injury inflicted by a bat bite (in comparison to lesions inflicted by terrestrial carnivores) or by circumstances that hinder accurate recall of events.

DETERMINING PET EXPOSURE

Dogs and cats are occasionally infected with rabies in Arizona. It is important to collect information about the animal (e.g. stray vs. owned), and the circumstances of the bite or exposure (provoked vs. unprovoked) to assess the risk of rabies and the potential need for post-exposure prophylaxis. If the dog/cat is available, it should be quarantined and observed for ten days. If

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the animal can be observed, rabies post-exposure prophylaxis is not warranted unless the animal dies and tests positive for rabies during the observation period. Please refer to the [algorithm\(s\)](#) in this manual for assistance in working with a potential exposure. Consult your [local health agency](#) if you have any questions regarding a potential rabies exposure.

HUMAN RABIES VACCINES & IMMUNOGLOBULIN

Two cell culture rabies vaccines are currently available in the U.S. for rabies prophylaxis in humans. They are both equally safe and effective. Some, but not all, of the [local health agency](#) in Arizona have rabies vaccines and immunoglobulin, and are prepared to administer it. Many hospital pharmacies stock it, as do military bases.

- Human Diploid Cell Vaccine (Imovax® Rabies) and Human Rabies Immunoglobulin (Imogam® Rabies HT) is available from Sanofi-Pasteur Labs [1-800-VACCINE (822-2463)].
- Purified Chick Embryo Cell Vaccine (RabAvert) is available from Chiron Corporation (1-800- 244-7668) or (www.rabavert.com).
- Human Rabies Immunoglobulin (HyperRabTMSD) is also available from Talecris Biotherapeutics (800) 243-4153 or (www.talecris.com).

Human Pre-Exposure Immunization

Rabies pre-exposure vaccinations are administered to individuals such as veterinarians and their staff, wildlife biologists, rehabilitators, and animal control officers who routinely have contact with stray domestic, exotic, and/or wild animals. Pre-exposure immunization consists of three cell culture rabies vaccinations given on days 0, 7, and 21-28. Pre-exposure immunization produces an immune response that is measurable by serum neutralizing antibody titers. Pre-exposure immunization may not provide optimal protection in the event of a rabies exposure. In the event of an exposure to a rabid or suspect rabid animal, vaccinated individuals should always receive two post-exposure vaccine doses on days 0 and 3. Immunoglobulin should not be administered.

Two years after a person receives the initial series of pre-exposure rabies vaccinations, a serum sample should be drawn to measure serum-neutralizing antibodies. If the titer is below a 1:5 serum dilution, and the person has continuing potential rabies exposures, a single dose of rabies vaccine should be administered. Neutralizing antibody titers should be checked every two years. For humans, the rapid fluorescent focus inhibition test (RFFIT) is recommended by the Advisory Committee on Immunization Practices (ACIP). Serology via enzyme linked immunosorbent assay (ELISA) is not recommended. The RFFIT is the only valid method at this time to verify rabies virus neutralizing antibodies.

There are [two laboratories in the United States](#) that provide RFFIT testing.

Travelers to Foreign Countries That Have Endemic Dog Rabies

Rabies pre-exposure vaccination is recommended for certain travelers to rabies enzootic areas. Travelers should consult with a travel medical clinic at least one month prior to leaving. If a traveler is bitten or exposed to a mammal in a rabies endemic area, they should wash the wound with soap and water and seek immediate medical attention. Post-exposure rabies prophylaxis should be started immediately after an exposure in a high-risk area, and can be discontinued if the 14-day quarantine period is completed and the animal remains healthy, or if testing of the animal concludes that it was not infected with rabies. If the animal is not available for quarantine or testing, post-exposure rabies prophylaxis should be considered.

Human Post-Exposure Management

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Rabies vaccination should be administered according to the most current ACIP recommendations. Physicians and providers who administer rabies post-exposure prophylaxis in Arizona are required to report each case to the local health department on a Post Exposure Vaccine Report form.

Local Treatment of Wounds

Individuals who are bitten by an animal should be encouraged to wash the wound thoroughly for 10-15 minutes with soap and water, and seek medical care.

Post-Exposure Immunization

The appropriate protocol for post-exposure prophylaxis depends on the exposed patient's previous rabies vaccination history.

Post-exposure protocol for people who have never been vaccinated against rabies:

1. One dose (20 IU/kg) of human rabies immune globulin (HRIG) is administered on day 0. Infiltrate as much of the HRIG into the wound site as possible, and administer any remaining HRIG intramuscularly. HRIG should never be administered in the same syringe as the rabies vaccine, or at the same site of injection. If HRIG is not readily available, it may be given up to seven days after the post-exposure vaccine series is initiated. After seven days (3 vaccinations), vaccine induced immunity should be initiated and administration of HRIG is contraindicated. HRIG is sold in 300 IU/2ml pediatric vials or 1500 IU/10ml vials.
2. Four doses of cell culture rabies vaccine at 1 ml/dose administered intramuscularly in the deltoid muscle on **days 0, 3, 7, and 14**. The anterolateral aspect of the upper thigh can be used in infants/children. Administration of the vaccine in the gluteal region should be avoided.
3. For patients who are immunosuppressed, five doses of vaccine should be administered on days 0, 3, 7, 14 and 28. After completing the vaccination series, an immunosuppressed person should have serum tested for rabies virus neutralizing antibody to ensure an acceptable antibody response developed.
4. Physicians and providers who administer rabies post-exposure prophylaxis in Arizona are required to report each case to the local health department on a Post Exposure Vaccine Report form.

Post-exposure protocol for previously immunized individuals who have had cell culture rabies vaccinations:

1. Two doses of cell culture rabies vaccine at 1ml/dose administered intramuscularly in the deltoid muscle on days 0 and 3 after a rabies exposure.
2. HRIG is not indicated if the pre-exposure vaccination was done with cell culture vaccines (available in the U.S. after 1980). If the exposed patient was previously immunized with an older vaccine (e.g. Duck Embryo, Suckling Mouse Brain, Inactivated Nerve Tissue) that was not produced in cell culture, then complete post-exposure prophylaxis treatment, including HRIG, should be administered.

Adverse reactions associated with post-exposure immunization:

1. HRIG: local pain and low-grade fever.
2. Rabies cell culture vaccine: mild, transient, local reactions (erythema, pain, itching, and swelling) have been reported. Occasional systemic reactions include headache, nausea, abdominal pain, muscle aches, and dizziness (see attached ACIP guidelines for more on reactions). Prophylaxis should not be discontinued due to reactions without considering the patient's risk of acquiring rabies. Any unusual or severe adverse reactions attributed to vaccines or HRIG should be reported to the Arizona Department of Health Services (602) 364-4562 and to the vaccine manufacturer.

HUMAN EXPOSURE RISK REDUCTION

Often animal bites occur when people feed, pet, or attempt to pick up or catch wildlife or unfamiliar, domesticated animals. The majority of animal bites to humans are preventable. Public education should emphasize the following preventive measures:

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- Do NOT pick up, touch, or feed wild or unfamiliar animals, especially sick or wounded ones. Teach children to keep a safe distance from wildlife and strays.
- Keep pets from having contact with wild animals.
- Vaccinate all cats and dogs against rabies.
- Do not leave pet food outside and use only animal-proof trashcans.
- Do not "rescue" seemingly abandoned young wild animals. Usually the mother will return. If the mother is dead or has not returned in many hours, call the [Arizona Game and Fish Department](#).
- Do not keep wild or exotic animals as pets.
- Cap chimneys, seal openings around foundations and eaves, and cut tree branches that provide access to buildings.
- Report sick or injured animals to a local animal control officer.
- If an individual is bitten or scratched by any animal, promptly wash wounds with soapy water for 10 minutes and see a doctor immediately. Report all bites to the [local animal control agency](#).
- If a pet is bitten or scratched by another animal, wear gloves while cleansing the wound. Contact a veterinarian to determine if the pet requires treatment, including a rabies booster.

Special considerations for hunters:

- Avoid animals which are acting strangely or that appear to be sick, including those that are aggressive, paralyzed, walking abnormally, appear to be unhealthy or are unusually tame.
- Do not skin road kills.
- Wear rubber gloves, eye protection, and an apron while skinning and handling animals.
- Regularly wash hands with soap and warm water.
- Take special care to avoid contact with saliva when skinning around the head and mouth region.
- Do not prepare meat with equipment used for skinning, preparing heads, hides, or antlers.
- Clean and disinfect knives, skinning boards, cutting surfaces and other equipment with a solution of bleach and water (1 part bleach: 9 parts water). Allow 10 minutes of contact time.
- Rabies virus is concentrated in saliva, nerve tissue, brain, and spinal cord and generally not in the muscle tissue.

HUMANE EUTHANASIA OF MAMMALS

The AVMA Guidelines on Euthanasia is available at: <https://www.avma.org/KB/Policies/Pages/Euthanasia-Guidelines.aspx>. Euthanasia techniques are discussed within the report and tabulated in appendices. The appendices list acceptable and conditionally acceptable agents and methods of euthanasia. Proper interpretation of the tables is only possible when used in context with the text of the report. An example of an unacceptable method is injection of euthanasia solution into the heart without prior sedation. Consultation with a local veterinarian is recommended to ensure euthanasia is being provided appropriately and humanely. Arizona Revised Statute Title 11 Chapter 7 Article 6.1 11-1021 lists which agents can be used when an “animal is destroyed while impounded in a county, city or town pound”.

Free training for providing intravenous injection of euthanasia solution is available through the Arizona Humane Society. Animal control officers and animal shelter operators who have not received such training through a local veterinarian, are encouraged to contact human societies directly to arrange training:

Arizona Humane Society
Director of Shelter Operations
1521 W. Dobbins Road
Phoenix, AZ 85041
(602) 997-7585, extension 2056

Bats submitted to the Arizona State Public Health Laboratory for rabies testing must be submitted dead. Freezing is not considered humane or a reliable form of euthanasia. Methods of humane euthanasia of bats include the following:

1. Carbon dioxide or carbon monoxide in compressed gas cylinders, usually administered within an enclosed chamber;
2. Inhalant anesthetics, halothane, enflurane or isoflurane, usually administered within an enclosed chamber via vaporizer or anesthetic soaked gauze or cotton;
3. Euthanasia solution or barbiturate solutions, administered intraperitoneally, intracardiac only if animal is anesthetized.

Whatever method is chosen, personnel should avoid physical contact with materials that may contain brain, spinal cord or saliva to avoid possible exposure to rabies.

Death should be confirmed before shipping a bat to the Arizona State Public Health Laboratory to avoid exposure to laboratory personnel.

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GUIDELINES FOR THE SUBMISSION OF SPECIMENS FOR RABIES TESTING

The [Arizona State Public Health Laboratory](#), located in Phoenix, is the only laboratory in the state that is able to confirm rabies infection in animals where exposures to humans or animal have occurred. Testing is performed using direct fluorescent antibody (dFA). Fresh brain tissue is required for this test. Three areas of the brain are tested (brainstem, cerebellum, and hippocampus). It is important that brain tissue be maintained fresh or frozen in good condition. Tissues should not be submitted in formalin or alcohol. Potentially decomposed or destroyed brains should be submitted to the laboratory for evaluation of whether they can be tested if there was a human or pet exposure. Any animal that is excreting rabies virus in their saliva should have detectable virus in the brain by dFA examination.

Currently, there are no reliable, standardized ante-mortem (live animal) tests that can be used to confirm whether an animal is infected with rabies. Animals that should be submitted for testing are:

1. Wild animals involved in human or pet exposures or
2. Domestic animals showing neurological symptoms of rabies that have become ill or died during quarantine.

As of June 1, 2011- All domestic animal specimens must have approval by the appropriate public health agency after a rabies risk assessment has been conducted. This is usually done at ADHS, however, first review of specimens may be delegated to the epidemiology staff at a local health department after they have been given training by ADHS. At present, only Maricopa County Department of Public Health has received this training. Please contact Maricopa County Epidemiology at (602) 747-7111 if your specimen was collected in that jurisdiction. Otherwise, contact ADHS (602) 364-4562. Final authority to approve submission for testing rests with the ADHS Vector-Borne and Zoonotic Disease Program.

Caged rodents such as hamsters and gerbils should NOT be submitted for testing, since these animals have no chance for contracting rabies.

When determining whether a domestic animal should be submitted for testing, consider the following:

1. If an animal bites a human, and the animal is healthy, it should be quarantined- not euthanized.
2. Was the animal currently vaccinated for rabies?
3. Did the animal have the opportunity to come in contact with a potentially rabid wild animal in the past six months?
4. Was the animal exhibiting signs consistent with rabies infection?
5. Is the animal from an urban or rural area?

When there is very low suspicion of rabies or when there are no human or pet exposures, a domestic animal does not need to be submitted for rabies testing. In the case of a vaccinated, indoor only animal that has bitten someone or an animal exhibiting neurologic signs consistent with rabies but without exposure, the animal can be submitted to an alternative lab at a cost to the submitter.

For wild animals that have been found dead or have shown signs consistent with rabies and have not exposed any humans or animals, the United States Department of Agriculture's Wildlife Services Division can perform direct Rapid Immunohistochemical Test (dRIT). This is a rapid test used in the field for surveillance purposes only. Animal heads being submitted to the United States Department of Agriculture's Wildlife Services Division for rabies testing should be frozen as the dRIT testing may be delayed 1-4 weeks. To submit a specimen for dRIT testing, call (602) 870-2081.

Removal of Animal Heads

Only veterinarians, animal control officers, Arizona Game and Fish officials, and others who have been appropriately trained and have pre-exposure prophylaxis should remove animal heads. The rest of the body should be incinerated. Bats should be submitted intact. Other animals should be decapitated and only the head submitted.

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Refrigeration versus freezing head

Refrigeration and immediate shipment is preferred. The head of a freshly euthanized/killed animal will store well in a refrigerator for 3-4 days. If shipment will be delayed due to weekend or holidays, refrigeration of the head and shipment with ample ice on Monday for receipt by Tuesday is recommended. If the animal is starting to decompose or has been dead for more than one day, has not been refrigerated and shipping will be delayed, then freezing the head is recommended. Freezing of the head will only delay the results due to allowance for thawing at the lab. Freezing should not affect the performance of the dFA test, as long as the head has not been repeatedly frozen and thawed.

Supplies

Sharp knife and sharpener (optional-sharp hacksaw, dehorner, shears, or brush cutters)

Protective clothing:

- Waterproof gloves (disposable or disinfect after use)
- Face mask
- Safety glasses or goggles
- Optional coverall, waterproof apron (a large plastic garbage bag with holes for arms and head)
- Cleaning supplies:
 - water
 - detergent
 - disinfectant with virucidal activity (bleach)
 - paper towels
 - plastic trash bags

Procedure

CAUTION: The brain, spinal cord, salivary glands, and saliva of the animal may contain rabies virus. If an exposure occurs during the process of removal of the head, it should be noted on the laboratory submission form for the animal.

Do not use an axe or power saw because infected material may become aerosolized.

Always wear protective gear (waterproof gloves, a facemask and eye protection) and exercise caution with the use of knives and other sharp objects during the procedure.

Packing, storing and shipping samples:

1. The head of the animal (except bats which should be submitted whole) should be removed from the body and placed in a plastic bag. Seal the bag. NOTE: The specimen should be refrigerated until time of shipment.
2. Place the bag containing the animal head inside a larger plastic bag.
3. Place at least two FROZEN gel packs on top of the specimen and seal this bag.
4. Place the double-bagged head in a sturdy, LEAKPROOF container (preferably metal or styrofoam).
5. Fill out the submission form. Place it in an envelope and tape onto the outside of the container/box (NOT on the inside of box). Address the box.
6. Specimens should be shipped or delivered to the lab as quickly as possible (overnight mail or same-day bus service are commonly used transport methods).
7. Notify the lab when high priority (human or pet exposure) specimens are being shipped (phone number below).

Clean up

Instruments and contaminated surfaces should be washed with detergent and water and then disinfected. Disinfect with a freshly prepared solution of bleach (1 part bleach in 9 parts water), alcohol (40- 70% ethanol), iodine (25ppm) or quaternary ammonium (200 ppm) compounds. The disinfectant should remain in contact with the contaminated surfaces for a minimum of 10 minutes.

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Specimen Submission & Shipping

The following minimal information must accompany all specimens to the Arizona State Public Health Laboratory:

1. Name, address, and phone number of the submitter
2. Date of death and location where collected (street address or closest cross streets)
3. Species of animal
4. Owner of animal - Name, address, and phone number
5. Person(s) or animal(s) exposed; date of exposure
6. Rabies vaccination status of animal, if known
7. Description of exposure(s)

Routine submissions can be received at the laboratory between 8AM and 4:30PM Monday - Friday.

Rabies testing is done by one laboratory in Arizona. Ship specimens to:

Arizona State Public Health Laboratory
VIROLOGY RECEIVING
250 N. 17th Ave
Phoenix, AZ 85007
(602) 542-6134

After hours and weekend rabies testing: Samples can be submitted after hours and on weekends only if there is human exposure to a suspected rabid animal. Contact ADHS at (602) 364-4562 and listen to the instructions regarding the after-hours answering service.

Laboratory Submission Form

Fillable Lab Submission form: <http://www.azdhs.gov/documents/preparedness/state-laboratory/public-health-microbiology/rabies-lab-submission-form.pdf>

Submission algorithms: <http://www.azdhs.gov/preparedness/epidemiology-disease-control/rabies/#clinical-lab-testing>

Legislation

<http://www.azleg.state.az.us/ArizonaRevisedStatutes.asp?Title=11>

Arizona Administrative Code

[Arizona Administrative Code- Arizona Secretary of State](#)

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Animal Exposure Report Forms

<http://www.azdhs.gov/preparedness/epidemiology-disease-control/rabies/index.php#clinical-lab-testing>

Rabies Risk Assessment Algorithms

[Rabies Risk Assessment Algorithm](#)

[Dog & Cat Bites in Arizona: Rabies Risk Algorithm](#)

[Rabies Post-Exposure Management Algorithm](#)

Post-Exposure Prophylaxis Vaccination Reporting Form

[Post Exposure Prophylaxis Vaccination Reporting Form](#)

List of laboratories that perform (RFFIT) (human titer check) testing Rapid Fluorescent Focus Inhibition Test

Non-military personnel (civilian):

KANSAS STATE UNIVERSITY

Rabies Laboratory

2005 Research Park Circle Manhattan, KS 66502

Tel: (785) 532-4483 Fax: (785) 532-4474

Email: rabies@vet.k-state.edu <http://www.vet.ksu.edu/rabies>

Military personnel:

DEPARTMENT OF DEFENSE

CDC Website for RFFIT Testing: http://www.cdc.gov/rabies/specific_groups/doctors/serology.html

List of alternative labs for Direct Fluorescent Antibody (DFA) testing for rabies in animals

Prior to submission, please contact each laboratory to obtain their respective submission form, instructions, and fees for DFA. Estimate for cost of testing is \$60 - \$65 per animal head.

Colorado State University - Veterinary Diagnostic Laboratory

300 West Drake Fort Collins, CO 80523

Phone: 970-297-1281 Fax: 970-297-0320

<http://dlab.colostate.edu>

Colorado Department of Public Health - Virology Lab

8100 Lowry Blvd Denver, CO 80230-6928

Phone: 303-692-3485

<http://www.cdphe.state.co.us>

Oregon State University – Veterinary Diagnostic Laboratory

30th & Washington Way - Magruder Hall – Room 134

PO Box 429 Corvallis OR 97339-0429

Phone: 541-737-3261 Fax: 541-737-6817

<http://oregonstate.edu>

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Sample* Wolf Hybrid Owner Consent for Rabies Inoculation

*(This or any form used should be reviewed and approved by the veterinary clinic’s legal counsel.)

I (owner name) request that (name of veterinarian, veterinary clinic) give my wolf hybrid, (name of animal), a rabies vaccination.

I understand that this vaccine is not licensed for use in wolf/dog or coyote/dog hybrid animals due to a lack of scientific studies showing that the rabies vaccine is effective in preventing rabies in wolf hybrids.

In requesting that this vaccine be administered to my animal, I understand and release the veterinarian of responsibility should my animal contract rabies. I further understand that:

My animal is a breed that is susceptible to rabies, a fatal disease that can be transmitted to other animals and to humans.

Although this vaccine may provide immunity to my wolf hybrid, its efficacy has not been proven and I will not assume that my animal is protected in the event of an exposure to rabies.

My animal is subject to state and local laws and ordinances regarding the disposition (quarantine, euthanasia, testing) of animals that are exposed to rabies, and animals that bite or expose people.

I understand that neither (Veterinary Clinic or Animal Control), nor the manufacturer or distributor of this rabies vaccine have made any representations or warranties as to the effectiveness of this vaccine for my animal, and I agree that none of those parties shall be liable for any damages which might result from failure of this vaccine, including but not limited to reactions, contraction of rabies virus by my animal or subsequent infection of other animals or persons by my animal.

I fully understand the risks, potential benefits, and limitations of rabies inoculation for my animal. I have been given the opportunity to ask questions and my questions have been answered to my satisfaction.

In consideration of this agreement, I release (Veterinary Clinic or Animal Control) and its employees, the manufacturer and distributor of this rabies vaccine from any and all claims, damages or actions resulting from or connected with vaccinating my animal against rabies.

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Date	Signature of owner	Date	Signature of Witness

Blank space for signatures and dates.

Updated 1/20/17

Douglas A. Ducey | Governor Cara M. Christ, MD, MS | Director