

This Chapter Covers:

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- ◆ Animals That Contract Rabies
- ◆ Clinical Signs of Rabies
- ◆ Rabies Treatment
- ◆ Rabies Seasons and Cycles
- ◆ Animal Bites
- ◆ Rabies Quarantine

Introduction

Rabies is a deadly disease caused by a virus. It is the most serious zoonotic disease that you might encounter.

- The rabies virus is shed (released) in the saliva of an infected animal. An animal usually contracts rabies from the bite of an infected animal. The virus may also enter the body if the mucous membranes (the wet parts of the eyes, nose, or mouth) or a scratch or break in the skin have contact with saliva containing the rabies virus. Exposure to rabies through mucous membranes is very rare.
- Once the rabies virus enters the body, it begins to multiply in the area near the entry site. If the infection is not stopped at this point, the virus will eventually invade the nerve cells in the area. Once the virus is in the nerve tissue, it travels along the nerve to the brain where it continues to multiply. The virus may then spread to the salivary glands or other parts of the body. This incubation period lasts a varying amount of time; it can

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range from days to years, but the average length is 3 - 8 weeks (refer to Figures 1 and 2 in the appendix of this chapter).

- **If the virus spreads to the salivary glands, the animal may be able to shed (or excrete) the rabies virus in the saliva; this means that the animal is infectious.** Shedding occurs in the last stages of the disease. Clinical signs also appear in these last stages, followed closely by death. Dogs, cats, and domestic ferrets with rabies may shed rabies virus three to six days before they show clinical signs of rabies and only live for a few days after the clinical signs appear. This is why it is so important to quarantine animals that bite or have otherwise potentially exposed a person to rabies. If a dog, cat, or domestic ferret is healthy 10 days after a potential exposure incident, it can be concluded that the rabies virus could not have been in the animal's saliva at the time of the exposure.

Animals That Contract Rabies

All warm-blooded animals can contract rabies, but some animals are more likely to become infected than others.

High-Risk Animals

- Texas law lists five wildlife reservoir species as **high risk** for rabies transmission: **skunks, bats, foxes, coyotes, and raccoons**. A reservoir is a particular species of animal in which a disease organism is maintained and can multiply. With rabies, the virus is maintained in these high-risk wild animals.
- **If a high-risk animal potentially exposes a person to rabies, the animal's**

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brain **must** be tested for rabies; the person **must be evaluated for starting rabies vaccinations immediately.**

Low-Risk Animals

- Low-risk animals are warm-blooded animals that rarely get rabies. Generally they are not exposed by an infected animal; however, when they are attacked, they often die from the wounds. Low-risk animals include rodents, moles, shrews, opossums, rabbits, and armadillos. Generally, low-risk animals are not tested unless there are unusual circumstances. The Texas Department of State Health Services' Laboratory Services Section discourages testing of indoor, caged-raised pets, such as hamsters, guinea pigs, and gerbils. Rabies postexposure treatment is rarely required for persons due to contact with low-risk animals.

Dogs, Cats, and Domestic Ferrets

- People are bitten most often by dogs and cats. Information on how to deal with these bites (as well as clarification of other potential rabies exposures) will be covered in the Animal Bites section of this chapter.

The "Other" Animals

- Domestic farm animals, such as horses, cows, sheep, goats, and pigs, are sometimes exposed to rabid animals and may develop rabies.
- According to Texas law, if an animal is **not** listed as high risk or low risk, and it is **not** a dog, cat, or domestic ferret, it is put in a group called **other**. If another animal potentially exposes a person to rabies, the local rabies control authority (LRCA) will decide if it is humanely killed and tested for rabies **or** quarantined or placed in confinement for a 30-day observation

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period.

- Examples of other animals include domestic farm animals, wolf-dog hybrids, tigers, bears, and monkeys.

Clinical Signs of Rabies

The clinical signs of rabies in domestic animals vary a great deal. Therefore, it is not possible to look at an animal and determine that it is rabid. However, some common **clinical signs** of rabies in both domestic and wild animals are:

1. **Change in behavior**. For instance, a friendly dog or cat may become vicious and bite without any apparent reason (unprovoked bite). This is often termed the “furious” form of rabies. A friendly dog or cat may become very shy and withdrawn. This may be termed the “dumb” form of rabies. Wildlife may also behave strangely. For example, a normally shy, nocturnal skunk may be seen in broad daylight and appear unafraid of dogs or humans.
2. **Unexplained paralysis (inability to move)**. Rabies often causes paralysis of the rear legs or lower jaw. An animal that cannot walk, appears drunk (has an unsteady gait), or cannot close its mouth may be suffering from rabies.

Other clinical signs of rabies include:

not eating	eating strange (non-food) objects
pawing at the mouth	appearance of <u>choking</u>
difficulty in swallowing	chewing at the site of the bite
seizures	hypersensitivities to touch or sound

Once clinical signs appear, death of the animal will soon follow.

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Remember: The entire course of clinical rabies in domestic animals usually lasts less than a week.

Rabies Treatment

Emergency first aid to prevent rabies in humans includes the following steps:

- Let the wound bleed.
- **Wash the wound with soap and water.**
- Seek medical attention.

Let the wound bleed to help remove the rabies virus from the wound. Wash the wound with soap and water; this will also help remove the rabies virus from the wound. Apply an antiseptic, if available. Seek medical attention as soon as possible. **Any bite, even a small one, can be deadly.**

Rabies Vaccinations

Vaccinations that a person receives **after** being exposed to rabies are called **postexposure prophylaxis** (prevention). The decision of whether to administer postexposure prophylaxis should be between a person and his or her physician. If the exposure victim has **not** been previously vaccinated against rabies, he or she will need to be treated with two types of products given by injection:

- One product provides **immediate, but temporary, protection against rabies**. It is a type of antiserum called **human rabies immune globulin (HRIG)** and is made of human antibodies. This product is given according to weight, meaning that a heavy person needs more antiserum than a light person. As much as possible is injected around the bite wound(s); any remaining antiserum should be given in the muscle at a place distant from where the vaccine was given. These antibodies immediately attack the

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rabies virus in the body, but they only last a few weeks.

- The other product is a **vaccine**, such as **human diploid cell vaccine (HDCV) or purified chick embryo cell (PCEC)**. **Five doses** of the vaccine are administered in the arm muscle **over a period of one month**. The rabies vaccine will cause the body to produce its own antibodies against the rabies virus and provide long-term protection.

Rabies Vaccinations for Animal Control Officers

According to Section 169.24 of the Texas Administrative Code, Rabies Control and Eradication (rules of the Rabies Control Act), **all animal control officers (ACOs) should take a series of rabies vaccinations to protect themselves from rabies**. This is called preexposure prophylaxis.

- The preexposure vaccinations consist of **three injections with rabies vaccine (such as HDCV or PCEC) given over a 3- to 4-week period**. After you receive this series of vaccinations, you should have your titer checked every two years and get a booster vaccination if needed.
- If you have had preexposure vaccinations and are exposed to rabies, you will only need **two** more injections of rabies vaccine and will **not** need the rabies antiserum (HRIG). Also, if you are exposed to rabies without being aware of it and do not receive postexposure treatment, you stand a better chance of not developing rabies than if you were not vaccinated previously.

Rabies Seasons and Cycles

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Rabies occurs throughout the year in Texas. In the spring (March and April) there are many skunks with rabies. In the fall there are numerous bats with rabies, and rabid foxes are often found in the winter. There are normally fewer rabid animals reported in the summer than at other times of the year. Rabies tends to occur in cycles, meaning that periodically the number of positive rabies cases will increase for a period of time and then decline to the previous level.

A rabies outbreak (an increase in the number of cases) can start with one infected animal. This one animal may bite several other animals before it dies. These animals eventually can pass the virus to many more animals. Most of the time, skunks bite other skunks causing a skunk-to-skunk rabies cycle, bats bite other bats causing a bat-to-bat rabies cycle, and so on.

Different types of rabies virus are known as variants. Specific variants of rabies virus have developed within certain wildlife reservoirs. Texas has a wide variety of rabies virus variants including, but not limited to:

- numerous bat variants, such as:
 - * Brazilian, or Mexican, free-tailed bat,
 - * red bat,
 - * big brown bat, and
 - * pallid bat;

- three skunk variants, including:
 - * South Central skunk,
 - * San Saba skunk, and
 - * hog-nosed skunk;

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- and three canine variants, including:
 - * domestic dog/coyote (DDC),
 - * Texas fox (TF), and
 - * Sonora dog.

Any of these variants can infect other species of animals. For instance, when a rabid fox with the TF variant of rabies bites a dog, the infected dog may also develop that variant of rabies virus and die. When a known variant of rabies “spills over” into another animal species outside of its normal cycle, the process is called spillover.

Epizootics (epidemics in animals) or outbreaks of rabies can occur in a small area of the state or can occur statewide. Rabies outbreaks are common along the US-Mexico border in domestic dogs. For example, the DDC variant of rabies virus became epizootic in coyotes and domestic dogs in South Texas during 1988. A gray fox rabies epizootic in West-Central Texas also began in 1988. This epizootic was caused by the TF variant.

To halt the expansion of these two epizootics, the Texas Department of State Health Services' Zoonosis Control Branch began the Oral Rabies Vaccination Program (ORVP). The ORVP is a large-scale rabies control program for wildlife (coyotes and gray foxes). The program includes dropping baits filled with an oral rabies vaccine along the edges of the epizootics. Coyotes and foxes that eat the bait are vaccinated against rabies. The vaccinated animals then form a living immune barrier to halt the spread of the rabies virus.

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Rabies Prevention

People generally have very little direct contact with wildlife, except bats, so exposure to rabies through contact with wildlife is unlikely. However, wild animals often expose domestic animals to rabies, which can then expose people to rabies. The best way to protect people from rabies is to vaccinate domestic animals against this disease. It is also important to educate people about the need to avoid physical contact with bats. Confining pets will help to reduce their contact with wildlife.

Rabies Summary

You may never see or handle an animal with rabies, but your knowledge of this deadly disease is very important. Your job places you at a higher risk of rabies exposure than most people. Many ACOs remove wild animals from urban settings, and nearly all ACOs deal with biting dogs and cats. Make sure that you are protected against rabies. Get the preexposure vaccination series, get your titer checked every 2 years, and take booster vaccinations as recommended by your physician.

As an ACO, you help fight rabies by removing stray animals from the rabies cycle. You also make a difference in your community when you educate people about the importance of getting rabies vaccinations for their pets.

Animal Bites

Every city and county must appoint a person to serve as the LRCA. This person does not have to be an ACO, nor does he or she have to be associated with the medical profession. This person is responsible for investigating all reported potential rabies exposures, such as bites and scratches, to humans and making sure that the animals involved are handled properly.

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Chapter 826 of the Texas Health and Safety Code, Rabies Control Act, is the state law that pertains to procedures for handling potential rabies exposures and quarantine. Refer to it and its associated rules, Texas Administrative Code, Rabies Control and Eradication, when questions arise concerning animal bites. Although the following section focuses on bites, potential rabies exposures include any incident in which there is probable cause to believe that an animal has exposed a human to rabies.

Handling Animal Bites

- **Treat every animal bite as a serious matter.** All bites must be reported to the LRCA, who must investigate them. Always respond to each incident to consider if the animal might be rabid.

- **Biting animals fall into one of four categories.** Each category requires a different method of handling.
 - 1) **High-risk** animals must be humanely killed and tested.

 - 2) **Low-risk** animals may or may not be tested for rabies as determined by the LRCA.

 - 3) **Dogs, cats, and domestic ferrets** must be quarantined until the end of the 10-day observation period (240 hours from the time of the bite incident) **or** they can be humanely killed and tested for rabies. There are exemptions for assistance and police animals.

 - 4) **Other animals** are either; humanely killed and tested **or** they are quarantined or confined as determined by the LRCA until the end of the **30-day** observation period.

Refer to Chart 1 in the appendix of this chapter for additional information on the

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disposition of biting animals.

- **Identify all animals correctly.** Testing and observation are useless if they are done on the wrong animal.
- **The attending physician decides if the bitten person receives postexposure rabies treatment.** If the animal tests positive for rabies or develops signs of rabies during the observation period, the person needs to begin treatment immediately. The attending physician may consult with their local health department or with the Texas Department of State Health Services about the need for postexposure rabies treatment.

Rabies Quarantine

Most dogs and cats bite to protect themselves or to protect their owner or their owner's property. Please refer to the manual section on animal behavior for more information on this subject. However, since rabies infection is almost always fatal, all biting animals are considered to be suspects for transmitting rabies until proven otherwise.

- **Do not** vaccinate the animal against rabies while it is in quarantine. (It may be treated for unrelated medical problems.)
- Remember, a dog, cat, or domestic ferret may **shed rabies virus (be infectious)** for **three to six days before** they show clinical signs of rabies. The virus is usually shed in the saliva, and the saliva from a rabid animal may infect open cuts or mucous membranes of other animals or people.
- **It is very important to prevent contact between animals held in**

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quarantine. Treat the animal held under rabies observation as though it is shedding rabies virus. Animals in quarantine must be separated from all other animals by a solid partition that prevents any physical contact between them.

- **Prevent human contact with the animal in quarantine as well.** A friendly lick on the finger may result in having to deal with another potential rabies exposure. There must be a **standard operating procedure (SOP)** that explains the precautions to be observed when unloading, handling, feeding, and caring for the animals in rabies quarantine. It would be best if only one person (who has a current preexposure rabies vaccination) takes care of the animals in quarantine.
- If a quarantined animal does not have a current rabies vaccination, it **must be vaccinated against rabies at the end of the observation period.**
- Notify everyone involved in the bite incident if the animal becomes sick or dies during the observation period. If the animal does not become sick during the observation period, it could not have transmitted rabies at the time of the bite incident. Remember to notify everyone involved in the bite incident when the animal is released.

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Chapter Appendix

Chart 1 - Disposition of Biting Animals

Figure 1 - Rabies Incubation Period

Figure 2 - Rabies in a Dog - Example of Incubation and
Transmission Time Line

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Disposition of Biting Animals

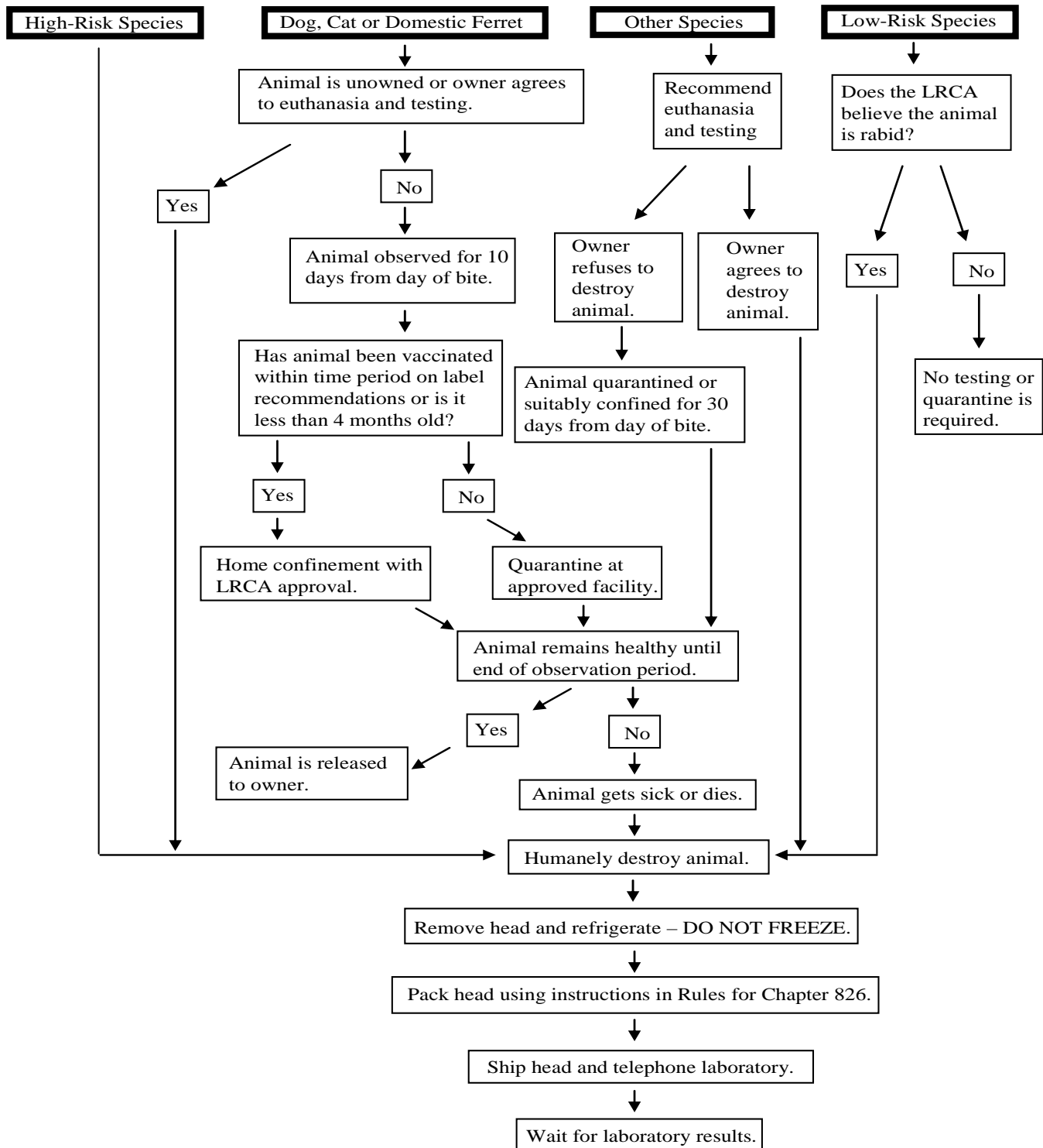
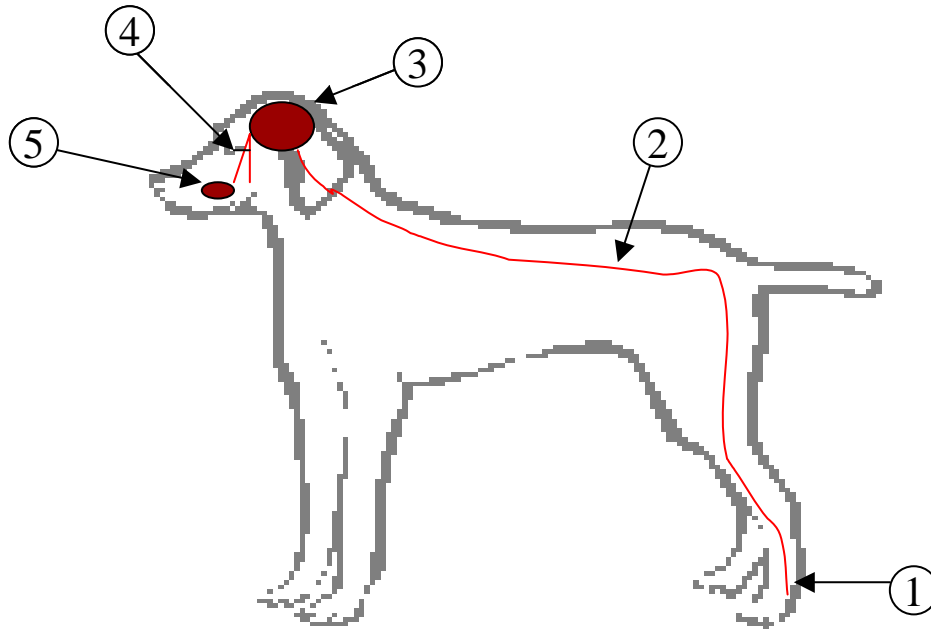


Figure 1

Rabies Incubation Period



Timeline:

- 1 thru 5 - May take days to years (average 3 - 8 weeks)
 - 3 thru 5 - Dog may or may not show rabies clinical signs when it bites someone
 - 1 thru 4 - Dog is not infectious during these stages
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- 1 - Bite site
 - 2 - Virus migrates up nerves to spinal cord
 - 3 - Virus migrates from spinal cord to brain
 - 4 - Virus migrates from brain down cranial nerves
 - 5 - Virus arrives in salivary gland and dog is infectious to others

Figure 2

Rabies in a Dog – Example of Incubation and Transmission Time Line

One Possible Bite Scenario

- ① Unvaccinated dog bitten by a rabid skunk
- ② Same dog bites a person

First clinical signs of rabies appear (i.e. between day 2 or day 3 of quarantine in this example). Due to clinical signs of rabies during quarantine, dog is destroyed and tested for rabies. If test is positive, get patient started on postexposure treatment.

Incubation ranges from days to years; average length is 3 to 8 weeks. Animal has no signs of rabies during this period (i.e. 1.5 months in this example).

