

# Virginia Guidelines for Rabies Prevention and Control

*Updated: February 2024*



Virginia Department of Health  
Office of Epidemiology  
Division of Surveillance and Investigation  
109 Governor Street  
Richmond, Virginia 23219  
Phone: 804-864-8141; Fax: 804-864-8131

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## Background

Rabies is a fatal, but preventable viral disease of mammals. The virus infects the central nervous system, ultimately causing brain inflammation and death. In many countries around the world, dogs are a major source of rabies and most rabies deaths in people around the world are the result of dog bites. In the United States, however, wildlife are the reservoir of rabies and any rabies cases diagnosed in domestic animals represent spillover infections from contact with rabid wild animals. Raccoons, skunks, foxes, and bats are the most common wild animals diagnosed with rabies in the United States every year. Cats are the domestic animals most commonly diagnosed with rabies. Annual summaries of rabies-positive animals are posted on the Virginia Department of Health website:

<https://www.vdh.virginia.gov/animal-contact-human-health/animal-contact-human-health-statistics/>

While most rabies cases diagnosed each year in the United States are in wild animals, most potential human rabies exposures are from dog and cat bites, and most domestic animal rabies exposures involve encounters with wild animals. As domestic animals are more likely to contact wildlife than people are, vaccination of domestic animals, particularly the ones that people have the most contact with, such as dogs and cats, is critical for protecting human health.

On average, two human cases of rabies are reported in the United States each year, most due to a bite from a dog while traveling to another country, or exposure to a bat while in this country. Virginia has reported two human cases of rabies since 2009.

Infectious rabies virus is found in wet saliva and central nervous system (CNS) tissue. In the environment, the virus is readily inactivated by drying, sunlight, high temperatures, and many disinfectants. Different environmental conditions affect the rate at which the virus becomes inactive, but in general, if the material containing the virus is dry, the virus can be considered noninfectious.

Rabies virus is transmitted through direct contact (such as through broken skin or mucous membranes in the eyes, nose, or mouth) with saliva or brain/nervous system tissue from an infected animal. Bites are the most effective means of rabies transmission. It is also possible, but rare, to get rabies from non-bite exposures, which can include scratches, abrasions, or open wounds that are exposed to saliva or other potentially infectious material from a rabid animal. Other types of contact, such as petting a rabid animal, or contact with the blood, urine, or feces of a rabid animal, are not considered rabies exposures. Other modes of transmission—aside from bites and scratches—are uncommon. Inhalation of aerosolized rabies virus is one potential non-bite route of exposure, but except for laboratory workers, most people won't encounter an aerosol of rabies virus. Rabies transmission through corneal and solid organ transplants have been recorded, but they are also very rare.

In most species, the incubation period for rabies is between 1-3 months, though it can vary depending on the species, type of exposure (bite vs. non-bite), and location of exposure (distance from the central nervous system). Once signs of rabies develop, disease progression is rapid and nearly always fatal. Most infected people and animals will die within days of illness onset.

## Introduction to the Guidelines

This document, including references, constitutes the rabies prevention and control policy for Virginia. Legal authority for actions related to rabies is found in the [Code of Virginia](#) and in the reference document [Index to Rabies Related Section of the Code of Virginia](#) and the *Virginia Administrative Code*, specifically Chapter 105 of Title 12, which can be found at: <http://law.lis.virginia.gov/admincode/title12/agency5/chapter105/>.

Other documents that provided a background for these guidelines include:

- Human Rabies Prevention – United States, 2008. Recommendations of the Advisory Committee on Immunization Practices (ACIP), U.S. Department of Health and Human Services. Available at: [http://www.cdc.gov/rabies/resources/acip\\_recommendations.html](http://www.cdc.gov/rabies/resources/acip_recommendations.html)
- Use of a Modified Preexposure Prophylaxis Vaccination Schedule to Prevent Human Rabies: Recommendations of the Advisory Committee on Immunization Practices-United States, 2022. Available at <https://www.cdc.gov/mmwr/volumes/71/wr/mm7118a2.htm>
- Compendium of Animal Rabies Prevention and Control published annually by the National Association of State Public Health Veterinarians (NASPHV). Available at: <http://www.nasphv.org/documentsCompendia.html>

Although the above referenced documents were used in the development of the Virginia Guidelines for Rabies Prevention and Control and may justify or explain the Virginia Department of Health's (VDH) recommendations, neither these guidelines nor the reference documents included above can be cited as law or regulation in Virginia. To ensure that you are using the most current documents, please go to the appropriate website for each.

For questions specifically related to rabies prevention and control in Virginia, call the Office of Epidemiology at 804-864-8141.

## Definitions

This section provides definitions for terms used within these guidelines.

### **Confinement – Dogs, Cats, and Ferrets**

The animal should be housed in a building, pen or some other suitable escape-proof enclosure and not removed from the enclosure unless on a leash and under the immediate control of a responsible adult while being kept either on the owner's property or in the immediate area associated with the owner's place of residence. The animal should not be moved or taken to another location, site, or property unless permission is obtained from the local health director or the director's designee. At the first indication of the animal becoming ill, it is the responsibility of the owner or custodian to notify the [local health department](#) and take the animal to a veterinarian for an examination. If rabies is suspected, the animal should be immediately euthanized, and the brain tested for rabies.

### **Confinement – Livestock**

The animal should be confined in a manner that is routine for that species (e.g., barn, stable, paddock, pasture). Sale or movement of the animal must be approved by the local health director or the director's designee in consultation with the Virginia Department of Agriculture and Consumer Services (VDACS).

### **Currently Immunized Against Rabies – Animals**

An animal is considered currently immunized against rabies if a vaccination certificate is available that describes the animal adequately and documents that the animal received a rabies vaccine(s) approved by the United States Department of Agriculture (USDA) within the recommended timeframe. A sample rabies form is available from NASPHV (Form #51, available at <http://www.nasphv.org/Documents/RabiesVacCert.pdf>). Use of this form is recommended, but not required.

The duration of immunity stated on the form must be appropriate for that animal's species and age as outlined in Appendix 1 of the [Compendium](#) of Animal Rabies Prevention and Control (herein after referred to as the Compendium) or described on the USDA-approved vaccine label. Generally, animals receiving their first rabies vaccine are not considered currently immunized against rabies for at least 28 days after the initial vaccination is administered. With subsequent vaccinations, the animal is considered to be currently immunized immediately, even if it was overdue for a rabies vaccine at the time of vaccination. In lieu of a vaccination certificate, the records of the attending veterinarian are sufficient.

The Code requires that a licensed veterinarian or a licensed veterinary technician who is under the immediate and direct supervision of a veterinarian on the premises administer vaccine for dogs and cats. There is no requirement in the Code for rabies vaccination of other animals and no prohibition against the sale of rabies vaccine to lay persons or owners vaccinating their own animals; however, VDH will not recognize an animal as vaccinated against rabies unless the vaccine is labeled for that species and was administered by a licensed veterinarian or a licensed veterinary technician who is under the immediate and direct supervision of a veterinarian on the premises. This is the best assurance that the vaccine was handled properly and administered appropriately.

### **Domestic Animal Exposure**

Rabies is transmitted when the virus is introduced into bite wounds or when wet saliva or CNS tissue enters an open wound or mucous membranes like in the eyes, nose, or mouth. Any circumstance where wet saliva or CNS tissue from a rabid or suspected rabid animal did have, or may have had, direct contact with mucous membranes or a break in the skin of a domestic animal is considered an exposure. The actual witnessing of a bite or attack by a rabid or suspected rabid (see definition below) animal is not necessary to meet the definition of a domestic animal rabies exposure; however, a suspected rabid or rabid animal needs to have been witnessed in close proximity to the exposed animal where, in the judgment of the local health director or the director's designee, contact with the suspected rabid or

rabid animal likely occurred. Any high-risk rabies vector species (e.g., raccoons, skunks, foxes, bats, etc.) or suspected rabid animal that has exposed a domestic animal and is not available for laboratory testing should be presumed to be rabid; post-exposure recommendations will be based on this presumption. Domestic animals that bite other domestic animals are not usually considered rabies suspects unless showing signs compatible with the disease.

### **High-Risk Animals**

The highest risk for rabies is posed by certain mammals in the scientific Order *Carnivora* (carnivorous mammals) such as raccoons, skunks, and foxes; and bats (scientific Order *Chiroptera*). In areas where raccoon variant rabies is established, some mammals in other scientific orders are also considered high-risk, including groundhogs (woodchucks) and beavers, both of which are large rodents in the scientific order *Rodentia*.

### **Human Exposure**

Any bite, scratch, or other circumstance where saliva or CNS tissue from a rabid or suspected rabid animal enters an open wound or mucous membrane by entering the eyes, nose, or mouth. Scratches should be evaluated like any other wound. Simply touching or handling a rabid or suspected rabid animal, or another animal or inanimate object that had contact with a that animal, does not constitute a rabies exposure.

Due to the nature of the injuries that may occur with unprotected contact with a bat (small injuries that may go unnoticed) evaluating exposures to bats is different than evaluating exposures to terrestrial mammals. Therefore, anyone who has been:

1. Bitten by a bat and knows he has been bitten; OR
2. In direct, bare-skinned contact with a bat and cannot rule out that a bite or scratch has not occurred; OR
3. In a room with a bat and is unable to tell or articulate whether an exposure took place (e.g. child, senile or unconscious adult) should be considered exposed.<sup>1</sup>

### **Hybrid Animals**

The direct offspring or subsequent generations of domestic animals bred to wild animals (e.g., wolf hybrids, Savannah, and Bengal cats).

### **Local Health Department**

A directory of local health departments in Virginia can be found at <http://www.vdh.virginia.gov/local-health-districts/>. People are encouraged to contact their local health department to report bites and other rabies exposures, rabies response procedures or regulatory language associated with rabies.

### **Low-Risk Animals**

Small rodents (including, mice, rats, squirrels, chipmunks, moles, voles, guinea pigs, gerbils, and hamsters) and lagomorphs (rabbits and hares).

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<sup>1</sup>Particularly in situations involving mentally competent adults where the only evidence of potential exposure is scenario #3, further evaluation should be performed to ascertain the likelihood of being exposed without being aware of the exposure.

### **Observation period**

An observation period is a period of time where certain domestic animals will be monitored for signs of rabies after a rabies exposure has occurred. Most animals are observed at home and in many instances, this is sufficient. The local health director does, however, have discretion to ensure that an animal being observed is under competent observation (*Code of Virginia* § 3.2-6522) and some localities have ordinances that may inform observation locations and types depending on the exposure incident.

### **Opossums**

Based on their greater resistance to infection and similar positivity rate to small rodents, opossums appear to be at lower risk for rabies infection. In contrast to small rodent and rabbits, however, as larger terrestrial mammals, opossums are more able to withstand an attack from a rabid animal and so could live long enough to manifest disease after an attack.

### **Rabid Animal**

A rabid animal is one in which a rabies diagnosis has been laboratory-confirmed by the Virginia Division of Consolidated Laboratory Services, the Fairfax Health Department Laboratory, the Centers for Disease Control and Prevention Rabies Laboratory, or a laboratory in another state that has been designated by that state's health department for animal rabies testing.

### **Reporting Bites and Other Rabies Exposures**

Prompt reporting of animal bites is essential to rabies response efforts. The *Code of Virginia* § 3.2-6522 requires that every person having knowledge of the existence of an animal that is suspected to be rabid and that may have exposed a person, companion animal, or livestock to rabies shall report immediately to the local health department the existence of such animal, the place where seen, the owner's name, if known, and the signs suggesting rabies. In some localities, rabies exposures can also be reported to local animal control personnel. Virginia regulations 12VAC5-105-10 define a suspected rabid animal (see definition below). Penalties for persons who withhold information are outlined in § 18.2-313.1 of the Code.

### **Suspected Rabid Animal**

A suspected rabid animal is any animal that has not been tested for rabies and is:

- A species at high-risk for acquiring or transmitting rabies, regardless of whether the animal is exhibiting clinical signs compatible with rabies, and
- Any animal VDH considers at low-risk for acquiring or transmitting rabies that is exhibiting clinical signs compatible with rabies.
- An opossum acting aggressively, ill or found dead.

At the discretion of the local health director, any animal to which an observation period will be applied that may have bitten a person should be considered a suspected rabid animal until the end of that observation period. The status of animals for which an observation period will not be applied and/or that VDH has not identified as either high or low risk for acquiring or transmitting rabies is at the discretion of the local health director.

### **Strict Isolation – Dog, Cat, or Ferret**

A kennel in a veterinary hospital, animal control facility, commercial boarding establishment, or [a pen at home](#) that prevents direct contact between the animal and any human or other animal, but allows for feeding, watering, and cleaning. The local health director or director's designee is responsible for

approving the adequacy of the isolation unit.

## Domestic Animals

### Pre-Exposure Vaccination

#### **Dogs and Cats**

Legal requirement for vaccination: The *Code of Virginia* § 3.2-6521 requires that all dogs and cats receive rabies vaccine by the time they are four months of age. A licensed veterinarian or a licensed veterinary technician under the immediate and direct supervision of a veterinarian must administer the vaccine.

Currently vaccinated: Animals are considered currently vaccinated if they are vaccinated by a licensed veterinarian or a licensed veterinary technician under the direct supervision of a licensed veterinarian on the premises and the animal was vaccinated and revaccinated in accordance with the current National Association of State Public Health Veterinarian's Compendium of Animal Rabies Prevention and Control or as described on the U.S. Department of Agriculture approved vaccine label. For the purposes of rabies exposure, an animal will not be considered currently vaccinated until it has been at least 28 days since the initial vaccination and then immediately after every subsequent vaccination.

Rabies vaccination clinics: Animal rabies clinics that are held at a site that is not licensed by the Board of Veterinary Medicine fall under a special exception in the Code (§ 3.2-6521). To comply with the Veterinary Practice Act, a veterinarian who administers vaccine at such clinics should ensure that the local governing body and health department have approved the clinic.

Licensing linked to vaccination: The *Code of Virginia* § 3.2-6524 requires that all dogs be licensed by four months of age and allows counties, cities, and towns to require licensing of cats. Section § 3.2-6526 of the *Code of Virginia* indicates that in order to be licensed, evidence of rabies vaccination that is satisfactory to the licensing agent must be shown to the person issuing the license. In most localities this would be the local treasurer. As per § 3.2-6521, rabies vaccine exemptions are available in Virginia. Exemption certificates may be presented in lieu of a rabies vaccination certificate to purchase a license.

Vaccine exemption: The *Code of Virginia* § 3.2-6521 allows for an exemption to rabies vaccination requirements if the animal suffers from an underlying medical condition that is likely to result in a life-threatening condition in response to vaccination and such exemption would not risk public health and safety. Exempting a dog or cat from a routine rabies vaccination schedule is a very serious decision and should always be made judiciously since forgoing vaccination has the potential to adversely affect both animal and human health. If approved, an exemption is valid for one year. An exemption can be used for obtaining a license for dogs (and, in some localities, a license for cats) in the Commonwealth, but CANNOT be used as a substitute for a current rabies certificate in response to a rabies exposure. More information about rabies exemptions, including the guidance document Rabies Vaccination Exemptions in Virginia: What Veterinarians Need to Know is available at: <https://www.vdh.virginia.gov/animal-contact-human-health/rabies-control/>.

Vaccine labels: USDA is the federal agency that approves animal vaccines and the language for their labels. Most vaccines for dogs and cats are labeled for animals as young as 3 months. (See list of vaccines in [Appendix 1 of the Compendium](#)).

Vaccination regimens: Rabies vaccines should be administered in a manner consistent with the manufacturer's label. For the most part, the initial vaccination should occur when the dog or cat is

between three and four months of age. A second vaccination should be administered within one year of the primary vaccine, even if the initial vaccine was labeled as having a 3-year booster schedule. Vaccines approved by the USDA for three years' duration of immunity can be used for subsequent vaccinations, beginning with the second vaccination, even if the second vaccination is overdue or early.

Animals overdue for routine rabies vaccination: If the animal is overdue for a booster rabies vaccination, it does not have to restart the series. No matter how long overdue, if a rabies vaccine labeled for three years' duration is administered to an animal that has previously been vaccinated, a rabies certificate valid for three years can be written. Animals overdue for a vaccination are considered current immediately after vaccination.

Triennial vs. annual vaccinations: There is no evidence that administering vaccine every year is more protective than using a triennial vaccine every three years. In general, VDH encourages the use of triennial vaccines after the initial vaccination. However, there are vaccines for cats that are labeled for annual use that might be preferred by some veterinarians and their use should not be discouraged.

Titers in lieu of vaccination: Rabies antibody titers are indicative of an animal's response to vaccination or infection. Titers do not directly correlate with protection because other immunologic factors also play a role in preventing rabies, and our abilities to measure and interpret those other factors are not well developed. Therefore, evidence of circulating rabies virus antibodies should not be used as a substitute for rabies vaccination. Rabies antibody titers should not be used to determine the need for routine rabies booster vaccinations or post-exposure prophylaxis vaccination.

### **Ferrets**

State law does not require ferrets to be vaccinated; however, at least one vaccine is labeled by the USDA for use in ferrets (see [Appendix 1 of the Compendium](#)) and its use should be encouraged.

### **Livestock**

The *Code of Virginia* does not require any species of livestock to be vaccinated. USDA-approved vaccines are available for cattle, horses, and sheep (see [Appendix 1 of the Compendium](#)). The vaccination of livestock that have contact with the public (e.g., petting zoos, riding stables) is encouraged. In addition, owners of valuable livestock may want their animals vaccinated. Although it is legal for owners to purchase rabies vaccine and vaccinate their own animals, VDH will not recognize an animal as vaccinated unless a licensed veterinarian or a licensed veterinary technician who is under the immediate and direct supervision of a veterinarian on the premises administered the vaccine.

## **Post-Exposure Management**

Please note that the *Code of Virginia* in section § 3.2-6522 gives the local health director broad discretion regarding rabies exposure response associated with animals that are not dogs or cats.

### **Vaccinated Dog, Cat, or Ferret (note: The *Code of Virginia* does not mention ferrets)**

Any currently immunized dog, cat, or ferret that is exposed to a proven or suspected rabid animal should immediately receive a booster rabies vaccine as per *Code of Virginia* § 3.2-6521 and be [confined](#) for 45 days of observation as per *Code of Virginia* § 3.2-6522. During the 45-day observation period, a veterinarian should evaluate the animal at the first signs of illness. If the signs are compatible with rabies, the animal should be humanely euthanized and tested for rabies or, if the animal dies, it should be tested for rabies.



### **Unvaccinated Dog, Cat, or Ferret**

Any unvaccinated dog, cat, or ferret that may have been exposed to a proven or [suspected rabid animal](#) should be humanely euthanized unless the exposing animal tests negative for rabies. If the owner of an exposed dog, cat, or ferret is unwilling to euthanize it, the dog, cat, or ferret should be placed in [strict isolation](#).

Please note that the specific wording of the Code section § 3.2-6522 that speaks to rabies exposure response to any dog or cat with no proof of current vaccination and is exposed is that the animal shall be isolated *“for a period not to exceed six months at the expense of the owner or custodian in a manner and by a date certain as determined by the local health director.”* The [Compendium](#), while not law in Virginia, is national guidance that is often used to guide Virginia’s rabies response practices. Currently, the Compendium recommends a 4-month strict isolation period for dogs and cats, and a 6-month strict isolation period for ferrets. Local health departments should consider isolating unvaccinated dogs and cats for no more than four months (120 days). A rabies vaccination shall be administered to the animal by a licensed veterinarian prior to release from isolation. (The Code does allow for the administration of rabies vaccine at the beginning of the isolation period and vaccinating at this time is encouraged.) A veterinarian should evaluate the animal at the first signs of illness. If the signs are compatible with rabies, the animal should be humanely euthanized and tested for rabies or, if the animal dies, it should be tested for rabies.

### **Dog, Cat, or Ferret with Expired Vaccination**

The disposition of any dog, cat, or ferret that has previously been vaccinated for rabies, but is not considered to be currently immunized against rabies (i.e., expired rabies vaccination status), that might have been exposed will be determined by the local health department (§ 3.2-6522). Many animals with expired vaccinations may be handled as currently vaccinated unless the exposed animal is immunosuppressed. These situations can be discussed with personnel in the Office of Epidemiology.

### **Livestock**

All species of livestock are susceptible to rabies; cattle and horses are the most frequently reported infected species. Food safety and human exposures of those who have direct contact with rabid livestock or tissues from rabid livestock are the primary public health concerns associated with rabies in livestock species. Because rabies virus is widely distributed in tissues of rabid animals, it is recommended that tissues and products from a rabid animal not be used for human or animal consumption.

- **Vaccinated livestock:** Vaccinated livestock that are exposed to a rabid animal or suspected rabid animal should immediately receive a rabies vaccine booster, be confined in a manner that is routine for that species and be observed for signs of rabies for 45 days after the exposure. VDACS should be notified when livestock are placed under observation. The health department should be alerted if any signs of clinical illness associated with rabies occur within the observation period. Movement of animals under observation must be approved by the local health director in consultation with VDACS. Considerations associated with movement of animals off of the property might include the type of exposure, the length of time elapsed between the exposure and when movement would occur, the health of the animals, as well as where and for what purpose the animal(s) is/are being moved.

Animal handlers and attending veterinarians should be reminded about appropriate barrier precautions they should utilize to prevent being exposed to rabies if an animal shows any sign of illness or abnormal behavior.

- **Unvaccinated Livestock:** Unvaccinated livestock that are exposed to a rabid animal or suspected rabid animal can be immediately slaughtered. Otherwise, they should be confined in a manner that is routine for that species and observed for signs of rabies for six months after the exposure. If practical, exposed animals should be separated from unexposed animals, especially if a bite from a rabid or highly suspicious animal was witnessed. VDACS should be notified of the exposure and confinement. The health department should be alerted if any signs of clinical illness associated with rabies occur within the observation period. Movement of animals under observation must be approved by the health director in consultation with VDACS. Considerations associated with movement of animals off of the property might include the type of exposure, the length of time elapsed between the exposure and when movement would occur, the health of the animals, as well as where and for what purpose the animal(s) is/are being moved. Animal handlers and attending veterinarians should use appropriate barrier precautions to prevent being exposed to rabies, especially if an animal shows any sign of illness or abnormal behavior.
- **Rabid Livestock:** Herbivore-to-herbivore transmission of rabies is uncommon. If the only rabid animal associated with a herd or flock is an herbivore, the main concern is that other members of the herd/flock may have been similarly exposed around the same time as the laboratory-confirmed rabid animal. In situations like this, monitoring the remaining animals in the herd/flock for 30 days after the index case's illness onset date should be sufficient to rule out concurrent exposure of other animals. During this time, animals should be housed in a manner that is routine for that species and observed for signs of rabies. Movement of the animals during this time must be approved by the health director and VDACS.

#### **Postexposure Prophylaxis in Unvaccinated Animals**

Currently there are no USDA licensed biologics for post-exposure prophylaxis of previously unvaccinated domestic animals, and there is evidence that the use of vaccine alone will not reliably prevent the disease. Rabies immune globulin is not available for animals. Some veterinarians might want to experiment with post-exposure treatment for animals; this should not change confinement or isolation requirements.

#### **Rabies in Vaccinated Animals**

Rabies is rare in vaccinated animals. Suspected or confirmed rabies in a vaccinated animal should be reported to the Office of Epidemiology. Laboratory-confirmed rabies in a vaccinated animal should also be reported to the vaccine manufacturer and USDA, Animal and Plant Health Inspection Service, Center for Veterinary Biologics (telephone: 800-752-6255). Health department personnel should conduct a thorough investigation and complete the Virginia Department of Health's Domestic Animal Rabies Report Form. More information about adverse event reporting can be found at: [https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/veterinary-biologics/adverse-event-reporting/ct\\_vb\\_adverse\\_event](https://www.aphis.usda.gov/aphis/ourfocus/animalhealth/veterinary-biologics/adverse-event-reporting/ct_vb_adverse_event).

#### **Wounds of Unknown Origin**

A specific, rabies-related course of action, such as confinement, is typically taken when an event that may have caused a wound was witnessed and aligns with the Domestic Animal Exposure definition. When an animal with a wound of unknown origin (WUO) is reported, local authorities are encouraged to share information with the owner to increase the likelihood that any illness that may develop for which rabies is a differential would come to the health department's attention promptly and, by extension, minimize any negative public health impact. Examples of information that would be important to share/discuss with the owner include: the typical incubation

period for rabies, clinical signs of rabies, how rabies is transmitted and the during and after hours contact for the appropriate authorities for reporting any concerns about rabies.

## Domestic Animal Control Strategies

- Localities are encouraged to enact and enforce animal control laws that increase responsible pet ownership, enhance the elimination of stray and feral domestic animals, and reduce the ownership of hybrid and exotic mammals.
- Localities are required to conduct campaigns to increase vaccination rates of dogs and cats. (§ 3.2-6521).
- Regardless of the species or vaccination status, a Domestic Animal Rabies Report Form, should be completed by local health department personnel for any domestic animal that has been laboratory-confirmed with rabies.

## Rabies Vaccination Exemptions

Virginia's rabies regulations, in part, provide for an exemption to rabies vaccinations for dogs and cats "*if a vaccination would likely endanger the animal's life due to a previously diagnosed disease or other previously documented medical considerations as documented by a licensed veterinarian.*" This exemption is designed to create a mechanism whereby owners can still obtain a county or city license for their dog or cat without having to produce a current rabies certificate. Veterinarians and owners should be prepared for an exempted animal to be treated as unvaccinated for the purposes of rabies exposure response. The entire text of Virginia's rabies regulations can be found at <http://law.lis.virginia.gov/admincode/title12/agency5/chapter105/>.

More information about rabies exemptions is available at <https://www.vdh.virginia.gov/animal-contact-human-health/rabies-control/>, under "Rabies Regulations and Exemptions". This site includes a guidance document ("Rabies Vaccination Exemptions in Virginia: What Veterinarians Need to Know") that has been developed to assist veterinarians with the rabies vaccine exemption process; it discusses the language of the laws and regulations associated with exemptions and examples of certain conditions for which an exemption might be appropriate. A standard application form to be used to apply for an exemption is also available on this site. Veterinarians interested in applying for an exemption should discuss the process by which they should apply with their local health department. A directory of local health departments can be found at <http://www.vdh.virginia.gov/local-health-districts/>.

## Wildlife

### Vaccination

#### **Injectable Vaccination**

Currently there are no injectable rabies vaccines labeled by the USDA for use in wild animals. However, they are often administered off-label to wildlife in an attempt to protect them; this most often occurs at zoos, wildlife rehabilitation facilities, and research institutions. In exposure situations, rabies vaccines used in an off-label manner are not recognized by VDH.

#### **Oral Vaccination**

Oral rabies vaccine (ORV), labeled by USDA, is currently available for use in federal or state mass immunization rabies control programs and is not available to individual veterinarians or citizens. The [federal USDA Wildlife Services](#) ORV program, in which Virginia participates, is intended to treat raccoons on a population level in raccoon variant rabies virus endemic areas and is not licensed for use on

individual private property. Since 2002, USDA has conducted an oral rabies vaccination program for raccoons in southwest Virginia in cooperation with VDH, the Virginia [Department of Wildlife Resources](#) (DWR), and local governments. The oral rabies vaccination program in Virginia is part of a national project to prevent the westward movement of raccoon rabies.

More information about USDA's national rabies management program can be found at: <https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/programs/nrmp> and <https://www.vdh.virginia.gov/animal-contact-human-health/rabies-control/oral-rabies-vaccine-project/>.

### **Relevance of Vaccination Status**

In exposure situations, wild animals that received injectable rabies vaccine should be managed the same as unvaccinated animals. Administration of vaccines that are not labeled for use in wildlife may create a false sense of security for people exposed to such animals. For the purposes of exposure response, it is prudent to treat raccoons from oral rabies vaccine program areas as unvaccinated.

## **Wildlife Control Strategies**

### **Wildlife as Pets**

For human safety and wildlife well-being, wild animals should not be kept as pets. In Virginia, the keeping of wild animals that are regulated by the DWR requires a permit from that agency. Assistance is available from DWR in situations where wild animals are being kept without a permit.

### **Wildlife Population Reduction**

General or large-scale population reduction programs have generally not proven effective for controlling rabies; however, wildlife population reduction programs may be useful in certain situations (see reference document entitled [Wildlife Population Control](#)), but the disadvantages should be weighed against the benefits. The DWR should always be consulted when wildlife population reduction programs are being considered.

### **Control of Nuisance Wildlife at High-Risk for Rabies**

As human populations continue to rise and move into traditional wildlife habitats, human-animal interactions become more prevalent. Some simple techniques Virginia property owners can employ to help prevent or resolve a problem with nuisance wildlife (and prevent them from reoccurring), include:

- Don't feed wildlife.
- Keep trash inside until the morning of trash pick-up or place trash in an animal proof container, such as a metal trashcan with latches on the lids.
- Do not leave pet food outside; keep pet feeding areas clean.
- Remove bird feeders when problem species, such as bears, have been seen around them.
- Close up all openings under and into your buildings. Animals look for places to den and raise their young—don't give them that opportunity.
- Clear overhanging tree limbs and branches which may be providing wildlife access to structures.
- Clear fallen fruit from around trees.
- Pass along this information to neighbors. If anyone in the neighborhood is feeding wildlife, directly, or indirectly, it can cause trouble for everyone.
- Reflective tape, lights, or noise sometimes works, but wildlife can eventually grow accustomed to these methods, so these are only temporary solutions.
- Electric fencing can be very effective in keeping wildlife out of crops, beehives, and structures.

In Virginia, it is illegal to trap and relocate an animal to another area. Captured nuisance wildlife must be released on site or euthanized, and not relocated. It is illegal to transport Virginia wildlife without a permit from DWR. Always consult DWR if there is a question or concern about the disposition of nuisance wildlife. Guidance and support regarding wildlife issues is available through:

- Licensed wildlife rehabilitators (<https://dwr.virginia.gov/wildlife/injured/rehabilitators/>)
- Licensed trapper or wildlife control specialists (<https://dwr.virginia.gov/wildlife/nuisance/>)
- Virginia's DWR toll-free wildlife conflict helpline at 1-855-571-9003. This helpline is manned during regular business hours on Mondays-Fridays.

### **Bat Control**

Bats are beneficial in many ways and should be protected. Efforts should be made to prevent killing them unnecessarily or destroying their habitat. To prevent rabies exposures, bats should be discouraged from living in buildings frequented by humans and domestic animals. See the reference document *Methods for Bat Exclusion and Capture* for suggested bat exclusion methods.

## Hybrid Animals

### Virginia Law

Enabling legislation (§ 3.2-6582) allows localities to adopt a permitting system for the regulation of hybrid canines and to set a fee to cover the cost of the permitting system.

### Vaccination

USDA has not labeled any vaccines for use in hybrid animals. Veterinarians may choose to vaccinate hybrids as an extra-label use of a biologic. The American Veterinary Medical Association liability insurance program recommends that the administering veterinarian inform the owner that the vaccine:

- is not approved for use in hybrid animals, and
- no studies to prove the efficacy of the vaccine have been performed in hybrid animals.

The veterinarian should inform the owner that public and animal health officials may consider a wolf hybrid unvaccinated for the purposes of rabies exposure and consider having the owner sign a consent form documenting that they have been informed of this. The AVMA position statement on canine hybrids can be found at <https://www.avma.org/resources-tools/avma-policies/canine-hybrids>.

## Post-Exposure Management

Section 3.2-6522 of the Code states "When any animal, other than a dog or cat, is exposed or may have been exposed to rabies through a bite, or through saliva or central nervous system tissue, in a fresh open wound or mucous membrane, by an animal suspected to be rabid, decisions regarding the disposition of that newly exposed animal shall be at the discretion of a local health director." The public health response, therefore, to any animal that is not a dog or a cat that may have been exposed to rabies is at the health director's discretion and may include euthanasia of an exposed hybrid animal if the exposing animal was unavailable for testing.

## Human

### Pre-Exposure Vaccination

Rabies pre-exposure vaccination is recommended for persons who are at increased risk of being exposed to rabies. This includes:

- Persons whose activities bring them into frequent or continuous contact with the rabies virus or potentially rabid animals (e.g., veterinarians, veterinary technicians, kennel staff, animal control officers, rabies laboratory workers, wildlife biologists and rehabilitators).
- International travelers who are likely to come in contact with animals in areas where dog rabies is enzootic and immediate access to appropriate medical care, including biologics, might be limited.

The reasons for recommending pre-exposure vaccination to these people include:

- After a rabies exposure, those who have been pre-exposure vaccinated receive a shorter and simpler post-exposure protocol (only needing to receive two doses of vaccine and no rabies immune globulin. Pre-exposure vaccination may help protect persons whose post-exposure therapy is delayed
- Pre-exposure vaccination may protect persons at risk from inapparent expositors.

The pre-exposure series includes an initial two-dose rabies vaccination series. These vaccines are administered intramuscularly (deltoid area) on day 0 (the day the first vaccine is received) and day 7.

After the initial vaccination series, titers are recommended in accordance with a person's risk category. Risk categories are detailed in the guidance document "[Use of a Modified Preexposure Prophylaxis Vaccination Schedule to Prevent Human Rabies: Recommendations of the Advisory Committee on Immunization Practices — United States, 2022](#)".

- In brief, those in risk categories identified as at higher risk of unrecognized exposures are recommended for routine titer assessment (either every 6 months or 2 years) and those in other categories are not recommended for routine titer assessment.
- Titers should be assessed via the rapid fluorescent focus inhibition test (RFFIT) test on a serum sample every two years. The RFFIT is the only accepted test for determining virus neutralizing antibody levels against the rabies virus. Other available titer tests (including the ELISA test) are not recommended for this purpose.
- Information on laboratories that perform the RFFIT, as well as downloadable submission forms are available at: <https://ksvdl.org/laboratories/rabies-laboratory/> or call Atlanta Health Associates at 800-717-5612 or 770-205-9091; or email [info@atlantahealth.net](mailto:info@atlantahealth.net).

Boosters for persons who are pre-exposure vaccinated are recommended either in response to an exposure or a titer as measured by RFFIT of <0.5 IU/mL. Even in the absence of a measurable titer, persons with healthy immune systems will respond immediately to the stimulation of a vaccine.

## Post-Exposure Prophylaxis (PEP)

Rabies post-exposure prophylaxis protocols vary based on a person's vaccination status.

### **Persons Who Have Never Received Rabies Vaccine**

Rabies post-exposure prophylaxis for immunocompetent persons who have not previously completed a rabies vaccination schedule includes:

- A four-dose rabies vaccination series. These vaccines are administered intramuscularly (deltoid

area) on days 0, 3, 7 and 14 (with day 0 being the day the first vaccine was received).

- A fifth vaccine, administered intramuscularly on day 28, is recommended for persons who are immunocompromised, recognizing that that the immune response still might be inadequate.
- Rabies Immune Globulin (RIG). RIG is administered at 20 IU/kg body weight. Ideally, the full dose should be infiltrated in and around the wound(s), if anatomically feasible. Any remaining volume should be administered intramuscularly at an anatomical site that is distant from the site used for vaccine administration (e.g., in the opposite deltoid).
  - RIG provides passive protection during the time that the body is making antibodies in response to the stimulation of the vaccine so the earlier it is administered, the better; day 0 is preferred. RIG administration is not indicated beyond the seventh day after the first dose of rabies vaccine, regardless of whether the day 3 and day 7 doses were received, because an active antibody response to the vaccine has already started, and there may be interference between active and passive immunization.

### **Previously Vaccinated Persons**

Those who have been pre-exposure vaccinated or have previously completed the rabies post-exposure protocol should complete the protocol for previously vaccinated persons. This includes:

- A two-dose vaccination series. These vaccines are administered intramuscularly (deltoid area) on days 0 and 3 (with day 0 being the day the first vaccine was received).

**DO NOT administer RIG to persons who have been previously vaccinated;** RIG will interfere with the antibody response in previously vaccinated persons.

## **Deviations from Recommended Vaccination Schedules and Serologic Testing**

Every effort should be made to adhere to the recommended pre- or post-exposure vaccination schedule. If a minor deviation of a day or two has occurred, the schedule can be resumed as though the patient were on schedule and future doses should be maintained with the recommended intervals between them. If a substantial deviation from the schedule occurs, the person should have a serum sample drawn within 14 days after administration of the final dose in the series to assess immune status via the rapid fluorescent focus inhibition test (RFFIT) test. The RFFIT is the only accepted test for determining virus neutralizing antibody levels against the rabies virus. Other available titer tests (including the ELISA test) are not recommended for this purpose. Information on laboratories that perform the RFFIT, as well as downloadable submission forms are available at: <https://ksvdl.org/laboratories/rabies-laboratory/> or call Atlanta Health Associates at 800-717-5612 or 770-205-9091; or email [info@atlantahealth.net](mailto:info@atlantahealth.net).

## **Management of Animals That Expose Humans**

### **Dogs, Cats, or Ferrets**

Any healthy dog, cat, or ferret (vaccinated or unvaccinated) that bites a person should be [confined](#) and observed for 10 days after the exposure occurred. If the animal was shedding rabies virus at the time of the bite, the animal will either be symptomatic for rabies at the time of the exposure or will develop symptoms within a few days (and almost certainly within 10 days). The animal may be euthanized, if requested by the animal's owner. If euthanized, the animal should be tested for rabies.

If signs of rabies develop during confinement and observation, a veterinarian should evaluate the animal and determine if the signs are compatible with rabies and, if so, the animal should be humanely euthanized and tested for rabies as soon as possible. If the animal dies, it should also be tested for rabies as soon as possible. Because a reaction to vaccination could be confused with early signs of



rabies, rabies vaccinations during confinement and observation are not recommended. If the exposing animal is not available for observation or testing, the person(s) assessed as exposed should receive a recommendation for rabies PEP.

### **Livestock**

Livestock such as cattle, horses, sheep, goats, and pigs are not usually at high risk for transmitting rabies. When livestock expose a person, many factors should be considered. If the animal's health and behavior are normal, and there is no history of that animal being exposed to or in close proximity to a rabid or suspected rabid animal, it might be reasonable to keep the exposing animal under observation for 10 days. Otherwise, euthanasia and testing of the exposing animal should be considered.

### **Native Terrestrial Wildlife**

- Wild animals that are defined as [high-risk animals](#) for rabies and that expose people should be euthanized and tested. Confinement periods are not applicable for wild animals because the length of time between rabies virus shedding, and illness onset has not been established for these animals and such signs may not be readily recognized.
- [Low-risk terrestrial wild animals](#) are rarely rabid, have never been known to transmit rabies to a human in the U.S., and should only be tested after exposing a person if they were acting sick or abnormal at the time of the exposure.
- If a suspected rabid animal is not available for testing, the exposed person(s) should receive a recommendation for rabies PEP.

### **Confined Wildlife or Exotic Animals**

Some species, such as primates, are not likely to contract rabies and may not require euthanasia after potentially exposing a person. Additionally, some animals may be part of a valuable exhibit, breeding, or research colony and could be difficult or impossible to replace if euthanized. These situations should be discussed with personnel in the Office of Epidemiology and decisions around managing these animals should be made on a case-by-case basis. Persons who work with these animals should understand potential rabies risks, be pre-exposure vaccinated, be educated and trained in ways to prevent rabies exposures, and, in some circumstances, accept the decision to receive PEP in lieu of sacrificing the animal.

### **Hybrids (e.g., wolf hybrids, coydogs, Savannah or Bengal cats)**

Euthanasia of the hybrid animal and submitting it for rabies testing is the safest course of action when such an animal bites a person. However, because wolves and dogs appear to have very similar genetic makeup and many animals that are advertised as "wolf-dogs" may really be dogs (*Canis lupus familiaris*), each wolf hybrid bite situation should be evaluated individually. If the bite victim is an adult who can understand the risk, and after consultation with a physician, does not want the animal sacrificed, it may not be worth pursuing euthanasia and testing; however, the recommendation as to the safest course of action (including rabies PEP for the victim if the animal is not tested) should be put in writing and signed by the victim. If the victim and physician want the animal sacrificed and tested for rabies, the health director has the authority to have animal control take possession of the animal and have it euthanized and tested.

### **Bats**

The determination of a [bat exposure](#) is different from defining an exposure to a terrestrial mammal because bat bites are small and sometimes go unnoticed. If a person meets our definition of exposure after a bat encounter, the bat should be captured and submitted for testing, if possible. If the bat is not



available for testing, the exposed person(s) should receive a recommendation for rabies PEP.

### **Domestic Animal Testing Decisions**

At the local authority's discretion, a rabies risk assessment may be performed to determine the best course of action when considering requests to forgo testing of domestic animals that may have exposed people and subsequently die or are euthanized within 10 days of the potential exposure. The language of the *Code of Virginia* that should be considered in these situations includes an excerpt from § 3.2-6522 which reads "When any animal may have exposed a person to rabies and subsequently expires due to illness or euthanasia, either within an observation period, where applicable, or as part of a public health investigation, its head or brain shall be sent to the Division of Consolidated Laboratory Services of the Department of General Services or be tested as directed by the local health department." If it is difficult for health department personnel to make a reasonable scientific case based on a rabies assessment that an animal "may have exposed a person to rabies" pursuing a definitive result may not be necessary. Information gathered as part of a risk assessment may include:

- Complete rabies vaccination history.
- Potential rabies exposures within the previous 6 months, including any history of bats seen in the owner's home over the previous 6 months.
- History of wounds of unknown origin within the previous 6 months.
- Behavioral history of the animal. (e.g., is there a history of biting people/being aggressive?)
- Medical history. (e.g., can all of the medical abnormalities documented in the animal be attributed to another, confirmed diagnosis?)
- Lifestyle. (e.g. indoor only for at least the last 6 months, only ever outside when supervised for at least the last 6 months, routinely outdoors without supervision, etc.,)
- The circumstances of the bite.

### **Public Education**

Key rabies messages to share with the general public include:

- Avoid contact with wildlife (i.e., hand-feeding, touching).
- Discourage wildlife (especially raccoons) from sharing the human environment by:
  - Removing food sources close to homes.
  - Not feeding wildlife.
  - Not feeding pets outside.
  - Securing trash cans.
  - Excluding wildlife from denning sites in and around buildings.
- Promptly report exposures to potentially rabid animals in order to receive appropriate and timely treatment.
- Get your animal(s) vaccinated for rabies and maintain their rabies vaccinations over time.

## Appendix 1: Human Rabies Post-Exposure Vaccine Quick Reference

### Rabies post-exposure prophylaxis schedule, United States, 2010

Adapted from *Use of a Reduced (4-dose) Vaccine Schedule for Postexposure Prophylaxis to Prevent Human Rabies* (Available at [https://www.cdc.gov/rabies/resources/acip\\_recommendations.html](https://www.cdc.gov/rabies/resources/acip_recommendations.html))

Vaccination status	Intervention	Regimen*
<u>NOT previously vaccinated</u>	Wound Cleansing <b>AND</b>  Human Rabies Immune Globulin <b>AND</b>  Rabies Vaccine	All post-exposure 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.  Administer 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 might partially suppress active production of antibody, no more than the recommended dose should be given.  Human Diploid Cell Vaccine (HDCV), or Purified Chick embryo vaccine (PCECV <sup>††</sup> ), 1.0 ml, IM (deltoid area <sup>†</sup> ), one each on days 0 <sup>**</sup> , 3, 7, 14 (Exception: In persons with immunosuppression, administer a fifth dose on day 28 and test one or more serum samples for rabies neutralizing antibody via the rapid fluorescent focus inhibition test.)
<u>Previously vaccinated</u>	Wound Cleansing, <b>AND</b>  Rabies Vaccine  <b>DO NOT Administer HRIG</b>	All post-exposure treatment should begin with immediate thorough cleaning 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.  Rabies Vaccine HDCV, or PCECV <sup>††</sup> 1.0 mL, IM (deltoid area <sup>†</sup> ), one each on days 0 <sup>**</sup> and 3.

\* These regimens are applicable or all age groups, including children.

<sup>†</sup> 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.

<sup>\*\*</sup> Day 0 is the day the first dose of vaccine is administered.

<sup>††</sup> Any person with a history of a complete pre-exposure or post-exposure vaccination regimen with HDCV, PCECV or rabies vaccine adsorbed; documented history of antibody response to any prior rabies vaccination.

<sup>†††</sup> If patient reports significant egg allergy, do not use PCECV.

## Appendix 2: Human Rabies Pre-Exposure Vaccine Quick Reference

**Risk Category 1:** Increased risk for unrecognized and recognized exposures including unusual or high-risk exposures. Working with rabies virus in high concentrations and exposure might be unusual (e.g., aerosolized virus). Examples include personnel working with live virus in research facilities or diagnostic laboratory personnel.

**RECOMMENDATION:** IM rabies vaccine on days 0 and 7

Check titers every 6 months; booster if titer <0.5IU/mL

**Risk Category 2:** Elevated risk for unrecognized and recognized exposures. Unusual exposures unlikely. Examples include persons who frequently handle bats have contact with bats, enter high-density bat environments or perform animal necropsies (e.g., biologists who frequently enter bat roosts or who collect suspected rabies samples)

**RECOMMENDATION:** IM rabies vaccine on days 0 and 7

Check titers every 2 years; booster if titer <0.5IU/mL

**Risk Category 3:** Exposure nearly always recognized; risk for recognized exposures higher than that for the general population and duration exceeds 3 years after the primary vaccination. Examples include persons who interact with animals that occupational or recreational activities that typically involve contact with animals include 1) veterinarians, technicians, animal control officers, and their students or trainees; 2) persons who handle wildlife reservoir species 3) spelunkers. May include travelers depending on activities.

**RECOMMENDATION:** IM rabies vaccine on days 0 and 7

One-time titer check during years 1–3 after 2-dose primary series and booster if titer <0.5 IU/mL OR booster vaccine >21 days but <3 years after day 0 vaccine

**Risk Category 4:** Elevated risk for recognized exposures, risk not sustained. Exposure nearly always recognized. Risk for exposure higher than for general population but expected to be time-limited. Examples include short-term volunteer providing hands-on animal care or infrequent traveler with no expected high-risk travel >3 years after PrEP administration).

**RECOMMENDATION:** IM rabies vaccine on days 0 and 7

No titer checks recommended