Rabies, Suspected Exposure

Condition	Potential exposure to a rabid animal. In Washington State the following species were confirmed rabid from 1988 to 2021: bats (542), cats (2), llama (1), and horse (1).	
Case classification	**Confirmed:** Human exposed to an animal that has tested positive for rabies **OR** public health agency recommends *or* concurs with healthcare provider recommendation for post-exposure prophylaxis based on risk assessment.	**Suspect**: Post-exposure prophylaxis given by healthcare provider but circumstances are unknown so public health agency is unable to perform risk assessment.
Treatment	**1.** Immediately wash bite, wound or scratch with soap and running water for 20 minutes, or with virucidal agent if available (e.g. povidine-iodine). **2.** Post Exposure Prophylaxis: • *If vaccinated after 1980:* 2 doses of vaccine IM in alternate deltoids days 0 and 3. • *If never vaccinated or vaccinated before 1980:* one dose (20 IU/kg) human rabies immune globulin day 0 and **four** vaccine doses IM in the deltoids days 0, 3, 7, and 14. • *If immunosuppressed:* add **fifth** vaccine dose day 28 followed by a titer after dose 5. • See CDC vaccine recommendations: https://www.cdc.gov/mmwr/PDF/rr/rr5902.pdf and https://www.cdc.gov/mmwr/PDF/rr/rr5703.pdf and https://www.cdc.gov/mmwr/volumes/71/wr/mm7118a2.htm **3.** Tetanus prophylaxis and antibiotics as indicated.	
Exposure	Exposure may include: animal bite; circumstances in which a person cannot be reasonably certain that a bite did not occur; or non-bite (saliva or brain/nervous tissue contaminates wound, scratch, or mucous membranes). Rabies is not transmitted by contact with blood, urine or feces, by touching fur, or by skunk spray. The virus is inactivated when dried. *Assessing risk of whether an animal is potentially rabid:* (Section 5A and https://www.doh.wa.gov/Portals/1/Documents/5100/RabiesPEPGuidance.pdf) **1.** Geographic origin of the animal: **bats** are considered rabid until proven otherwise. **Wild terrestrial carnivores** (raccoons, skunks, foxes, coyotes, wolves, wolf-dog hybrids, bobcats, cat hybrids, etc.) are at risk of being rabid elsewhere in the US and could be translocated to WA. **Other species** are rarely rabid in the US. In Africa and Asia, dogs are the most common vector. **2.** Animal health and behavior: animals with unusual or changed behavior consistent with rabies (see Section 2B) are more likely to be rabid and should be evaluated by a veterinarian. **3.** Circumstances of exposure: an unprovoked animal attack (vs. a provoked attack) is more likely to be from a rabid animal. **4.** Animal vaccination status: vaccinated dogs, cats, and ferrets are unlikely to be rabid, but rabies should not be ruled out even if an animal is up to date with vaccination. **5.** Likelihood the suspect animal was exposed to a rabid animal: exposures are more likely for animals that are feral, outdoors without supervision, or imported (other state or country). **6.** Ten day observation period (dogs, cats, and ferrets only): if an animal in observation develops signs of rabies within 10 days of biting a human it should be euthanized and tested.	
Laboratory testing	• Local Health Jurisdiction (LHJ) and Communicable Disease Epidemiology (CDE) arrange **urgent** testing of animals if human(s) determined to be exposed. • *Specimens*: entire bat, head of other animals (e.g. cats, most dogs. Have euthanasia performed by rabies vaccinated veterinary professional. • *Shipping*: keep all specimens **cold but not frozen**. Ship cold with tracking number and attached rabies form: https://www.medialab.com/dv/dl.aspx?d=2177716&dh=02564&u=69790&uh=0e2a1 • *Collection and submission instructions:* https://www.doh.wa.gov/ForPublicHealthandHealthcareProviders/PublicHealthLaboratories/MicrobiologyLabTestMenu	

Rabies, Suspected Exposure

1. DISEASE REPORTING

A. Purpose of Reporting and Surveillance

1. To assist in the prevention of human cases of rabies.
2. To facilitate rabies post-exposure prophylaxis (PEP) and counseling to those exposed to a rabid, or potentially rabid, animal or human.
3. To ensure capture and confinement of potentially rabid animals involved in human exposure that have a defined observation period (including dogs, cats, and ferrets), or facilitate histological examination of the brain of potentially rabid animals involved in human exposure for animals that cannot be observed.

B. Legal Reporting Requirements

Under the 2023 notifiable conditions rule revisions, only those situations in which human exposure to rabies is suspected, including confirmed rabies in animals, are reportable to the local health jurisdiction (LHJ). For the purposes of reporting, "Rabies, Suspected Human Exposure" includes three conditions listed in the 2023 rule revisions:

- Rabies, suspected human exposure (suspected human rabies exposures due to a bite from or other exposure to an animal that is suspected of being infected with rabies); and
- Animal bites (when human exposure to rabies is suspected); and
- Rabies (suspect or laboratory confirmed human cases and laboratory confirmed animal cases)

1. Health care providers and Health care facilities: *immediately* notifiable to **local health jurisdiction.**
2. Laboratories: Rabies virus (human or animal specimen) ***immediately*** notifiable to **local health jurisdiction**; specimen submission required - clinical specimen associated with positive result (2 business days)
3. Veterinarians: Animal cases notifiable to Washington State Department of Agriculture (https://app.leg.wa.gov/WAC/default.aspx?cite=16-70).
4. Local health jurisdictions: notifiable to the Washington State Department of Health (DOH) Office of Communicable Disease Epidemiology (CDE) within 7 days of case investigation completion or summary information required within 21 days.

C. Local Health Jurisdiction Investigation Responsibilities

1. Begin investigation when suspected human exposure to rabies or animal case of rabies is reported.
2. Identify other persons with suspected exposure.
3. Counsel patient(s) and/or health care provider regarding the risk of rabies exposure and need for rabies PEP.

4. As appropriate, facilitate capture and 10-day confinement of dogs, cats, and ferrets involved in a human exposure (see Section 5).
5. Facilitate animal euthanasia and transport of animal carcass/head for rabies testing to the Washington State Public Health Laboratories (PHL) or the Washington Animal Disease Diagnostic Laboratory (WADDL). Call CDE at 206-418-5500 prior to submitting specimens to get a tracking number.
6. Report all *confirmed* and *suspect* cases to CDE (see definitions below) by completing the "Rabies, suspected exposure" case report form (https://www.doh.wa.gov/Portals/1/Documents/5100/210-044-ReportForm-RabiesSuspectedExp.pdf) in the Washington Disease Reporting System (WDRS).

   Note: Animal bites for which rabies exposure has either been ruled out (i.e., testing with negative result or observation occurs through end of confinement) or is **not** suspected are not reportable to either the local health jurisdiction (LHJ) or CDE. If the LHJ receives such reports and chooses to track these in WDRS, the same form can be used but these cases should be classified as "Not reportable."

2. THE DISEASE AND ITS EPIDEMIOLOGY

Background

Rabies virus causes acute encephalomyelitis in mammals and the outcome is virtually always fatal. In the United States, 2-3 rabies deaths are reported per year. Only 2 human cases have been diagnosed in Washington in the last 50 years. For more information on human rabies, see the Rabies *Surveillance and Reporting Guidelines* at: https://www.doh.wa.gov/Portals/1/Documents/5100/420-072-Guideline-RabiesHuman.pdf.

A. Etiologic Agent

The rabies virus (Family *Rhabdoviridae,* genus *Lyssavirus*); several variants

B. Description of Illness in Animals

Rabid animals can show a range of symptoms, often described as either "dumb" or "furious" rabies. An animal may progress from one state to the other. Dumb rabies is characterized by reclusive behavior, drooling, anorexia, a startled response to sudden noise or light exposure, and frequent licking and biting of the site of the bite due to irritation there. Furious rabies is marked by excitation and marked aggressiveness, notably biting of objects, animals, humans, or even self. Salivation can be profuse due to difficulty swallowing and there is often a change in vocalization (e.g., dog develops an unusual bark). Central nervous system signs of rabies may include paralysis, poor coordination, convulsions and coma. Wildlife may lose their fear of people; animals normally active only between sunset and sunrise may be seen during daylight hours. Infected bats may act strangely (e.g., crawling, hissing).

C. Reservoirs

In the U.S. Pacific Northwest, bats are the primary reservoir species. Other animals (notably potential bat predators such as foxes or cats) are infected only as rare "spillover" from rabid bat populations. Elsewhere in the country, skunks, raccoons and foxes are also

reservoirs, see CDC map here: https://www.cdc.gov/rabies/exposure/animals/wildlife_reservoirs.html.

In some parts of the world, dogs and other carnivores are important reservoirs.

D. Animals Rabies in Washington State and the Pacific Northwest

Bats are the only known reservoir for rabies in Washington State. Rabid bats are found throughout the state. The percentage of bats in the wild that are infected with rabies at any given time is very low (less than 1%); however, on average, 6-7% (range, 3–10%) of bats that have had suspected or confirmed exposure to a person or animal submitted for testing in Washington are rabid (Table 1). This difference is because bats are not randomly sampled from the population and submitted bats are more likely to be sick or exhibiting abnormal behavior. During the past few decades, only a few animal rabies cases have occurred in animals other than bats (Table 2).

Bats are also the primary reservoir for rabies in Oregon, Idaho, and British Columbia; however, rabid non-bat animals have been occasionally detected in these places. Such instances where bat-variant rabies has been identified include: 20+ foxes, 3 coyotes, a skunk, a goat and two cats (Oregon, 2000–2021); 1 bobcat, 2 skunks, and a cat (Idaho, 2001-2021); and 4 skunks and 1 cat (British Columbia, 2000-2021). This illustrates that rabies in bats spills over to other wild animals, as well as domestic animals; however, these spillover events rarely result in further transmission to other animals.

Table 1: Rabid Bats Detected in Washington, 2015–2021

Year	Rabid bats /Total bats submitted (%)
2021	12/200 (6%)
2020	8/230 (3%)
2019	9/255 (4%)
2018	40/531 (8%)
2017	22/376 (6%)
2016	20/298 (7%)
2015	9/305 (3%)

Table 2: Rabid Non-Bat Animals and Rabies Strain Type in Washington, 1986–2021

Year	Animal type (County)	Rabies Strain
2015	Cat (Jefferson)	Bat-variant
2002	Cat (Walla Walla)	Bat-variant
1994	Llama (King)	Bat-variant
1992	Horse (Franklin)	Unknown
1987	Dog (Pierce)*	Unknown history of bat exposure

* infection was not confirmed at CDC

E. Modes of Transmission

Rabies can be spread when infected saliva or central nervous system tissue inoculates broken skin or contaminates mucosa. Most often this occurs via a bite from an animal. All mammals are susceptible to rabies. Person-to-person transmission has never been confirmed via a bite but has occurred via corneal and organ transplants. Limited evidence suggests rabies might be transmitted by exposure to very large amounts of aerosolized rabies virus (e.g., exposure to many bats in a cave or to a laboratory culture). It is **not** transmitted by contact with blood, urine or feces, or by touching fur. Rabies virus becomes noninfectious when it dries out and when it is exposed to sunlight. 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.

F. Incubation Period of Rabies *in Animals*

Dogs, cats, and ferrets have an incubation period of 6 months or less based on observational studies (averages: dogs, 3-8 weeks; cats, 4-6 weeks). There are few data about incubation periods in other mammals. Variation in incubation period is due to species differences, size of viral inoculum, proximity of the bite to the nervous system, and virus variant.

G. Period of Communicability

Infected animals can transmit rabies when the infection has spread to the salivary glands, which typically occurs around the time that central nervous system (CNS) signs develop but is not greater than a few days prior to symptom onset. **The rationale for a 10-day confinement period for dogs, cats, and ferrets is due to this observed interval between viral shedding and onset** (based on experimental data). If communicable at the time of biting, these species should develop CNS symptoms within 10 days. Confinement for other animal species is not appropriate due to lack of information about their communicability period relative to symptom onset.

3. CASE DEFINITIONS

A. Classification of "Rabies, Suspected Exposure" in WDRS

Confirmed:

- Human exposed* to an animal that tests positive for rabies
- Public health agency recommends, *or* concurs with healthcare provider's (HCP) recommendation, for post-exposure prophylaxis (PEP) administration based on risk assessment of exposure*§

Suspect:

- PEP given by HCP but circumstances are **unknown** to public health agency so public health is unable to perform risk assessment of the potential exposure*

Not reportable (animal bites **without** suspected rabies exposure):

- Animal tests negative for rabies (regardless of whether PEP was started)
- Dog, cat, or ferret remains healthy after 10-day observation
- Public health agency assesses risk, concludes no exposure, and thus does not recommend PEP but person insists on receiving PEP
- HCP administers PEP but public health risk assessment concludes no exposure

Note: Animal bites for which rabies exposure is **not** suspected are **not** reportable to either the local health jurisdiction (LHJ) or to DOH Office of Communicable Disease Epidemiology, thus do not need to be recorded in WDRS. However, if the LHJ receives such reports and desires to track these in WDRS, these should be classified as "Not reportable."

* Exposures may include bites, circumstances in which bites could not be ruled out (e.g., bat found in a room with a baby or a deeply sleeping person who cannot be reasonably certain that a bite, scratch, or mucous membrane exposure did not occur), or non-bites (contamination of wounds, scratches, or mucous membranes with saliva or neural tissue). See section 5A.

§ For risk assessments, assume all **bats** that cannot be tested are rabid. See section 5A.

4. DIAGNOSIS AND LABORATORY SERVICES

*Note: For diagnosis of **human rabies** (i.e., a person with symptoms consistent with rabies), please see the Rabies Surveillance and Reporting Guidelines (https://www.doh.wa.gov/Portals/1/Documents/5100/420-072-Guideline-RabiesHuman.pdf).*

A. Diagnosis

Rabies testing in animals is done using a direct fluorescent antibody (DFA) test, a direct rapid immunohistochemical test (DRIT), immunohistochemistry, or the LN34 real-time reverse transcription PCR (RT-PCR) assay. There are no reliable, standardized ante-mortem (live animal) tests that can be used to confirm whether an animal is infected with rabies. DFA requires fresh brain tissue (brainstem, cerebellum, and hippocampus), whereas available RT-PCR testing requires fixed tissue. For all tests, the animal must be euthanized.

B. Tests Available at the Washington State Public Health Laboratories (PHL) and the Washington Animal Disease Diagnostic Laboratory

Two laboratories in Washington State perform DFA testing on animals that have potentially exposed a human to rabies. Brain tissue from non-bat animals with evidence of rabies by DFA will be forwarded to CDC for testing with monoclonal antibodies to determine the variant of the rabies virus. Prior approval for all submissions to either PHL or WADDL for DFA must be obtained from DOH Office of Communicable Disease Epidemiology (CDE); please call 206-418-5500 to arrange.

The whole bat, or the head of other animals should be **refrigerated** and **shipped with regular cold packs as soon as possible after death**. A rabies vaccinated veterinary professional should perform euthanasia and decapitation if required. The bat or the head may be frozen as a last resort if shipment of the specimen must be delayed. Avoid freeze-thaw cycles; if the animal is already frozen, keep it frozen until and during shipping. Tissues fixed in formalin can only be tested by PCR at the Washington Animal Disease Diagnostic Laboratory (WADDL) or CDC.

In animal-only exposure situations (i.e., cat caught a bat; no humans exposed), the suspected rabid animal can be tested for a fee at WADDL ($63.50, performs RT-PCR; 509-335-9696): https://waddl.vetmed.wsu.edu/search-tests/Panels/Test-Details?id=2063, or at Oregon State University Veterinary Diagnostic Laboratory ($104, performs DFA: 541-737-3261): https://vetmed.oregonstate.edu/diagnostic/rabies-submissions.

C. Specimen Collection: How can an animal be humanely euthanized?

Methods for humane euthanasia should be employed while avoiding damage to the head. The animal should be euthanized by a currently rabies vaccinated veterinary professional. Local health jurisdictions should contact veterinarians in their jurisdiction to solicit assistance with animal euthanasia.

The **Michigan Rabies Working Group** and the **Bat World Sanctuary** maintain lists of acceptable means of bat euthanasia, to be performed by vaccinated personnel with appropriate personal protective equipment, including: inhalant anesthetics and injectable anesthetics. Physical methods of euthanasia such as cervical dislocation or decapitation are not acceptable for euthanasia of bats due to concern for rabies exposure. Freezing, drowning, or lighter fluid are never acceptable means of attempting euthanasia.

D. Specimen Submission

Guidelines for submitting specimens to the PHL can be found at: https://www.doh.wa.gov/Portals/1/Documents/5100/rabiesspecimenguidelines.pdf. The PHL Virology Lab provides shipping containers, including large sizes. Animal heads or whole bats must be shipped with a completed rabies specimen submission form: https://www.medialab.com/dv/dl.aspx?d=2177716&dh=02564&u=69790&uh=0e2a1

Specimen submission to WADDL should be coordinated by contacting the rabies epi on-**call: 206-418-5500.**

Note that the PHL have a Microbiology Test Menu of Services, which includes detailed information about all tests performed at the PHL. See https://www.doh.wa.gov/ForPublicHealthandHealthcareProviders/PublicHealthLaboratories/MicrobiologyLabTestMenu. To find the section on rabies testing, scroll down at the link above, then click on "Rabies DFA."

5. ROUTINE CASE INVESTIGATION

A detailed document on assessment of rabies exposures from animal contact and guidance on rabies post-exposure prophylaxis is available here: https://www.doh.wa.gov/Portals/1/Documents/5100/RabiesPEPGuidance.pdf

The decision to test an animal and/or recommend rabies post-exposure prophylaxis (PEP) hinges on whether an exposure to rabies is suspected to have occurred. The determination should be based upon the following questions:

- Was there a human exposure (possible bite, scratch, or mucous membrane contact)?
- What is the risk that the animal was shedding rabies virus in its saliva at the time of the exposure?

Reporting of all animal bites is not; instead, only those in which human exposure to rabies is suspected are reportable to the local health jurisdiction (LHJ). Some providers may suspect that a rabies exposure did occur, but the LHJ may disagree after receiving the report and assessing the situation. If the LHJ concludes that a human exposure to rabies has *not* occurred, the event (animal bite, scratch, etc.) does not need to be reported to DOH (see case classifications above).

A. Was there a human exposure?

An exposure requires that saliva (or central nervous system tissue) of an animal is introduced into bite wounds, open cuts or abrasions in skin, mucous membranes (e.g., eyes, mouth or nose), or scratches. Transmission may occur following exposure to aerosolized rabies virus (e.g., exposure to many bats in a cave).

Rabies is not transmitted by contact with blood, urine or feces, by touching fur, or by being sprayed by a skunk. The virus is inactivated when dried. Rabies exposures can be ruled out in these situations.

Special Considerations for Bats

Bat mouths and teeth are very small, thus bat bites may cause only minor injury or may not leave any visible marks. In 1995, a human rabies case occurred in a Washington State child with a bat in the bedroom approximately 2.5 weeks prior to illness onset https://www.cdc.gov/mmwr/preview/mmwrhtml/00038616.htm. Family members examined the child at the time the bat was found but did not see any evidence of a bite, so this was discounted as an exposure and public health was not contacted. Such case examples emphasize the importance that all contact with a bat and any situation in which a bat found in a room or bedroom with a person should be **evaluated carefully** as discussed below.

"The risk for rabies resulting from an encounter with a bat might be difficult to determine because of the limited injury inflicted by a bat bite (compared with more obvious wounds caused by the bite of terrestrial carnivores), an inaccurate recall of a bat encounter that might have occurred several weeks or months earlier, and evidence that some bat-related rabies viruses might be more likely to result in infection after inoculation into superficial epidermal layers. For these reasons, **any direct contact between a human and a bat should be evaluated for an exposure**. If the person can be reasonably certain a bite, scratch, or mucous membrane exposure did not occur, or if the bat is available for testing and is negative for presence of rabies virus, post-exposure prophylaxis is not necessary. Other situations that might qualify as exposures include finding a bat in the same room as a person who might be unaware that a bite or direct contact had occurred (e.g., a deeply sleeping person awakens to find a bat in the room or an adult witnesses a bat in the room with a previously unattended child, mentally disabled person, or intoxicated person). These situations should not be considered exposures if rabies is ruled out by diagnostic testing of the bat, or circumstances suggest it is unlikely that an exposure took place." https://www.cdc.gov/mmwr/PDF/rr/rr5703.pdf
A risk assessment tool is available to assist with evaluation of possible exposure events, see Appendix A here: https://www.doh.wa.gov/Portals/1/Documents/5100/RabiesPEPGuidance.pdf.

B. What is the risk that the animal in question was shedding rabies virus in the saliva at the time of the exposure?

The following factors should be assessed: (1) geographic location of exposure and origin of the animal; (2) animal health and behavior; (3) animal rabies vaccination status if eligible for vaccine,; (4) circumstances of exposure; (5) likelihood the animal could have been exposed to a rabid animal; and (6) whether the animal can be observed (dogs, cats, and ferrets only) or tested to determine whether it was rabid. These elements of a rabies risk assessment are discussed in detail below. An algorithm including these points is also available for use at: https://www.doh.wa.gov/Portals/1/Documents/5100/RabiesPEPGuidance.pdf.

1. Epidemiology of Animal Rabies in the Place Where the Exposure Occurred

The known epidemiology of rabies in the geographic location of exposure and origin or travel of the animal (e.g., from Washington, out-of-state, or out-of-country) must be considered because the prevalence of rabies varies both by geographic area and by species within those places. For instance, canine variants of rabies have been eliminated in the United States but are still maintained in dog-to-dog transmission cycles elsewhere in the world. This means that dog bites in some countries carry a much higher risk of rabies exposure. Even within this country, certain rabies variants and associated animal reservoirs occur in geographically definable regions https://www.cdc.gov/rabies/location/usa/surveillance/index.html. However, affected areas may expand or contract as a result of virus transmission and animal population interactions and, even in Washington, animals could be imported from endemic areas. If a person is

exposed to an animal outside of Washington, the epidemiology of animal rabies in the area where the exposure occurred should be considered.

a. Bats: Bats serve as a reservoir for rabies throughout Washington and the United States.

b. Dogs, Cats and Ferrets: Although rabies in dogs and cats is very rare in Washington, domestic animals can be exposed to rabies during encounters with wildlife. Even indoor pets can be exposed, since rabid bats in Washington have been found in people's homes. In 2002, a rabid cat was identified in Walla Walla with bat variant rabies and in 2015 a rabid cat was identified in Jefferson with bat variant rabies. Nationally, more cats are reported to have rabies than dogs.

c. Wild Terrestrial Carnivores (raccoons, skunks, foxes, coyotes, wolves, wolf-dog hybrids, bobcat-cat hybrids, etc.): Rabies has not been identified in wild carnivores tested in Washington since a rabid coyote was found in 1930. Raccoon variant rabies has never been reported in Washington. Since the 1960s, the only documented rabies in wild terrestrial carnivores occurred in four pet skunks (not truly wild); 2 were illegally imported and the source was out of state; the others had inappropriately been given attenuated live virus rabies vaccine. However, DOH does not perform routine surveillance for rabies in wild carnivores. Rabies testing is performed on the small number of wild carnivores that expose a human and are subsequently captured, or occasionally when a wild carnivore has been captured but no exposure occurred. Evidence of transmission of bat-variant rabies among non-bat species along with the possibility of translocation of rabid animals from other areas of the country has the potential to rapidly change the epidemiology of rabies in Washington. Because the period of rabies virus shedding in these animals is unknown, these animals must be euthanized and tested rather than confined and observed when they bite humans.

d. Rodents (mice, rats, squirrels, hamsters, etc.), Lagomorphs (rabbits, hares), and Opossums: Rabies in rodents, lagomorphs, and opossums is very uncommon in the entire country. In the eastern United States, raccoon variant rabies occasionally spills over into large rodents, especially woodchucks (groundhogs). According to CDC's national data (2020), woodchucks accounted for 100% of rabid rodents that are reported. Rabies inoculation experiments with opossums (marsupials) in the 1960s found them to be relatively resistant.[1]

[1]Beamer PD, Mohr CO, Barr TRB. Resistance of the Opossum to Rabies Virus. Am J Vet Res 1960;21:507–10.

e. Livestock (cattle, sheep, goats, pigs, horses, llamas, etc.): Although rabies in livestock is rare, animals can be exposed to rabies during encounters with wildlife. Rabies should be considered in the differential diagnosis of any acute, progressive, fatal neurological illness in livestock, especially those imported from areas where terrestrial rabies exists. In 1994, a rabid llama with bat variant rabies was identified in King County and in 1992 a rabid horse was identified in Franklin County (rabies variant unknown).

2. Animal Health and Behavior

a. **Current animal behavior and health status:** Animals exhibiting unusual behavior that might be consistent with rabies (see Section 2B) are more likely to be rabid than animals acting normally. However, signs vary by species, can be subtle or obvious, and can include sudden death with few or no symptoms. Signs of rabies among wildlife cannot be interpreted reliably. The animal behavior and health status are best evaluated by a veterinarian.

b. **Previous history of biting**: Bites by animals with a history of menacing behavior or biting may reflect the animal's aggressive personality rather than infection with rabies virus. It is not uncommon for aggressive behavior to worsen over time, and these bites may seem unprovoked.

3. **Animal Vaccination Status**
    a. Vaccinated dogs, cats, and ferrets are unlikely to become infected with rabies. However, it is possible that veterinary records show the animal is currently vaccinated but it is not in fact immune to rabies due to vaccine inefficacy, vaccine mishandling, or poor documentation. Falsified vaccination documents for imported dogs have been reported. Rabies antibody titers do not indicate immunity. An exposure to a rabid animal might also result in rabies in a vaccinated animal due to immune overwhelm, or amount or location of rabies virus inoculation. Even if an animal is currently vaccinated, rabies cannot be ruled out.
    b. Rabies vaccines given off-label to other species, including hybrids (e.g. wolf-dogs), are of unknown efficacy and should be disregarded in decisions about PEP.
4. **Circumstances of Exposure**
    a. **Provoked versus unprovoked exposure:** An unprovoked attack by an animal is more likely than a provoked attack to indicate that the animal is rabid. Examples of a provoked encounter include startling an animal, running or biking past an animal, trying to capture an animal, or removing food, water, or objects from the animal. Although bites from an injured animal are usually considered provoked, a rabid animal may be more prone to trauma (e.g., being hit by a car due to poor coordination).
5. **Likelihood the Animal Could Have Been Exposed to Another Rabid Animal**
    a. **Feral/Stray Animals:** Feral animals living outdoors have an increased chance of being exposed to other rabid animals, such as bats, as compared to pets which are more likely to be under the owner's control (see indoor vs. outdoor below).
    b. **Indoor vs. Outdoor Animals:** Strictly indoor-only animals are unlikely to be exposed to a rabid animal unless bats have been in the home. Thus, the likelihood of an indoor-only animal becoming rabid is much lower than animals that go outside without supervision (e.g., roaming freely or in an outdoor cage or fenced yard).
    c. **Animal import and/or travel history:** Animals that have recently (within the previous 6 months) traveled or lived in areas where rabies is endemic in dogs or wild carnivores are more likely to be infected than animals that have not left Washington. The risk of rabies differs elsewhere in the United States (e.g., raccoon rabies in the east coast, skunk rabies in central states) and internationally (e.g., dog rabies in parts of Asia, Africa, Central and South America, and the Middle East).
6. **Can the animal be confined for a 10-day observation period from the date of the bite (dogs, cats, and ferrets without signs of rabies only) or is the animal head available for testing?**
    a. When possible, any dog, cat, or ferret (vaccinated or unvaccinated) that bites a person and that is not exhibiting signs of rabies should be confined and observed for a 10-day period. Extreme care should be used to prevent exposure of additional persons to the confined animal.
        - If there is no change in health or behavior after 10 days, the animal was not shedding rabies virus at the time of exposure and rabies PEP should not be recommended or can be discontinued if it was already started.
        - If signs of rabies develop or the animal dies during the observation period, the local health department should be notified and the animal should be immediately tested for rabies. If the animal must be euthanized for humane reasons, consider risk for rabies as above in the decision to test and/or administer PEP.

b. Because the period of rabies virus shedding in wild animals and hybrids (offspring of wild animals crossbred to domestic dogs and cats) is unknown, these animals must be euthanized and tested rather than confined and observed when they expose humans.

c. It is not known how long livestock shed rabies virus, so the observation period cannot be applied to livestock. Evaluate potential human exposures on a case-by-case basis.

Consult the Office of Communicable Disease Epidemiology as needed (206-418-5500). For additional information, refer to the Compendium of Animal Rabies Prevention and Control http://nasphv.org/Documents/NASPHVRabiesCompendium.pdf and the most current ACIP recommendations(https://www.cdc.gov/mmwr/PDF/rr/rr5703.pdf and https://www.cdc.gov/mmwr/PDF/rr/rr5902.pdf.

6. DECISION TO ADMINISTER RABIES PEP

The decision to give rabies post-exposure prophylaxis (PEP) should be made between a health care provider (HCP) and patient. Rabies PEP is imperative for anyone exposed to an animal that tests positive for rabies. Algorithms to assist with the decision are available https://www.doh.wa.gov/Portals/1/Documents/5100/RabiesPEPGuidance.pdf. Additionally, an Excel-based decision calculator is available by emailing zd@doh.wa.gov, or a rabies epidemiologist is available for consultation by calling 206-418-5500.

7. RABIES POST-EXPOSURE PROPHYLAXIS

Essential components of rabies **post-**exposure prophylaxis (PEP) are wound treatment, administration of human rabies immune globulin (HRIG) [only for previously unvaccinated persons], and a series of doses of rabies vaccine (4, or 5 if immunecompromised).

A. Wound Treatment

Immediately wash all bite wounds and scratches with soap and water and, if available, a virucidal agent such as povidine-iodine solution. Administer tetanus prophylaxis and measures to control bacterial infection as indicated.

B. Post-Exposure Prophylaxis (PEP)

Rabies vaccination should be given according to the most current Advisory Committee on Immunization Practices (ACIP) recommendations. The Centers for Disease Control and Prevention (CDC) adopted recommendations in March 2010 to reduce the number of rabies vaccine doses given in the PEP series from 5 to 4 doses for unvaccinated persons who are immunocompetent https://www.cdc.gov/mmwr/PDF/rr/rr5902.pdf. Additional ACIP recommendations are at: https://www.cdc.gov/mmwr/PDF/rr/rr5703.pdf and https://www.cdc.gov/mmwr/volumes/71/wr/mm7118a2.htm.

Two cell-culture vaccines are available in the United States for rabies pre- and post-exposure prophylaxis in humans. They are equally safe and effective.

- Human diploid cell vaccine (HDCV) (Imovax™) is available from Sanofi Pasteur (1-800-822-2463) www.vaccineshoppe.com/image.cfm?doc_id=5983&image_type=product_pdf

- Purified chick embryo cell vaccine (PCEC) (RabAvert™) is available from Novartis Vaccines and Diagnostics (1-800-244-7668)
  https://www.fda.gov/downloads/BiologicsBloodVaccines/Vaccines/ApprovedProducts/UCM312931.pdf

Two manufacturers provide HRIG (for post-exposure use only) in the United States.

- Imogam Rabies–HT™ available from Sanofi Pasteur (1-800-822-2463)
  https://www.vaccineshoppe.com/image.cfm?doc_id=5967&image_type=product_pdf
- HyperRab™ S/D available from Grifols Therapeutics Inc. (1-800-243-4153)
  http://www.grifolsusa.com/documents/10192/60862/ft_hyperrab_eeuu_en/09f14ece-e450-48f8-9137-3ce7e0aaa8c6

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

1. For people who have **never*** been vaccinated against rabies:

   - One dose (20 IU/kg) of human rabies immune globulin (HRIG) is administered on day 0. If anatomically feasible, the full dose of HRIG should be thoroughly infiltrated into the wounds and surrounding tissues, such as the area of the face that was bitten. Any remaining volume should be injected intramuscularly at a site distant from vaccine administration; typically the deltoid muscles are reserved for vaccine and are not used for administering HRIG. Use a sufficiently long needle to ensure intramuscular injections. HRIG should never be administered in the same syringe or in the same anatomical site as rabies vaccine. Note: administration in the gluteal region is not contraindicated, but intramuscular administration can be difficult and as such is not recommended.

   *If a person has received a previous dose of rabies vaccine without completing the full vaccination series, consult with CDC regarding whether HRIG is recommended. A titer check within the first week of vaccine administration may also inform whether HRIG is needed.

   Note: If HRIG was not administered when vaccination was begun on day 0, it can be administered up to and including day 7 of the PEP series" https://www.cdc.gov/mmwr/pdf/rr/rr5902.pdf. After the seventh day, HRIG is not indicated because an antibody response to cell culture vaccine is presumed to have occurred.

AND one of two vaccine options:

- **For immunocompetent persons only: four** doses of cell culture rabies vaccine at 1 mL/dose administered intramuscularly in the deltoid muscle on days 0, 3, 7, and 14. Alternating deltoid sites may be more comfortable for the patient. The anterolateral aspect of the upper thigh can be used in infants/young children. Use a sufficiently long needle to ensure intramuscular injections. Do not administer in the gluteal region due to potential for diminished immunologic response.
- **For persons who are immunosuppressed** (see definition below*): **five** doses of cell culture rabies vaccine at 1 mL/dose administered intramuscularly in the deltoid muscle on days 0, 3, 7, 14, and 28. The anterolateral aspect of the upper thigh can be used in infants/young children. Use a sufficiently long needle to ensure intramuscular injections. Do not administer in the gluteal region due to potential for diminished immunologic response. At least one week, and preferably 2-4 weeks after the fifth dose, obtain one or more serum samples to test for rabies virus neutralizing antibody titers using rapid fluorescent focus inhibition test (RFFIT) to ensure an acceptable response has occurred. Titers can be obtained through:
  - Kansas State University (785)-532-4298

        - http://www.ksvdl.org/rabies-laboratory/rffit-tests/
    - Atlanta Health Associates (770)-205-9091 or (800)-717-5612
        - http://www.atlantahealth.net/

Generally, antibody levels peak around 2-3 weeks after completing a primary rabies vaccination series. There is no "protective" titer, but most published studies have used 0.5 IU/mL as a correlate of protection. This level is endorsed by the ACIP.

If an immunocompromised patient has a low titer (<0.5IU/mL) after the fifth dose of vaccine, the local health jurisdiction, the patient, and the patient's healthcare provider should jointly consider the option of providing a sixth booster dose in the context of the patient's current condition and treatments. Consider the exposure risk, current titer level, current immunosuppressive condition or treatments, and any risks associated with a dose of vaccine. If it is determined that a sixth dose will not interfere with treatments or place the patient at increased risk of adverse events, and concern for exposure is high, this booster dose should be provided.

* Immunosuppression can be due to a variety of conditions including congenital immunodeficiency; bone marrow transplant; human immunodeficiency virus infection; leukemia; lymphoma; malignancy; or therapy with alkylating agents, antimetabolites, radiation or high dose corticosteroids. For some of these conditions, all affected persons will be immunocompromised; for others, health care providers will ultimately have to determine the degree to which the immune system is compromised. Certain medical conditions, such as renal failure, diabetes, asplenia, or cirrhosis, may increase the patient's risk for certain infectious diseases and, when such conditions are long-standing or associated with complications, may dampen the immune response of these patients and result in relative immunosuppression. The 5-dose vaccine regimen should be considered for patients with these conditions. Among the elderly a lower immune response, though not a *lack* of response, may also warrant consideration of the 5-dose regimen. Consult CDE as needed (206-418-5500).

2. For persons **with** previous pre-exposure vaccination or post-exposure prophylaxis:

   If prior vaccinations were given following one of the ACIP-recommended regimens (with cell culture vaccines available in the United States after 1980) or if persons received another vaccine regimen **and** had a documented adequate rabies virus-neutralizing antibody response, give:

   - Two doses of cell culture rabies vaccine (1 mL) administered intramuscularly in the deltoid muscle on days 0 and 3 after a rabies exposure.
   - HRIG should not be given to previously vaccinated persons to avoid possible inhibition of the relative strength or rapidity of an expected anamnestic response.

C. Timing of Rabies Post-Exposure Prophylaxis

Any animal bite or scratch should be immediately cleaned as described above. According to the ACIP, the "administration of rabies PEP is a medical urgency, not a medical emergency," https://www.cdc.gov/mmwr/PDF/rr/rr5703.pdf. National recommendations are that persons bitten by animals known to be or suspected to be rabid should be given PEP urgently since the time which can pass between an exposure and effective administration of PEP is unknown. The incubation period is highly variable in humans; with the reported U.S. median of ~35 days; range: 5 days to >2 years https://www.cdc.gov/mmwr/pdf/rr/rr5902.pdf. PEP should not be delayed unnecessarily.

Local health jurisdictions should be available for consultation with healthcare providers and should facilitate testing the animal for rabies at the Washington State Public Health Laboratories if needed. Factors to consider when determining how quickly to begin PEP include the likelihood that rabies was transmitted and the anatomic proximity of the bite to the central nervous system. It may be appropriate to initiate PEP prior to receiving test results depending on the behavior and appearance of the animal, the severity and location of the bite, whether the exposure was provoked, and the species of the animal.

PEP can be delayed when the dog, cat, or ferret is currently healthy, and can be observed for 10 days. Likewise, PEP can be delayed up to 5 days while an animal is being tested if the appearance/behavior of the animal, bite severity and bite location are not high risk. Each exposure situation should be carefully assessed to determine timing of PEP in relation to animal testing results.

PEP should be initiated immediately for bites to the head and neck from a high risk animal or severe bites from a wild carnivore from a rabies endemic area. For dog, cat, and ferret exposures where the animal was in or imported from a country with endemic canine rabies, providers should consider starting PEP immediately given the elevated risk of the animal being rabid even if the animal is being observed. If PEP is started prior to the availability of animal testing results, PEP can be discontinued if the animal is later found to be negative. If PEP has not been started and test results indicate the animal was rabid, PEP should be started immediately. Since incubation periods of more than 1 year have been reported for human rabies cases, PEP should be administered regardless of the time interval since a documented or likely exposure to rabies occurred.

In the event of a mass bat exposure investigation (theoretical exposure of numerous people), involved LHJs should notify DOH immediately and collaborate to determine a standardized follow-up approach specific to the situation. An assessment tool is available in Appendix A here: https://doh.wa.gov/sites/default/files/legacy/Documents/5100//RabiesPEPGuidance.pdf.

The turnaround time for animal testing results from the Washington State Public Health Laboratories is within 30 hours of specimen arrival. If you have difficulty deciding whether or not to delay PEP until the animal is tested, consult the Office of Communicable Disease Epidemiology (CDE) at 206-418-5500.

D. Deviations from Recommended Vaccination Schedules

Arrangements should be made so that patients do not deviate from the recommended PEP vaccination schedule. However, occasionally lapses are unavoidable. If a delay of a few days occurs, the vaccination schedule should be resumed as if the patient were on schedule by giving the missed dose immediately and resetting the count to the appropriate dose day. For instance if the next dose is scheduled for day 7 but the patient does not return until day 9, the day 7 dose should be given and counted as day 7; the correct interval should be maintained until the next dose (i.e., 7 more days until the new day 14 dose). When longer delays occur, serologic testing using the RFFIT assay (Section 7B) should be performed 7 to 14 days after the final dose in the series to assess immune status.

E. Post-Exposure Prophylaxis outside the United States

Patients exposed to potentially rabid animals in foreign countries may start a PEP regimen with a vaccine that is unavailable in the United States. These vaccines may include purified vero cell vaccines (e.g., Verorab™, Imovax – Rabies vero™, or TRC Verorab™), purified duck embryo vaccine (e.g., Lyssavac N™), and different formulations of human diploid cell vaccine (e.g., Rabivac™) or purified chick embryo cell vaccine (e.g., Rabipur™). The regimens for PEP using these vaccines may differ from the regimen used in the United States, particularly if the vaccines are administered intradermally rather than intramuscularly.

Additional prophylaxis might be necessary. Rabies virus neutralizing antibody titers using the RFFIT assay (Section 7B) from specimens collected 1 to 2 weeks after pre-exposure or post-exposure prophylaxis are considered adequate if titer is ≥ 0.5 IU/mL.

When possible, request by e-mail or fax a photograph or copy of the packaging from the vaccine that was administered abroad and any health care visit notes, documentation of vaccine administration, or receipts from the health care visit. This documentation may aid in the assessment of whether additional prophylaxis is necessary.

Be aware that counterfeit pharmaceuticals are not uncommon in some parts of the world. The ACIP guidelines recommend repeating the PEP series if regimens not used in the United States are used. Since these regimens have not been approved by the FDA, these individuals are generally treated as "unvaccinated" and the series is repeated as though it was never received. Alternatively, the traveler could be given a new first dose of vaccine and serum could be drawn to check the rabies virus neutralizing antibody titers before giving HRIG to determine if it is necessary.

If you are confident that the overseas vaccine was a bona fide cell culture vaccine, then either the full series can be accepted or any remaining doses needed in the series can be continued using cell culture vaccine in the United States; serology is not warranted. Titers by RFFIT should be checked if there were significant deviations in the prophylaxis schedule or if a non-cell culture vaccine was used. Consult CDE as needed at 206-418-5500.

F. Adverse Reactions Associated with Post-Exposure Prophylaxis

Prophylaxis should not be discontinued due to reactions without considering the patient's risk of acquiring rabies. Health care providers should report any unusual or severe adverse reaction attributed to HRIG or vaccine to the vaccine manufacturer and the local health jurisdiction, which should notify CDE, and to the Vaccine Adverse Events Reporting System (VAERS: https://vaers.hhs.gov/). For additional information, please refer to current ACIP recommendations for preventing rabies in humans: https://www.cdc.gov/mmwr/PDF/rr/rr5703.pdf; https://www.cdc.gov/mmwr/PDF/rr/rr5902.pdf;

https://www.cdc.gov/mmwr/volumes/71/wr/mm7118a2.htm.

8. MANAGING SPECIAL SITUATIONS

A. Dogs, Cats, or Ferrets Exposed to a Potentially Rabid Animal

When a domestic animal has direct contact with a known or suspected rabid animal, it is considered to have had a potential exposure to rabies. There are currently no licensed biologics for post-exposure prophylaxis of domestic animals, and there is evidence that the use of vaccine alone will not reliably prevent the disease in these animals. It is important to capture and submit the suspect rabid animal for testing if possible. Testing for animals exposed without human exposure is referred to Washington Animal Disease Diagnostic Lab or Oregon State University Veterinary Lab (Section 4B).

If the exposed dog/cat/ferret is currently vaccinated (see Section 8C) against rabies:

1. Immediately take the animal to a veterinarian for a booster rabies vaccination regardless of timing of previous booster. This vaccination should be given within 96 hours of the exposure.
2. Confine the dog, cat, or ferret under owner's control with close observation **for 45 days**. The animal should be kept at home or 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. The animal should not have contact with people or animals outside of its household.

3. The owner(s)/caretaker(s) should be counseled as to possible signs of rabies in their animal. Any sign of illness or behavioral change should be reported to the local health jurisdiction (LHJ) immediately and the animal should be taken to a veterinarian. If the veterinarian thinks the symptoms are suggestive of rabies, the animal should be euthanized and tested for rabies.

If the exposed dog/cat is overdue for vaccination (note this guidance is *not* for ferrets):

If an exposed dog or cat has been previously vaccinated with a USDA-licensed rabies vaccine, and there is **valid documentation** (even if the animal has only ever received one dose):

1. The animal can be treated as vaccinated but overdue.
2. The animal must immediately be given a booster vaccination, and no later than 96 hours after exposure, and be confined and under owner's control with close observation **for 45 days**. The animal should be kept at home or 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. The animal should not have contact with people or animals outside of its household. If booster vaccination is delayed, public health officials may consider increasing the observation period for the animal, taking into account severity of exposure, the length of delay in booster vaccination, current health status, and local rabies epidemiology.

If the exposed ferret is overdue for vaccination:

Ferrets that are overdue for booster vaccination should be evaluated on a case-by-case basis, taking into consideration factors such as the severity of exposure, time elapsed since last vaccination, number of previous vaccinations, current health status and local rabies epidemiology, but are generally considered unvaccinated.

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

1. Consider immediate humane euthanasia; OR
2. Set up strict quarantine of the animal. Cats and dogs should be placed in strict quarantine for 120 days (4 months) and ferrets should be placed in strict quarantine for 180 days (6 months).
    a) Administer a rabies vaccination at the time of entry into quarantine. The period from exposure to vaccination should not exceed 96 hours. If vaccination is delayed, public health officials may consider increasing the quarantine period for dogs and cats from 4 to 6 months.
    b) If the quarantine is in an animal control or veterinary facility, the owner should be made aware of the cost, and the facility should agree to the terms of confinement as decided by the local health officer.
    c) If the quarantine is at home, it should be set up in a manner that prevents against escape and avoids direct contact with people and other animals.
3. The owner(s)/caretaker(s) should be counseled as to possible signs of rabies in their animal. Any sign of illness or behavioral change should be reported to the LHJ immediately and the animal should be taken to a veterinarian. If the veterinarian thinks the symptoms are suggestive of rabies, euthanize and test the animal for rabies.

If the exposed dog or cat (note this guidance is *not* for ferrets) has been, or very likely has been, previously vaccinated with a USDA-licensed rabies vaccine, but there is no valid documentation:

1) The animal can be treated as unvaccinated, immediately given a booster vaccination and placed in strict quarantine, as above.

2) Alternatively, the attending veterinarian may use prospective serologic monitoring following consultation with the local health jurisdiction to determine whether it is indicated. Such monitoring entails collecting paired serum samples to document prior vaccination by providing evidence of anamnestic response to booster vaccination. All costs associated with prospective serologic monitoring are at the pet owner's expense.
    a. If an adequate anamnestic response is documented (at least 2-fold rise in titer between paired specimens AND the second titer above 0.5 IU/mL), the animal can be considered previously vaccinated and observed for 45 days (the same management as for currently vaccinated animals). While awaiting results of the prospective serologic monitoring, the animal should be confined and kept under the owner's control.
    b. If an inadequate anamnestic response is documented (<2-fold rise in titer OR second titer <0.5 IU/mL), the animal is considered to be previously unvaccinated and should be placed in strict quarantine for a total of 4 months from the date of exposure (the same management as for unvaccinated animals).

Protocol for prospective serologic monitoring:

If using prospective serologic monitoring, the first veterinary visit, at which serum is collected and a rabies vaccination is given, must occur as soon as possible following the exposure and should not exceed 96 hours post exposure. The date of this visit will be counted as day 0.

- At the day 0 visit the veterinarian shall:
    - Collect 1-2 mL of serum, and hold the serum refrigerated until the second specimen is collected. (Serum held for longer than 7 days should be frozen.)
    - Administer a USDA-licensed rabies vaccine.
- On day 5 (but no later than day 7), the veterinarian shall:
    - Collect a second (paired) serum specimen (1-2 mL). Keep refrigerated.
    - Submit the paired serum specimens with the appropriate forms to an approved rabies laboratory for Rapid Fluorescent Foci Inhibition Test (RFFIT).
    - At this time, the approved laboratory is Kansas State University Rabies Laboratory. Information about proper packaging and shipping of specimens for prospective serologic monitoring, as well as information about the cost of the testing, is available here: http://www.ksvdl.org/rabies-laboratory/rffit-test/rffit-submission-forms.html
        - For questions about using prospective serologic monitoring, consult the public health veterinarian or CDE at 206-418-5500.

B. Livestock Exposed to a Potentially Rabid Animal

Livestock currently vaccinated with a vaccine approved by USDA for that species should be revaccinated immediately and observed for 45 days following exposure to a potentially rabid animal. Livestock that have never been vaccinated should be euthanized immediately. Animals that are not euthanized should be confined and observed on a case-by-case basis for 6 months. Consult the public health veterinarian on livestock exposures; if unable to reach the public health veterinarian, consult CDE at 206-418-5500.

C. Rabies Vaccine for Animals

There are formulations of rabies vaccine licensed for cats, dogs, and ferrets, as well as horses, cattle, and sheep. An animal's vaccine status is up-to-date if the initial vaccination was administered at least 28 days prior or if the booster vaccinations have been administered in accordance with the most current *Compendium of Animal Rabies Prevention and Control*

http://nasphv.org/Documents/NASPHVRabiesCompendium.pdf. A booster vaccination should be administered 1 year after the initial vaccination regardless of the animal's age at first vaccination. An animal is considered currently vaccinated immediately after a booster vaccination.

D. Exposure to a Human with Rabies

Although person-to-person transmission of rabies by bite has never been confirmed, PEP is recommended for persons who have exposure (Section 5A) to a human rabies case. Consult CDE (206-418-5500) regarding PEP of persons exposed to a human with rabies.

9. ROUTINE PREVENTION

A. Human Pre-exposure Immunization

Rabies pre-exposure vaccinations are administered to individuals such as laboratory workers testing for rabies virus, veterinarians and their staff, wildlife biologists, rehabilitators, animal control officers who routinely have contact with stray domestic, exotic, and/or wild animals, and travelers staying for prolonged periods in rabies enzootic areas where medical care may be difficult to obtain. Pre-exposure immunization consists of two cell culture rabies vaccinations given on days 0 and 7. In addition, persons in risk category 1 (as defined by the ACIP: https://www.cdc.gov/mmwr/volumes/71/wr/mm7118a2.htm) should have rabies antibody titers checked every 6 months, and those in risk category 2 should have titers checked every 2 years; a booster dose should be administered if titers are < 0.5 IU/mL. Persons in risk category 3 should either have titers checked once during years 1-3 after completion of the 2-dose primary series, or preemptively receive a one-time booster dose of rabies vaccine during day 21- year 3 after completion of the 2 dose primary series.

B. Prevention Recommendations

1. **Be a responsible pet owner**
   - Keep rabies vaccination up-to-date for dogs, cats and ferrets as mandated by WAC 246-100-197. This is important not only to keep your pets from getting rabies, but also to provide a barrier of protection to you, if your animal is bitten by a rabid animal.
   - Keep your pets under direct supervision so they do not come in contact with wild animals. If your pet is bitten by a wild animal, seek veterinary assistance.
   - Call your local animal control agency to remove any stray pets from your neighborhood. They may be unvaccinated and could be infected by the disease.
   - Spay or neuter your pets to help reduce the number of unwanted pets that may not be properly cared for or regularly vaccinated.
2. **Avoid direct contact with unfamiliar animals**
   - Enjoy wild animals (e.g., raccoons, skunks, and foxes) from afar. Do **not** touch, handle, feed, or unintentionally attract wild animals with open garbage cans, pet food, or litter.
   - **Never** adopt wild animals or bring them into your home. **Do not** try to nurse sick wild animals. Call animal control or a wildlife rescue agency for assistance; report sick or dead wildlife to the Department of Fish & Wildlife: https://wdfw.wa.gov/get-involved/report-observations.
   - Teach children **never** to touch or handle unfamiliar animals, wild or domestic, even if they appear friendly. "Love your own, leave other animals alone" is a good principle.
   - Prevent bats from entering living quarters or occupied spaces in homes, churches, schools, or other similar areas, where they might come in contact with people or pets.

- When traveling abroad, avoid direct contact with wild and stray animals, especially dogs in developing countries. Rabies is common in many countries in Asia, Africa, and Latin America where dogs are the major reservoir of rabies. Before traveling, consult a health care provider, travel clinic, or your health department about the risk of rabies, pre-exposure prophylaxis, and how to handle an exposure, should it arise.

3. Keep bats out of your home

Some bats live in buildings, and there may be no reason to evict them if there is little chance for contact with people. However, bats should always be prevented from entering living areas of your home. For assistance with "bat-proofing" your home, contact an animal control or wildlife conservation agency. Department of Fish & Wildlife has information for keeping bats out of homes- wdfw00605.pdf (wa.gov). If you choose to do the "bat-proofing" yourself, here are some suggestions:

- Carefully examine your home for holes that might allow bat entry into your living quarters. Any openings larger than a ¼ inch x ½ inch should be caulked.
- Use window screens, chimney caps, and draft-guards beneath doors to attics; fill electrical and plumbing holes with stainless steel wool or caulking; and ensure all doors to the outside close tightly.
- Additional "bat-proofing" can prevent bats from roosting in attics or buildings by covering outside entry points. Observe where bats exit at dusk and exclude them by loosely hanging clear plastic sheeting or bird netting over these areas. Bats can crawl out and leave, but cannot re-enter. After the bats have been excluded, the openings can be permanently sealed.

ACKNOWLEDGEMENTS

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References: https://www.cdc.gov/rabies/

UPDATES

January 2011: First issuance of this guideline. Prior to 2011, similar content was provided in the "Animal Bites and Rabies PEP" guideline. The Legal Reporting Requirements section reflects the 2011 Notifiable Conditions Rule revision.

June 2012: Case definitions were clarified in Section 3. Section 5C was updated to include additional historic animal rabies data. Wording was revised throughout to shorten the guideline.

December 2014: The tables in section 2D were updated to include additional historic animal rabies data through 2013. A section on post-exposure prophylaxis in immune-compromised individuals was added to section 7B(1). A section on repeating PEP in international travelers was added to section 7E. Appendix A was updated through 2013.

March 2016: Section 8A was updated to reflect changes to the Rabies Compendium, namely: a section was added regarding how to manage cats and dogs who had received rabies vaccine in the past but were out of date; a section was added regarding the use of prospective serologic monitoring for dogs and cats who have been, or very likely have been, previously vaccinated, but for whom no documentation exists; and the quarantine period for dogs and cats was changed from 6 months to 4 months.

December 2016: Cover page added, section 4C added with acceptable euthanasia methods, section 7C was updated with additional guidance on timing of PEP.

June 2017: Section 7C was updated with additional information about mass bat exposure events.

September 2017: Updated tables in section 2D, updated HRIG administration information in 7B

December 2019: Updated tables in section 2D, updated Sections 6A and 7C, updated Appendix A, routine review.

December 2022: Updated section 9 to reflect May 2022 ACIP change in recommendations for PrEP, added availability of RT-PCR testing at WADDL for non-human exposures to section 4B, routine review. Original data table in Appendix A was removed; information is available here: https://doh.wa.gov/you-and-your-family/illness-and-disease-z/rabies/rabies-activity-washington. Section 1B was updated consistent with language in the January 2023 WAC changes.