

# Alaska Rabies Prevention and Control Manual

Prepared by the Alaska Section of Epidemiology

**Main telephone number 907-269-8000;  
after-hours 800-478-0084**



**version 3, October 2009**

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## I. Overview of Rabies Virus

### The virus

Rabies virus is an RNA virus classified in the *Rhabdoviridae* family. There are variants of the rabies virus that are adapted to their reservoir species but can be transmitted to other species, e.g., fox variant detected in a dog. Molecular analyses are needed to identify virus variants.

### Susceptible animals

Rabies virus can cause acute encephalitis in all warm-blooded hosts, including pets, livestock, wildlife and humans, and the outcome is almost always fatal. Although all species of mammals are susceptible to rabies virus infection, only a few species are important as reservoirs for the disease. In the United States, several distinct rabies virus variants have been identified in terrestrial mammals, including raccoons, skunks, and foxes. In addition, several species of bats are also reservoirs for rabies.

### Routes of transmission

Rabies virus can be transmitted when the saliva or neural (brain and nerve) tissue of an infected animal comes into contact with an open wound or mucous membrane of another animal. This is usually from a bite, defined as penetration of the skin by the teeth. Nonbite exposures may also occur, defined as contamination of an open wound, abrasion, mucous membrane, or scratch with saliva or other potentially infectious material (such as neural tissue) from an infected animal. Contact with blood, urine, or feces from an infected animal does not constitute an exposure. Rare cases have occurred from organ transplantation or occupational exposures in the laboratory.

### Incubation period

The incubation period (time from exposure to virus until development of symptoms) can vary but is generally 3-8 weeks. Since the virus grows along peripheral nerves to the central nervous system (CNS), the distance from the bite to CNS and the innervation at the area of the bite are some of the factors that can influence the length of the incubation period.

### Infectious period

The infectious period is the length of time that a rabid animal can potentially shed virus and infect another animal. In general, this period can start from a few days before clinical signs are evident until the animal dies. The time frame for dogs/cats is a maximum of 10 days, which is why there is a 10-day observation period following a bite to a human. If the dog/cat is still alive and not showing signs of illness after 10 days, the animal was not infectious (shedding virus) at the time of the bite. The period of viral shedding for wildlife may vary, which is the reason why there is no standard observation time for wildlife that bite humans.

### Virus stability

Rabies virus is not a particularly hardy virus and is inactivated once dried. Freezing will not kill the virus, although repeated freeze-thaw cycles will eventually degrade the virus. Items, such as knives, that are contaminated with secretions from rabid animals can be disinfected with a dilute bleach solution. Properly cured pelts from rabid animals are not considered infectious.

For more information on the natural history of rabies virus, visit the Centers for Disease Control and Prevention Rabies website: <http://www.cdc.gov/ncidod/dvrd/rabies/default.htm>.

## II. Alaska Rabies Statistics

### Human cases

Historically, there are three reported human rabies cases associated with exposures in Alaska. In February 1914, a sled dog attacked a man in Candle. In January 1942, a man was mauled by a wolf 10 miles east of Noorvik. In 1943, a boy was mauled by a wolf near Wainwright. With effective reporting, testing, and delivery of rabies post-exposure prophylaxis, the Alaska Division of Public Health strives to minimize the likelihood that Alaska will report additional human rabies cases.

### Animal cases

Data on rabies testing in Alaska comes from the Alaska State Virology Laboratory in Fairbanks where rabies testing has been conducted for 50+ years. Select specimens are also sent to the US Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia, where specialized testing is performed. Wildlife reservoirs for rabies in Alaska are red and arctic foxes. Additionally, there have been two bats from southeastern Alaska confirmed to have rabies. In 1993, a little brown bat was confirmed by CDC to have the silver-haired bat virus variant, and in 2006, a Keen's myotis bat was confirmed to have the red bat variant.

Following are two tables that describe some of the results from ASVL. It is important to note that the specimens collected were not collected as part of a systematic survey but represent a convenience sample of animals that were submitted for a variety of reasons, e.g., they were involved in an altercation with a human or were displaying aberrant behavior.

Table 1. Animals EVER confirmed to have rabies in Alaska since 1971.

<b>Animal</b>	<b>Year of most recent positive</b>
Arctic fox	2009
Caribou	1982
Cat <sup>1</sup>	1976
Coyote <sup>2</sup>	1998
Dog	2009
Keen's Myotis bat <sup>2</sup>	2006
Little brown bat <sup>2</sup>	1993
Red fox	2009
Reindeer	1982
River otter	2000
Wolf	2009

<sup>1</sup>Only two of all the cats ever tested have been positive, including one imported case from the 1960s.

<sup>2</sup>Only one of all these types of animals ever tested have been positive.

Many other types of animals have been tested for rabies in Alaska from shrews to bears. It is unlikely that a small rodent would develop rabies if exposed to a rabid fox mainly because smaller animals do not usually survive the initial attack by one of the larger carnivores.

Table 2. Boroughs and census areas EVER confirmed to have rabies in Alaska since 1971.<sup>1</sup>

<b>Borough or Census Area</b>	<b>Year of most recent positive</b>
Aleutians East	2000
Bethel	2009
Bristol Bay	1998
Dillingham	2009
Ketchikan <sup>2</sup>	2006
Lake and Peninsula	2000
Nome	2008
Northwest Arctic	2009
North Slope	2009
Wade Hampton	2007
Yukon Koyukuk	1997

<sup>1</sup>Cases are attributed to the region where rabies was acquired and not the area from where the animal was submitted for testing.

<sup>2</sup>The two bats originated from the Ketchikan Gateway Borough; no cases of terrestrial mammal rabies have been confirmed in this region.

Rabies is enzootic (always present at a certain level) among the fox populations in northern and western coastal Alaska. Epizootics (outbreaks among animals) occur every few years and follow the population cycles of the rodent populations upon which the fox feed. Because patterns of rabies transmission are dependent on wildlife populations, future changes to the ecology or populations may directly or indirectly affect regions of the State generally considered to be enzootic. Ongoing surveillance is therefore critical to rapidly document any changes that may occur.

Seasonality of rabies does seem to occur with peaks in cases documented in the winter and early spring. However, these data may reflect more the patterns of submission and less the total picture of rabies ecology. Rabies has been documented in animals submitted in all 12 months of the year; therefore, rabies activity should be considered a year-round possibility in enzootic areas.

More detailed statistics are available by request for certain years, regions, and species. Please contact either the Section of Epidemiology or the Alaska State Virology Laboratory for more information.

(Detailed map under construction).

### III. General Principles of Rabies Prevention and Control

#### Prevent rabies in wildlife reservoirs

In the United States, various federal and state programs have been developed to vaccinate wildlife against rabies in certain geographic locations to prevent propagation of rabies virus among wildlife populations and thus potential spillover into domestic animals. Notable projects have occurred in Massachusetts (Cape Cod), Ohio, and the southern Texas border. There is nothing currently underway in Alaska; however, the University of Alaska-Fairbanks (UAF) is collaborating with federal partners to conduct experiments on the use of various baits for foxes. Given the terrain and the migration patterns of foxes on sea ice and across the Arctic, a large scale wildlife vaccination program is not likely feasible in Alaska. However, under certain circumstances, setting out rabies vaccine-laden baits for foxes could be a useful more localized tool to create a buffer zone around a particular area in the future.

#### Prevent transfer of rabies virus to pets

Sometimes humans are directly exposed to rabid wildlife but more often a domestic pet serves as an intermediate host that can bring rabies from wildlife into a household setting. Vaccinating pets against rabies is therefore a simple step to minimize opportunities for humans to be exposed to the virus.

#### Prophylax humans that are exposed to potentially rabid animals

The Alaska Section of Epidemiology (SOE) provides 24/7 consultation about a human-animal interaction that may be considered an exposure to rabies. If after consultation with SOE, rabies post-exposure prophylaxis (PEP) is indicated, SOE will provide the medication to an appropriate health care facility as soon as possible (usually via Alaska Airlines Goldstreak service).

Rabies PEP is a series of injections given over a 3- to 4-week time period (See Appendix A for an example of a treatment sheet). The course is shorter for those persons previously vaccinated. Rabies PEP is indicated for anyone exposed to rabies and should be initiated as soon as possible after the exposure. Depending on the circumstances, SOE might recommend waiting for a laboratory result from the suspected animal before starting PEP. There is no specific time-frame for starting PEP, except that if a person has developed clinical signs of rabies, other treatment protocols would be recommended based on consultation with experts. (Note that SOE does not provide rabies vaccine for pre-exposure series).

**Section of Epidemiology:      907-269-8000      Mon – Fri 8 AM – 5 PM**  
**800-478-0084      After-hours**

## IV. Section of Epidemiology Lay Vaccinator Program

### Background

According to Alaska state regulations, rabies vaccines can only be administered to animals by licensed veterinarians or state-certified Lay Vaccinators. In the 1970s, the Section of Epidemiology (SOE) in partnership with the Alaska State Virology Laboratory (ASVL) designed a program whereby non-veterinarians could be certified by the State to serve as Lay Vaccinators administering rabies vaccine to animals. The ultimate goal of the Program was to decrease the likelihood of human exposure to potentially rabid animals.

### Lay Vaccinator (LV) Program policies

Governing policies for the SOE LV program were updated in 2007 and are available in an *Epidemiology Bulletin* on-line: [http://www.epi.alaska.gov/bulletins/docs/b2007\\_02.pdf](http://www.epi.alaska.gov/bulletins/docs/b2007_02.pdf) (Appendix B). One of the substantive changes to the policies was to focus LV efforts in areas of the State of Alaska considered to be enzootic for rabies.

### Roles of SOE and LV Sponsors and Supervisors

SOE's primary role in the LV program is to provide oversight and consultation for those persons designated as LV Sponsors. SOE maintains the LV database and creates the certificates for LVs, and provides all needed vaccine and supplies to Sponsors. The Sponsors or Supervisors are tasked with actually identifying, training, and communicating directly with LVs in the field. A training template powerpoint is available from SOE; however, regions are encouraged to tailor training programs to their specific conditions. General training aspects that should be addressed include safe and proper methods for handling animals, routes of vaccine administration, completing rabies vaccination certificates, storing and handling vaccines, and handling and disposing of syringes.

SOE contacts Sponsors when their LVs have certificates that will be expiring. Before certificates are renewed, Sponsors should ensure that the LV is still willing and able to competently administer vaccinations. On an annual basis, SOE will distribute the re-certification paperwork required to continue ordering vaccine and supplies.

### Rabies vaccine and supplies information

The rabies vaccine supplied by SOE is IMRAB 3 manufactured by Merial®. Vaccine is labeled for use in dogs, cats, and ferrets; and the duration of immunity is 3 years. **For animals receiving their first vaccination and ferrets, the duration of immunity is ONLY ONE year.** Vaccine must be stored at 2°-7°C (35°-45°F) and not frozen. Vaccine should be shaken well before being drawn up into a syringe. Vaccine can be administered by either the SQ (subcutaneous) or IM (intramuscular) routes. If vaccine vials are stored at correct temperatures and are not grossly contaminated (i.e., no color change or particular matter noted), multidose vials do NOT need to be used in their entirety at a single setting.

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## V. Alaska Rabies Surveillance and Testing

### Alaska State Virology Laboratory (ASVL)

Testing for rabies at ASVL located in Fairbanks is done on an animal's brain tissue, i.e., the animal must be dead to be tested. ASVL does not evaluate human specimens for rabies. **All questions about suspected cases in humans should be referred to the Section of Epidemiology (SOE): 907-269-8000 or 800-478-0084 after-hours.** After consultation, human specimens will be referred to the CDC (for more information, see <http://www.cdc.gov/rabies/healthcare.html>). The ASVL main number is 907-474-7017; for rabies results, call 907-474-6065.

Not all animals are tested for rabies. In general, ASVL tests animals for which their rabies status will impact public health decision-making. **SOE should be consulted about all animals exhibiting behavior compatible with rabies.** SOE will recommend either rabies testing, quarantine of domesticated animals, or carcass destruction. Specimens approved for testing should be shipped directly to ASVL. Animals (pets or wildlife) routinely tested for rabies include:

- Animals that have bitten humans to determine whether rabies post-exposure prophylaxis is indicated.
- Wildlife that have bitten pets to determine the appropriate follow-up for the pet, i.e., euthanasia or variable periods of quarantine/confinement.
- Animals exhibiting rabies compatible behavior as part of surveillance for detecting rabies activity in certain parts of the state.

### Specimen submission procedure

Please carefully read the 2-page instruction sheet from ASVL for information on how to package and ship specimens, making special note of the fact that:

- BRAIN must be intact to guarantee a definitive result.
  - Badly decomposed specimens will be deemed "UNSATISFACTORY".
  - If the brain is only partially present, the result will be "UNSAT" if brain regions tested are negative; however, if any of the required brain regions are positive, the specimen will be deemed "POSITIVE".
  - Please inform SOE or ASVL prior to submission if the specimen appears compromised.
- ASVL must be aware of shipment tracking numbers/information especially if delivery/arrival will be after hours.
- Specimens for rabies testing should include the head and upper region of the neck, unless the species is small or lacks a prominent nose. The nose is used to stabilize the animal head for necropsy. Only intact heads will be accepted; dissected brains will not be accepted. Examples of species that should be submitted as a whole carcass are: cats, ferrets, mink, and bats.
- Paperwork (i.e., the animal bite investigation form) must be completed for the specimen to be processed. Rabies investigation request forms, specimen submission instructions, and rabies shipping container labels for submission to ASVL are available on-line at <http://hss.state.ak.us/dph/labs/publications/default.htm>.

### Animal carcass disposal

Carcasses of animals should always be disposed of properly, i.e., burial or incineration, see <http://dec.alaska.gov/eh/sw/April%202009%20Factsheets/Working/Factsheet%20Docs%20&%20HTML/Disposal%20of%20Animal%20Carcasses.pdf>.

## **VI. Reporting Animal Bites and Other Legal Issues**

### State requirements

Animal bites themselves are not reportable to the Alaska State Section of Epidemiology (SOE). However, health care providers are legally mandated to report cases of human rabies or suspected exposure to rabies. This means that no statewide statistics on all dog bites are routinely collected and that persons should check with their local authorities to determine what, if any, legal requirements are in place.

### Local ordinances and authorities

Across the different localities in Alaska, there may be local ordinances that govern whether animal bites must be reported to certain authorities, e.g., Municipality of Anchorage. Yet other regions have more informal agreements and reporting mechanisms to follow, e.g., CHAs must submit dog bite report forms to a regional Environmental Health Program or equivalent. SOE is always available to consult on what constitutes a possible exposure to rabies and give recommendations on management, but may still refer callers to their local authorities for follow-up if applicable.

Communities are encouraged to develop multifaceted solutions to animal control, to include management of stray dogs and dog bite investigation follow-up. Examples of Model Dog and Cat Ordinances are available from the American Veterinary Medical Association (c.f. [http://www.avma.org/issues/policy/dog\\_cat\\_control.asp](http://www.avma.org/issues/policy/dog_cat_control.asp)).

### State regulations dealing with animals

Several state departments have regulations that concern different aspects of animals in Alaska. The Department of Health and Social Services (where SOE is housed) has regulations that address the potential of animals to transmit disease to humans. The Department of Environmental Conservation (where the State Veterinarian's Office is housed) has regulations that address the movement of animals across state lines, protection of animals from foreign animal diseases, and disposal of animal carcasses. Finally, the Department of Fish and Game has regulations that list which animals can be legally owned. See Appendix D for a list of the citations where these regulations can be found.

## **VII. Response and Follow-up to a Confirmed Rabid Animal**

Once rabies has been confirmed in an animal in a community, there are several critical actions that need to be taken to minimize the likelihood of rabies transmission to other animals or humans. Circumstances will vary depending on the geographic location, available resources, and the individual scenario; however, for any situation, one of the most important things is to ensure that good communication is maintained among all parties involved or affected by the response.

### Immediate response to rabid animal

- Ensure that any and all persons who were exposed to this animal have been contacted and are referred to the appropriate health authorities. Section of Epidemiology (SOE) staff will be coordinating interviews to determine potential exposures and then contacting local and regional health care providers to arrange for administration of rabies PEP as needed.
- Any animal that was exposed to a rabid one must be identified and its rabies vaccination status assessed.
  - Animals that are unvaccinated should be euthanized immediately.
  - Animals that are currently vaccinated may be observed/confined for 45 days; however, if there is no way to reliably quarantine the animal or it shows any sign of illness, it should be euthanized immediately and may tested for rabies depending on the timing.

These recommendations are spelled out in the National Association of State Public Health Veterinarians (NASPHV) Compendium of Animal Rabies Prevention and Control (Appendix E) that is adopted by reference in Alaska State Regulations (Appendix D). In addition, there is a more succinct version in Appendix F.

### General considerations for the community

Once the immediate response is underway, it is important to ensure additional actions are taken to prevent any future rabies cases in the community. Appendix G has an example of a poster that can be adapted for certain locations. Examples of activities that should be considered include:

- Ensuring that all dogs are up to date on rabies vaccinations.
- Ensuring that all dog bites (as well as bites from wildlife) to humans are reported to the appropriate authority for investigation and follow-up.
- Ensuring that dogs or foxes in the community that are acting strangely are reported to the appropriate authorities to be tested for rabies if indicated.
- Ensuring that any dog bitten or known to be fighting with wildlife is reported to the appropriate authorities to determine a prudent course of action.
- Working with community stakeholders to ensure that loose and stray dogs are managed.

## **Appendix D. Animal-Related State Regulations in Alaska**

### **DHSS**

Regulations in the Department of Health and Social Services relate mainly to rabies vaccination of animals and follow-up of animals that bite humans or are suspected to be rabid.

7 AAC 27.020 – 27.030.

Text available in the Division of Public Health, Conditions Reportable manual, available at <http://www.epi.hss.state.ak.us/pubs/conditions/ConditionsReportable.pdf> (see pages 32-34).

### **DEC**

Regulations in the Department of Environmental Conservation relate to the movement of animals; reporting requirements for veterinarians who diagnose or suspect animal diseases; and quarantine authority of the State Veterinarian under certain disease circumstances.

Current regulations can be found at [http://www.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=%5Bgroup%2Btitle18chap36!3A%5D/doc/%7B@1%7D/hits\\_only](http://www.legis.state.ak.us/cgi-bin/folioisa.dll/aac/query=%5Bgroup%2Btitle18chap36!3A%5D/doc/%7B@1%7D/hits_only). Note that regulations are currently under revision and proposed changes will be introduced in an upcoming legislative session.

### **DFG**

Regulations in the Department of Fish and Game relate to animals that are allowed to be held as pets in Alaska and information about wolf-hybrids. Current regulations can be found at <http://www.adfg.state.ak.us/regs/title5regs.php>; see Chapter 92 for statewide provisions (92.029 and 92.030).

### **All State of Alaska Regulations**

Regulations can also be found individually by searching the State of Alaska website of the Alaska Administrative Code: <http://www.legis.state.ak.us/cgi-bin/folioisa.dll/aac?>.

Additionally, many of these regulations can be found in the Alaska Board of Veterinary Examiners handbook available at <http://www.commerce.state.ak.us/occ/pub/vethandbook.pdf> (updated 2009).

- DHSS regulations on pages 24-27.
- DEC regulations and requirements on pages 7-23.
- DFG regulations on pages 28-31.

## Appendix F. Dog Bite Scenarios

### Alaska Section of Epidemiology (SOE) General Guidelines for Determining the Disposition of a Dog that Bites or is Bitten<sup>1</sup>

Scenario	Dog vaccinated <sup>2</sup>	Dog unvaccinated
Dog bites human	<p>Dog must be quarantined for 10 days.<sup>3</sup></p> <ul style="list-style-type: none"> <li>• If animal shows any signs of illness, must be euthanized immediately and tested for rabies.</li> </ul>	<p>Dog may be immediately euthanized if sick or stray.</p> <p>If owned and well, dog must be quarantined for 10 days.<sup>3,4</sup></p> <ul style="list-style-type: none"> <li>• If animal shows any signs of illness, must be euthanized immediately and tested for rabies.</li> <li>• Once 10-day period is over, animal should be immediately vaccinated.</li> </ul>
Rabid fox bites dog	<p>Dog must be immediately re-vaccinated.</p> <p>Then, confined by the owner for 45 days.</p> <ul style="list-style-type: none"> <li>• If the owner cannot reliably and completely confine the animal, <b>SOE strongly recommends euthanasia.</b></li> <li>• If animal shows any signs of illness, must be euthanized immediately and may be tested for rabies.</li> </ul>	<p>Dog may be immediately euthanized if sick or stray.</p> <p>If owner will not allow dog to be euthanized, animal must be strictly confined for 6 months.<sup>4</sup></p> <ul style="list-style-type: none"> <li>• <b>SOE strongly recommends euthanasia</b> and would like complete assurance that the owner can reliably and completely confine the dog.</li> <li>• If animal shows any signs of illness, must be euthanized immediately and may be tested for rabies.</li> <li>• Dog should be vaccinated upon entry into confinement or 1 month prior to release.</li> </ul>

#### Notes:

1. Please contact SOE for consultation about any suspected human exposures to rabies or other guidance in determining scenario management.
2. Vaccinated means that a dog has received a rabies vaccination at least 28 days prior to the incident. SOE considers a complete vaccination series to be that the animal had one vaccination after the age of 3 months, a booster 1 year later, and then boosters every 3 years thereafter.
3. “Quarantine” facilities must be reviewed by SOE. At a minimum, animal in quarantine must be confined to a single location and unable to freely access other animals and humans. If no acceptable facilities exist, SOE may recommend euthanasia.
4. SOE may seek to obtain a court order requiring euthanasia if the scenario is highly suspicious for rabies.

Table based on the National Association of State Public Health Veterinarians (NASPHV) Compendium of Animal Prevention and Control as adopted in Alaska State Regulations. Available at <http://www.nasphv.org/Documents/RabiesCompendium.pdf>.

**Appendix G. Rabies Follow-up Poster**



**On DATE, 200X, Rabies Was Found HERE in VILLAGE!!**

**This means you should:**

- Make sure all your dogs and cats are currently vaccinated against rabies.
- If you are bitten by a dog, cat or wildlife, report this to your local Community Health Aide (CHA) or regional **Office of Environmental Health (OEH)** right away.
- If your dog or cat is acting sick or not behaving normally (for example, drooling, walking funny, acting mean or anyway strange), contact the VPSO, VPO, or regional **OEH** offices right away.
- If you see foxes or other wildlife acting sick (as above), contact the VPSO, VPO, regional **OEH** or wildlife offices right away.
- If you shoot an animal, **DO NOT SHOOT IT IN THE HEAD!** Rabies testing is done on the brain.

**Contact information:**

CHA.....	907-XXX-XXXX
VPO/VPSO.....	907-XXX-XXXX
<b>OEH (regional)</b> .....	907-XXX-XXXX
Wildlife agency (regional).....	907-XXX-XXXX
Alaska Section of Epidemiology.....	907-269-8000

## Appendix H. Alaska Rabies Bibliography

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<http://www.epi.alaska.gov/bulletins/catlist.jsp?cattype=Rabies>.

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