

## Human Exposures to Dogs and Cats Tested for Rabies, 2008 to 2011

**Background:** Human exposures to animals infected with rabies virus is a public health risk. To minimize the potential for human exposure to rabies, the Centers for Disease Control and Prevention (CDC) recommends all domestic dogs, cats, and ferrets receive rabies vaccinations. However, no statewide law exists in Montana requiring rabies vaccination for these animals and only certain Montana counties have rabies vaccination ordinances. Domestic animals involved in human biting incidents are often quarantined to assess for development of rabies, or are euthanized and tested for rabies. These incidents result in significant public health costs, including but not limited to activities related to animal control, public health investigation, laboratory testing, and administration of rabies post-exposure prophylaxis (rPEP). The estimated average cost of rPEP is \$2315 per course. In Montana, human exposure to an animal known to be infected with rabies is a reportable event. During 2008 to 2011, the administration of rPEP was not an explicitly reportable event.

**Etiology, Transmission, and Pathogenesis:** Rabies is caused by an acute infection with rabies virus. All mammals are susceptible to rabies infection. In the U.S., rabies virus is enzootic among bats, raccoons, skunks, foxes, and coyotes. In Montana, rabies is enzootic among bats and among skunks east of the Continental Divide. Through effective rabies vaccination programs in the United States, the number of rabies-infected dogs has decreased from nearly 7000 in 1947 to 71 in 2006. Presently, more cats than dogs are reported as rabies positive. Rabies virus is typically transmitted to humans through the bite or scratch of a rabies-infected animal. Other rare forms of transmission include aerosols, organ transplantation, and splashes to mucous membranes. The incubation period is normally 3 to 8 weeks, but is highly variable, ranging from a few days to up to several years. Human rabies is almost universally fatal. The clinical syndrome for rabies includes a non-specific prodrome, neurological signs similar to encephalomyelitis that continue to progress, and negative test results for other etiologies. Human rabies is preventable by the timely administration of rPEP. There is no approved treatment for human rabies. An experimental protocol using antiviral drugs has been used in the treatment of human rabies. Only 5 (16%) of the 31 patients known to have received this protocol survived.

**Trends:** Only 20 (36%) Montana counties are known to legally require rabies vaccination for dogs and 16 (29%) for cats (**Table**). During 2008 to 2011, 920 domestic dogs, cats, and ferrets were tested for rabies by the Montana Veterinary Diagnostic Laboratory, including 471 (51%) cats, 448 (49%) dogs, and 1 (0%) ferret. Two (<1%) dogs and 2 (<1%) cats tested positive for rabies. Montana had an average rate of 11.9 cats and 11.3 dogs tested per 100,000 human population/year. Average annual rabies testing rates varied greatly by county from 0 to 143 tests per 100,000 human population/year for cats and 0 to 86 tests for dogs. Cat and dog testing rates did not differ significantly between counties with and without rabies vaccination ordinances. Of the animals tested, 822 (89%) were associated with human exposures. Data pertaining to the number of rPEP courses administered in Montana during 2008 to 2011 resulting from exposure to dogs, cats, and ferrets, and the resultant costs incurred, were not readily ascertainable.

**Prevention:** Rabies prevention can be categorized into animal and human prevention opportunities.

**ANIMAL:** One of the most important ways to prevent human rabies is by ensuring domestic dogs, cats, and ferrets are adequately vaccinated against rabies. The presence and enforcement of laws requiring rabies vaccinations for all domestic dogs, cats, and ferrets in Montana would expectedly increase the number of domestic pets vaccinated against rabies. Pet owners should also minimize the potential for their pets to interact with wildlife. In jurisdictions with animal control authorities, stray animals should be reported to prevent expansion of these populations as these animals have the possibility of being unvaccinated and carrying the rabies virus.

**HUMAN:** Persons exposed to saliva or neurological tissue of animals potentially infected with rabies should be evaluated urgently and treatment decisions should not be delayed. Wounds should be cleansed immediately with soap and water. Healthcare providers should immediately report all animal bites to their local public health department and consult with public health officials regarding the need for rPEP. Public health consultation following animal bites is important to ensuring appropriate decisions are made regarding the use of rPEP.

**Table. Rabies testing characteristics for dogs and cats by presence of county rabies vaccination ordinances, 2008 to 2011**

County Vaccination Ordinance	No. Counties (%)	No. Animals Tested	2010 Census pop	Avg. Annual Testing Rate (per 100,000 pop/year)	Positive Tests	Human Exposures
<i>Cats</i>						
Yes	16 (29)	256	536,201	11.9	0	222
No	37 (66)	206	409,703	12.6	1	172
Unknown	3 (5)	9	43,511	5.2	0	7
<i>Dogs</i>						
Yes	20 (36)	351	746,832	11.8	1	332
No	33 (59)	92	199,072	11.6	0	84
Unknown	3 (5)	5	43,511	2.9	0	5