

VIRGINIA

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## Dog and Cat Rabies in Virginia, 1988-1991

Nationally, as in Virginia, the number of rabies cases in dogs and cats is relatively low when compared to the number of cases reported in wild animals. Despite this fact, a study based on data from 20 states (Helmick 1983) found that more than half (58%) of the people receiving postexposure prophylaxis did so because of exposure to cats and dogs.

To better characterize the situation in Virginia, we collected data on all the dogs and cats with rabies between January 1, 1988 and December 31, 1991. All the cases were confirmed by the fluorescent antibody technique except three, which were confirmed by mouse inoculation.

There were 1,083 laboratory confirmed animal rabies cases reported to the Virginia Department of Health. Raccoons and skunks accounted for the majority of cases (Table 1). From a total of 3,181 cats and 1,927 dogs tested for rabies, 48 positive cases were reported; only five (10%) of these cases were in dogs. The dog cases occurred in Louisa, Westmoreland, Smyth, Prince William, and Suffolk counties. One case occurred in 1988, 1989, and 1990, respectively, and two in 1991 (three cases in 1992 through July 18). Two dogs were strays and the other three were pets. The median age of the dogs was 11.5 months. The sex of the dog was reported for three and all were male. Three of the dogs were located in rural areas and one was from a

suburban area. One of the dogs had been observed with a raccoon and one with a skunk in the six-month period before their deaths. Two of the dogs had unexplained wounds in this six-month period.

Three of the dogs showed a loss of coordination, with one of them having paralyzed limbs; two displayed unusual aggressiveness, and these two dogs were also chewing and/or biting various objects; one dog had seizures; and one dog showed no symptoms. Other symptoms included were a drooping jaw, restlessness, lameness, excess drooling, and loss of appetite. Only one of the dogs was taken to a veterinarian for its illness, and rabies was the clinical diagnosis. Four of the dogs were euthanized, and the other was found dead.

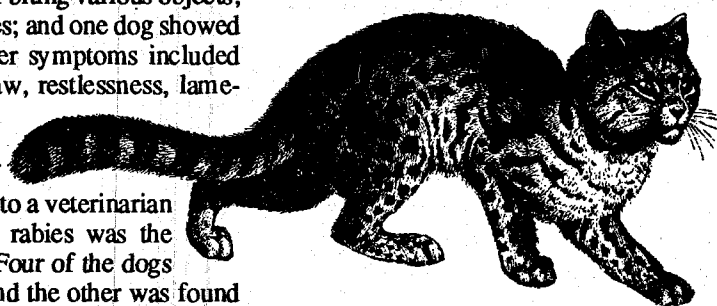
At least 21 people received postexposure prophylaxis from contact with four of the dogs, but only 9 people had been bitten and 3 had been scratched or licked on an open wound or mucous membrane. At least 13 domestic animals were also exposed.

The vaccination history of the two strays was unknown. One of the pet dogs had never been vaccinated, one was described as not current, and the third pet was described as current on rabies vaccinations. The dog described as current had received two three-year vaccinations, one in February 1987 and one in June 1989, and may have received an earlier vaccination before February 1987. The dog's most recent vaccination (June 1989) was given one year and nine months before the diagnosis of rabies.

Of the 3,181 cats tested for rabies, 44 (1.4%) were positive. Northumberland,

Augusta, and Loudoun counties had the highest numbers of reported cases (see map). The breakdown of cases by year was 15 in 1988, 11 in 1989, 10 in 1990, and 8 in 1991 (14 through July 18 in 1992).

Most of the cats were strays (66%) and were in a rural environment (64%). Median age was approximately one year, 62% were



female and only 20% were neutered. Among the pet cats, 50% were not kept in at night, 43% were outside 24 hours a day, 47% had an unexplained wound or cut, 33% had been missing for a period greater than or equal to 24 hours, and 14% had an unexplained lameness. None of the pet owners reported seeing the cat fighting or playing with any wild animals within a six-month period before the cat's death. Approximately half of the stray cats had been seen previously in the community, and most were found or captured in a residential area.

The most frequently reported clinical sign in rabid cats was unusual aggressiveness (75%). Other commonly reported signs included lethargy (30%), excitability (18%), loss of coordination (16%), loss of appetite (14%) and a healed or open wound (14%). In two cats, no symptoms were noted. Approximately 1/3 of the cats were taken to a veterinarian for their illnesses.

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**Table 1. Confirmed Rabies in Animals, by Species, Virginia, 1988-1991**

Species	No.	% of Total
Raccoon	664	61.3
Skunk	240	22.2
Fox	60	5.5
Cat	43	4.0
Bat	39	3.6
Cow	13	1.2
Dog	5	0.5
Groundhog	5	0.5
Horse	5	0.5
Bobcat	3	0.3
Opossum	3	0.3
Beaver	1	0.1
Goat	1	0.1
Sheep	1	0.1
Totals	1083	100.0

Eighty-four percent of the cats were euthanized (or otherwise purposely killed); 16% died naturally. Of those dying naturally, the number of days from onset of clinical signs to death varied from one to seven days, with a mean of 3.8 days.

A total of 100 people received postexposure prophylaxis (mean of 2.3 people per cat); 30 people had been bitten and 46 people had been scratched or licked on an open wound or mucous membrane. At least 102 domestic animals were possibly exposed to the rabid cats.

Two cats were described as current on rabies vaccination, 19 had no reported previous vaccinations, and the remaining cats' vaccination histories were unknown.

## Discussion

In Virginia, the number of cases of laboratory confirmed rabies in cats gradually declined from 1988 through 1991, while the number of cases of rabies in dogs remained constant. To date in 1992, however, there has been an unexplained resurgence in the number of rabies cases in cats. It is interesting to note that a Virginia law requiring the vaccination of all domesticated cats went into effect in 1988. It was also in 1988 that cats first became the most commonly reported rabid domestic animal in the United States.

There were significantly more cases of cat rabies reported than dog rabies. Most of this difference may be attributed to the greater number of stray cats versus stray dogs, the increased opportunity cats have to interact with wild animals, and the decreased likelihood that cats will be vaccinated. Rural farm cats are one source of stray cats that may prove difficult to con-

trol. They are seen as beneficial for rodent control, yet few people are willing to assume financial responsibility for vaccination. The data suggests that problems with dog and cat rabies, particularly cat rabies, will continue unless the stray population is decreased or vaccinated.

Although the small number of dog cases limits our ability to compare findings for the two species, some differences and similarities may be noted. Rabid dogs tended to be male, while the majority of rabid cats were female. The temperament of male dogs versus female dogs may account for their increased likelihood to get rabies. The increased number of female cats affected with rabies may have to do with the increased number of female cats in the general cat population (undocumented) rather than any behavioral or susceptibility difference.

The fact that most of the cases of rabies in both dogs and cats occurred in young animals may be due to a variety of factors, such as their decreased likelihood of being vaccinated, their increased likelihood of interacting with wild animals, and the probability that older strays are either adopted or have already died or been killed (i.e. stray cats are a young population).

Although none of the pet cats had been observed fighting or playing with any wild animals, a large percentage of the pet cats (47%) did have an unexplained wound or cut within the six-month period before their death. These wounds could have been inflicted by rabid animals. The fact that wild animal exposures were not noted in the pet cats probably stems from the general lack of supervision of these pets.

The symptoms noted in both species were variable, which can make clinical diagnosis difficult, especially since no an-

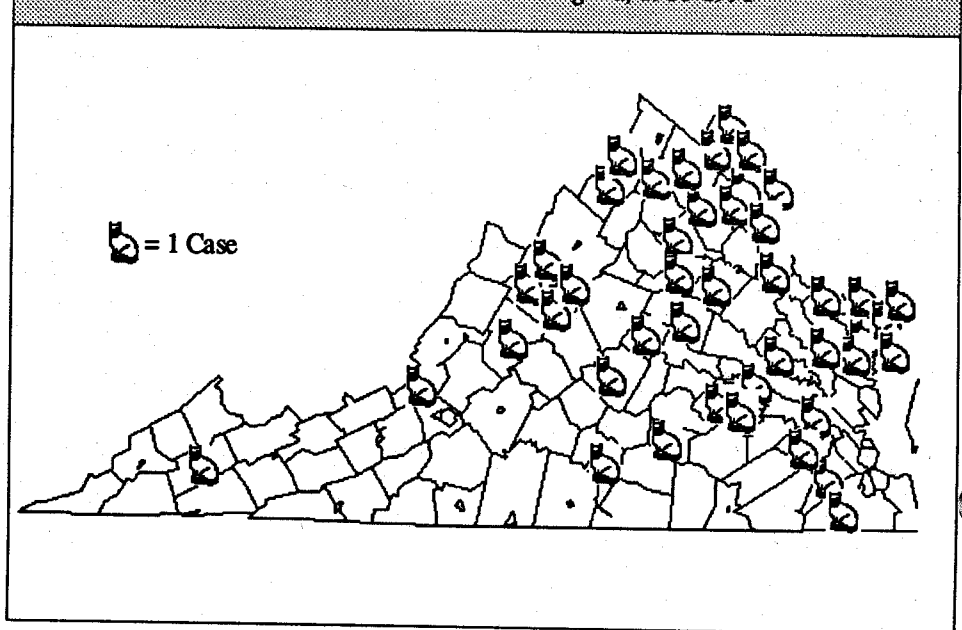
temortem test exist for rabies. Rabies has been classified into a furious and a dumb form, although this terminology may be misleading; the furious form often precedes the dumb form in the same animal. In dogs, the furious form may be characterized by aggressive behavior, depraved appetite, and frothing at the mouth. In most cases, an alteration of the dog's bark occurs, caused by paralysis of laryngeal muscles. In the dumb form of the disease, progressive paralysis is seen.

Cats show similar signs, with a furious form characterized by aggressiveness and increased salivation and a dumb form characterized by progressive paralysis. Cats have been reported to exhibit the furious form more frequently than dogs. Dogs are more likely to develop the dumb form of rabies. Our data shows the same trend with 74% of cat cases versus 40% of dog cases showing aggressiveness. The high percentages of the furious form of rabies may, however, be misleading. Animals showing a furious form of rabies are more likely to be tested as rabies suspects due to their noticeable behavior and the fact that they are more likely to have bitten someone.

The incubation period for rabies is variable in dogs and cats. Cases from the literature suggest incubation periods ranging from 7 days to many months. Where possible rabies exposure was noted in the Virginia cases, time periods before onset of clinical signs ranged from 15 days to three months (virus shedding would not occur until late in the incubation period).

Following the onset of clinical signs, animals infected with rabies virus usually progress rapidly to death. In our study, the longest survival time after initial symptoms of disease was seven days.

**Distribution of Cat Rabies in Virginia, 1988-1991**



Although almost all the rabid dogs and cats were either unvaccinated or not up to date on their vaccinations, three animals described as current apparently succumbed to rabies. One of the cats was a stray without a collar, so the description may have been in error. One cat is listed as having had one vaccination two years before its death. If this was the cat's only vaccination, it should have been followed by a booster vaccination one year later. The dog described as current on rabies vaccination did have a history of appropriate vaccination. This particular dog did, however, also have a history of a facial wound after being seen with a raccoon. Perhaps he received a high dose of virus in a location that allowed little opportunity for his immune system to prevent infection. The dog was not given a booster vaccination, which should be given to currently vaccinated dogs and cats that have contact with a wild, carnivorous mammal or a bat. In addition to revaccination, these dogs and cats should be confined and observed for 90 days as an added precaution. Vaccine failures can occur for a variety of reasons (immunodeficient animals, accidental vaccine inactivation, improper vaccine administration), but currently approved rabies vaccines are considered highly efficacious when properly administered.

The public should be made aware that dog and cat rabies is still occurring in Virginia and appropriate preventive measures should be taken. These measures include regular rabies vaccination of all dogs and cats; prompt removal of stray animals; and proper postexposure treatment of both humans and animals.

*Reported by Janet Ball and Lucie Peletier, fourth year students, Virginia-Maryland Regional College of Veterinary Medicine during a public practice clerkship in the Office of Epidemiology, VDH.*

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## The Wolf Hybrid Issue

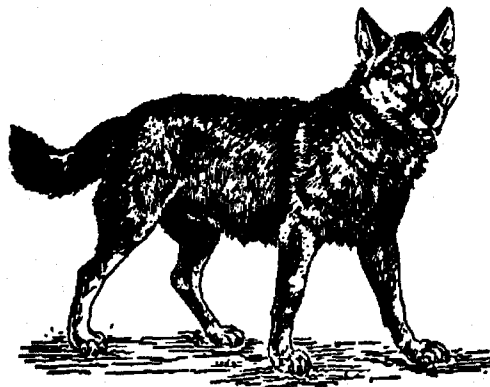
On May 16, 1992 the Board of Directors of the Virginia Department of Game and Inland Fisheries (DGIF) approved a set of new regulations governing non-game species. Included in the list of wild animals for which a permit will be required are wolf hybrids. This decision was made following months of study by the Board members and hours of testimony at two separate Board meetings.

The requirements for a permit will be established by a committee appointed by DGIF which will include representatives from animal control and welfare groups, the Virginia Veterinary Medical Association, wolf hybrid owners, and the Departments of Health, Agriculture and Consumer Services, and Game and Inland Fisheries. To give this group time to develop the standards, permits will not be required until July 1, 1993.

The position of the Virginia Department of Health (VDH) on the administration of rabies vaccines to wolf and other hybrids has not been changed by the recently enacted non-game regulations. There is still no rabies vaccine approved by the United States Department of Agriculture for use in hybrids. Administering such vaccines to hybrids constitutes extra-label use of a biologic. We recommend that veterinarians inform hybrid owners that there have been no studies to prove the efficacy of the vaccine in these animals. The American Veterinary Medical Association Professional Liability Insurance Trust recommends that a record of the discussion with the client be included in the animal's medical chart and that the owner initial it.<sup>1</sup> Veterinarians who vaccinate hybrids for rabies and provide a certificate, should be

sure the certificate makes it clear that the animal is a hybrid, not a dog.

As in the past, hybrids that bite people or are exposed to an animal that could be infected with rabies will be managed as wild animals.<sup>2</sup> The period of time between rabies virus shedding in the saliva and the onset of clinical signs has not been established for wild animals, neither



has the incubation period. To afford maximum protection to the public, hybrids involved in human bite incidents should be euthanized and tested for rabies. Hybrids that are exposed to a potentially rabid animal should be euthanized, even if the hybrid has received a rabies vaccination.

There is presently no easy method of identifying hybrids. Depending on their genetic makeup, they may more strongly resemble a dog than a wolf or vice versa. In some instances people pay extra money for dogs that are advertised as hybrids and in other cases, a hybrid owner may want to hide the fact that the pet is part wolf and tell you it is a German shepherd. Scientists believe that within a few years they will have a test to identify dogs, wolves, and hybrids using blood or other tissue. In the meantime veterinarians and government authorities have to accept at face value what they are told an animal is. Many hybrids do have pedigree papers documenting their breeding.

*Reported by Suzanne R. Jenkins, VMD, MPH, Director, Bureau of Zoonotic Diseases, VDH*

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**Cases of Selected Notifiable Diseases, Virginia, June 1 through June 30, 1992.**

Disease	Total Cases Reported This Month						Total Cases Reported to Date in Virginia		
	State	Regions					This Yr	Last Yr	5 Yr Avg
		NW	N	SW	C	E			
AIDS	46	1	16	8	10	11	325	352	235
Campylobacter	77	12	24	15	19	7	267	210	233
Gonorrhea*	1291	-	-	-	-	-	9040	8673	7710
Hepatitis A	7	0	5	0	2	0	54	100	151
Hepatitis B	11	3	6	1	1	0	92	106	144
Hepatitis NANB	5	1	2	0	2	0	20	21	27
Influenza	0	0	0	0	0	0	116	687	1374
Kawasaki Syndrome	0	0	0	0	0	0	10	18	13
Legionellosis	0	0	0	0	0	0	10	7	5
Lyme Disease	5	0	3	1	0	1	24	42	21
Measles	5	0	5	0	0	0	11	24	49
Meningitis, Aseptic	10	2	6	1	1	0	87	115	78
Meningitis, Bacterial	5	0	1	0	0	4	70	65	86
Meningococcal Infections	2	0	2	0	0	0	35	23	33
Mumps	13	1	4	3	3	2	33	38	64
Pertussis	0	0	0	0	0	0	4	10	16
Rabies in Animals	35	12	11	7	3	2	151	141	158
Rye Syndrome	0	0	0	0	0	0	0	1	1
Rocky Mountain Spotted Fever	1	0	0	1	0	0	1	5	3
Rubella	0	0	0	0	0	0	0	0	3
Salmonellosis	71	6	22	12	14	17	362	499	539
Shigellosis	12	3	5	2	0	2	85	189	150
Syphilis (1° & 2°)*	51	0	5	3	14	29	395	515	319
Tuberculosis	29	0	0	10	4	15	145	158	177

*Localities Reporting Animal Rabies:* Alleghany 1 cat; Augusta 2 raccoons; Fairfax 5 raccoons, 1 skunk; Fauquier 1 raccoon; Frederick 1 skunk; Giles 1 cat, 2 cows; Greensville 2 raccoons; Highland 1 cat, 1 raccoon; Isle of Wight 1 raccoon; Loudoun 1 fox, 2 raccoons, 1 rodent; Louisa 1 raccoon; Madison 1 skunk; Montgomery 1 bat, 1 raccoon; Prince George 1 bat; Prince William 1 raccoon; Pulaski 1 cow; Rappahannock 1 cow; Spotsylvania 1 skunk; Suffolk 1 raccoon; Warren 2 raccoons.

*Occupational Illnesses:* Asbestosis 15; Byssinosis 1; Carpal Tunnel Syndrome 95; Coal Workers' Pneumoconiosis 22; Dermatitis 1; Loss of Hearing 10; Mesothelioma 1; Repetitive Motion Disorder 3; Occupational Asthma 1.

\*Total now includes military cases to make the data consistent with reports of the other diseases.

~Other than meningococcal

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