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Potential Rabies Exposures in a Virginia County

S Y N O P S I S

Objective. Although records of animal bites and scratches are kept at most local health departments, little is known about the epidemiology and characteristics of these potential rabies exposures on a local level. Bite and scratch records for a four-and-a-half-year period from Montgomery County, Virginia, were examined in order to identify preventable trends.

Methods. The author retrospectively reviewed animal bite and scratch records from the Montgomery County Health Department dating from January 1992 through July 1996.

Results. Cat bites or scratches involved stray or feral animals more than eight times as often as dog bites or scratches. Cats were involved in the majority of incidents in which rabies postexposure prophylaxis (PEP) was recommended. Overall, PEP was recommended following 5.9% of reported incidents. The records also indicated that 65% of owned cats were unvaccinated at the time of the incident, while only 28% of owned dogs were unvaccinated. Children under the age of 18 were significantly more likely to be involved in a potential exposure than adults.

Conclusions. Potential exposures should be analyzed periodically by local health departments. Suggestions for minimizing the number of potential rabies exposures in Montgomery County based on the results of the study reported here include: reducing the stray and feral cat population, targeting educational programs to children, and encouraging owners to vaccinate their pets.

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Rabies is a continuing problem in Virginia, in both wild and domestic animals; the annual number of confirmed cases has increased steadily in recent years.^{1,2} Virginia is one of many Eastern states currently experiencing an epidemic of rabies among raccoons, and as reports of raccoon rabies have increased, so have the reports of rabies in domestic animals.³⁻⁵ Cats are the domestic species most commonly reported as rabid in Virginia as well as in the United States as a whole.^{1,2} Of 612 reported animal rabies cases in Virginia in 1996, 29 (4.7%) involved cats.⁶ In fact, in 1996 Virginia reported more cases of rabies in cats than any other state but North Carolina.⁶ The appearance of rabies in domestic animals puts humans at increased risk of exposure.

In Virginia, the evaluation of potential rabies exposures is the responsibility of each local health department.⁷ For each reported incident in which a human is bitten or scratched, health department staff decide whether to quarantine the animal for 10 days or euthanize it and test for rabies.^{7,8} If the animal is not available for testing or quarantine or if an animal tests positive for rabies, the local health department will usually recommend rabies postexposure prophylaxis (PEP) for the victim, based on guidelines recommended by the Immunizations Practices Advisory Committee of the Centers for Disease Control and Prevention.^{7,9}

Most local health departments collect a large amount of demographic data in each bite or scratch report. However, this useful information is rarely analyzed. A brief telephone survey of 17 Virginia Health Districts showed that only one, Norfolk City Health District, regularly examined demographic data on bite and scratch reports and implemented educational programs based on the results.

In Virginia, data on the characteristics of animal bites and scratches or on the use of PEP are not collected at the state level except for cases involving confirmed rabid animals.⁷ Because potential rabies exposures have both medical and psychological consequences, they should also be analyzed at both the state and local levels to identify important trends.

The purpose of my study was to examine the epidemiology and characteristics of animal bite and scratch incidents in Montgomery County, Virginia, and to make suggestions to minimize the number of potential exposures in the future.

METHODS

I conducted a retrospective study using bite and scratch records from the Montgomery County Health Depart-

ment, a division of the New River Health District in Virginia. Demographic information was routinely collected for each animal bite or scratch reported to the health department, but this information had not been previously analyzed for potential risk factors.

I defined a potential exposure as an incident reported to the health department in which a human was bitten or scratched by a domestic or wild animal.

A total of 640 potential exposures were documented in Montgomery County between January 1992 and July 1996. I recorded the following data for each incident: case number; species of animal; whether the animal was a stray; the animal's rabies vaccination status; whether the person was a child (younger than age 18) or adult; and the outcome of the case (10-day quarantine, PEP recommended, animal euthanized and tested negative for rabies, animal euthanized and tested positive for rabies).

I defined a stray animal as an animal for which an owner could not be identified. Feral animals—that is, members of domestic species living in the wild—were included in this working definition of stray animals.

Statistical significance was determined with chi-square tests using the STATCALC program of EpiInfo, Version 6, available from the Centers for Disease Control and Prevention.

RESULTS

Exposure data by species. The Figure shows the profile of animal species involved in human exposures in Montgomery County between January 1992 and July 1996. The classification "other domestic animals" includes two horses, a pig, a goat, and two hamsters. The "wildlife" category includes a fox and three bats as well as lower-risk animals such as mice, chipmunks, squirrels, voles, and groundhogs.

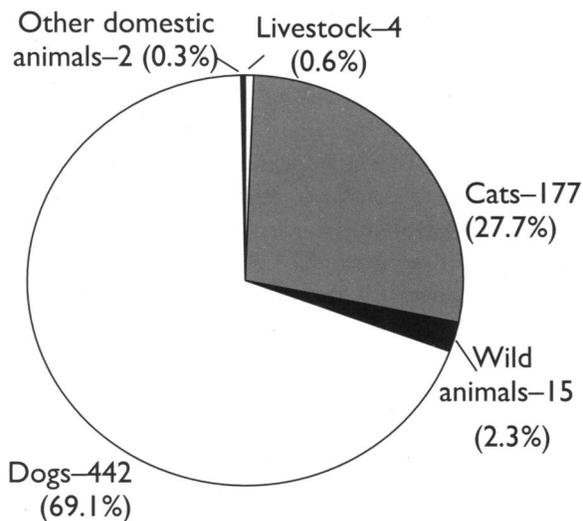
Dogs were involved in 69% (442/640) of potential exposures, while cats were involved in only 27.7% (177/640). Human exposures to wild animals (15/640) and other domestic animals (6/640) accounted for the remaining 3.3%.

Of the potential exposures involving cats, 56.5% (100/177) were caused by stray animals. In contrast, only 6.8% (30/442) of the potential exposures to dogs were due to stray animals. This represents a statistically significant difference ($P < 0.00001$).

Recommendations for PEP. PEP was recommended following only 5.9% (38/640) of reported incidents; in 37

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Figure. Animal species involved in reported bite and scratch incidents, Montgomery County, Virginia, January 1992 through July 1996 (N = 640)



of these, the animal was not caught, and in one case the animal was euthanized and tested positive for rabies (see Table). Only 2.5% (11/442) of potential exposures to dogs resulted in recommendations for PEP; in contrast, 13.6% (24/177) of exposures to cats resulted in the need for PEP. Twenty-four percent (24/100) of exposures to stray cats resulted in recommendations for PEP, as did 26.7% (8/30) of exposures to stray dogs. In three cases, PEP was recommended after exposure to canines with identified owners; one of these was a wolf-dog hybrid. Potential exposures involving stray cats accounted for 63.2% (24/38) of all recommendations for PEP. In contrast, potential exposures involving wild animals accounted for only 7.9% (3/38) of PEP recommendations.

Animal outcomes. A variety of outcomes were possible for each potential exposure; these are summarized in the

Table. The Montgomery County Health Department protocol generally requires euthanasia and rabies testing of wild animals or sick domestic animals at the Department's discretion. Alternatively, a 10-day quarantine is usually imposed on healthy cats and dogs. (A quarantine period has not been established for any species other than dogs and cats, although new guidelines established in January, 1998, allow ferrets to be treated the same as dogs and cats with respect to quarantine and PEP.⁸) Because livestock are not considered at high risk for rabies, bites from such animals are usually not investigated unless the animal dies soon after the incident.

Vaccination status. Of the 412 pet dogs that were involved in a human exposure, 28.2% (116/412) were not vaccinated for rabies or their vaccinations had expired. In contrast, 64.9% (50/77) of the pet cats involved in potential exposures were unvaccinated. The difference between the two groups is statistically significant ($P < 0.00001$).

Children's exposure. According to the U.S. Census, the population of Montgomery County in 1990 was 73,913.¹⁰ Of this total, 17.9% (13,241) were children younger than age 18,¹¹ yet 35.3% (226/640) of the potential rabies exposures in Montgomery County involved people in this age category. Children were significantly more likely to be involved in a potential exposure than adults ($P < 0.00001$, odds ratio 2.5). The difference between juvenile exposures involving owned animals (182/226) versus wild or stray animals (44/226) was not significant.

DISCUSSION

More than 98% of the potential rabies exposures that occurred during the study period in Montgomery

County, Virginia, involved domestic animals or livestock. Although only 5.9% of all potential exposures resulted in the need for PEP, all of the exposures had an emotional and economic impact on the community. Reducing the number of potential exposures that occur every year is a desirable goal.

Before this retrospective study was conducted, health department officials felt that there was a significant problem with stray and feral cat exposures in the community, but they did not have convincing evidence to support this idea. The study found that stray cats constituted a substantial portion of potential exposure cases (15.6%), while stray dogs represented a much smaller proportion (4.7%). In addition, more than 60% of PEP recommendations followed incidents involving stray or feral cats. Reducing the number of potential exposures due to stray cats would reduce the overall number of potential exposures as well as the costs associated with PEP. Reducing the stray cat population may also reduce the transmission of other zoonotic diseases such as toxoplasmosis and cat scratch disease.^{12,13}

Children were statistically more likely to be involved in a potential exposure than adults, which is similar to findings in other published reports.¹⁴ This information supports the value of age-targeted education as a means of reducing potential rabies exposures.

Almost 30% of owned dogs and approximately 65% of owned cats were not vaccinated for rabies at the time of the reported incident. These data support findings in other parts of the United States that showed cats were less likely to be current on rabies vaccinations than dogs.¹⁵ The Commonwealth of Virginia requires that both species be vaccinated. In Montgomery County, proof of a current rabies vaccination must be presented

in order to obtain a dog license, while cats are not licensed, so cat owners lack a legal incentive to obtain the appropriate vaccinations for their pets. Requiring cats to be licensed in Montgomery County would promote better compliance with Virginia state law, and licensure of cats is a recognized way to enhance rabies control.⁸ Also, providing more public education about the dangers of rabies and the benefits of vaccination may encourage more owners to vaccinate their pets.

In this study, I included both bites and scratches in the definition of a potential rabies exposure. Bite exposures from rabid animals are generally considered to have a higher risk for transmission of rabies than scratches.⁹ A scratch does not represent a true exposure unless animal saliva enters the wound. However, because of the risk of animal saliva being on the nail or claw, and because many scratch incidents occur to children, who may not be able to ascertain their risk of exposure to saliva, scratches are treated similarly to bite wounds in Montgomery County. Other localities may view animal bites and scratches differently.

A study such as this has certain unavoidable limitations. Potential exposures were examined for only a single county, and the conclusions may not be applicable in other areas. Another limitation was the potential for missed cases, either from misplaced files or from unreported incidents. In order for the health department to assess a potential exposure, it must first be reported by county residents. Some residents may not be aware of the risks associated with animal bites and scratches, and therefore may not report all potential exposures.

Based on the findings of this study, which were shared with the Montgomery County Health Department in 1997, programs are being implemented to help

Table. Outcomes of potential exposures to animal bites and scratches in Montgomery County, Virginia, January 1992 through July 1996 (N = 640)

Outcome	Number	Percent
Animal not available for testing; PEP recommended for potentially exposed human	37	5.8
10-day quarantine for animal	527	82.3
Animal died or was euthanized and tested negative for rabies	26	4.1
Animal died or was euthanized and was not tested for rabies; PEP not recommended	5	0.8
Animal died or was euthanized and tested positive for rabies; PEP recommended for exposed human	1	0.2
Unknown/no action	44	6.9

PEP=Postexposure prophylaxis

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reduce the number of potential exposures that occur each year. An educational program targeting third graders is being conducted in some County classrooms, which is designed to promote better rabies awareness among children and encourage them to leave unfamiliar animals alone. Children are also instructed to tell a parent or teacher whenever they are bitten or scratched by an animal. A proposal is also being developed to provide facilities for cats at the Montgomery County Animal Shelter, which does not currently accept cats. A cat shelter will help reduce the numbers of stray and feral cats in the community and therefore reduce the number of potential exposures caused by these animals.

This study was a simple yet effective way to examine the characteristics of potential rabies exposures in a small geographic area. The study identified several risk factors and resulted in recommendations to reduce the

number of potential exposures that occur on a local level. Other geographic localities may find that the characteristics of potential rabies exposures in their area vary significantly from those in Montgomery County.

Although many local health departments in Virginia collect demographic data on animal bite and scratch reports, most do not appear to be using this information to gain insight into the epidemiology of potential exposures in their area. Local health departments can make a point of annually reviewing their bite and scratch records to look for ways to minimize the number of future exposures.

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