Reported Cat Bites in Dallas: Characteristics of the Cats, the Victims, and the Attack Events

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During 1986, Brenda J. May, Director of Animal Control, Division of Environmental Health, Department of Health and Human Services for the City of Dallas, TX, provided access to the 1985 animal bite reports.

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Synopsis

Associated with the increased popularity of cats as pets in American households has been an increase in the number of cat bites reported to health departments. Bite reports from Dallas, TX, for 1985 were analyzed for different aspects of the cat bite event, including characteristics of the cats, the people bitten, the wounds, and the attack events. Cat bites and scratches constituted 25 percent of the 2,494 reported animal bites.

Biting cats were typically stray females. People 21 to 35 years old were bitten in numbers disproportionate to their numbers in the Dallas population. Females were the victims of a majority of bites. Although wounds were typically described as "scratches" of a hand or finger, 80 percent of all victims sought some form of treatment for their wound. The highest proportion of bites occurred from May through August from 9 am through 12 noon; unowned cats accounted for most wounds.

Cat bite events may be explained by frequency of contact, that is, women prefer cats as pets; activities that bring people and cats into contact; and reaching toward cats to feed or pet them. More specific information on the causes of cat bites will enable educational programs to be established so that the rate of cat bites can be decreased at the community level.

A RECENT SURVEY indicates that cats are now the most popular pet in American households (*1*). Associated with the increase in feline ownership has been an increase in abandoned cats, feral cats, and reported cat bites (*2*). It has been suggested that within 1 year, 25 percent of owned cats have left their owner's household, and after 3 years only 33 percent of initially owned cats still reside in their original owner's home (*3*). As a result of the large number of strays, health departments and community animal control organizations are spending more time and money than ever before on the handling of cats and on the investigation of cat bites (*4*).

Although an increase in animal bites of any kind poses a health risk to society, an increase in the rate of cat bites may be particularly dangerous: Jacobs (*5*) estimates that approximately 50 percent of cat bites become infected, a rate much higher than that for dogs; Kizer (*6*) reports 29 percent of cat bite victims, compared with 5 percent of dog bite victims treated at the UCLA Hospital Emergency Department, returned with complications; and reports from the Centers for Disease Control (*7*) and others (*8–12*) indicate a higher incidence of rabies in cats (1981 to 1986) and a higher infection rate from cat scratches and bites compared with dog bites.

Because little has been documented about cat bite events, the purpose of this study was to describe the cat, victim, and other variables that characterize cat bites. Educational programs designed to reduce the frequency of cat bite injuries may result from a better understanding of the ecology of cat bites. Such programs are already under way to reduce dog bites at the community level (*13, 14*).

Method

Animal control officers for the city of Dallas, TX, investigated and recorded 623 cat bites for the 12-month period beginning January 1, 1985. The bites represented 25 percent of all reported animal bites for that year.

A total of 28 items were numerically coded from the animal bite form; 10 of these items containing mutually exclusive and exhaustive categories were selected as variables in this study. The 10 variables were classified within 3 general categories that describe various aspects of a bite event: cat's characteristics (ownership status and sex); victim-wound characteristics (victim's age, sex, bite location on the body, wound type, treatment, and treatment site); and setting characteristics (date and time of bite; see accompanying box).

Results

The results are presented within each bite event category. Chi-square and maximum likelihood chi-square analyses (SAS, catmod procedure) were used to determine the relatedness among bite event variables. Particular attention was devoted to comparisons of bites by owned and stray cats.

Cat characteristics. Stray, female cats accounted for a significant portion of all cat bites ($\chi^2(1) = 19.08$, $P < .0001$; fig. 1). Stray cats were involved in 57 percent of the bites, and female cats inflicted 67 percent of the 623 bites. The owner or another family member received 50 percent of the 263 bites from owned cats; thus, family members were bitten by their own cat in only 21 percent of the 623 reported cases.

Victim-wound characteristics. Females were victims in 59 percent of the events. People 25 to 34 years of age received bites at the highest rate (8.9 bites per 10,000 population) compared with other age groups in Dallas (fig. 2).

Wounds were described as scratches (70 percent), punctures (27 percent), or tears (3 percent). Bites were located on the hand (42 percent), finger (21 percent), arm (18 percent), foot or leg (8 percent), face or neck (7 percent), or on multiple body locations (3 percent).

A maximum likelihood chi-square was used to determine if cat's status, and victim's age or sex was a useful predictor of where, on the body, that people were bitten (bite location). All three variables significantly predicted the location; none of the interactions was significant:

- Owned cats bit people on different parts of the body than did stray cats ($\chi^2(3) = 13.01$, $P = .0046$): a greater percentage of owned cats inflicted bites on the neck, face, or multiple locations; stray cats delivered relatively more bites to the finger or hand (table 1).
- Young children were bitten on different parts of the body than older people ($\chi^2(18) = 37.14$, $P = .0050$): 33 percent of the bites to children 5 years or younger were located on the neck, face, or multiple locations; 90 percent of the bites received by victims 25 years of age or older were located on the finger, hand, or arm (table 1).
- Males were bitten on different parts of the body than females ($\chi^2(3) = 15.72$, $P = .0013$): males received a relatively greater percentage of bites on the finger or hand (72 percent versus 57 percent for females), and females, compared to males, were bitten more on the remaining parts of the anatomy (table 1).
- Eighty-one percent of all victims sought treatment for their wound. Treatment was administered at home (57 percent), at a physician's office (28 percent), or at an emergency room (15 percent).

A second maximum likelihood chi-square was used to determine if cat's status, bite location, victim's age, or victim's sex was a useful variable in predicting the treatment site. A significant prediction resulted from knowledge of cat's status and bite location, but not

Items Coded for Analysis in Study of Cat Bites, Dallas, TX, 1985

Cat's status: owned or stray. Stray cats included those for whom no owner could be found. Thus, stray cats were distinct from owned cats that were "straying," "roaming," or "at large."
Cat's sex: male or female. Categories for neuter-spay were included on the bite form, but they were left blank in 97 percent of all cases; thus, reproductive status was deleted from the analysis.
Victim's age: 1 to 93 years. Age was rounded to the nearest year for coding.
Victim's sex: male or female.
Bite location: foot, leg, finger, hand, arm, neck, face, or multiple locations.
Wound type: scratch, puncture, or tear. Wounds were classified within these categories; a few reports stating only that the victim's skin had been broken were classified as scratches.
Treatment: yes or no. Did victim receive treatment for bite?
Treatment site: emergency room, physician's office, home, or not applicable. Treatment at an emergency room was classified as such regardless of the care victims received. Treatment administered at home was typically first aid.
Time of bite: 1 to 24 hours.
Date of bite: January to December of 1985.

Table 1. Bite location, by cat's ownership status and age and sex of the victim, Dallas, TX, 1985 (percentage distribution)

Characteristic of cat and victim	*Foot, leg*	*Finger, hand*	*Arm*	*Neck, face, multiple*
Cat's status				
Owned	9	56	20	15
Stray	8	68	17	7
Victim's age				
0–5 years	13	36	18	33
6–17 years	13	58	11	18
18–24 years	10	46	27	17
25–34 years	4	70	19	6
35–44 years	7	69	19	4
45–64 years	8	71	17	4
65 years and older	8	71	17	3
Victim's sex				
Male	4	72	15	9
Female	11	57	21	11

Table 2. Treatment site by cat's ownership status and bite location, Dallas, TX, 1985 (percentage distribution)

Treatment site	Cat's status		Bite locations			
	Owned	Stray	Foot, leg	Finger, hand	Arm	Neck, face, multiple
Emergency room	25	13	16	16	17	36
Physician	12	8	13	9	6	18
Home	51	62	53	61	66	24
None	12	17	18	15	11	22

from either victim variable (age or sex), nor from any variable interactions.

- People bitten by owned cats received treatment for their wounds at different sites than did victims of stray cats ($\chi^2(3) = 12.09$, $P = .0071$). Twenty-five percent of bites by owned cats resulted in treatment at an emergency room compared with 13 percent of stray-cat bites. A greater percentage of bites from strays were treated at home (table 2).
- People bitten on different parts of the body received wound care at different treatment sites ($\chi^2(9) = 22.35$ $P = .0078$). A greater percentage of neck, face, or multiple wounds were treated at an emergency room, and bites on other parts of the body were treated at home (table 2).

Setting characteristics. Forty-four percent of all bites occurred in the summer months, May through August. Analysis of the relationship between date of bite and cat's status revealed that most victims were bitten by stray cats in the summertime and by owned cats in the remaining months ($\chi^2(2) = 9.42$, $P = .0090$; fig. 3).

Twenty-five percent of the cat bites occurred between 9 am and 12 noon. The temporal distribution of bites was not related to the cat's ownership status.

Discussion

The most common cat bite events involved stray female cats that bit (or scratched) adult females. Bites were located on the finger, hand, or arm and occurred in the late morning, in the summertime. The bites were considered severe enough for people to seek treatment, and the majority of wounds were cared for at home.

Although bites of owned cats were less frequent than those of strays, owned cats delivered more severe bites; a higher percentage of bites were delivered to the face or to multiple locations, and wounds were treated at an emergency room or physician's office.

The partitioning of the data into different aspects of the cat bite event allows for comparisons to similar kinds of data about dog bites. In general, the majority of dog bites are by owned, male dogs; their victims are younger than 20 years of age; males are bitten almost twice as often as females; victims are family members or are at least acquainted with the biting dog; bites take place in the late afternoon; and they occur in the summer months (*6, 9, 15–22*). Except for the "time of year" variable, cat bites differ from dog bites in every reported aspect of the bite event.

The ecology of cat bites, then, is different from that of dog bites. Attempts to determine if the distributions of bite-event variables are unusual (in a statistical sense) or normative is never an easy task. For example, one of the most striking differences between cat and dog bites is that adult women are most often recipients of cat bites. It may be that there are more adult women to bite in Dallas than there are young males and, thus, the bite differential. The 1980 census data for metropolitan Dallas indicate there were 95.2 males per 100 females, a bias slightly favoring females as the more "available" victim.

Nevertheless, the availability of different groups of victims cannot account completely for the unequal distributions of bites: dog bite data for 1985 in Dallas show 62 percent of the victims were males (the same "available" male population composed only 41 percent of cat bites), and 6– to 10–year-olds were the group most frequently injured (*21, 22*). Further, figure 2 indicates that cat bites are distributed disproportionately among the age groups of Dallas residents, even when the number of people in each age group is taken into account. Thus, distribution of the Dallas population by age or sex group is not sufficient to account for the unique age-sex patterns of cat bites and dog bites.

A second explanation related to the "availability" of people in the population is more tenable. If it can be established that, compared to males, females prefer cats, a "frequency of contact" hypothesis (*6, 18*) concerning cat bites may be a parsimonious explanation for the differences in the bite rate.

It has been suggested that women are more likely to own cats than dogs (*6*) and that a cultural bias exists against male ownership of cats (*23*). The clearest data-based evidence of a female sex bias in favor of cats is a study of pets in Toronto, which revealed that more than 90 percent of cats in apartments were owned by women (*24*). Women's preference for cats is likely to bring them into frequent contact with potential biters and,

thus, women's risk for cat bites would likewise be greater compared with the bite risk for men.

Other differences among the cat, victim-wound, and setting variables may also reflect an underlying difference in victims' opportunities for contact with cats. For example, summertime increases in bites, especially by strays, may merely reflect the greater exposure of potential victims to cats during the extended daylight hours. The propensity of owned cats to bite children 5 years of age or younger and to bite a person's neck or head may also be explained by the more frequent accessibility and proximity of owned cats to those targets.

Opportunities for cat bites may involve people's attempts to feed or otherwise care for cats. Although information on feeding or caregiving was not available from the Dallas bite report forms, perhaps victims offered table scraps to their own cats in the home and to stray cats at the back door or at the garbage receptacle. According to Hart and Mader (*25*), stray cats are the most pervasive problem for managers and the residents of apartment complexes, and residents sometimes enhance the problem by feeding the strays.

It seems clear that, whether cats bit or scratched their victims, people must have reached for, held, or otherwise attempted to handle the animal. The overwhelming majority of bites (82 percent) were located on the hand, finger, or forearm. Borchelt and Voith (*26*) report that people may unintentionally elicit aggressive behavior in cats by reaching for them and that victims are bitten when the cats attempt to escape. Others (*27*) have suggested this kind of "fear-related" aggression to be the most frequent reason that cats bite people. Other kinds of aggression may include "play aggression," when the victim, moving in front of the cat, elicits aggressive play or predatory behavior (*26*); "redirected aggression," when a cat cannot attack an "appropriate" target (such as another cat) and redirects its aggression to the closest available object (*26*); and a "biting and petting syndrome," when a cat suddenly bites or severely scratches a person after it has been handled or petted for several minutes (*27*).

Whatever the explanation, the results in this study are consistent with suggestions by others (for example, references *8, 10*) that cat scratches and bites frequently occur on the handlers' upper extremities and are associated with attempts to restrain or otherwise come into physical contact with the animals.

A "frequency of contact" hypothesis may also do well in accounting for the discrepancy in bites between female and male cats. However, answers to why female cats account for 59 percent of all cat bites must begin with such questions as, are there more female than male cats in Dallas? Do animal control officers correctly identify cats' sex (how are at-large stray cats identified)? Is there something about female cats that makes them behaviorally different from males in interactions with people? Further study is needed before there can be clear answers to these and other questions concerning the characteristics of cats that bite.

Figure 1. Ownership status and sex of cats in 623 bite events, Dallas, TX, 1985

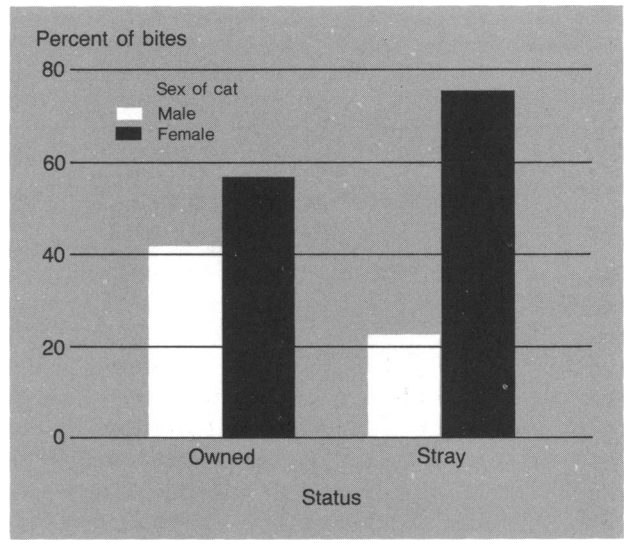
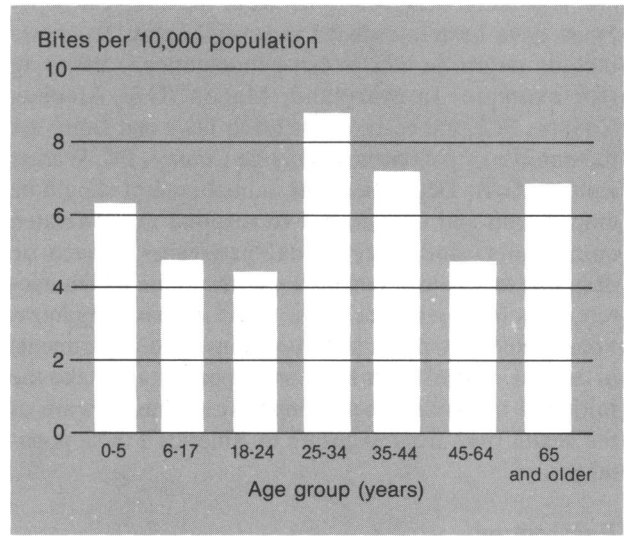
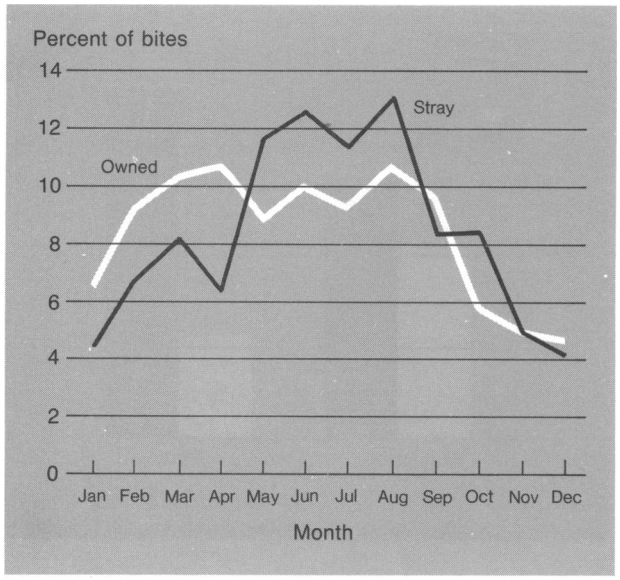


Figure 2. Bites per 10,000 population by age group, Dallas, TX, 1985



As cats remain popular pets for urban dwellers, bites by stray cats will continue to be a problem. From October 1, 1988, through September 31, 1989, 25 percent of the 2,745 reported animal bites in the City of Dallas were cat bites, a percentage identical to the 1985 cat bite rate. Because of the health risks associated with cat bites, programs for the prevention of cat bites at the community level should be directed toward potential victims as well as pet owners. Community programs

Figure 3. Distribution of cat bites by month and cat's ownership status, Dallas, TX, 1985



and legislation designed to decrease the stray cat population have been introduced in several areas. Examples include requiring cats to have inoculations, licensing (for example, in Maryland; Macon, GA; Alachua County, FL), cat restraint or leash laws and limits on the number of pets owned (Orange County, FL; Warner Robins, GA). Departments of animal control should be empowered and encouraged to respond to cat-related complaints, and educational programs should be designed to sensitize potential victims to the unique factors associated with cat bites. Local humane organizations, veterinary medical associations, and departments of animal control each have an opportunity to take the initiative in making their communities more aware of the health risks from exposure to America's most popular pet.

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