

# Fatal Dog Attacks, 1989–1994

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**ABSTRACT.** *Objectives.* To update data on fatal dog bites and see if past trends have continued.

*Design.* To merge data from vital records, the Humane Society of the United States, and searches of electronic news files.

*Setting.* United States.

*Subjects.* U.S. residents dying in the U.S. from 1989 through 1994 from dog bites.

*Results.* We identified 109 dog bite-related fatalities, of which 57% were less than 10 years of age. The death rate for neonates was two orders of magnitude higher than for adults and the rate for children one order of magnitude higher. Of classifiable deaths, 22% involved an unrestrained dog off the owner's property, 18% involved a restrained dog on the owner's property, and 59% involved an unrestrained dog on the owner's property. Eleven attacks involved a sleeping infant; 19 dogs involved in fatal attacks had a prior history of aggression; and 19 of 20 classifiable deaths involved an unneutered dog. Pit bulls, the most commonly reported breed, were involved in 24 deaths; the next most commonly reported breeds were rottweilers (16) and German shepherds (10).

*Conclusions.* The dog bite problem should be reconceptualized as a largely preventable epidemic. Breed-specific approaches to the control of dog bites do not address the issue that many breeds are involved in the problem and that most of the factors contributing to dog bites are related to the level of responsibility exercised by dog owners. To prevent dog bite-related deaths and injuries, we recommend public education about responsible dog ownership and dog bite prevention, stronger animal control laws, better resources for enforcement of these laws, and better reporting of bites. Anticipatory guidance by pediatric health care providers should address dog bite prevention. *Pediatrics* 1996;97:891–895; *dog bites, children, injury.*

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ABBREVIATIONS. DBRFs, dog bite-related fatalities; MCMTs, multiple-cause mortality tapes; NCHS, National Center for Health Statistics; HSUS, Humane Society of the United States.

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From 1979 through 1988, dog attacks claimed at least 15 lives annually in the United States.<sup>1</sup> During this same period, pit bull breeds were involved in 41.6% of the deaths, almost three times more than German shepherds, the next most commonly re-

ported breed.<sup>1</sup> Alarming, the proportion of deaths attributable to pit bulls had increased from 20% during 1979–1980 to 67% by 1987–1988. Publicity about such attacks led to many jurisdictions adopting pit bull-specific bans to prevent such episodes. However, the wisdom of such a breed-specific approach has been called into question.<sup>2</sup> To monitor the problem and see if past breed involvement trends still held, we studied fatal dog attacks from 1989 through 1994.

## METHODS

We used three sources of data to identify dog bite-related fatalities (DBRFs): the NEXIS search service of Reed Elsevier Inc,<sup>2</sup> the multiple-cause mortality tapes (MCMTs) from the National Center for Health Statistics (NCHS), and reports compiled by the Humane Society of the United States (HSUS) sources, ie, press clipping services, local humane society and animal care and control agency reports, law-enforcement contacts, and legal consultations. We searched for accounts of DBRFs from 1989 to 1994 in the NEXIS database using the search strategy previously reported.<sup>1</sup> Briefly, this consisted of scanning for words or word combinations suggestive of DBRF in electronic files of newspapers, magazines, wire services, and broadcast transcripts. MCMTs from 1989 through 1992 were used to identify DBRFs in U.S. residents occurring within the U.S. DBRFs were defined as those with the underlying cause of death coded as dog bite (*International Classification of Diseases, Ninth Revision* [E906.0]). We also reviewed records where E906.0 or E906.9 (unspecified injury caused by an animal) was mentioned anywhere in the chain of events leading to death.

We also reviewed death tapes from 1987 and 1988, which were unavailable at the time of our previous report.<sup>1</sup> Information extracted for each case included decedent's age, sex, state of occurrence, and date of death. Mortality data through 1992 were used because they were the most recent data available at the time of analysis. The HSUS listing of DBRFs contained date of death, city and state of attack, number and breeds of dogs involved, and information on circumstances.

Information from the three sources were merged. Because breed characterizations of dogs involved in fatal attacks are a continuing source of controversy<sup>3</sup> and because press accounts of dog attacks may be erroneous with respect to breeds of dogs involved, we primarily used breed data from the HSUS. These data generally involved a significant effort to obtain accurate breed designations through review of police or animal control reports, statements by owner or victim, or photographic evidence reviewed by knowledgeable animal control professionals. When multiple dogs of the same breed were involved in a fatality, we counted that breed only once. When crossbred animals were involved in a fatality, each breed in the dog's parentage was counted once. Thus, if three German shepherds killed a man, the German shepherd breed was counted once. If three German shepherd-labrador crossbreeds killed a man, the German shepherd crossbreed was counted only once, as was the labrador crossbreed. Dogs were also classified as on or off the owner's property and unrestrained or restrained (eg, chained, leashed) at the time of the

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attack. We also noted if the dog had any prior reported history of aggression and the dog's gender and neuter status.

Dog bite-related death rates per 100 million population were calculated for 1989 to 1994 using population estimates from the U.S. Bureau of the Census.<sup>4</sup> Children less than 1 month of age were assumed to represent one twelfth of the population less than 1 year of age.

### RESULTS

We identified 109 deaths from 1989 to 1994, a rate of 7.1 deaths per 100 million population per year. For the period 1989 through 1992 when all three data sources were available, 84 deaths were identified. The NEXIS/HSUS data identified 62 total deaths; death certificates identified 41 of these 62 deaths as dog bites and detected an additional 22 deaths from dog bites. Of the 21 deaths found by NEXIS/HSUS but not recorded as a DBRF on the death certificate, 11 were coded as E906.9; the other 10 deaths did not have E906.0 or E906.9 anywhere on the certificate. Given that NEXIS/HSUS data found 73.8% of total dog bite deaths during this 4-year period, we estimate that for the period from 1993 to 1994 an additional 9 deaths occurred for a total of 118 deaths during the 6-year study period.

Of 82 deaths that could be classified, 1 (1.2%) involved a police or guard dog at work, 18 (22.0%) involved an unrestrained dog off the owner's property, 15 (18.3%) involved a restrained dog on the owner's property, and 48 (58.5%) involved an unrestrained dog on the owner's property. Of 85 deaths where the number of dogs involved was known, 62 (72.9%) deaths involved one dog, 18 (21.1%) involved two dogs, and 5 (5.9%) involved three to seven dogs. For the 18 deaths involving unrestrained animals off the owner's property, 10

(55.6%) resulted from a dog that had escaped a fence, pen, or restraint and 7 (38.9%) involved two or more dogs.

We found no obvious trend in the number of fatalities over the years (1989 = 16, 1990 = 32, 1991 = 19, 1992 = 17, 1993 = 14, 1994 = 11). There was some variation by season (winter = 27, spring = 25, summer = 22, and fall = 35). The fall increase was noted primarily for attacks by unrestrained dogs off the owner's property. The three states with the largest number of fatal attacks were California, Texas, and Illinois (Figure). Only 16 states had no fatal attacks during the 6 years and only six states had no attacks from 1979 through 1994 (Figure). By NCHS region, the South had the most fatalities (49). The South also had the highest death rate per 100 000 000 (9.3) followed by the West (7.6), Midwest (6.4), and Northeast (3.9).

Of those killed by dog attacks, 56.9% were less than 10 years of age (Table 1). The death rate was particularly high for those less than 1 month of age and then fell continuously until age 29 when it began to climb. Males, whose death rate was 8.8% higher than that of females, accounted for 55 (50.5%) of the deaths. Between the ages of 1 and 29 years, there were more male than female victims; after age 49 years, the reverse was true.

Of the 18 deaths in infants less than 1 year of age, all but one occurred on the dog owner's property and involved an unrestrained dog (the exception involved a penned wolf hybrid). Three attacks involved two dogs. In 11 attacks, the infant was sleeping in a crib or bed. Malamutes and pit bulls were involved in four attacks each, huskies and German

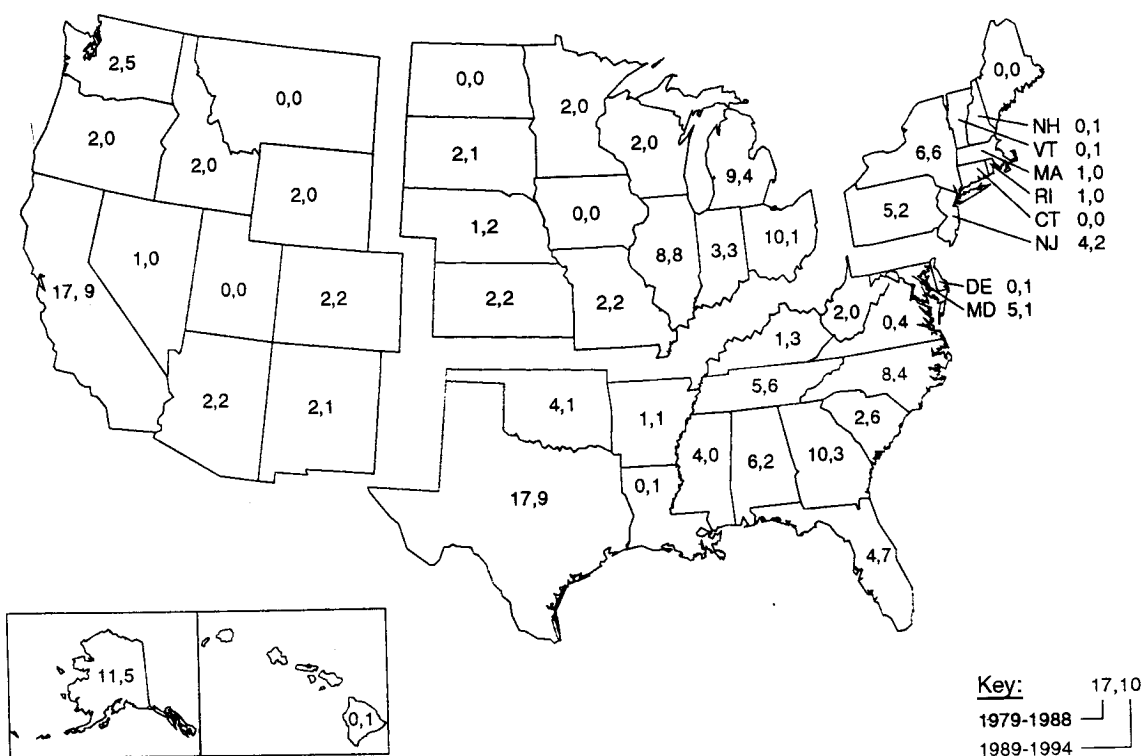


Figure. Number of dog bite-related fatalities, by state and region of occurrence, United States, 1979-1994.

**TABLE 1.** Dog Bite-Related Fatalities and Death Rates, by Age and Sex, United States, 1989–1994

Age group	Number of Deaths (Death Rate*)		
	Males	Females	Total
<1 month	3 (298.5)	2 (208.5)	6† (305.4)
1–11 months‡	4 (36.2)	8 (75.8)	12 (55.5)
1–4 years	18 (38.3)	9 (20.1)	27 (29.4)
5–9 years	11 (19.5)	6 (11.2)	17 (15.5)
10–29 years	4 (1.8)	1 (0.5)	5 (1.1)
30–49 years	5 (2.2)	5 (2.2)	10 (2.2)
50–69 years	3 (2.5)	8 (5.8)	11 (4.3)
≥70 years	6 (11.5)	14 (16.9)	20 (14.9)
Total	55¶ (7.4)	53 (6.8)	109   (7.1)

\* Per 100 million population per year.

† Includes one neonate of unknown sex.

‡ There were three deaths in 1-month-olds, four deaths in 2-month-olds, two deaths in 6-month-olds, and one death each in 5-, 7-, and 9-month-olds.

¶ Includes one male of unknown age.

|| Includes one male of unknown age and one neonate of unknown sex.

shepherds in three each, wolf hybrids and rottweilers in two each, and a chow in one.

Full circumstances were known for 38 of the 44 deaths among children aged 1 through 9 years old. Seventeen (44.7%) of the attacks involved an unrestrained dog on the owner's property; 11 (28.9%) involved a child wandering too close to a chained dog, and 10 (26.3%) involved an unrestrained dog off the owner's property. Only 7 (17.9%) of the 39 deaths involved more than one dog.

From 1989 through 1994, pit bulls and pit bull mixed breeds were still the most commonly reported breed, involved in 24 (28.6%) of 84 deaths where breed of dog was reported (Table 2). Although the proportion of fatal attacks with reported pit bull involvement had increased from 20% in 1979 through 1980 to 67% by 1987 through 1988,<sup>1</sup> the

proportion fell steadily thereafter. The next most commonly reported breeds during the study period were rottweilers (16) and German shepherds (10). For 78 attacks with data on breed and circumstances, 6 of 24 (25.0%) pit bull-associated attacks involved an unrestrained dog off the owner's property, compared with 10 of 54 (18.5%) for all other breeds. In 7 deaths (29.2%), the pit bull was chained compared with 7 of 58 attacks (12.1%) for other breeds. For 82 attacks with data on breed and number of dogs involved, 8 of 24 pit bull attacks (33.3%) involved more than one dog, compared with 20.7% for 58 attacks involving other breeds. Of 11 pit bull attacks for which data were available, 7 (63.6%) had a prior history of aggression compared with 12 of 31 (38.7%) for other breeds.

For 41 fatal attacks, we had information on the gender of the dog involved. Twenty-five had a male dog involved (20 of the 24 single dog attacks). For 20 of these 41 fatal attacks, we also had information on the neuter status of the animal. In only one attack had the dog (a male chow) been previously neutered; 15 attacks involved an unneutered male dog.

Review of death tapes for 1987 and 1988 identified 9 additional deaths (5 in 1987 and 4 in 1988) not included in the prior report,<sup>1</sup> and additional news accounts that became available identified 4 more deaths (2 in 1986, 1 in 1987, and 1 in 1988) for a total of 170 deaths from 1979 through 1988 and a revised death rate of 7.2 per 100 million population.

## DISCUSSION

The death rate from dog bite-related fatalities in the 6-year study period has remained relatively constant compared with the prior 10 years. Dog bites continue to produce about 18 deaths per year in the United States. The main victims of fatal dog bites are children; the death rate for neonates was two orders

**TABLE 2.** Breeds and Crossbreeds\* Involved in Dog Bite-Related Fatalities, by Two-Year Periods, United States, 1979–1994

	Prior Study <sup>†</sup>					Current Study			Total
	1979–1980	1981–1982	1983–1984	1985–1986	1987–1988	1989–1990	1991–1992	1993–1994	
No. known Purebreed	10	20	27	24	22	35	24	25	177
Pit bull	2	5	10	9	12	8	6	5	57
Rottweiler	0	0	1	1	3	1	3	10	19
Shepherd	2	1	5	1	1	5	2	0	17
Husky	2	1	2	2	0	2	2	1	12
Malamute	2	0	3	1	0	2	3	1	12
Doberman	0	1	0	2	2	2	1	0	8
Chow	0	1	0	0	0	2	3	0	6
Great Dane	3	1	0	0	0	0	0	1	5
St Bernard	1	2	1	0	0	0	0	0	4
Akita	0	0	0	0	0	1	1	2	4
Crossbreed									
Wolf	0	1	1	2	1	4§	1	2	12
Pit bull	0	1	0	3	2†	3	1	1	10†
Shepherd	0	2	0	2	2	2	0	1	9
Husky	0	1	1	2	1	1	0	0	6
Malamute	0	0	0	0	0	2	1	0	3
Rottweiler	0	0	0	0	1†	1	0	1	2†
Chow	0	0	0	0	0	1	0	1	2

\* Data shown only for breed and crossbreeds involved in ≥4 fatalities; data from prior study<sup>1</sup> is updated. Each breed contributing to the crossbreed is counted only once.

† One fatality also involved a pure breed, so pit bull total involved = 67 and rottweiler total involved = 21.

§ One fatality from a pet wolf occurred in 1989 in Minnesota and was not included.

of magnitude higher than that for adults and the rate for children one order of magnitude higher.

Fatal dog bites represent the most extreme manifestation of a much more common problem. In 1986, dog bites caused an estimated 585 000 injuries resulting in medical attention or restricted activity, an estimate that placed dog bites among the top 12 causes of nonfatal injury.<sup>3</sup> In 1994, an estimated 1.8% of the U.S. population was bitten by a dog and 0.3% of the U.S. population sought medical care for a bite, ie, 4.7 million bites, of which 800 000 bites resulted in medical attention (1.4 attended bites per minute).<sup>6</sup>

Injuries from playground equipment cause about 17 deaths each year and 170 000 injuries seen in emergency departments,<sup>7</sup> a similar level of mortality but lesser amount of morbidity than dog bites. Nevertheless, the playground injury problem has resulted in the development of standards for equipment and playgrounds, training and inspection programs, dedication of staff to maintenance, and, most recently, the creation of a federally-funded national center for playground safety to educate the public.<sup>8</sup> The dog bite problem has not enjoyed a similar prevention effort, despite the fact that 35% of American households owned a dog in 1994 representing a dog population exceeding 52 million.<sup>9</sup> To counteract this lack of attention we need to reconceptualize the dog bite problem as a largely preventable epidemic, rather than as an endemic problem about which little can be done.

The current incidence of fatal and nonfatal bites and the large dog population underscores the need for a more aggressive approach to the prevention of dog bites. Physicians, health care providers, and those concerned with containment of health care costs can contribute to ameliorating the dog bite problem in several ways:

#### Patient Education

Victim behavior is only one of several factors contributing to a bite. Reviews<sup>3,10</sup> have noted that the majority of victims are engaging in normal, nonprovocative activities before the bite incident. For example, in this study, 11 fatal attacks were to sleeping infants. Adults need to be informed that dog owners, through their selection and treatment of a pet, may be able to reduce the likelihood of owning a dog that will eventually bite.<sup>11</sup> For example, male dogs appear more likely to bite than female dogs, and unneutered dogs appear more likely to bite than neutered ones.<sup>11</sup> Educational efforts directed at high-risk groups, particularly children, could have a significant effect on the incidence of dog bites. Pediatric anticipatory guidance should address strategies for bite prevention, including the need for appropriate supervision of children (Table 3). Health care professionals should take an active role in helping to disseminate existing bite-prevention materials<sup>12</sup> and in helping develop new resources for patient education.

#### Community Advocacy

At the community level, health care providers should actively support school-based educational programs on bite prevention, canine behavior, and educa-

TABLE 3. Possible Messages for Anticipatory Pediatric Guidance on Preventing Dog Bites

#### Parents

- Consider the selection of any dog carefully\*
- Dogs should be sterilized to reduce aggressive tendencies
- Never leave infants or young children alone with any dog
- Make certain that any dog entering the household receives proper training and socialization. Try to teach submissive behaviors such as rolling over to show stomach, taking food away without growling, etc
- Dogs with prior histories of aggression should not be considered appropriate for families with children
- Teach children basic safety around dogs and review these ideas regularly
- If your dog develops aggressive or undesirable behaviors, seek professional help immediately
- Don't play aggressive games with your dog (eg, wrestling, "sicking")

#### Children

- Never approach an unfamiliar dog
- Never play with a dog unless supervised by an adult
- Immediately report stray dogs or dogs displaying unusual behavior to an adult
- Never run from a dog and scream
- Avoid direct eye contact with a dog
- Don't disturb a dog that is sleeping, eating, or caring for puppies
- Don't pet a dog without letting it see and sniff you first
- Remain motionless when approached by an unfamiliar dog
- If knocked over by a dog, lie still and remain in a ball
- If bitten, report the bite to an adult immediately

\* Realistically evaluate your environment and lifestyle to help decide the type of dog. Speak with a professional to make an informed decision. Ask questions about the dog's background. Although genetics play a contributing factor in aggression, each dog should be judged on an individual basis. Involve the family in the selection; be sensitive to cues that a child is fearful or apprehensive about a dog (if so, delay getting the dog). Spend time with a dog before bringing it into your home. Use caution about bringing a dog or puppy into the home of an infant or toddler.

tional programs regarding responsible dog ownership and training. There should be strong advocacy for supporting animal control programs and laws for regulating dangerous or vicious dogs.<sup>13</sup> For example, in at least 19 deaths in this study, the dog had a reported prior history of aggression; moreover, 21% of DBRFs were from free roaming dogs off the owner's property. More stringent animal control laws and enforcement might prevent some of these deaths. Although several breeds appear overrepresented in the population of animals involved in fatal attacks, this representation fluctuates over time. Thus, it may be unproductive to view this as a problem that is unique to any one breed. Community responses that address the problem of chronically irresponsible dog owners may be an effective approach.<sup>14</sup>

#### Bite Reporting

Because improved surveillance data for fatal and nonfatal dog bites are needed if we are to better understand how to evaluate prevention efforts, providers should report dog bites as required by local or state ordinances. Reports of bite incidents should, whenever possible, include detailed information about the circumstances of the bite including ownership, breed, sex, spay/neuter status of the animal, history of prior aggression, and the nature of restraint before the bite incident.

Finally, it is important to recognize that most of the

52 million dogs in this country never bite or kill anyone. However, the problems caused by the highly visible minority of animals and their owners have far-reaching consequences.

#### ACKNOWLEDGMENTS

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#### HARSH WORDS ABOUT OUR HEALTH CARE SYSTEM

... the U.S. health care system is flawed principally because we have never asked what its goals are. So long as that fundamental moral question remains unanswered, no amount of political or economic tinkering will fix the system's problems. If we carefully examine the present workings of our system, we would have to conclude that its goals are two: maintain the prerogatives of physicians and the well-being of the private insurance industry. Such goals hardly represent an exercise of *moral* choice, and ... are morally indefensible.

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Submitted by Student