Article

Fatal dog attacks in Canada, 1990–2007

Malathi Raghavan

Abstract — In Canada, public debates on dog attacks are dominated by studies from the United States. An electronic search of media reports in the Canadian Newsstand database, for the years 1990 to 2007, identified 28 fatalities from dog-bite injuries. Predominant factors in this case series were owned, known dogs; residential location; children's unsupervised access to area with dogs; and rural/remote areas, including aboriginal reserves in the prairies. A higher proportion of sled dogs and, possibly, mixed-breed dogs in Canada than in the United States caused fatalities, as did multiple dogs rather than single dogs. Free-roaming dog packs, reported only from rural communities, caused most on-reserve fatalities. Future studies are needed to assess if this rural/urban divide is observed in nonfatal attacks and if the breeds that bite in Canada are different from the breeds that killed. Breed representation in this paper and, perhaps, multiple-dog overrepresentation should be understood in the context of the overall Canadian dog population.

Résumé — Attaques mortelles de chiens au Canada, 1990–2007. Au Canada, le débat public sur les attaques de chiens est dominé par les études en provenance des États-Unis. Une recherche électronique des articles parus dans les médias a été réalisée à partir de la base de données du Canadian Newstand pour les années 1990–2007 et a identifié 28 cas mortels reliés à des morsures de chien. Les facteurs prédominants associés à cette série de cas étaient reliés à des chiens connus ayant un propriétaire, à une localisation résidentielle, à des enfants ayant un accès non surveillés à un endroit où se trouvaient des chiens et à des localisations rurales ou éloignées dont les réserves autochtones des prairies. Une plus forte proportion de chiens de traîneaux et possiblement de chiens de races croisées étaient impliqués dans les cas mortels recensés au Canada par rapport à ceux recensés aux États-Unis et les attaques par plusieurs chiens plutôt que par un seul étaient davantage associés aux cas mortels. Des meutes de chiens en liberté, observées uniquement dans les communautés rurales, ont été responsables de la majorité des attaques mortelles sur les réserves. D'autres études semblent nécessaires pour vérifier si cette division rurale/urbaine est observée dans les attaques non mortelles et si au Canada les races qui mordent sont différentes des races qui tuent. La représentation des races dans cet article et peut-être la surreprésentation des groupes de chiens doivent être comprises dans le contexte de la population globale de chiens au Canada.

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Introduction

In Canada, 1 to 2 human deaths a year, on average, can be attributed to dog attacks (1,2), a statistic that is comparable with the annual average of 15 deaths in the United States (1–3). Further systematic information is lacking on dog attacks and related fatalities in Canada. Public discussions on dog attacks are predominantly influenced by studies conducted in the United States (3–5). Consequently, any factors unique to Canada, such as local dog legislation, landscapes and lifestyles, predominant breeds and lineages, may be overlooked in concerted efforts to prevent dog attacks.

Office of the Dean, Faculty of Medicine, University of Manitoba, Winnipeg, Manitoba R3E 3P5.

Address all correspondence to Dr. Raghavan; e-mail: raghavan@cc.umanitoba.ca

In 1990, Winnipeg was the first major Canadian jurisdiction among several to ban pit bull (terrier)-type dogs. Ontario adopted a province-wide ban on pit bulls in 2005. Edmonton requires that vicious dogs be muzzled in public and that the American Staffordshire terrier and Staffordshire bull terrier (breeds often included under pit bull-types) be automatically considered vicious. The effectiveness of breed-specific legislation, however, has been questioned for several reasons, including the lack of comprehensive Canada-based studies on dog attacks (6).

Newspaper reports, although not suitable for surveillance or reporting the rate of occurrence of dog-attack fatalities, contain information on factors facilitating fatal attacks. Such accounts were used in the United States to identify factors commonly encountered in fatal dog attacks (3–5). The present retrospective, descriptive study was undertaken to summarize factors, including breeds of dogs, encountered in print-media reports of fatal dog attacks in Canada.

Materials and methods

A systematic electronic search of English newspaper reports in the Canadian Newsstand database through ProQuest Web interface (7) was conducted for the period from January 1, 1990, to December 31, 2007. Keywords primarily used in the search included 'fatal dog attack,' 'fatal dog bite,' and 'dog mauling.' Additional searches combined words such as 'died,' 'dead,' 'killed,' 'mauled,' 'attacked,' 'bitten,' 'wounded,' 'injured,' and 'death,' with 1 or more words such as 'dog,' 'pet,' and 'pack.'

The electronic search identified 28 dog-attack fatalities for entry into the study: 2 in 1990; 1 in 1993; 2 in 1994; 3 in 1995; 1 in 1996; 1 in 1997; 5 in 1998; 3 in 1999; 2 in 2002; 2 in 2003; 1 in 2004; 3 in 2006; and 2 in 2007. That is, an average of 1 to 2 dog-attack deaths a year was reported by the Canadian press in those years. There was 1 death per attack in 26 incidents; 1 incident in 1998 resulted in 2 deaths. Reports of injuries without follow-up confirmation of death were not included in this case series. The death of an elderly man in 2002 was also not included in the above list, as the cause, initially attributed to an attack by the victim's pet dog, was retracted the following day by the investigating authorities.

Full-text news reports were retrieved to extract and tabulate information from each case. If more than 1 newspaper reported an incident simultaneously, then all reports were retrieved, filed, and read. Details of interest for the study included the age, sex, and primary residence of victims of the attack; the number, breed, sex, neuter status, ownership, primary residence, husbandry, and degree of domestication of dogs implicated in the attack; place and time of attack; circumstances leading to the attack; and victim's relationship to the implicated dogs and their owners. When details were not available for some cases, they were noted as missing.

Results

Victims

Twenty-four (85.7%) of the 28 victims were children under 12 y of age; 4 (14.3%) were adults over 21 y. The median age was 5 y. The youngest victim was aged 1 mo and the oldest 45 y. Seventeen (60.7%) victims were males.

Twenty (71.4%) victims were found dead at the scene of the attack. Eight (28.6%) victims that were still alive when found at the scene of the attack were rushed to receive medical care. Three among the 8 died at local nursing stations, 4 in hospitals, and 1 on the way to the nearest hospital, about 75 km away.

In 22 incidents, the victims (19 children and 3 adults) were alone with the dog(s) at the place and time of the attack. In 10 of these 22 incidents, adult caretakers were in another part of the house or grounds during the attack. In the remaining 6 incidents, 4 child-victims were attacked in the presence of 1 or more child-companions and 2 victims (1 adult and 1 child) were attacked in plain view of the dogs' adult-owners. The profiles for 9 of the 28 victims indicated some familiarity or history with dogs — 5 children were described as 'dog-lovers,' while 3 children and 1 adult had sustained dog-bites previously. In separate incidents, 2 toddlers were last seen alive playing with a puppy.

Dogs

The American Staffordshire terrier, the most widely legislated breed in Canada in the period under study, caused 1 fatality (Table 1). The rottweiler, a target of breed-specific legislation in fewer jurisdictions, and the husky, possibly an unlegislated breed, caused more fatalities, as did the mixed-breed dogs. The rottweilers, huskies, and the mixed-breed dogs were also represented in larger numbers.

Nineteen (67.9%) deaths were caused by multiple-dog attacks; in 13 of these 19 attacks, all implicated dogs were owned-dogs. Nine attacks by multiple owned-dogs occurred during disruptions to the dogs' husbandry and environment or in a social group/pack. That is, owned-dogs were either temporarily moved to another household (with or without dogs of its own) or were off-property roaming in packs. Free-roaming sled dogs implicated in 3 deaths had been allowed to inhabit semi-wild environments without human supervision. However, not all sled dog attacks occurred when the dogs were freely roaming; 3 attacks occurred when the dogs were penned in. Three deaths were caused by free-roaming strays, while 3 more were blamed on packs formed between loosely-owned yard dogs and free-roaming strays.

In general, all 9 deaths caused by free-roaming dog-packs were reported only from remote areas and they contributed to 7 of 11 fatalities reported from aboriginal reserves in the northern prairies (Table 2). The issue of possible starvation was raised after several on-reserve attacks, and 3 attacks by sled dog packs involved extensive soft tissue loss from victims' bodies. Sexually intact male dogs, separated from a bitch in estrus in the household, were implicated in 1 single-dog and 1 multiple-dog attack. Owned male and female dogs implicated in at least 7 deaths were described as breeding stock and were likely intact when the incidents occurred. Although dogs' gender and neuter status were not routinely reported, it is assumed that several implicated dogs, such as yard dogs, were likely intact.

Discussion

Several predominant factors in this case series have been identified previously in dog-bite deaths in the United States and Australia (2–4); namely, children; males; unrestrained dogs; children's unsupervised access to areas with restrained or unrestrained dogs; owned, known dogs; and residential location. The results also reflect the findings from Canadian hospital-based reviews of non-fatal dog-bite injuries that children were more likely to be bitten by known dogs, at home, in summer, between 4 and 8 pm (8,9), and suggest that dog attacks are influenced by accessibility to and interaction with children, and, therefore, up to a certain point, preventable.

Fatalities, however, were disproportionately high in rural/remote Canada, including on reserves, although only 22% of Canada's population lives in rural areas and an estimated 1.3% on reserves (10,11). Approximately 3 out of every 4 reported Canadian deaths were caused by multiple dogs, whereas fewer than one-third of US fatalities from 1979 through 1994 were caused by multiple dogs (3,4). A higher proportion of sled dogs and, possibly, mixed-breed dogs caused fatalities in Canada than in the United States (5). The frequency at which sled dogs and

Table 1. Dogs implicated in the 28 newspaper reports on fatal attacks in Canada, 1990–2007

	Number[a] (%) of 28 fatalities
Number of dogs implicated in victim's death	
1	9 (32.1)
2–3	6 (21.4)
4–6	8 (28.6)
8	4 (14.3)
Multiple dogs; number not reported	1 (3.6)
Domestication, socialization of dogs[b]	
Owned	25 (89.3)
Pet, farm, or yard dogs	19 (67.9)
Guard dogs	1 (3.6)
Sled dogs	7 (25.0)
Wild or stray dogs roaming in packs	6 (21.4)
Owned dogs' familiarity with victims[b,c]	
Belonged to or temporarily housed with victim's family	10 (35.7)
Belonged to relative, friend, or neighbor of victim's family	8 (28.6)
Unrelated	8 (28.6)
Unknown/not reported	1 (3.6)
Owned dogs' access to victim[b,c]	
Restrained[d] on property; unsupervised victim in dogs' area	8 (28.6)
Unrestrained on property	7 (25.0)
Restrained[d] off property; unsupervised victim in dogs' area	2 (7.1)
Unrestrained off property; wandering in packs	6 (21.4)
Unknown/not reported	3 (10.7)
Owned dogs' history of aggression[b,c]	
Towards people	5 (17.9)
Towards animals	2 (7.1)
No history	4 (14.3)
Unknown/not reported	14 (50.0)
Breeds (total numbers) of dogs implicated	
Reports quoting dog owner or knowledgeable authority (n = 48)	16 (57.1)
American Staffordshire terrier (2)	1 (3.6)
Husky, Labrador (8); husky, Siberian (2)	3 (10.7)
Rottweiler (7)	3 (10.7)
"Sled dog" (22)	4 (14.3)
Rottweiler-German shepherd crossbreed (1)	1 (3.6)
Other[e] (6)	6 (21.4)
Reports not quoting dog owner or knowledgeable authority[f] (14)[g]	7 (25.0)
Mixed breed/breed not specified (> 34)	7 (25.0)

[a] Number may add up to greater than a total of 28 (or respective subtotal) because dogs from more than 1 category were implicated in some attacks
[b] Total number of dogs per category has not been tabulated
[c] Based on a subtotal of 25 owned dogs
[d] Includes any method used to separate dogs from people including tethering, fencing in, etc
[e] Represents 1 dog each from the following breeds: Border collie; bull mastiff; chow chow; Labrador cross; malamute; Maremma
[f] Public perception of dangerous breeds may influence breed-reporting by layperson
[g] Includes 1 or more dogs from the following breeds or their crossbreeds: chow chow, German shepherd, husky, rottweiler, pit bull-type

mixed breed dogs are encountered in the larger Canadian dog population is not known.

In the United States, pit bull-type dogs and rottweilers were involved in more than half of 238 dog-attack deaths; they were followed by German shepherds, husky-type dogs, and malamutes in the number of deaths caused (5). However, as pit bull-type dogs gradually, and almost singularly, came under legislation in several Canadian jurisdictions, this breed-type's ranking in the present retrospective study cannot be compared easily with the ranking from the earlier US-based study. In nonfatal aggressive incidents, the pit bull did rank highest in 2000 and 2001 (2.84 bite incidents per 100 licensed dogs of this breed type) in 1 Canadian municipality (Edmonton, Alberta) (12). Other breeds that followed in this municipality included the rottweiler (1.60 bite incidents per 100 licensed), Akita (1.52), mastiff (1.47), Dalmatian (1.40), and Great Dane (1.21) (12). The rottweiler, by causing 21 of the 72 non-fatal injuries attributed to dogs from known breeds, ranked 1st in a hospital-based summary of dog bites in children (9).

Irrespective of breed, inadvertently creating the circumstance for multiple dogs, whether owned or stray, to form packs without human supervision may have been a major dog-related factor underlying the pattern of the fatalities identified in this study. Kneafsey and Condon (13) have reported that in a pack situation, once an aggressive act is initiated, whether as a playful nip or a serious bite, individually benign dogs may join in and the pack instinct escalates the attack until the victim is killed or the dogs are driven off. Other factors thought to facilitate

Table 2. Place and time of attack in the 28 newspaper-reported fatal dog attacks in Canada, 1990–2007

	Number (%) of 28 fatalities
Place	
Region (Provinces or Territories)	
Atlantic (Newfoundland, New Brunswick)	3 (10.7)
Central (Quebec, Ontario)	8 (28.6)
Prairie (Manitoba, Saskatchewan, Alberta)	13 (46.4)
Western (British Columbia)	1 (3.6)
Northern (Northwest Territories, Nunavut)	3 (10.7)
District	
Urban, metropolitan	1 (3.6)
Suburban	3 (10.7)
Small, rural, or remote community	24 (85.7)
Aboriginal reserves	11 (39.3)
Rural, remote municipality	11 (39.3)
Uninhabited island	2 (7.1)
Location	
Private property	17 (60.7)
Victim's residence	9 (32.1)
Other residence	8 (28.6)
In home	3 (10.7)
Yard	13 (46.4)
No information	1 (3.6)
Public space	11 (39.3)
Street, road, highway	7 (25.0)
Sea ice/outdoors	2 (7.1)
Uninhabited island	2 (7.1)
Time	
Season (months)	
Winter (Dec–Feb)	7 (25.0)
Spring (Mar–May)	6 (21.4)
Summer (Jun–Aug)	11 (39.3)
Fall (Sep–Nov)	4 (14.3)
Time of day	
Morning (0800–1200)	6 (21.4)
Afternoon (1200–1600)	2 (7.1)
Evening/night (1600–2400)	8 (28.6)
Unknown/not reported	12 (42.9)

the initiation of attacks on humans by dogs include a possible genetic predisposition toward aggressiveness; male gender; intact reproductive status; poor health; late, inadequate training and socialization; lack of supervision; defense of territory or puppies; hunger; predatory experience; pack-dog experience; assertion of social dominance; age, size and behavior of victims; and absence of other people in the vicinity (1,5,13,14). It may be that children, while being curious about dogs, are less experienced in reading signals when dogs are alarmed, provoked, or plainly aggressive, and when attacked, are unable to defend themselves. Discussions on why children are more often the victims of dog attacks and what can be done to prevent such attacks have been published (13–15).

The year 1990 was chosen as the start of the study period, as all Canadian regions came to be represented in the news database by this year. Some deaths from infections, complications, or hospitalizations following non-newsworthy dog-bite injuries may not have been reported by newspapers. For this reason, newspaper reports are not usually suitable for reporting the rate of occurrence of dog-attack fatalities. The number underreported or missed in this news search, however, is expected to be minimal, as the reported deaths were found to agree with mortality data from traditional sources. The validation was done in a piecemeal fashion for 12 of the 17 y studied, as no known national surveillance on dog attacks exists. Canadian vital statistics available for the years 2000 to 2004 attributed a total of 6 deaths nationwide to the cause 'Bitten or struck by dog (W54)'; specifically, 3, 2, and 1 deaths, respectively, were recorded for 2002, 2003, and 2004 (16). Six fatalities had previously been recorded nationwide between 1994 and 1996, using data from Statistics Canada (1). An average of 1 fatality a year between 1991 and 1994 had also been reported, using data from Statistics Canada (8). Press-reported details surrounding 2 deaths in 1998 and 1 death in 1999 were confirmed in scholarly publications based on these deaths (1,9). Localized data available from emergency departments and hospitals in Canada indicated a very low case-fatality rate (0.07% and 0, respectively, annually) for dog-bite related injuries (8,9), but patients from the catchment areas who died before they could be seen at either facility were not counted. Only 4 of the 28 victims in the present study were seen in hospitals. Together, these facts suggest that relying on hospital data alone could lead to an underestimation of dog-bite-related fatalities and provide further justification for the use of press-reports as the basis for this study.

In conclusion, the multidimensional public health issue of fatal dog attacks appears to disproportionately affect rural and remote sections of the Canadian population. Larger, well-designed studies should assess if nonfatal dog-bite injury rates are higher in rural than urban Canada and if the breeds that bite in Canada are different from the breeds that kill. Breed representation in this study, along with the overrepresentation of multiple-dog households/situations, should be understood in the context of the make-up of the larger Canadian dog population. The frequency at which different breeds and multiple-dog households are encountered in Canada was not addressed in this study. The study did not evaluate the effectiveness of legislation targeting dogs, dog breeds, and dog-owner practices that have been adopted by various municipalities across Canada over time. Future studies should be designed to appropriately evaluate the effectiveness of dog-bite awareness campaigns and dog-control legislation, whether directed at the level of breeds, individual dogs, or dog-owner practices, in Canada. CVJ

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