

Animals and Society Institute



Dog Bites: Problems and Solutions

POLICY PAPER

Janis Bradley

The Animals and Society Institute is an independent research and educational organization that advances the status of animals in public policy and promotes the study of human-animal relationships. We are a think tank as well as a producer of educational resources, publications and events. Our objectives are to promote new and stricter animal protection laws, stop the cycle of violence between animal cruelty and human abuse, and learn more about our complex relationship with animals.

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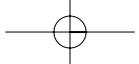
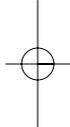
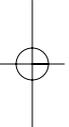
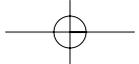
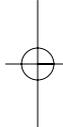
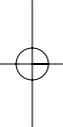


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1. Dog Bites: Problems and Solutions

Executive Summary

Public concern regarding dog bites has grown in recent years. Alarm often intensifies in response to a fatality or serious injury. Many actions, both legislative and educational, have been proposed and some implemented in attempts to address this concern. However, in considering any public policy change in response to a perceived threat to the general welfare, it is important to consider not only the scope of the problem relative to other risks, but also whether or not an effective remedy is available. If a remedy is known, we must still consider what detrimental side effects it might carry, what resources would be required to effect it, and whether such resources might have greater beneficial impact on public safety if directed toward other hazards. This paper is a brief attempt to address these questions insofar as current research allows.

Dog bite fatalities are extremely rare, accounting for about one in 167,000 deaths per year in the U.S. Dog bites represent 0.2 percent of emergency room visits. They are comparable in incidence to (but less severe than) accidents involving many common household objects, such as chairs. Attempts have been made to reduce this injury rate by banning breeds of dogs considered dangerous. However, follow-up studies show no impact on bite rates following breed-ban legislation. Moreover, no credible evidence has been presented to demonstrate that any particular breeds, including Rottweilers, American Staffordshire Terriers, and American Pit Bull Terriers are overrepresented among biting dogs.

Other attempts to identify and regulate high-risk animals focus on prior aggressive behavior. This has been shown to be effective with regard to previous injurious biting behavior. Threatening behavior, however, is too widespread among dogs to be sufficiently predictive of actual biting. Removing or regulating all threatening dogs would require enormous increases in enforcement personnel, and draw resources from other public safety issues affecting more people. It could also significantly decrease the number of people keeping dogs. Since living with companion dogs has been shown to prevent and ameliorate the effects

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of widespread chronic diseases, any measures that discourage companion animal guardianship should be approached with caution.

Two types of solutions are proposed. First, legal penalties should focus on people who knowingly keep dogs in clear disregard for public safety, either through a lack of appropriate supervision and confinement, mistreatment or neglect likely to foster aggression, or through a lack of precautions taken after an injurious bite has occurred. Second, information should be widely disseminated, especially to children, regarding safe ways to interact with dogs, and education for responsible dog guardians should include instruction on puppy socialization and breeder selection. In addition, broad public information campaign should convince people that it is unrealistic to expect selective aggression from dogs. If society wants “people-safe” dogs, it must reject using them for protection and guarding.

2. Scope of the Problem: Incidence of Dog Bite Fatalities and Injuries. Comparison with Other Injury Modalities in Rate and Severity

2.1 Fatality incidence

Calls for legislation to prevent dog bites often arise in response to a single local fatality. This may not be a realistic response, however, because dog bite fatalities are extremely rare. For each dog bite fatality in the United States, more than 1,000 people die as a result of a fall, and almost 3,000 die in auto accidents.¹

Approximately one person in 18 million dies as a result of a dog bite in this country in an average year.^{2,3,4} One in 167,000 deaths overall is attributable to this cause.⁵ Most mortality modalities this rare are not regularly counted; however, a few other rare fatalities are studied occasionally. Statistics show that dog-bite deaths occur at approximately one-fifth the rate of lightning fatalities, one-third the rate of forklift fatalities, and one-third the rate of cattle-related fatalities. (The cattle figure is probably low, since the only counts available are for work-related injuries).^{6,7,8,9} Children under 10 are twice as likely to drown in a five-gallon bucket and 1.5 times more likely to die on playground equipment than from a dog bite.^{10,11,12} This is not to say that these deaths are unimportant, but in considering allocating public resources to prevent such deaths, one must first establish that the same resources could not be used to save more lives at risk from other causes. For example, an intervention that reduced automobile-accident mortality by 0.009 percent would save twice as many lives as one that eliminated dog-bite fatalities.

Thus, a reasonable decision to allocate resources to prevent a very rare cause of death requires that the risk factors be clearly identifiable and necessitate only modest expenditure to implement. Some rare mortality modalities can meet this standard. Grain-bin fatalities, for example, have been substantially decreased by regulating safety standards for working conditions.^{13,14} This is possible because exposure to the hazard is limited to a relatively small number of sites that can be easily inspected, and because dangerous conditions are readily identified. Such an approach

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is clearly impractical when dealing with an estimated U.S. dog population of around 74 million,¹⁵ approximately one in 5 million of whom is involved in a fatal attack each year. This problem of scale is exacerbated by the fact that even if it was possible to inspect them all, there is no reliable way to predict which dogs are dangerous.

2.2 Dog bite injury rates compared with common medically treated injuries

There is considerable confusion about how many injuries result from dog bites every year and whether or not these numbers are increasing. Yearly estimates for 1992 through 1994 (the date of the last major study) range from 334,000 to 800,000.^{1,16,17,18} A number in the lower range is more statistically defensible; this lower estimate comes from an actual count of injuries treated in sampled hospital emergency departments, so the occurrences were documented by medical professionals. The larger number comes from a telephone survey, with all the reporting and sampling biases inherent in such a procedure. Also, the emergency-department study counted more actual bites as the basis of their estimate than did the phone survey. This means that when the counted bites were extrapolated to national bite rates, the statistical margin of error was much narrower.

Claims of increased bite-related injuries are often made by insurance spokespersons, attorneys specializing in dog bite litigation, and even by CDC-affiliated researchers. Two National Center for Injury Prevention and Control surveys done in 1986 and 1994^{17,18} are often used to support these claims. The studies appear to show a 36 percent increase in medically treated dog bites by comparing 1994 study results with those from a 1986 study, although the authors themselves do not draw such a conclusion. However, there are difficulties with both numbers, and enough differences between the methodologies of the two studies to make it inadvisable to compare them.

In 1986, in a study of nonfatal injuries, the National Center for Health Statistics interviewed one person in each of 23,838 households. The survey tallied injuries sustained by everyone in those households, thus gathering information on a total of 62,052 people. The survey counted injuries that had resulted in “restricted activity” or a “doctor visit” in the two weeks prior, and injuries requiring hospitalization or “limitation of regular activities” for the entire year. Only the short-term data were used

in the report, since records for the longer period was considered unreliable. The interviewees reported six injurious dog bites, which were used to calculate a national figure of 585,000 bites for 1986. Extrapolation on this scale inevitably leads to a very wide margin of error (technically called a “confidence interval”); in this case, it ranged from 226,000 to 944,000.

Then in 1994, the CDC conducted a much smaller injury survey, interviewing one adult in each of 5,328 households about injuries sustained by that adult and by any children under 15 in the household, thus gathering information on a total of 8,869 people. This survey recorded injuries that occurred over the previous year and counted only injuries that received medical treatment. The reported total of 38 injurious bites was used to calculate a national figure of 756,701 (rounded up to 800,000 to include the bites the researchers thought they would have found among 15- to 17-year-olds, who were not covered in the survey). The margin of error was even greater than in the earlier study; it ranged from 345,038 to 1,168,363, substantially overlapping the 1984 result. The differences in methodologies and the statistically overlapping results make it impractical to use these two studies to compare dog bite injuries in 1986 with those in 1994.

Given these survey weaknesses, it’s probably better to rely upon the emergency department numbers, which are replicated every year in an ongoing injury data collection effort of the CDC called the National Electronic Injury Surveillance System (NEISS).¹ An annual rate of 334,000 injurious dog bites (the average between 1992 and 1994) was collected by a separate but similar emergency department survey system called the National Center for Health Statistics National Hospital Ambulatory Medical Care Survey, which collects data on all emergency room visits arising from both illnesses and injuries.¹⁶ But the NEISS estimates for 2002–2004, a full decade later, suggest stability, averaging 334,000 bite incidents per year once again, even though the dog and human populations had both increased by 12–15 percent in the interim. It should be noted that these data collection systems do not include injuries treated in physicians’ offices, or ones that are not treated at all, so we must assume that the total bite numbers are somewhat higher. It is likely, however, that most serious injuries go through emergency systems.

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It's important to note that this more stable data-collection system shows no increase in dog bite injuries over the last decade. Although this may be due to slightly different methodologies, it remains the case that the increases often described in the press have not been documented.

Nevertheless, it is safe to say that dog bite injuries occur relatively frequently. They currently account for 0.2 percent of all emergency department visits, and 0.8 percent of injury-related visits.¹ Approximately one third of American households includes at least one dog.¹⁵ This means that at least 96 million people are in daily contact with dogs, if we include only the members of the dogs' own households. Almost anything with that kind of massive exposure is going to carry some hazards. In fact, dogs are associated with fewer injuries than other ordinary artifacts of daily life, including tables and chairs, doors, beds, even sneakers and slippers.^{19,20} For another example, roughly 180 million people of all ages in the U.S. participate in some kind of sport or physical activity at least occasionally—about double the number of people who live with dogs. Yet emergency departments treat more than 13 times as many sports-related injuries as dog bites.²¹ When looking specifically at injuries to children under 14, dogs bites account for about two-thirds as many injuries as playground equipment.^{1,21}

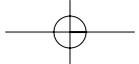
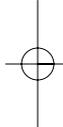
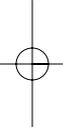
Dog bites are much rarer than the sorts of injuries that are ordinarily described as common. For every dog bite treated in an emergency room, for example, 23 falls and 13 automobile accident injuries are treated.¹ And as mentioned previously, falls and automobile accidents are much more serious, 51 and 200 times more likely to prove fatal, respectively.

2.3 Injury Severity

Dog bites, on average, are less severe than any of the more common injury categories. Ninety-nine percent of emergency room-treated dog bites are rated as minor, scored as 1 on a six-point injury severity scale.²² (A level 1 injury is one from which the person recovers quickly with no lasting impairment; a level 6 is one likely to be fatal.) Treated fall injuries, on the other hand, average around a 4,²³ meaning a moderate injury that either requires weeks to months to fully heal or results in lasting minor impairment.

Falls are four times as likely to result in hospitalization as dog bites and are 51 times more likely to be fatal.¹ Pennsylvania Department of Health studies found that the average treatment for dog bites costs less than the average fall injury, results in hospitalization less frequently, and that hospital stays (when they do occur) are shorter.^{24,25} This discrepancy holds true for other common injuries as well. Injuries from overexertion, for example, are more severe than those from dog bites, according to national data.¹

Similar disparities in magnitude exist between dog bites and other unusual injuries. Almost half (45 percent) of playground injuries are severe, including internal injuries, concussions, and dislocated, fractured, and amputated limbs.¹² Most dog bite injuries are minor punctures and lacerations.²² More than three percent of patients in emergency rooms because of playground accidents are hospitalized.¹² This is three times the rate of hospitalizations for dog bites.¹



3. Existing and Proposed Legal Remedies: Efficacy and Costs

3.1 Attempts to identify and remove high-risk animals: breed bans

The best known study of fatal dog bites has attributed more fatalities to dogs identified as “pit bull type” dogs over the past two decades than to any single breed.²⁶ News reports of dog attacks often identify the dog or dogs involved as pit bulls. This has led to a widely held perception that some breeds of dogs present a greater risk of injuring people than others and therefore should be eliminated from the population as a public safety risk, even though the researchers themselves caution strongly against such an approach. One of the co-authors of the study, veterinarian behaviorist Goleb, has stated, “It is frustrating for me personally because people who want to enact Breed Specific Legislation keep using the report to try and make a case against pit bulls. *The whole point of our summary was to explain you can’t do that.* [emphasis from source]”²⁷ Nevertheless, hundreds of municipalities have instituted statutes that prohibit or limit the ownership of pit bulls and occasionally other breeds, most commonly Rottweilers. Numerous objections have been made to this approach, based on lack of reliable evidence that pit bulls are overrepresented among injurious biters.²⁸

The data presented in support of this practice suffer from a lack of breed-specific population figures from which to determine proportionate representation of a particular breed among biting dogs. There also are difficulties in defining what is meant by a pit bull, difficulties in identifying individual members of the breed or group of breeds once defined, a lack of any scientifically credible evidence for any physiological traits making pit bulls more dangerous than other dogs, and difficulty differentiating between genetic tendencies toward aggression and the kind of aggression elicited by careless and inhumane husbandry practices.

One researcher has found major gaps in the data collection in the two most commonly cited studies on fatal attacks.^{26,28,29} These studies rely on information gathered from newspaper articles, and thus exclude fully 27 percent of the fatalities uncovered by searching death certificates. Research on the missing 27 percent of cases reveals breed

identification on nearly half, showing a much lower percentage attributed to pit bulls (7 percent) than in the overall study.²⁹ The same author also points out the extreme imbalance in press coverage of dog-bite events depending upon the breed. She found four dog bite incidents of roughly equal severity occurring on a single day in 2006, but the one case attributed to pit bulls generated 22 to 90 times the number of news stories as the bites attributed to dogs of other breeds.³⁰ Clearly, this kind of selective press coverage contributes to the public perception of pit bulls as especially dangerous.

For all these reasons, the breed-ban approach has been controversial, both legally and politically, and has led to court challenges of these statutes on constitutional grounds, up to and including state supreme courts. The results have been varied. The objections cited above, however, have been summarized in a 2006 Ohio Appeals Court decision overturning a city breed-ban ordinance as violating the equal protection and substantive due process clause because there was no rational basis to single out the American Pit Bull Terrier as inherently dangerous. The court also found that the breed ban violated the due process clause because there was no rational basis to positively identify a pit bull. In other words, the breed ban failed to meet a minimum standard of rationality.³¹

Even if the drawbacks listed above could be overcome, one insurmountable difficulty with breed bans will remain. This is the fact that they do not decrease the appeal of owning dogs with a popular reputation and persistent media portrayal as aggressive. Some people seek out such dogs for protection, some for dog fighting competition, some for fostering a macho image, and some simply for financial gain by breeding puppies to sell to people with any of these motives. Banning specific breed(s) does nothing to deter people from satisfying these motives, as all people so motivated need do is shift their attention to another breed, and then selectively breed and raise the dogs for elevated levels of aggression and tendency to bite hard enough to injure. This behavior-related breeding can be accomplished with any genetic line within any breed in a few years. In fact, a follow-up to the breed/fatality study revealed an entirely different composition of breeds involved in fatal attacks in the decade immediately preceding the period covered by the study.²⁹ This is unsurprising, as dramatic genetic behavioral modification has even been done with wild animals. Most

famous are the Russian Institute of Cytology and Genetics' rapid transformation of wild, aggressive foxes into cuddly, affiliative pets, and their more recent separation of behaviorally normal lines of rats into either affectionate pets or ferocious attackers.^{32,33}

Moreover, there is no evidence of decreased dog-bite injuries where breed-ban legislation is in force. The only study so far on pre- and post-breed ban dog-bite rates was completed in the U.K. in the mid-1990s.³⁴ The study concluded that the Dangerous Dogs Act, which banned several breeds, had had no effect whatsoever. The Aberdeen Royal Infirmary researchers did find, however, that "human bites were as common as those from the most implicated dog breed." At least there, it seems that people bite and injure other people as often as any single breed of dog does.

3.2 Attempts to identify and remove high-risk animals: "dangerous dog" laws

The second common legislative approach to removing dangerous dogs from the population targets the behavior of the individual dog, designating dogs with labels such as "potentially dangerous," "dangerous," or in some cases "vicious" based on actual incidents, and then either eliminating the dogs or limiting the conditions under which they may be kept (such as requiring sterilization, microchipping, training, behavioral consultation, muzzling, etc.). Such laws increasingly also specify civil and criminal liability incurred by people whose dogs injure someone after receiving such a designation.

There is some evidence that a "prior behavior" approach to the "dangerous dog" designation may decrease injurious bite incidence. This has only been demonstrated, however, where the dangerous dog label is limited to dogs who have already bitten and injured someone. A program in Oregon showed a decrease from 25 percent to 7 percent in repeat injurious bites after the implementation of a program restricting conditions of ownership of dogs who had caused injuries.³⁵

Many dangerous dog laws try not only to control dogs who have already injured people, but to predict which ones will do so in the future and attempt to prevent this. Typical legal descriptions of "dangerous" dog behavior include "approaches in a vicious or terrorizing manner," "in a menacing fashion," having "a known disposition, tendency, or propensity to attack," or "engages in any behavior that requires a

defensive action by any person to prevent bodily injury.”^{36,37} Aside from the subjectivity of these descriptions, the main difficulty with such an approach is that the best research to date indicates the likelihood that a majority of dogs engage in such behavior without necessarily hurting anyone. One groundbreaking study found that 41 percent of the dogs studied had growled, snarled or snapped at a familiar person at some time, but that only 15 percent had actually bitten, and only 10 percent of the 15 percent of the bites had injured.³⁸ This means that a hypothetical net cast to identify the 1.5 percent of dogs who will injure based on whether they had behaved aggressively would actually capture at least 41 percent of the dog population. And since this study only included behavior toward family members and other people well known to the dog, and only included guardians responsible and caring enough to provide veterinary care for their companions, the percentage of potential problems within the entire dog population must certainly be considerably higher. A history of threatening behavior has not been shown to predict that a dog will bite, much less that she will injure if she bites. One could make the argument that it is prudent to spay and neuter even such a large percentage of dogs as ever engage in threatening behavior, thus limiting the population entirely to consistently affiliative individuals, but enforcement of such wide-scale forced sterilization is unlikely.

3.3 Resources for enforcement

There are currently about 15,000 animal control officers in the U.S.³⁹ This is one for every 5,000 dogs. A conservative estimate of the incidence of aggressive behavior among dogs³⁸ indicates that at least 2,000 out of each caseload of 5,000 are likely to meet criteria for “dangerous dog” designation according to statutes that try to eliminate or regulate dogs at high risk for biting (who have not yet bitten or injured someone). No one knows what percentage of dogs bear a physical resemblance to any or all of the commonly prohibited breeds. In some urban areas, this may well be a majority of the dogs. In addition, animal control officers have many other duties beyond policing dangerous dogs. It would be impractical for officers to identify, much less enforce proscriptions on owners for such a large number of dogs. This would require an enormous commitment of additional officers in animal control departments that are already under-funded to meet their mandates. A commitment to enforce dangerous-dog statutes would have to draw

resources from other areas of public services. Community officials might well have to choose between animal control officers and crossing guards, pool lifeguards, emergency services dispatchers, or any of a number of other public employees who safeguard citizens against much more common hazards than dog bites.

Breed bans have proved costly. In 2004, a task force study in Prince George's County, Maryland, recommended repealing the community's breed ban because it was ineffective and had cost the county \$570,000 in kenneling and maintenance costs alone. This figure did not include direct enforcement costs.⁴⁰ In the U.K., the country with the longest history of breed bans, attempts to enforce bans have proved to be expensive, with kenneling costs for confiscated animals totaling over 3 million pounds (nearly \$6 million) in the first four years (1992–95) of implementation.⁴¹ And yet, as mentioned above, follow-up studies indicate no change in dog-bite injury rates.³⁴

3.4 Other outcomes

With regard to dangerous dog laws based on behavior, as discussed above, definitions of dangerous are so varied and subject to interpretation that most dogs' behavior could be interpreted to qualify. A conservative estimate would be about 30 million dogs who would likely meet criteria. (This estimate is based on a study that found 41 percent of dogs growl, snarl, or snap at a familiar person, and thus does not include dogs that only threaten strangers, so the real percentage is almost certainly considerably greater.)³⁸ Some statutes require only that the dog "endangered" a person in some way, leaving the way open for complaints by anyone who simply felt (but was not really) endangered.³⁶ All this creates a serious danger of abuse in any system that attempts to weed out "potentially dangerous" animals who have not bitten anyone. It casts a net far too wide to be enforceable. When laws exist without the practical means to widely enforce them, the result is selective enforcement, enforcement based on grudge complaints, and widespread noncompliance.

With regard to breed-ban legislation, perhaps the most worrisome potential effect is driving the behavior of keeping dogs of certain breeds or physical descriptions underground. Not only can this make criminals of otherwise law-abiding people, it is not farfetched to think that people

hiding their dogs from the authorities could increase the risk of zoonotic disease. Up until the mid-20th century, about 100 Americans per year died of rabies; today it's one or two, and in some years none.⁴² Not one of these deaths has been documented to have been the result of a native domestic animal bite in decades (although 1–2 per decade have involved the variant of the virus found in indigenous dogs).⁴³ This is entirely attributable to the very high rate of vaccination of domestic dogs against this disease. This is in stark contrast to much of the rest of the world; worldwide annual human rabies deaths are around 55,000, according to the World Health Organization.⁴⁴ Ninety-nine percent of these victims worldwide are estimated to have contracted the disease from domestic dogs.⁴² We would be ill advised to do anything that would discourage anybody from inoculating their dogs against rabies.

The most significant risk of either breed bans or “dangerous dog” laws is that, if successful, they would eliminate large populations of animals, most of whom would never have injured a human. Discouraging dog guardianship on any significant scale risks a detrimental effect on public health, as discussed in the next section.

4. Benefits of Dogs vs. Risks

4.1 Health benefits of dog guardianship

Both of the legal remedies described previously attempt to address the problem of dog bites by eliminating segments of the dog population supposedly at an elevated risk for inflicting bites. Apart from whether this perception is accurate, only a minority of the animals eliminated would have injured anyone, and the net result would be a smaller population of dog guardians. Thus it is important, when evaluating such a strategy, to consider the potential loss of health benefits of dog guardianship.

A growing body of research supports the contention that dog companions enhance human health across the lifespan. For example, a study of children in Sweden has shown a dramatically lower incidence of allergies among children who lived with a dog (even better, with two) as infants.⁴⁵

Several large-scale studies (one including almost 6,000 people in a heart health screening clinic) have documented a correlation between companion animal guardianship and decreased risk of cardiovascular disease, either in terms of lower risk factors for developing disease or of survival rates after a heart attack.^{46,47} One study found dog guardianship to be comparable to heart-healthy dietary changes in its correlation with decreased heart attack risk.⁴⁶

Among the elderly, dog guardians spend an average of 1.4 hours a day outside playing or walking with their dogs and less sedentary time than their peers without companion animals.⁴⁸ This level of activity is known to contribute to extending the time older people can live independently.

A group from a 1991 U.K. study reported that common health complaints, including backaches, headaches, and contracting the flu, decreased a few months after adopting a dog or a cat.⁴⁹ This improvement held true whether or not the new dog guardian increased his or her walking activity.

Talking to or simply being in the presence of their dogs allows people to lower their blood pressure to their resting heart rate level, even in stressful situations. The effect is more significant than that attained through meditation.⁵⁰

Petting one's dog increases calming neurochemicals, including serotonin, prolactin, and oxytocin, and decreases the main neurochemical connected with stress, cortisol.⁵¹ Chronically elevated levels of this stress hormone have been tied to many health risks, from high blood pressure to immunosuppressant ailments.

4.2. Numbers of people benefiting versus numbers harmed

With growling, snarling, and snapping demonstrated to be normal (meaning exhibited by most individuals) and actual biting occurring in about 15 percent of dogs,³⁸ it is likely that if we keep dogs, we will continue to have some dog bites. A very small percentage of those bites will injure. However, any injury-prevention approach that significantly reduces the number of companion dogs would also risk removing the preventive effect these animals have on ailments that cause exponentially more loss of life and health than even the highest estimates of bite cases. This is made clear by considering the two most common ailments that are ameliorated by living with dogs.

Allergy reduction, as documented in the Swedish study mentioned earlier, could cancel out the risk to children from dog bites many times over. Asthma, the most severe common manifestation of allergies, afflicts millions of children, with around 200 dying of it each year in the U.S. About 13 million people of all ages seek medical treatment for this ailment each year.⁵²

Cardiovascular disease kills approximately 910,000 Americans every year.⁵³ Multiple studies have found that dog guardians have fewer risk factors for cardiovascular disease than nonguardians, and are almost five times more likely to survive a heart attack for at least a year if one does occur.^{46,47}

If only a very small percentage of the more than 44 million American households that now include dogs¹⁵ were to stop keeping these companions, the detrimental impact on public health could be considerable. In order to prevent this, any legal proscriptions that attempt to prevent dog bites must be accurately and narrowly targeted only at animals who present a very high risk (dogs who have already bitten and injured someone).

5. Recommendations

5.1 Effective legislation

Effective and equitable dog-bite legislation should target people who willfully disregard public safety in the keeping of their companion animals. This is almost certainly a minority of dog guardians.

5.1.1 Enforcement of existing dog regulations

There is consensus among researchers that the majority of dogs who bite injure people they know well, in the dogs' own homes.^{54,55,56,57} Yet much of the public concern is directed at bites to strangers in public places. This statistically misplaced concern may occur because the victims of such bites often have not consented to the dog having access to them. The most direct approach to this concern is to more stringently enforce leash laws and to increase penalties for violations.

5.1.2 Limit injury prevention proscriptions to dogs who have bitten injuriously

It is possible to have a law that identifies dogs who present a demonstrable threat to humans. These are the dogs with a history of injuring. Incidents of repeat injurious bites should carry heavy penalties. An effective law of this type would include a clear definition of serious injury. Such a law could be equitably enforced if medically treated bites were consistently reported.

5.1.3 Tracking of dogs with one injurious bite

The only program with any evidence of preventing repeat bites placed restrictions on the guardians of dogs who had injured someone, and then monitored the guardians for compliance.³⁵ If we decide to delegate increased law enforcement resources to this issue, this would be a productive place to put them. At the current rate of 334,000 documented injurious bites per year,^{1,16,22} this would make an maximum average load of 22 follow-up cases for each of the 15,000 animal control officers nationwide,³⁹ a more efficient use of resources than any of the proposals that target much larger numbers of dogs.

5.1.4 Bites in the context of other negligent infractions

Guardians should also be subject to serious penalties if their dogs bite and injure (even on a first occurrence) if the bite occurs in the context of another infraction, particularly a violation of leash laws, but also where a lack of supervision of dogs with children can be demonstrated, or where the guardians have a history of animal cruelty violations. Fines assessed for such violations could then be used to fund animal law enforcement.

5.2 Focus prevention resources on education

Most of the exposure to dog-bite injury risk can be mitigated by providing appropriate education to well-intentioned but misinformed and/or uninformed guardians, and to the public at large.

5.2.1 Educating children and adults to behave safely around dogs

Sixty-seven percent of injurious dog bites to children have been shown to be preventable by changing the child's or the caregiver's behavior in interacting with the dog.⁵⁸ Even a single 30-minute lesson incorporated into a regular school day, taught by a dog handler, has been shown to dramatically reduce high-risk behaviors toward unfamiliar dogs in both very young (kindergarten) and middle-school children.^{59,60} This is a strategy worth pursuing if we want to direct resources toward preventing dog-bite injuries. Much of this work could be done by volunteers, minimizing the impact on fiscal resources that are needed to address more widespread public health dangers. Many dog professionals would volunteer their time in such an endeavor, and many humane organizations have education departments staffed with people well qualified to undertake such teaching tasks. National humane organizations could be tapped to develop appropriate curriculum, so a school program could be implemented with very little impact on public resources.

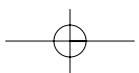
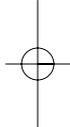
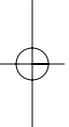
5.2.2 Educating dog guardians in puppy-raising techniques to minimize aggression: Methods and resources

Several major provocations for dog bites (food and object guarding, handling sensitivity, and wariness of strangers) can be

substantially mitigated by proper puppy-raising techniques. Requiring or providing incentives to guardians to attend training classes certified to address these issues would have a far-reaching preventive effect. Many communities now charge variable registration fees depending on the reproductive status of a dog; a similar mechanism could be applied to puppy-class attendance, and the majority of the expense would be borne by the guardian.

5.2.3 Incentives for breeders to select for low reactivity: Methods and resources

Finally, dogs can be bred to be less inclined to guard their food and possessions, respond defensively when touched, and to try to drive strangers away. The public can be educated about the likelihood of behavior problems, especially aggression, among puppy-mill dogs sold in stores and through Internet brokers. Certifying breeders of purebred dogs as producing animals who do not demonstrate problematic behaviors could be undertaken. Qualifying all breeding animals through the AKC Canine Good Citizen test would be a start toward safety ratings for dogs. The public must, of course, be educated to value such safety ratings (as has been done with many consumer products). These measures would almost certainly help minimize injurious dog bites among the purebred dog population.



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