

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 only 15 percent of those dogs actually bit anyone. Of those who bit someone, only 10 percent of the bites were considered injurious, making the total incidence of injurious dog bites only 1.5 percent of the total dogs studied.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

The majority of dog bites occur in the biting dog's home and are directed at people the dog knows.^{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.

6. Works Cited

1. Centers for Disease Control and Prevention. Web-based injury statistics query and reporting system (WISQARS). National Center for Injury Prevention and Control, Centers for Disease Control and Prevention. 2006. Accessed at www.cdc.gov/ncipc/wisqars. All data on mortality/morbidity/ED data. All annual figures based on averages from 2001-2003 unless otherwise noted.
2. Sacks, J. J., Sattin, R. W., Bonzo, S. E. "Dog bite-related fatalities from 1979 through 1988." *Journal of the American Medical Association*, 1989; 262, 1489-1492.
3. Sacks, J. J., Lockwood R., Hornreich J., Sattin R. W. "Fatal dog attacks, 1989-1994." *Pediatrics*, 1996; 97, 891-5.
4. Centers for Disease Control and Prevention. "Dogbite-related fatalities—United States, 1995-1996 (1997)." *Morbidity and Mortality Weekly Report*, 1997; 46:463-7.
5. Kochanek, K., Murphy, S. L., Anderson, R. N., Scott, C. "Deaths: Final data for 2002 national vital statistics reports." 2004; 53 (5): 1-116.
6. Curran, E. B., Holle, R. L., López, R. E. "Lightning casualties and damages in the United States from 1959 to 1994." *Journal of Climate*, 1999; 13 (9); 3448-3464.
7. "Lightning-Associated Deaths - United States, 1980-1995." *Morbidity and Mortality Weekly Report*, 1998; 47(19), 391-394.
8. Collins, J. W., Landen, D. D., Kisner, S. M., Johnston, J. J, Chin, S. F., Kennedy, R. D. "Fatal occupational injuries associated with forklifts, United States, 1980-1994." *American Journal of Independent Medicine*, 1999; 36(5), 504-12.
9. Langley, R. L., Hunter, J. L. "Occupational fatalities due to animal-related events." *Wilderness and Environmental Medicine*; 2001; Vol. 12, No. 3, pp. 168-174.
10. Jumbelic, M. I., Chambliss, M. "Accidental toddler drowning in 5-gallon buckets." *Journal of American Medical Association*, 1990; 263 (14), 1952-3.
11. "U.K. Department of Trade and Industry Fatal drowning accidents - 5-gallon buckets." *Department of Trade and Industry Journal*, March 1996.
12. Tinsworth, D., McDonald, J. "Special study. Injuries and deaths associated with children's playground equipment." *U.S. Consumer Product Safety Commission 2001*.
13. "Suffocations in Grain Bins-Minnesota, 1992-1995." *Morbidity and Mortality Weekly Report*, 1996; 45(39), 837-841.
14. Occupational Safety and Health Administration. "Grain handling facilities." *Standard Regulatory Review*, March 13, 2003.
15. American Pet Products Manufacturers Association. "Fact Sheet. 2004/2005." Accessed at www.appma.org/press_industrytrends.asp.
16. Centers for Disease Control and Prevention. "Nonfatal dog bite-related injuries treated in hospital emergency departments-United States, 2001." *Morbidity and Mortality Weekly Report*, 2003; 52(26): 605-610.

17. Sosin D. N., Sacks, J. J., Sattin, R. W. "Causes of nonfatal injuries in the United States, 1986." *Accident Analysis and Prevention Journal*. 1992; 24, 685-7.
18. Sacks J. J., Kresnow, M., Houston, B. "Dog bites: How big a problem?" *Injury Prevention*, 1996; 2: 52-54.
19. National Electronic Injury Surveillance System On-line U.S. Consumer Products Safety Commission. Accessed at www.cpsc.gov/library/neiss.html. Data for calendar year 2003.
20. Royal Society for the Prevention of Accidents. "Home and Leisure Accident Surveillance System-Annual Report 2000-2002." Accessed at www.rospa.com/hassandlass/reports/2002data.pdf on June 10, 2004.
21. "Nonfatal sports- and recreation-related injuries treated in emergency departments- United States, July 2000-June 2001." *Morbidity and Mortality Weekly Report*, 2002; 51(33), 736-40.
22. Weiss, H. B, Friedman, D. I, Coben, J. H. "Incidence of dog bite injuries treated in emergency departments." *Journal of the American Medical Association*, 1998; 279 (1), 51-53.
23. Mathers, L. J., Weiss, H. B. "Incidence and characteristics of fall-related emergency department visits." *Academic Emergency Medicine*, 1998; 5, 1064-1070.
24. Anastasopoulou, A., Weiss, H. B., Forjuoh, S. N. "Fall injuries in Pennsylvania, 1994." Center for Violence and Injury Control, Department of Emergency Medicine, Pittsburgh, PA: Allegheny University of the Health Sciences, 1998.
25. Strotmeyer, S. J., Forjuoh, S. N, Coben, J. H. "Dog bite injuries in Pennsylvania, 1995." Pittsburgh, Pennsylvania: Center for Violence and Injury Control, Department of Emergency Medicine, Allegheny University of the Health Sciences, 1999.
26. Sacks, J. J., Sinclair, L., Gilchrist, J., Golab, G. C., Lockwood, R. "Breeds of dogs involved in fatal human attacks in the United States between 1979 and 1998." *Journal of the American Veterinary Medical Association*, 2000; 217, 836-840.
27. Golab, G. in "Why Debate What the Experts Have Concluded..." Accessed at www.animalfarmfoundation.org/topic.php?id=4&topic=17.
28. Lockwood R., Rindy K. "Are 'pit bulls' different? An analysis of the pit bull terrier controversy." *Anthrozoos*, 1987; 1(1): 2-8.
29. Delise, K., "Fatal Dog Attack Studies: Wrong numbers, not statistics." Accessed at www.animalfarmfoundation.org/item.php?id=4&topic=0&item=344.
30. Delise, K., "Media Reports of Dog Attacks: June 8, 2006." Accessed at www.animalfarmfoundation.org/topic.php?id=4&topic=18.
31. City of Toledo v. Tellings, No. CRB-02-15267, March 3, 2006.
32. Trut L. N. "Early canid domestication: The farm fox experiment." *American Scientist*, 1999; 87: 160-169.
33. Wade N. "Nice rats, nasty rats: Maybe it's all in the genes." *The New York Times*, July 25, 2006.

34. Klaassen B., Buckley J. R., Esmail A. "Does the dangerous dogs act protect against animal attacks: A prospective study of mammalian bites in the accident and emergency department." *Injury*, 1996; 27 (2): 89-91.
35. Oswald M. "Report on the potentially dangerous dog program: Multnomah County, Oregon." *Anthrozoos*, 1991; 5 (4), 247-54.
36. Favre D. S., Borchelt P. L. *Animal Law and Dog Behavior*. (Tucson: Lawyers & Judges Pub. Co.; 1999). This work and the one following contain full discussions of the various legal principles underlying the basic types of dangerous dog statutes.
37. Randolph M. *Dog Law* (Berkeley, CA: Nolo, 2001; 4th Ed.).
38. Guy N. C., Luescher U. A., Dohoo S. E., Spangler E., Miller J. B., Dohoo I. R., Bate L. A. "Demographic and aggressive characteristics of dogs in a general veterinary caseload." *Applied Animal Behaviour Science*, 2001; 74(1), 15-28.
39. U.S. Department of Labor Bureau of Labor Statistics "Occupational Outlook Handbook, 2004." Accessed at www.bls.gov/oco/oco20055.htm.
40. Vicious Animal Legislation Task Force, Prince George's County, Maryland. "Report of the Vicious Animal Legislation Task Force. 2003."
41. The United Kingdom Parliament House of Commons Dangerous Dogs Hansard Written Answers, June 5, 1996. Accessed at www.parliament.the-stationery-office.co.uk/pa/cm199596/cmhansrd/vo960605/text/60605w08.htm.
42. "Rabies: Epidemiology." Accessed at www.cdc.gov/ncidod/dvrd/rabies/Epidemiology/Epidemiology.htm.
43. Noah D. L., Drenzek C. L. et al. "Epidemiology of human rabies in the United States, 1980 to 1996." *Annals of Internal Medicine*, 1998; 128 (11) 922-30.
44. "Rabies." National Center for Infectious Diseases. Accessed at www.who.int/zoonoses/diseases/rabies/en/index.html.
45. Hesselmar B., Aberg N., Aberg B., Eriksson B., Borksten B. "Does early exposure to cat or dog protect against later allergy development?" Department of Pediatrics, University of Goteborg, Goteborg, Sweden. *Clinical and Experimental Allergy*, 1999; 29 (5), 611-7.
46. Anderson, W. P., Reid, C. M., Jennings, G. L. "Pet ownership and risk factors for cardiovascular disease." *Medical Journal of Australia*, 1992; 157, 298-301.
47. Friedmann E., Thomas S. A. "Pet ownership, social support, and one-year survival after acute myocardial infarction in the cardiac arrhythmia suppression trial (CAST)." *American Journal of Cardiology*. 1995; 76: 1213-1217.
48. Siegel, J. M. "Stressful life events and use of physician services among the elderly: The moderating role of pet ownership." *Journal of Personality and Social Psychology*, 1990; 58: 1081-1086.
49. Serpell J. A. "Beneficial aspects of pet ownership on some aspects of human health and behaviour." *Journal of Research in Social Medicine*, 1991; 84: 717-720.
50. Allen, K. M. "Dog ownership and control of borderline hypertension: A controlled

- randomized trial." Presented at the 22nd Annual Scientific Sessions of the Society of Behavioral Medicine in Seattle, WA. March 24, 2001.
51. Odendaal J. S., Meintjes R. A. "Neurophysiological correlates of affiliative behavior between humans and dogs." *Veterinary Journal*, 2003; 165, 296-301.
 52. Mannino D. M., Homa D. M., Akinbami L. J., Moorman J. E., Gwynn C., Redd S. C. "Surveillance for asthma-United States, 1980-1999." *Morbidity and Mortality Weekly Report: Surveillance Summaries*, 2002; 51, 1-13.
 53. CDC Coordinating Center for Health Promotion: Division for Heart Disease and Stroke Prevention. "Heart Disease and Stroke: The nation's leading killers. 2006." Accessed at www.cdc.gov/nccdphp/publications/aag/pdf/aag_cvh2006.pdf.
 54. Greenhalgh C., Cockington R. A., Raftos J. "An epidemiological survey of dog bites presenting to the emergency department of a children's hospital." *Journal of Pediatrics and Child Health*, 1991; 27: 171-4.
 55. Avner J. R., Baker M. D. "Dog bites in urban children." *Pediatrics*, 1991; 88: 55-7.
 56. Beck A. M., Jones B. A. "Unreported dog bites in children." *Public Health Report*, 1985; 100: 315-21.
 57. Shewell P. C., Nancarrow J. D. "Dogs that bite." *British Medical Journal*, 1991; 14; 1512-1513.
 58. Kahn A., Bauche P., Lamoureux J. "Child victims of dog bites treated in emergency departments: A prospective survey." *European Journal of Pediatrics*, 2003; 162(4), 254-8.
 59. Chapman, S., Cornwall, J., Righetti, J., Lynne, S., Grossman, D. "Preventing dog bites in children: Randomized controlled trial of an educational intervention." *The Western Journal of Medicine*, 2000; 173 (4) 233.
 60. Wilson, F., Dwyer, F., Bennett, P. C. "Prevention of dog bites: Evaluation of a brief educational intervention program for preschool children." *Journal of Community Psychology*, 2002; 31 (1) 75-86.

7. Overview References

- AVMA Task Force on Canine Aggression and Human-Canine Interactions. "A community approach to dog bite prevention." *Journal of the American Veterinary Medical Association*, 2001; 218: 1732-1749.
- Beck, A. M., Meyers, N. M. "Health enhancement and companion animal ownership." *Annual Review of Public Health*, 1996; 17: 247-257.
- Delise, K. *Fatal dog attacks: the stories behind the statistics*. (Manorville, NY: Anubis Press, 2002).
- Ozanne-Smith, J., Ashby, K., Stathakis V. 1998. "Dog bites and injury prevention - a critical review and research agenda." *Proceedings of Animals, Community Health and Public Policy Symposium*. Sydney: AU.
- Serpell, J. A. "Evidence for long-term effects of pet-ownership on human health." In L.H. Burger (Ed.), *Pets, Benefits and Practice* (pp.1-7). London: BVA Publications, 1990.