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Opposition to Proposed Mandatory Spay/Neuter Ordinance in City of Pasadena

Public Safety And Dogs

A mandatory spay-neuter ordinance for pit bull type breeds has been proposed for the City of Pasadena. While well intended, this is a distracting and counterproductive policy for a number of reasons.

Mandatory spay-neuter ordinances have been implemented in several jurisdictions. The results of these are

- no decrease in dog bite incidents. A similar ordinance passed in San Francisco and dog bite incidents increased by 13%.
- increase in pets surrendered to animal shelters because low-income pet owners who cannot afford the fines or the costs for sterilization surgery end up having to relinquish their pets to shelters
- increase in euthanasias of pets in shelters due to the increase in owner surrenders
- increase in animal control costs associated with the increased shelter intakes and increased enforcement
- decrease in dog licensing compliance as many dog owners who fear losing their family pets hide them from authorities
- decrease in dog licensing income because of the decreased licensing compliance

While supporters of breed specific legislation point to a study by CDC researchers published by the American Veterinary Medical Association (AVMA), both the CDC and AVMA have produced formal responses repudiating the use of this study for that purpose saying the study cannot be used to determine which breeds are more likely to cause fatal dog bites or other bites.

Laws that target specific breeds have been proven to be ineffective, too costly to implement and put all dogs at risk including all breeds and family pets. To help ensure public safety, the city should instead take an overall approach to amending its animal code, focus on enforcing responsible pet owner and provide a community-based, proactive educational program for its residents. Cities and governments that are effectively dealing with the issue have the following in common

Programs include the following components:

- **Guidelines for Responsible Pet Ownership**
- **Guidelines to Ensure Proper Containment of dogs including fencing**
- **Proactive Education Program for Grade school children**
- **Free and Low Cost Spay and Neutering Services**
- **Vaccination/Licensing/Training Clinics**
- **Dog Ownership Education and Handling Classes**
- **Public Incentive Program for Responsible Ownership**

We believe that we have many shared objectives in common and that it would be more effective and less costly to the City of Pasadena to partner with the APDR and other interested parties to provide community resources to help educate the “uneducated owners”, support the responsible owners and penalize the reckless owners all the while improving public safety and creating a compassionate community. Please contact us to explore alternatives to the proposed ordinance as in every instance it has been implemented it has failed with the issue getting worse on all levels. For your review we have compiled data regarding all aspects regarding the subject from credible sources.



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To Whom It May Concern:

Attached, as requested, please find a copy of the report titled “Breeds of dogs involved in fatal human attacks in the United States between 1979 and 1998” and published in the September 15, 2000 issue of the *Journal of the American Veterinary Medical Association*.

In your review of this report, please be cognizant of the following:

- This study was NOT conducted by the American Veterinary Medical Association, but by individual investigators from the Centers for Disease Control and Prevention, the Humane Society of the United States, and the American Veterinary Medical Association. The report underwent the standard review process required for publication of scientific reports published in the *Journal of the AVMA*.
- In contrast to what has been reported in the news media, the data contained within this report **CANNOT be used to infer any breed-specific risk** for dog bite fatalities (e.g., neither pit bull-type dogs nor Rottweilers can be said to be more “dangerous” than any other breed based on the contents of this report). To obtain such risk information it would be necessary to know the numbers of each breed currently residing in the United States. Such information is not available.
- Data in this report indicate that the number of dogs of a given breed associated with fatal human attacks varies over time, further suggesting that such data should not be used to support the inherent “dangerousness” of any particular breed. More than 25 breeds have been involved in fatal human attacks over the 20-year period summarized in this report.
- Fatal attacks represent a small proportion of dog bite injuries to humans and, therefore, should not be the primary factor driving public policy concerning dangerous dogs.
- Strategies that can be used in an effort to prevent dog bites include enforcement of generic, non-breed-specific dangerous dog laws, with an emphasis on chronically irresponsible owners; enforcement of animal control ordinances such as leash laws; prohibition of dog fighting; encouraging neutering; and school-based and adult education programs that teach pet selection strategies, pet care and responsibility, and bite prevention.

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NCIPC Bibliography of Articles on Dog Bites

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- **AVMA Task Force on Canine Aggression and Human-Canine Interactions. [A community approach to dog bite prevention.](#) * JAVMA 2001; 218: 1732-1749.** This 2001 report, intended for communities interested in developing a comprehensive bite prevention program, includes model legislation for the control of dangerous dogs.
- **CDC. [Nonfatal Dog Bite--Related Injuries Treated in Hospital Emergency Departments--United States, 2001.](#) MMWR 2003; 52(26): 605-610.**
- **CDC. [Dog-Bite-Related Fatalities - United States, 1995-1996.](#) MMWR 1997;46:463-7.** Details are provided on the approximately 12 annual deaths from dog attacks. Data are provided on dog breeds involved in fatal attacks from 1979. Recommendations on reducing dog bites are included.
- **Gershman KA, Sacks JJ, Wright JC. [Which dogs bite? A case-control study of risk factors.](#) Pediatrics 1994;93:913-7.** Biting and non-biting dogs in Denver are compared. Biting dogs were more likely to be male, unneutered, and chained.
- **Quinlan KP, Sacks JJ. [Hospitalizations for Dog Bite Injuries \[letter\]](#) JAMA 1999; 281:232-233.** Data are provided on the 6,000 hospitalizations for dog bites in 1994, and medical care cost estimates are provided for medically treated dog bites.
- **Sacks JJ, Sinclair L, Gilchrist J, Golab GC, Lockwood R. [Breeds of dogs involved in fatal human attacks in the United States between 1979 and 1998.](#) JAVMA 2000;217:836-840.** This article lists the breeds involved in fatal attacks over 20 years. It does not identify specific breeds that are most likely to bite or kill, and thus is not appropriate for policy-making decisions related to the topic. Each year, 4.7 million Americans are bitten by dogs. These bites result in approximately 16 fatalities; about 0.0002 percent of the total number of people bitten. These relatively few fatalities offer the only available information about breeds involved in dog bites. There is currently no accurate way to identify the number of dogs of a particular breed, and consequently no measure to determine which breeds are more likely to bite or kill.

 Many practical alternatives to breed-specific policies exist and hold promise for preventing dog bites. For prevention ideas and model policies for control of dangerous dogs, please see the American Veterinary Medical Association (AVMA) Task Force on Canine Aggression and Human-Canine Interactions: [A community approach to dog bite prevention.](#) *
- **Sacks JJ, Kresnow M, Houston B. [Dog bites: how big a problem?](#) Injury Prevention 1996;2:52-4.** Annually in the United States 4.7 million people are bitten by dogs. Of these, approximately 800,000 people require medical

Contact CDC

Centers for Disease Control and Prevention,
 National Center for Injury Prevention and Control (NCIPC)
 4770 Buford Hwy, NE

Animal Welfare Community No Longer Supports Mandatory Spay/Neuter

Much has changed in the past few years.

In 2007, many animal welfare organizations supported mandatory spay-neuter in the state legislature.

By 2009, NO respected animal welfare organization supported mandatory spay-neuter when it was again introduced.

The Humane Society of the United States (HSUS) dropped its support for MSN, even though they had actively lobbied for it in 2007. HSUS said they have re-evaluated their position about mandatory spay/neuter.

The State Humane Association of California (SHAC), the state coalition of humane societies that had *sponsored* mandatory spay-neuter in 2007, dropped their support by 2009.

The American Society for the Prevention of Cruelty to Animals (ASPCA) does not support mandatory spay-neuter in fact their position statement says that mandatory spay/neuter doesn't work.

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Position Statement on Mandatory Spay/Neuter Laws

Background

Nationwide, per capita shelter intake and euthanasia have been in a steady decline for the past several decades and research indicates that the main reason for this decline is the increasing incidence of spayed and neutered animals in the pet population (Zawistowski et al., 1998; Irwin, 2001; Clancy & Rowan, 2003). In fact, the veterinary community recently formally acknowledged the importance of safe, efficient, accessible sterilization programs as the "best antidote to the mass euthanasia of cats and dogs resulting from overpopulation" (Looney et al., 2008). There is, however, variation in the trend in shelter intake and euthanasia decline across communities as well as a difference between that for dogs and cats. As a result, many communities are currently searching for methods to reach the segments of the animal-owning population that are still contributing disproportionately to companion animal overpopulation. Attempts to reduce shelter intake and euthanasia through the passage of legislation mandating the spaying and neutering of companion animals has recently garnered much attention and debate.

To the knowledge of the ASPCA, the only method of population control that has demonstrated long-term efficacy in significantly reducing the number of animals entering animal shelters is the voluntary sterilization of owned pets (Clancy & Rowan 2003; FIREPAW, 2004; Secovich, 2003). There is also evidence that sterilizing very specific, at-risk sub-populations of companion animals such as feral cats and animals in shelters can also contribute to reductions in overpopulation (Zawistowski et al., 1998; Clancy & Rowan 2003; Levy et al., 2003; Lord et al., 2006; Natoli et al., 2006). In contrast, the ASPCA is not aware of any credible evidence demonstrating a statistically significant enhancement in the reduction of shelter intake or euthanasia as a result of the implementation of a mandatory spay/neuter law.

The California Veterinary Medical Association (CVMA) that had *sponsored* mandatory spay-neuter in 2007 no longer does so.

The American Veterinary Medical Association (AVMA) issued a position statement opposing all mandatory spay/neuter laws

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EXECUTIVE BOARD COVERAGE

AVMA: Mandatory spay/neuter a bad idea

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The AVMA policy on "Dog and Cat Population Control" has been revised to express the Association's nonsupport for regulations or laws mandating spay/neuter of privately owned, nonshelter dogs and cats.

The Animal Welfare Committee recommended the changes to the policy, which reads, in part, as follows: "The AVMA does not support regulations or legislation mandating spay/neuter of privately owned, non-shelter dogs and cats. Although spaying and neutering helps control dog and cat populations, mandatory approaches may contribute to pet owners avoiding licensing, rabies vaccination and veterinary care for their pets, and may have other unintended consequences."

The policy was adopted in November 2004 and considered by the AWC in accord with the five-year review directive. After review and discussion, committee members agreed that the AVMA should not support regulations or legislation mandating spay/neuter of privately owned, nonshelter dogs and cats for a number of reasons, which were provided in the background of the recommended policy changes.

Although spay/neuter is an important part of effective population control programs, and may benefit individual dogs and cats if performed at the appropriate time, whether and when to spay/neuter specific animals requires the application of science and professional judgment to ensure the best outcome for veterinary patients and their owners. Prevention of unexpected litters; reduced incidences of some cancers and reproductive diseases; and prevention and amelioration of certain undesirable behaviors have been documented as benefits to spaying/neutering dogs and cats. However, potential health problems associated with spaying and neutering have also been identified, including an increased risk of prostatic cancer in males; increased risks of bone cancer and hip dysplasia in large-breed dogs associated with sterilization before maturity; and increased incidences of obesity, diabetes, urinary tract infections, urinary incontinence, and hypothyroidism.

There are conflicting reports regarding euthanasia rates and animal control costs achieved in communities that have enacted mandatory spay/neuter.

Mandating spay/neuter can increase canine, feline, and zoonotic disease risks because some people will attempt to avoid detection of their unaltered pets by failing to seek veterinary care.

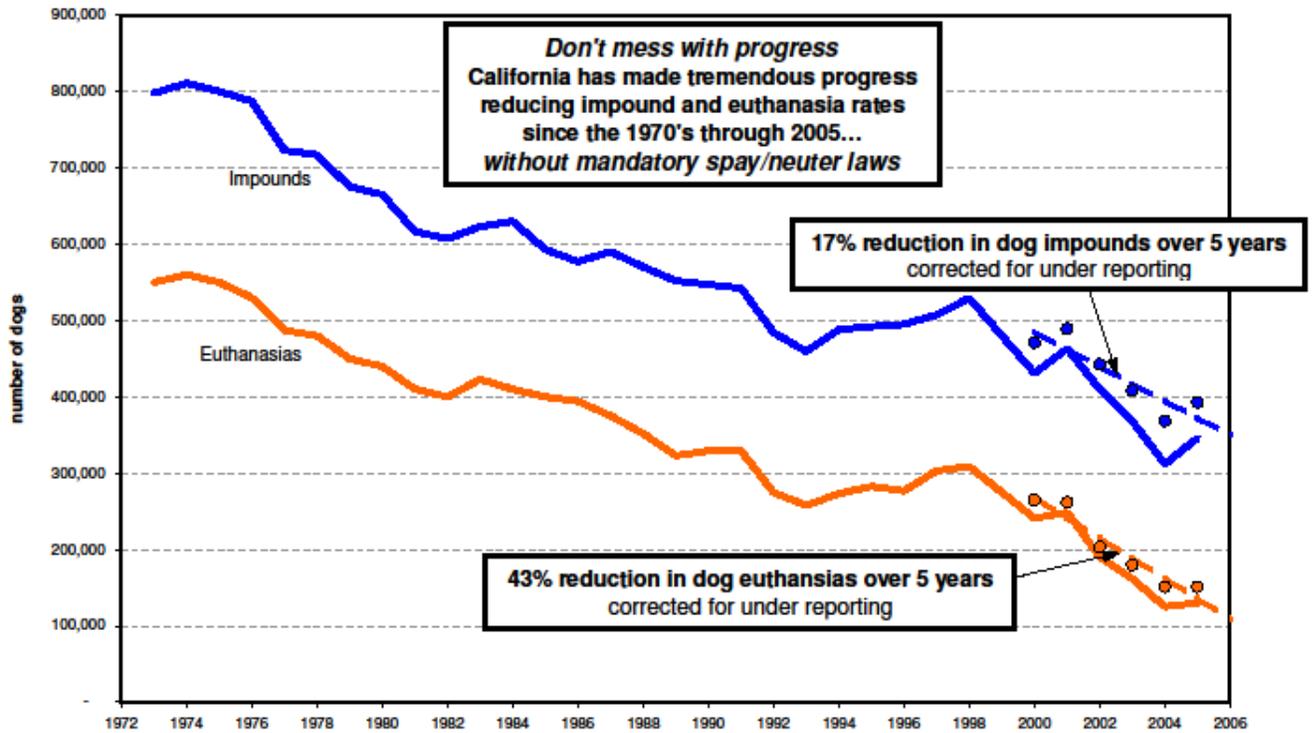
The AVMA policy on "Dog and Cat Population Control" can be read along with other Association policies at www.avma.org in the Scientific section under Policy. ³

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These animal welfare organizations changed their positions because they, like we, have studied the shelter data from jurisdictions that have mandatory spay/neuter and found it to be a failure. Consistently, the facts show that mandatory spay/neuter leads to MORE deaths of cats and dogs, and HIGHER costs to the taxpayers.

Supporters cite Santa Cruz County as their “model for the state” for mandatory spay/neuter because impound and euthanasia stats decreased there since mandatory spay/neuter passed in 1995. But these statistics have been falling all over the state even without mandatory spay/neuter, for a very long time.

California Shelter Impounds and Euthanasias for Dogs, 1973-2005
California Department of Health Services - Veterinary Public Health Section



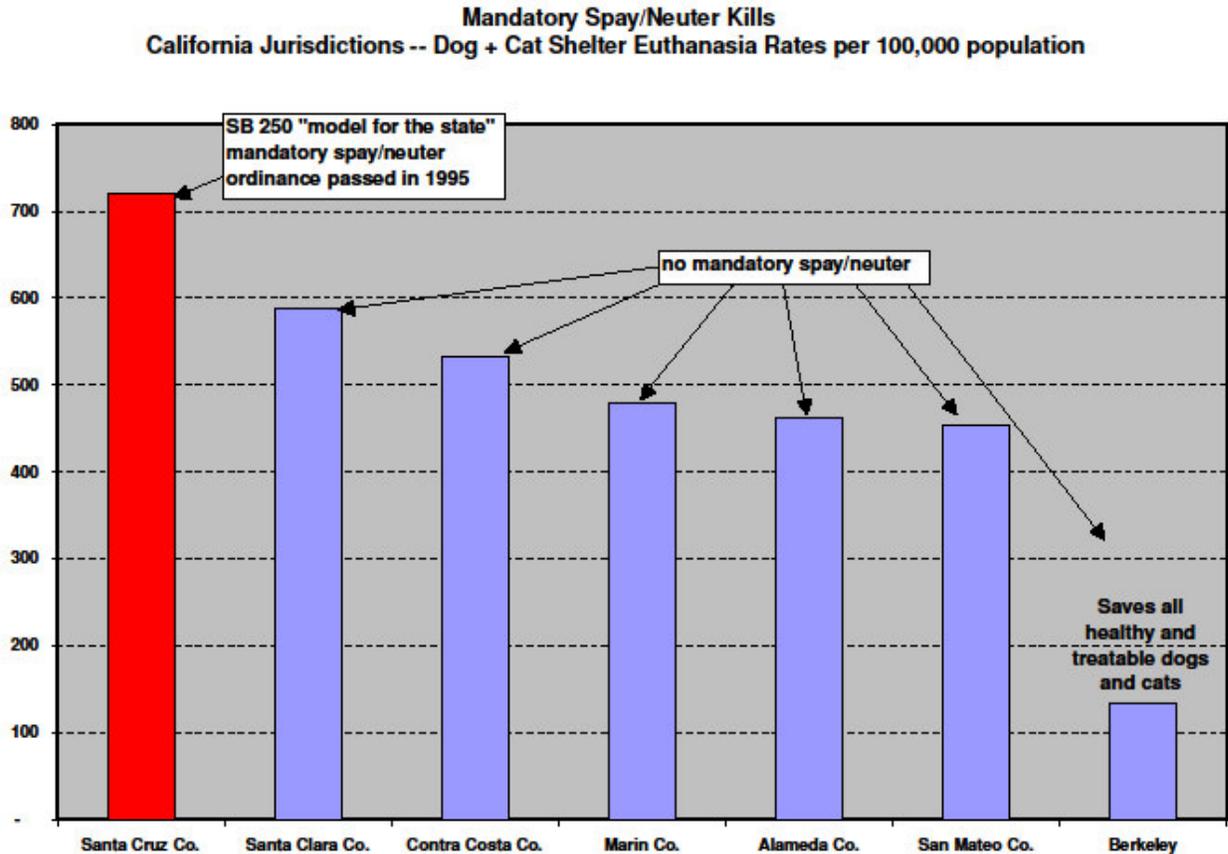
Notes:
 1) Raw data, not corrected for growth in human population
 2) 1999 omitted due to severe under reporting
 3) Source: California Department of Health Services - Veterinary Public Health Section, with assistance from NAIA and The Animal Council

Many California jurisdictions have been experiencing much faster rates of improvement of their shelter statistics than has Santa Cruz County.

Mandatory Spay/Neuter Failure in Santa Cruz County

The ASPCA says because of this sea change we need to compare mandatory spay/neuter jurisdictions to neighboring or similar jurisdictions that do not have mandatory spay/neuter.

More than 10 years after a passing mandatory spay/neuter ordinance, Santa Cruz County kills more dogs and cats per capita than nearby jurisdictions that do not have mandatory spay/neuter.

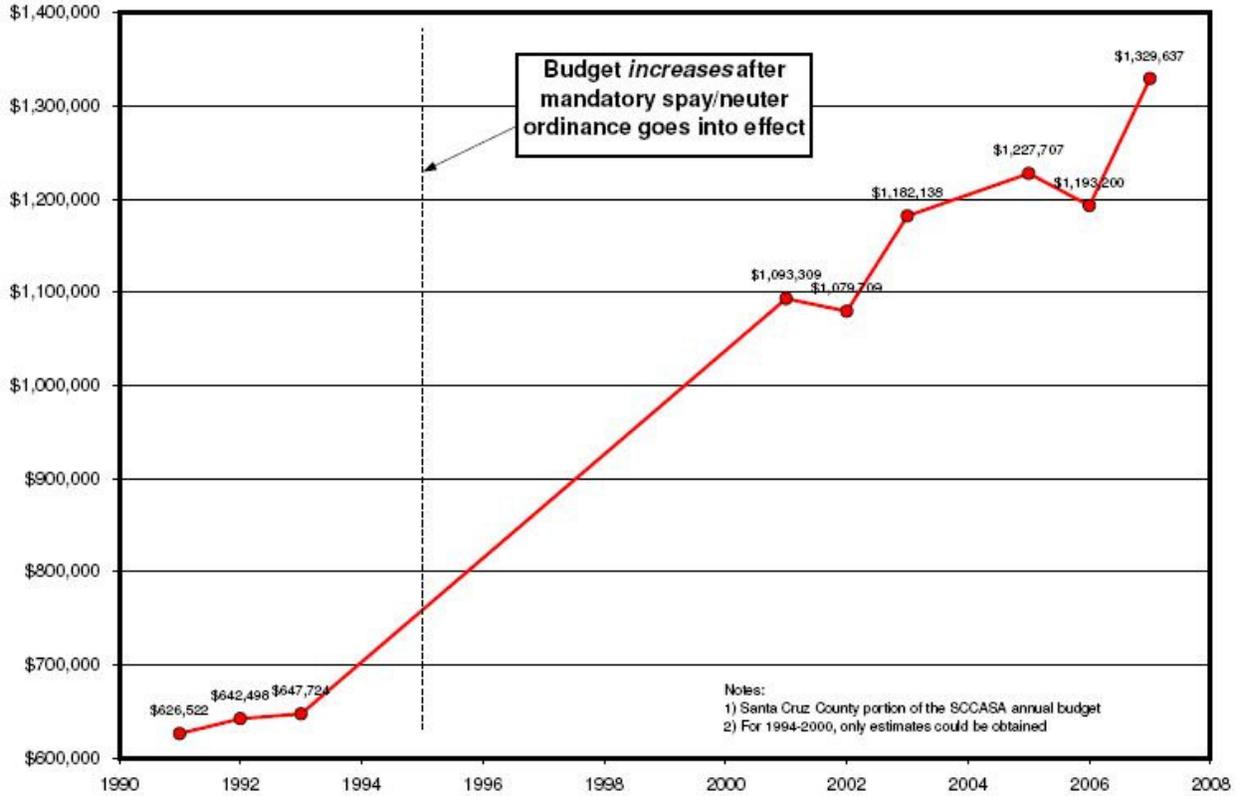


Sources: 2007 California Department of Public Health shelter statistics, U.S. Census Bureau projections for current population of California cities and counties

Mandatory Spay/Neuter Increases Animal Control Costs

Since Santa Cruz County passed mandatory spay/neuter in 1995, animal services costs have doubled.

Santa Cruz County Animal Services Budget

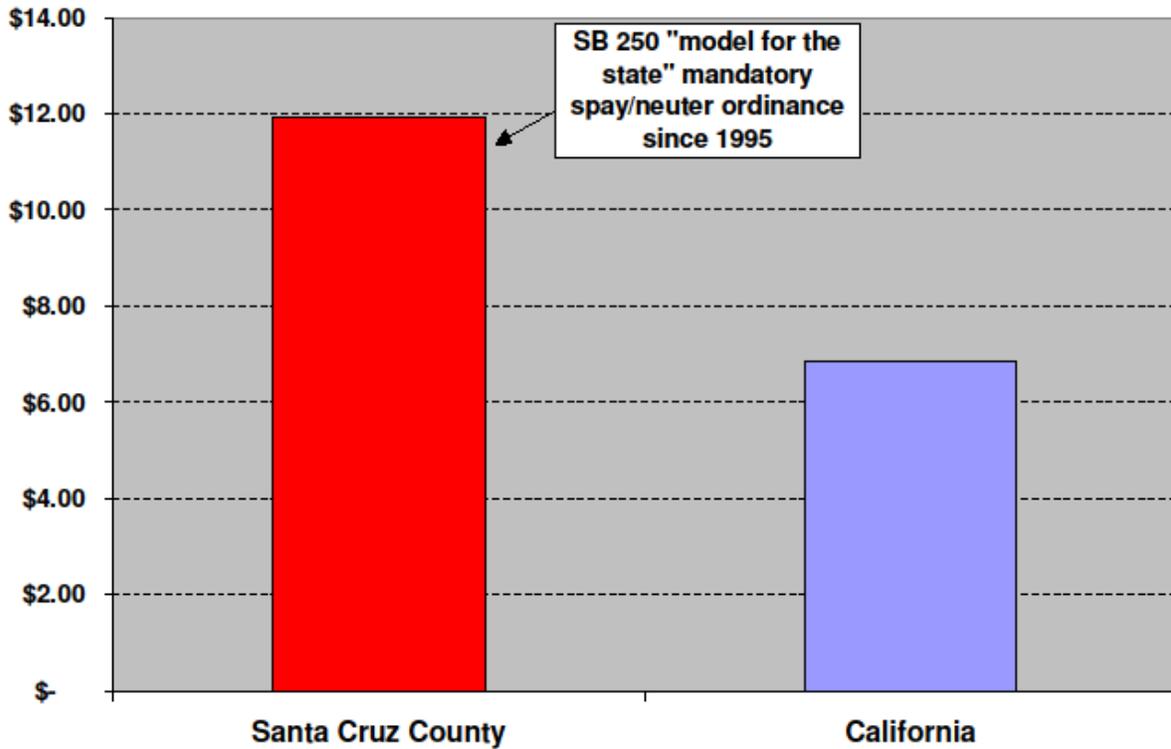


Source: County of Santa Cruz budgets per State Controller County Budget Act, provided by Teresa Johnson; Courtesy of the National Animal Interest Alliance

On a per capita basis, Santa Cruz County's Animal Services budget is now **74% higher** than the California statewide average.

Mandatory spay/neuter kills more pets AND costs the taxpayers more money.

Mandatory Spay/Neuter is Expensive Annual Animal Control Costs, per capita



Sources: Senate Local Government Committee SB 250 bill analysis (\$249 million annual cost of animal services in CA), Santa Cruz Sentinel (\$3 million annual budget for Santa Cruz Co. Animal Services), U.S. Census Bureau current population projections

Mandatory Spay/Neuter Failure in Los Angeles

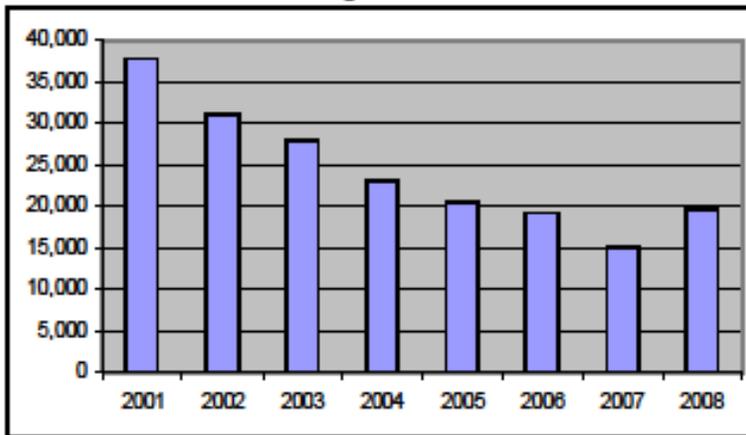
At the urging of the proponents of MSN the City of Los Angeles imposed mandatory spay/neuter in early 2008. In 2008, shelter euthanasias in Los Angeles shot up 24% for dogs and 35% for cats, reversing many years of steady progress.

Los Angeles Animal Services - 2008 Statistical Report

Cat and Dog Euthanasia

The 2008 euthanasia rate for dogs and cats rose 30% compared to 2007. When normalized to account for the 20.5% increase in intakes the euthanasia rate rose 3.02%. Years 2006 through 2008 are the three lowest euthanasia rates in the Department's history. The worst year was 1971 when 110,835 animals were euthanized.

Table 7: Annual Cat and Dog Euthanasia Rate

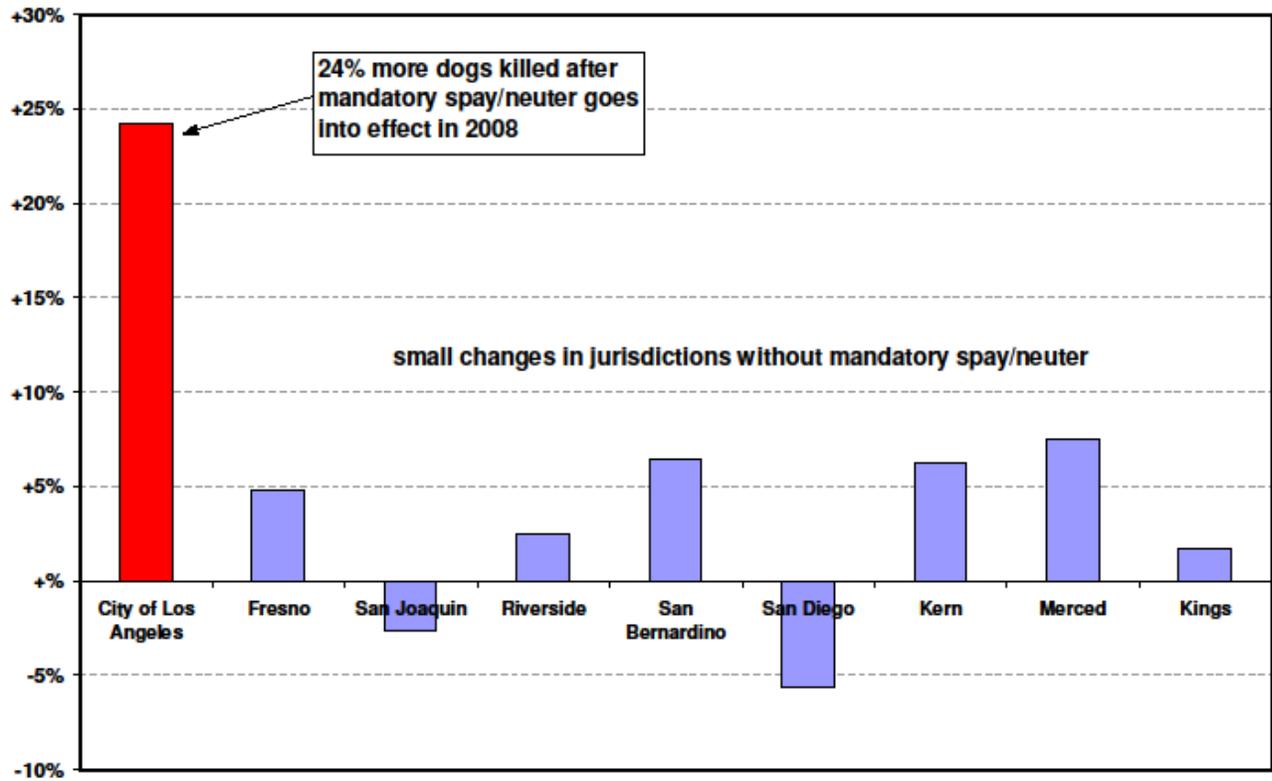


Dog & Cat Euthanasia	
2001	37,818
2002	31,151
2003	27,955
2004	23,111
2005	20,561
2006	19,226
2007	15,009
2008	19,617

<http://www.laanimalservices.com/PDF/reports/annual/2008%20Statistical%20Report%20LA%20Animal%20Services.pdf>

Los Angeles Animal Services blames the bad economy for the increase in shelter euthanasias, but other California counties with similar or higher unemployment rates did not experience such a large increase in 2008.

Change in Dog Euthanasias, 2007 to 2008 California Public Animal Shelters



Sources: California Department of Public Health, Los Angeles Animal Services

Opponents of the Los Angeles mandatory spay/neuter ordinance predicted this result.

Why Mandatory Spay/Neuter Kills More Pets

Everyone on both sides of this debate acknowledges that voluntary spay/neuter has been a key reason why shelter euthanasias have fallen nationwide over the past 30 years. It seems intuitive that if voluntary spay/neuter has helped, that mandatory spay/neuter will also help. But it doesn't work out that way.

Mandatory spay/neuter laws have the unintended consequence of causing more shelter impounds and killing because they fall hardest on the poor. Surveys show that nearly 90% of owned pets are spayed or neutered, but that this falls to about 50% among the poor. When asked, the main reason the poor give for not spaying and neutering their pets is the high cost of the surgery, generally \$200 to \$500 depending on the gender and size of the animal.

Free or low cost, and accessible, voluntary spay/neuter programs have been successful in helping low-income pet owners and further reducing shelter impound and euthanasia rates.

Compelling low-income pet owners to spay or neuter their pets through a mandatory spay/neuter law does not make them any more capable of paying for the surgery.

When a low-income person has their pet impounded for whatever reason, the more expensive it is to recover their pet from impound the less likely they will be able to afford it. Mandatory spay/neuter imposes an additional reason to impound a pet, and it imposes an additional financial burden to recover a pet from impound – the cost of the surgery. As a result, more pets are impounded, and more impounded pets end up being relinquished to shelters rather than reclaimed. Since over 80% of relinquished pets end up being killed, this becomes a conveyor belt to death.

Mandatory spay/neuter laws backfire, and become unintended vehicles to take pets from low-income families -- and kill them.

With the economic recession, many more people are finding themselves in a financial situation where they cannot afford the cost to spay or neuter their pets. They are struggling to put food on the table and pay the mortgage.

Progressive democrats generally do not support policies that fall hardest on the poor, but that's exactly what mandatory spay/neuter does. San Francisco pet columnist Christie Keith discusses this in her column "*There's nothing progressive about mandatory spay/neuter*"



Your Whole Pet - Christie Keith

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There's nothing progressive about mandatory spay/neuter So why do Democrats keep voting for it?

By Christie Keith, Special to SF Gate
Tuesday, June 9, 2009

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When did the party of "Yes, we can!" become the party of "No, you'd better not" when it comes to dogs and cats?

IMAGES



Courtesy of Christie Keith

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As a lifelong liberal I can't fathom why Democratic lawmakers hold the positions they do with regards to animal legislation. Take SB 250, a statewide mandatory spay/neuter bill passed by the California State Senate last week. Only one Democrat, Sen. Lou Correa of Santa Ana, voted against the bill, and no Republicans voted for it. It's now headed to the Assembly, where it stands a good chance of becoming law. Last year's version of this same bill, [AB 1634](#), was approved by the Assembly before being defeated in the Senate.

SB 250 calls for the mandatory sterilization of dogs and cats, with the hope of reducing the number of animals who end up -- and often die -- in California's shelters. But it doesn't really accomplish that goal, and what it does should worry anyone who cares about animals, but especially progressives.

Under the bill, every California pet owner must obtain a license to keep a dog or cat who hasn't been sterilized, a license that can be revoked if the owner [violates](#) a number of animal laws -- not just big ones like animal cruelty and neglect, but little ones, like letting your dog stand next to your car in a beach parking beach without his leash on. If that happens, you can be forced to spay or neuter your pet, unless a veterinarian certifies that the animal would "suffer serious harm or death if surgically sterilized." If a pet owner can't afford that option or refuses to comply, the animals can be seized and sterilized or even killed at taxpayer expense.

It's easy to see why libertarians and conservatives would object to such a law; asking the government if your cat can keep her uterus isn't something they'd be likely to support, and in all honesty, lifelong liberalism aside, neither do I.

Although it's being sold as a cost saving measure, the California Legislative Analyst's Office [determined](#) that SB 250 would increase animal control expenses at the state and county levels, especially in the short run, although they weren't able to put a dollar amount on that increase.

The fact that a bill will cost taxpayer money wouldn't normally be a deal breaker for the Democrats. But the economic problems with this bill aren't limited to its costs for governments. Mandatory spay/neuter laws like SB 250 should be anathema to progressives and liberals because they target

poor people and leave the wealthy virtually unaffected.

Both the [American Society for the Prevention of Cruelty to Animals \(ASPCA\)](#) and the [Association of Pet Product Manufacturers](#) report that nearly all family pets are already spayed or neutered -- except those belonging to poor people.

While spay/neuter rates among pets owned by middle and upper income people approach 90 percent, only 53 percent of pets owned by poor people are spayed or neutered. The majority of lower income owners say they want to alter their pets but either can't afford to pay for the surgery and/or can't get their pets to a facility that will do it.

In many communities, no form of public or private assistance is available to defray the cost of spay and neuter surgeries, which range

from less than \$100 for a cat to \$900 for a very large dog, depending on local veterinary rates. And for people without a car, simply transporting pets to clinics or hospitals can be nearly impossible.

The progressive solution would be to fund free and accessible spay/neuter for people who want to alter their pets but can't afford the procedure. That's what happened in New Hampshire, which subsequently saw its shelter intake numbers plummet and its euthanasia rate drop by 75 percent. Many California communities, including San Francisco, have done the same, with similar results.

In California's current economic climate, however, funding that sort of service statewide is unthinkable, and SB 250 contains no provision for providing low cost, accessible care for the pets of poor people. Instead it forces low-income families to obtain a veterinary procedure they cannot afford while imposing penalties and fees, all under the threat of having to surrender the pet to animal control authorities -- during a recession, no less.

SB 250 also creates a terrible situation for feral, stray, homeless and community cats. Hint to California lawmakers: No one owns these cats. But under SB 250, many of the people who feed and care for them are considered to be their owners, and would therefore be required to have the cats altered.

If you've ever tried to catch a feral cat or even a frightened pet cat, you might have sympathy for anyone trying to comply with such an order. Besides, when did criminalizing compassion become a progressive cause?

Don't misunderstand: I support programs that trap the cats, alter them and release them into managed colonies located away from areas that are ecologically sensitive. But SB 250? Bad for people, and bad for cats.

If you don't believe me, believe [Alley Cat Allies](#), the nation's leading advocate for feral and stray cats, which says, "Caring for stray and feral cats should be encouraged; but tragically, this bill would mean the very people doing the most to help cats would be breaking the law."

Mandatory spay/neuter laws also violate another important progressive value: choice. Why do Democrats, who vehemently defend a woman's right to make her own medical decisions in consultation with her doctor, ignore the findings of the American Veterinary Medical Association, which [opposes](#) mandatory spay/neuter on medical grounds?

While spay/neuter surgery is the right choice for most pet dogs and cats, it nonetheless carries [some health risks](#). Those begin with the small risk of death from anesthesia or surgical complications, but they don't end there.

In a [paper](#) published in the Journal of the American Veterinary Medical Association, Margaret V. Root Kustritz found that surgical sterilization of dogs and cats can increase many health problems, including the painful, costly and fatal disease known as osteosarcoma, a bone cancer.

Though the risks are small and most owners will (and do) opt for the surgery, isn't the obvious liberal position that it be a matter of choice, reached after discussion with the pet's veterinarian, rather than forced on them by lawmakers in Sacramento who have never seen their pet and are, by the way, not veterinarians?

Of course, it's consistent with progressive ideals to prevent animal suffering and death; we all want that. But the American Society for the Prevention of Cruelty to Animals, in a recent [policy statement](#) on mandatory spay/neuter laws, states that they are "not aware of any credible evidence demonstrating a statistically significant enhancement in the reduction of shelter intake or euthanasia as a result of the implementation of a mandatory spay/neuter law."

Democrats recently swept to national power on a populist wave of community empowerment. President Obama campaigned that we should "assume the best in people instead of the worst." He also promised to "go line by line to make sure that we are not spending money unwisely," and pledged in his inaugural address that he would end programs that don't work.

With that in mind, I'd like to ask Democrats in the Assembly to consider something before they vote on this bill: Why would we, as progressives, align ourselves with a law that targets the poor, criminalizes compassion, and takes away medical choice from pet owners and their veterinarians?

California's Democratic lawmakers can save the lives of animals and cut costs without hurting people or violating progressive values. They can vote against SB 250 and for [Assembly Concurrent Resolution 74](#), which urges the adoption of a set of programs that have worked in communities across the country to lower shelter intake and deaths while saving money -- without punitive legislation or putting an unfair burden on low income pet owners.

It's non-binding, so it won't cost the state a cent. In fact, the programs it espouses, such as low-cost spay/neuter programs like the one adopted by New Hampshire, usually result in cost savings in the communities that implement them. And its passage would signal that the days of Democratic support for regressive, uncompassionate and ineffective animal legislation are over.



Issue Analysis: Why Mandatory Spay/Neuter Laws are Ineffective

No dog should ever go unloved or unwanted. Stories of dogs being relinquished to shelters break the hearts of every dog lover.

These issues are the result of a variety of causes. National research organizations have reported that the majority of unwanted dogs in the United States come from owners who are unable or unwilling to train, socialize, and care for their dogs.

As part of encouraging responsible dog ownership, the American Kennel Club (AKC) urges pet owners to spay and neuter their dogs if they do not want to participate in AKC dog shows or performance events or use them in a responsible breeding program. The AKC supports public education programs that teach future pet-buyers and help current

mandatory sterilization policies.

Identifying the Problem

Although MSN may sound like a logical solution to the problem of unwanted dogs, they only address a symptom of the problem. A truly effective solution will require addressing this larger issue.

National studies and anecdotal experiences of shelters across the country demonstrate that economics also plays a significant role in animal relinquishment. Unemployment, tighter budgets, and other monetary concerns including unexpected relocation all contribute to families to giving up pets.

As communities recognize that there are irresponsible dog owners who do not properly train their dogs and who allow

basic animal control laws they are already tasked with enforcing.

Many communities that enact MSN laws find that enforcement can be expensive. A mandatory spay/neuter law enacted in Dallas, Texas, in 2008 resulted in a 22 percent increase in animal control expenditures, as well as an overall decrease in licensing projected to reduce revenue by \$400,000. The City of Santa Cruz, California, experienced a 56% cost increase over the first 12 years of implementation. The City of Los Angeles' budget ballooned from \$6.7 million to \$18 million following implementation. Similar increases in animal control costs following the establishment of mandatory spay/neuter laws have been experienced in communities

“Nearly one in every two families in the United States has a dog, generating a significant demand for well-bred puppies.”



BULLDOG- ISABELLE FRANCAIS FOR AKC

dog owners understand the great responsibility that comes with dog ownership.

Some policymakers and groups assert that the solution is mandatory spay/neuter (MSN) laws. The AKC disagrees. Unlike voluntary programs, mandatory spay/neuter laws have proven to be ineffective. Numerous studies have found they result in significant cost increases and many other unintended consequences for responsible dog owners, local shelters, and the community at large – *without addressing the real underlying issue of irresponsible dog ownership.*

For these reasons, the American Kennel Club is joined by numerous organizations including the American Veterinary Medical Association, the National Animal Interest Alliance, and the American Society for the Prevention of Cruelty to Animals in opposing

their dogs to roam or otherwise create a nuisance, it becomes increasingly evident that most problems stem from owner irresponsibility. Mandatory spay/neuter laws will not address these problems; however, they will punish law-abiding citizens who wish to keep an intact animal, while those who already neglect their responsibilities will likely continue that behavior.

Unintended Consequences

Mandatory spay/neuter laws also have a tendency to create problems for communities because they are very difficult to enforce and can be easily evaded by avoiding dog licensing.

MSN laws also greatly increase the workload for animal control officers, who must now also verify the sterilization of residents' pets in addition to the

throughout the country from Colorado to North Carolina to Washington.

Mandatory spay/neuter policies prove expensive for the public as well. When these laws are established, many cities find that their publicly-funded low-cost spay/neuter programs cannot meet the demand, which forces dog owners to pay full price for the procedure. This can be a huge financial burden for low-income dog owners, who may ultimately be forced to choose between harboring an illegal unsterilized dog and turning it over to a shelter because they cannot afford the procedure.

Unintended broader public health and safety consequences should also be considered. The American Veterinary Medical Association's "Dog and Cat Population Control" policy notes that the mandatory nature of these laws may

Continued on next page

result in pet owners avoiding rabies vaccinations and other general veterinary care in order to hide their lack of compliance.

Another disturbing trend arises when these laws prevent responsible breeders from being able to breed and raise quality family pets. Nearly one out of every two families in the United States has a dog. This generates a significant demand for well-bred puppies. Responsible breeders are committed to raising healthy purebred dogs and provide the opportunity for local residents to purchase a quality dog from an expert in the breed who is also knowledgeable about the needs, temperament, and background of the puppy offered for sale. These breeders help potential new owners understand the breed and ensure that a prospective buyer is a good lifestyle fit with the new puppy.

If responsible breeders are forced out of business, those who wish to purchase a purebred dog are forced to seek other avenues. This may include buying puppies over the Internet, where the dogs may be imported from countries with fewer health and safety standards than the United States. Anecdotal evidence has shown a significant increase in the number of dogs being transported into the country, with little to no veterinary oversight and care before the dogs are given to the new owners. A number of these dogs have become seriously ill with diseases such as rabies that are dangerous to both the dog and humans.

Why Exemptions Aren't Enough

Sometimes, instead of an outright spay/neuter mandate, lawmakers will opt to enact laws with stricter regulations on those who choose to not sterilize their dogs. Intact animal permits and differential licensing require those who choose not to sterilize their dogs to obtain a license that is often significantly more expensive than those for sterilized dogs. Some communities do not require licenses unless a dog is intact. Other policies provide exemptions for owners whose dogs are listed with a nationally-recognized registry.

These policies, including exemptions,

punish responsible dog owners simply because they choose to own an intact dog. Responsible dog breeders and owners have a right to own an intact dog if they so choose without being subject to regulations beyond those of other dog owners.



SOFT-COATED WHEATEN TERRIER- MARY BLOOM © AKC

“Public education about responsible dog ownership improves public safety, reduces economic burdens on a community, and preserves the rights of dog owners – all while helping dog owners learn how to care for their pets.”

The AKC encourages dog owners to sterilize their pets unless they wish to participate in responsible breeding programs, performance events, or AKC conformation dog shows. As conformation shows are ultimately designed to judge the quality of breeding stock, all dogs entered into these events must be intact. Mandatory spay/neuter defeats the whole purpose of traditional dog shows!

Some laws offer exemptions to MSN policies for “show dogs”. However, this exemption misses the point that spaying/neutering should be an individual decision made by an owner, not forced by the state. It is also very difficult to prove whether or not a dog is being kept for exhibition. Some mandatory spay/neuter schemes require a dog to be shown at least once a year in order to be exempted from the sterilization policies, but not all breeders show all their dogs every year. In addition, many breeders choose to breed their female show dogs after they have finished showing them to their championships. Other owners may choose to see how a dog develops before making a decision about whether to show

the dog. There are many valid reasons for an exhibitor not to show a dog every year, and this choice should be respected.

What's the Solution?

Targeting the issue of irresponsible ownership is the best solution for addressing dog-related issues in a community. This begins with gathering data about the extent and nature of a possible problem in a community. Does the community have reliable statistics on unowned or unwanted animal populations? Does the community currently have comprehensive animal control statutes to address at-large dogs, nuisance dogs, and stray animals? If so, how are they enforced?

Does enforcement include appropriate fines and penalties? Does the community need additional support to enforce these laws? If existing laws are not being followed or enforced, then adding more laws will not improve the situation.

Communities may also want to consider encouraging private organizations to provide/subsidize low-cost

spay/neuter clinics to help give low-income individuals the opportunity to sterilize their dogs if they wish.

One of the most effective ways to ensure compliance is through strong public education programs. These programs cover the basics of responsible dog ownership and local dog laws. The American Kennel Club has a wealth of materials to help shelters, community organizations, schools, and other public organizations educate the public about responsible dog ownership. The AKC also provides resources through thousands of local kennel clubs, located in all 50 states, who are willing to assist local leaders in designing and implementing positive canine education programs.

Addressing irresponsible dog ownership through strict enforcement of animal control laws and strong public education programs are effective and cost-efficient ways to address animal control issues. Public education about responsible dog ownership improves public safety, reduces economic burdens on a community, and preserves the rights of responsible caring dog owners – all while helping dog owners learn how to care for their pets.



AMERICAN
KENNEL CLUBSM

MANDATORY SPAY/NEUTER LAWS

BACKGROUND:

Mandatory spay/neuter laws are usually considered by state and local governments in response to animal control concerns in the community. Proponents believe that mandatory spay/neuter laws will reduce the number of animals at the local shelters and strays roaming in neighborhoods. However, these laws have not proven an effective solution to animal control concerns and punish responsible breeders.

POINTS TO CONSIDER:

- **MANDATORY SPAY/NEUTER LAWS ARE INEFFECTIVE**
Mandatory spay/neuter laws have not proven effective in reducing shelter populations. In fact, some shelters have seen an increase as owners choose to leave their dogs at a shelter if they are unable to pay the costs associated with having their dog spayed or neutered. Moreover, many national research organizations have reported that the majority of unwanted dogs in the United States come from irresponsible owners who are unwilling to train, socialize, or care for their dogs. Imposing a mandatory spay/neuter law will not resolve the issue of irresponsible ownership.
- **MANDATORY SPAY/NEUTER LAWS ARE DIFFICULT TO ENFORCE**
Mandatory spay/neuter laws are extremely difficult to enforce and can be evaded by irresponsible animal owners. Mandatory spay/neuter laws often result in a decrease in the number of dogs licensed, because some individuals choose to not license their animals in order to avoid spaying and neutering their pets.
- **MANDATORY SPAY/NEUTER LAWS ARE COSTLY TO THE COMMUNITY**
Mandatory spay/neuter laws greatly increase the work load of animal control offices, many of which are already strained financially. Animal control offices also find they are euthanizing more animals at the taxpayer's expense, because some owners choose to leave their animals at the shelter rather than complying with the law. A mandatory spay/neuter law also communicates the message that the municipality is not "dog friendly" and sends a strong message that AKC events, which generate a significant amount of revenue for the local economy, are not welcome in the community.
- **MANDATORY SPAY/NEUTER LAWS ARE UNFAIR TO RESPONSIBLE DOG OWNERS**
Mandatory spay/neuter laws target all dog owners, regardless of their level of responsibility or the behavior of their animals. The AKC believes responsible owners have a right to use their own discretion in determining whether to alter their animals. In addition, these laws would restrict the rights of numerous responsible breeders who breed and raise purebred dogs for the purpose of showing. These breeders make a serious commitment to their animals and to ensuring the future health, welfare and breed type of their individual breeds. The AKC believes the decision to spay/neuter is best left to responsible owners in consultation with their veterinarian.

A BETTER SOLUTION IS AVAILABLE

Rather than impose a mandatory spay/neuter law on all dog owners, governments should instead focus on enforcing effective animal control laws and increasing public education efforts. Strongly enforced regulations such as leash laws would prevent irresponsible owners from allowing their pets to run loose, which can lead to accidental breeding. A strong public education campaign teaches community residents how to properly care for their pets and the importance of being a responsible pet owner. The American Kennel Club, as well as many local dog clubs, can assist communities in developing effective animal control laws and public education programs that address the issue of irresponsible ownership while still protecting the rights of responsible owners and breeders.

KC DOG BLOG

Unofficial Watchdog on Animal Welfare Issues

March 18, 2008

BSL/MSN in San Francisco (Part 2 of 4)



After California's state law prohibiting Breed Specific Legislation from being enacted was changed, to allow for cities to create breed specific mandatory spay/neuter policies, San Francisco became the first city in the country to enact a breed-specific spay/neuter program, mandating that all "pit bulls" be spayed or neutered.

The ordinance went into affect February 1, 2006. So with 2 years under its belt, I thought I'd call the San Francisco Animal Control to see how the law was doing.

The San Francisco ordinance has gotten a lot of publicity. Last August, [a story came out in the San Francisco Chronicle talking about how the sterilization law was a success](#) -- noting that the city had impounded 21% fewer "pit bulls" and the number of 'pit bulls' euthanized had dropped 24%. It is also noted in this article that the law went into affect after 12 year old Nick Fabish was attacked and killed when he apparently tried to break up the two "family pit bulls" while they were mating in the house and he was home alone.

Also using only percentages, [the city's animal control office](#) also announced that total bites by "pit bulls" had gone down from being 32% of all bites to making up only 11% of all bites in the first half of the year...although noting that total dog bites had more than doubled in the first 6 months of last year but Carl Friedman advised that the other bites didn't pack the "punch" of pit bull bites and that most of the bites were believed to be minor.

So with all that in mind, I called and asked for the exact numbers myself to find out what is really going on in San Francisco with their law.

What I received back was exactly what I requested. No more. No less. So if you have more questions than this feel free to ask, but I may or may not be able to break down the data further. I also won't try to explain the percentages in the articles quoted above...for the life of me I have no idea where they came from based on the numbers I've gotten.

The numbers I've been given are from 7/01/04-1/31/06 -- the 19 months leading up to the February 1, 2006 start date for the ordinance. I also have the numbers from 2/1/06-8/15/07 -- so the 18 1/2 months following the passing of the ordinance. When it seems appropriate (when the numbers are big enough), I'm going to use the 1/2 month average for bites/euthanasias to project those last 15 days so we're comparing equal timelines. In these cases, I'll give my real number, but put the projected number in parenthesis).

Public Safety

Since my number one goal stated yesterday was protecting people from dogs, and because the ordinance was passed following a major 'pit bull' attack, I'll start with the dog bite numbers.

Bite numbers for the 19 months prior to the BSL/MSN:

Total: 596

Mastiff-Type dogs: 151

(Mastiff Types, by SFAC's definition includes 'pit bulls', St. Bernards, Boxers, Bulldogs, Shar Pei, Rottweilers and Great Danes -- and all their mixes)

Pit bull types and their mixes: 120 (all included) in the 152 above

210 of the bites were listed as "unknown."

So "pit bulls" made up 20% of the total bites pre BSL/MSN. Mastiff types made up 25%.

In the 18 1/2 months following BSL/MSN (19 month projections in parenths):

Total bites: 657 (676)

Mastiff Type Bites: 151 (155)

"Pit Bulls and Mixes": 102 (105)

So in comparison:

"Pit Bulls" made up 16% of the total bites, Mastiff types made up 23%.

"Unknown bites" went up to 275.

So, after the ordinance:

Total bites went up 13.4%

"Mastiff-type" dog bites went up by a total of 4 bites.

"Pit bull" bites (a subset of the Mastiffs) went down by 15 bites.

Impounds and Euthanasia

The second reason people give for passing this type of ordinance is because they are trying to control their shelter killing -- of which 'pit bulls' make up a large percentage of. So the following are the impound and euthanasia numbers for the two time periods discussed:

19 Months pre-MSN

Impounds for all Dogs: 3,804

Impounds for 'pit bulls: 1,246

Total Dogs Killed (Euthanasia): 1,156

"Pit bulls" killed: 702

So 'pit bulls" made up 33% of all impounds and 61% of all dogs killed in the 19 months prior to the ordinance. Euthanasia rate is 30% for all dogs, 56% for "pit bulls".

19 month post BSL/MSN

Impounds for all dogs: 3,720 (3,826)

Impounds for "pit bulls: 989 (1,017)

Total dogs killed: 995 (1,023)

Pit bulls killed: 576 (592)

So 'pit bulls" made up 27% of all impounds and 58% of all dogs killed post ordinance. Euth rate is 26% for all dogs, and 58% for "pit bulls".

In total, total dogs killed dropped 3%.

Total 'pit bull' type dogs killed dropped 16%

Total non-pit bull dogs killed decreased 1%.

Tomorrow. We'll look at Kansas City.

Posted at 06:44 AM in [BSL/MSN](#) | [Permalink](#)

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Comments



In the first set of bite numbers, Mastiff types and 'pit bull' types are listed separately, yet it says that 'pit bull' types are considered Mastiffs.

Am I reading this incorrectly?

Posted by: [Caveat](#) | [March 18, 2008 at 08:56 AM](#)



Oops, yes I was - although 'pit bull' is included in Mastiff type (but not a lot of other well known Mastiffs..) they've separated them into a sub-category.

Need more coffee.

Posted by: [Caveat](#) | [March 18, 2008 at 08:59 AM](#)



Yeah -- they group them in as "mastiff-type" dogs. I wanted to show both sets of numbers because while the bite numbers for 'pit bulls' have gone down slightly, the bite numbers for the bigger group of large dogs has not...which would be counter (in theory anyway) to Friedman's claim that while the bites are going up, they are less severe. And this is just this one group of dogs -- while bites of other groups have gone up also and we all know that many types of dogs have the ability to create severe problems under the wrong circumstances.

Posted by: [Brent](#) | [March 18, 2008 at 09:02 AM](#)



Since when are pit bulls considered Mastiff types? Oh yeah, since OH decided 16 different breeds were considered pit bulls...

I've said it before I'll say it a million more times before I die...You're not going to get any other correlation than bites by breed if you're ONLY tracking bites by breed. This is like tracking

KC DOG BLOG

Unofficial Watchdog on Animal Welfare Issues

March 21, 2008

BSL/MSN San Francisco (part 3.5 of 4)

I should know better than to put a finite number for a series. Someone always has something even better to share that justifies its own post. This one is well worth a 3.5 and breaking into the series.

So on Wednesday, after my post about San Francisco, I got an email from Terry Houston, PhD. Terry Houston has written two separate reports on the San Francisco BSL/MSN that are quite interesting. I've gotten them posted on the [KCDA Website](#) for everyone to be able to view. They're well worth the fairly lengthy read.

The first article was written, specifically covering dog bites during 2003 and 2004. In the report, Houston analyzes dog bites by breed, gender and reproductive status of the dog, age of the dog, severity of the bite, gender and age of the victim, and zip code. The report was given to the San Francisco Animal Control group prior to them passing the law mandating the spay/neuter of 'pit bulls'. There are a couple of paragraphs that I think are particularly important, so I will pull them out here.

Of the 75 breeds of dog identified in the 435 bite reports, 73% (289) were labeled as mixed. The city of San Francisco may have a larger percentage of mixed bred dogs than the reported estimate of nearly 40% of the dog population in veterinary caseload studies (4, 8). A national survey put the percentage of mixed bred dogs at 51% (9, 10). The identification of such a large number of mixes in the population raises the question of accuracy when identifying dog breeds. Certain mixes may yield dogs that look like "pitbulls" but are in fact not. A dog that is part Australian Cattle dog and part Labrador could easily be labeled a "pitbull" mix. A German Shepherd dog and a Greyhound mix may be labeled the same, particularly if the dog is a "brindle", a color associated with "pitbulls" but is not uncommon in other breeds. The dog may be called a "pitbull"- German Shepherd mix based on coat color alone. Breed identification is very subjective unless the parents of the dogs are known or the dogs are registered with a national registry. Several generations of breeding mixed breed dogs with other mixed makes identification of the specific dominant breed problematic.

One other note is that 87% of all of the dog bites covered were considered minor. This will be fairly important in tomorrow's discussion. Houston also discusses at length the issues that arose with the accuracy of the data that was being analyzed and how better, more consistent reporting is necessary for AC's to know what is going on in their departments.

In conclusion, Houston notes:

The data from the City of San Francisco indicates that mandatory spay/neuter of any specific breed based on reported bites to the city is not an effective method of minimizing dog bites...The risk from an intact dog for the moderate/severe bites shows that reproductive status is not a risk factor. The high portion of males as victims in reported bites also would indicate that bites are very much a human factor....To minimize dog bites the issue has to be addressed to all dog owners, not just particular breeds. Training and socialization of the dog are important factors to help minimize the risk of a dog bite.

Two years later, Houston did a follow-up report seeing how San Francisco's new BSL/MSN law was working. According to the numbers Houston used in the report, here are the reported dog bites for each year. The percent of bites that are listed as "unknown" (so no breed, gender or spay/neuter status is known) is listed in parenthesis. Also note that the new BSL/MSN law took affect in February 2006.

2003 -- 386 (35%)

2004 -- 312 (41%)

2005 -- 366 (36%)

2006 -- 364 (42%)

Houston's conclusions on the study:

Dog bites are more of a result of human interactions with the dog and the lack of understanding of basic animal behavior. Dogs chase things, they have natural prey drive, so are going to run after other dogs, cats and other small animals. When a person runs, walks, skates, bicycles past them, they are likely to give chase. Spaying or neutering is not going to reduce bites without addressing some of the basic problems.

Education on responsible dog ownership and emphasis on basic training, socialization and inclusion of the dog in the household will do more to reduce bites. There is a serious need to start addressing and targeting human behaviors instead of focusing just on the actions of the dogs.

The two articles are great and well worth the read. Houston also details out the issues in the accuracy of the documented data with SF AC. Take the time and check them out -- they're both available [here](#).

Tomorrow. Some of my thoughts on these case studies.

Posted at 10:31 AM in [BSL/MSN](#) | [Permalink](#)

KC DOG BLOG

Unofficial Watchdog on Animal Welfare Issues

March 21, 2008

BSL/MSN - Discussion (Part 4 of 4)

So five days this week, four posts on BSL/MSN - which is basically the mandated spay/neuter of a certain breed of dog. On Monday we looked at the idea of BSL/MSN, and I layed out my criteria for evaluation of different laws. I still think animal control laws and policies should serve one of three goals:

- 1) Protect people from animals
- 2) Protect animals from people (including shelter euthanasia)
- 3) Respect taxpayer dollars that go toward animal control

So over the past 4 days we've looked at a couple of case studies of this law -- looking at the shelter euthanasia numbers and kill numbers for the first two cities to pass mandatory spay/neuter of 'pit bull' laws. On Tuesday, we looked at San Francisco. Wednesday, Kansas City. On Friday, a different look at San Francisco.

I'll note that both of the cities that instituted the ordinance did so following fatal dog attacks in their area -- which would lead us to believe that the primary reason for the ordinances were for public safety. Although in each case, slowing down shelter killing has also been used as a reason for the ordinances. So how are they doing?

In San Francisco, bite totals remained flat from 2005 to 2006, in spite of the ordinance. However, in the 19 months preceding the ordinance compared to the 19 months following the ordinance bites went up 13%. Although 'pit bull' bites went down, the total number of serious bites and bites by "mastiff" type dogs (basically most large dogs are grouped in this grouping in San Fran) remained flat. In Kansas City, the total number of dog bites dropped 6% -- although the bites attributed to 'pit bulls' increased. Given this, I would speculate that KC's drop in dog bites is actually more due to them also increasing the budget for more animal control officers (KCMO only responded to 20% of their AC calls in 2005) than the actual ordinance itself given that the one grouping of dogs affected by the ordinance actually had more bites attributed to them.

Based on these numbers, there is very little evidence that in the early stages of the BSL/MSN that the ordinance is improving public safety.

Meanwhile, animal euthanasia numbers are also interesting.

San Francisco saw a 3% drop in total euthanasia, with euths to both 'pit bulls' and non-'pit bulls' decreasing slightly, however the percentage of 'pit bulls' that entered the shelter that were euthanized increased by 2 percentage points.

In Kansas City, euthanasia rates went up 7% (450 total kills) between 2005 and 2007 after a big spike in 2006 following the passing of the ordinance. What is more disturbing is that the euth rate for "pit bulls" went up 76% following the ordinance....which is actually one of the specific problems the ordinance was supposed to cure. This leads me to believe that KCMO may be using the ordinance to confiscate pit bulls -- and that this isn't the only story where the dog was unjustly taken from its owner and killed. Taking dogs from otherwise good homes to kill them, only because they are not neutered, is NOT helping.

So the bottom line -- I'm seeing very little evidence that in the early stages of these ordinances that anything is improving in terms of public safety OR decreasing euthanasia. In fact, in each case, one of the two problems has actually become significantly worse since the adoption of the ordinance. This, tacked on to some legal issues that each city has faced due to breed ID (which ties up taxpayer dollars), it really appears as if the ordinances are NOT working. I know T.E. Houston agrees.

Meanwhile, there was something else really interesting that I picked up from doing this little exercise. In the TE Houston study, it was noted that 87% of all reported dog bites were considered minor. In Kansas City, the number ranged from about 88-92%. Of this small percentage of bites that was considered "major" (a very subjective measurement -- in fact, so subjective that the same word isn't used for it in all cases -- some cases are "severe" and others "serious" -- I've included them all in these reports) here is a list of the breed listings for the dogs involved in "serious" attacks in KCMO: Akita, Austrailian Shepherd, Border Collie, Chow Chow, Dalmation, German Shepherd, Golden Retriever, Labrador Retriever, Chinese Shar Pei, Dogue Bordeaux, Pit Bull, Rottweiler, Oldeng Sheepdog, Bull Terrier, unknown, Cocker Spaniel, English Springer, Bulldog, Bull Mastiff, Great Dane and Siberian Husky.

That's 21 different breeds that have accounted for the 104 major/serious attacks in Kansas City over the past 3 years. How was limiting one "breed" going to help?

Posted at 04:38 PM in [BSL/MSN](#) | [Permalink](#)

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KC DOG BLOG

Unofficial Watchdog on Animal Welfare Issues

June 29, 2010

Topeka, KS Considering BSL Repeal

Last week, the Topeka Capital Journal wrote that the city of [Topeka is considering repealing the city's breed specific laws](#). The Topeka law currently requires all 'pit bulls' to be licensed and microchipped. If a dog is suspected of being in violation of the law, then the city confines the suspected 'pit bulls' at the local Humane Society until owners are either cleared or charged in municipal court.

For the past decade, the city's animal control unit has been over budget by about \$27,000 a year (a fairly large amount for a smaller community like Topeka that has amounted to \$272,751 over the past decade) -- and the vast majority of those overruns is because of their need to confine the suspected 'pit bulls'.

"These are not dogs that exhibited aggressive behavior," said Assistant city attorney Kyle Smith. "They're just running loose or otherwise in violation of our breed-specific ordinances."

Meanwhile, many times there can be 20-40 dogs in the shelter that are awaiting their fate and often the humane society has to kill dogs of other breeds at the shelter in order to make space for the 'pit bulls'.

"Studies show that cities with breed-specific laws are not any safer," said Smith. "Stronger laws against aggressive and dangerous dogs which hold the owners responsible are seen as more effective."

I hope the council listens to Mr. Smith -- he seems to get it. Smith has made some efforts to learn a lot about this issue. Last January, the University of Kansas Student Animal Legal Defense Fund sponsored a presentation by Best Friends' Ledy Van Kavage entitled "Due Process and Doggie Discrimination," and Smith, and several other representatives from the city were in attendance.

Following the presentation, the city put together a committee to address the city's dangerous dog law -- and the committee featured the city attorney, a city council person, a representative from Helping Hands Humane Society and the president of the Kansas Student Animal Legal Defense Fund group.

The proposal the city is looking at is a solid breed-neutral approach that focuses on animal cruelty, focuses on promoting low-cost spay/neuter services, and focuses on targeting aggressive dogs regardless of breed.

It looks like a great option for the city of Topeka and is similar to the trend we're seeing in other places.

Our friends over at the [Game Dog Guardian](#) have some more details on the committee that was formed, including links to the budget spreadsheets and Mr. Smith's proposal to the council.

Individuals can make a difference in their community with the right approach and working to educate council members on the information that is available and help them realize the realities of their archaic laws.

Posted at 08:49 AM in [BSL Repeals](#) | [Permalink](#) | [Comments \(0\)](#) | [TrackBack \(0\)](#)

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June 16, 2010

Delta, BC looks to repeal Breed Specific Law

[Delta, BC is looking at repealing breed-specific legislation](#).

Their current ordinance automatically designates 'pit bulls' as dangerous and requires them to be kept in a special structure when on their owner's property and muzzled when walked on a leash.

The new ordinance would remove these restrictions to focus more on the behavior of the animals, not the breed.

"The problem is people, not the animals," said long-time resident Robert Campbell.

According to the draft bylaw, there is no list of dog breeds that are listed as "genetically prone to fight other animals or people." One of the key elements to the municipal solicitor Greg Vanstone says is "the wide range of human behavior that dogs may be exposed to."

Apparently Mr. Vanstone put together a nice report for the council -- but I have been completely unable to find it on the city website, so if anyone finds a link please post it in the comments.

Delta is a medium-sized city (approximately 100,000 population) in British Columbia. Hats off to the city of Delta and their willingness to listen to experts in their community and take steps to improve their canine legislation.

Posted at 10:00 AM in [BSL Repeals](#) | [Permalink](#) | [Comments \(3\)](#) | [TrackBack \(0\)](#)

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May 05, 2010

Putnam County, WV repeals Breed Specific Law

Last year, Putnam County, WV passed a law that specifically targeted pit bull-type dogs in their community.

Yesterday, [they repealed the ordinance](#) and replaced it with an ordinance that targeted aggressive dogs based on behavior, not on how they look.

"A vicious dog is a vicious dog, regardless of what the breed is," said Commission President Joe Haynes -- who voted against the original ordinance last year.

"Whether a dog is vicious or not should be based on its behavior, rather than its breed. You've got people who have dogs of that breed who are family pets who've never exhibited (aggressive) behavior."

Congrats to the folks in Putnam County who continued to talk to their commissioners, and to the commissioners for listening and eventually getting this right.

Posted at 09:15 AM in [BSL Repeals](#) | [Permalink](#) | [Comments \(2\)](#) | [TrackBack \(0\)](#)

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April 23, 2010

Streator, IL repeals breed restrictions

The community of [Streator, IL](#) [unanimously approved a new law](#) that will focus resources on dogs with complaints of being aggressive vs just singling out "pit bulls". The previous breed-specific law was passed "several years ago".

Streator is a small community of about 14,000 people in North-Central Illinois -- and is the hometown of Clyde Tombaugh, who discovered the planet(?) Pluto.

The repeal of their breed specific legislation is part of a trend across the nation of cities that are beginning to realize that the laws are not an effective way of dealing with dog bites in their communities.

Posted at 09:51 AM in [BSL Repeals](#) | [Permalink](#) | [Comments \(2\)](#) | [TrackBack \(0\)](#)

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April 22, 2010

Scotland Parliament passes bill to repeal breed ban

The [Scottish Parliament](#) today approved their new dangerous dog law they've been calling "dog Asbos" in a unanimous decision. The new law gives councils greater power to impose penalties for owners of badly behaved dogs and will focus on "deed not breed". The law would replace several laws dealing with dogs in the country, including the Dangerous Dogs Act, which bans four breeds of dogs in Scotland.

Dog Asbos was proposed by MSP Alex Neil. [In his proposal](#), he notes that the Dangerous Dogs Act was "[difficult to enforce and a huge drain on resources.](#)" *"It is clear that a dog's breed is only one factor which may affect its behavior. Attempting to define the law purely in relation to breed has failed to protect the public."*

The statistics support Neil. Over the past decade, [Scotland has seen an over 150% increase in dog attacks](#).

Bill Reilly, President of the British Veterinary Association commented:

"The key message is that any dog can show aggression, particularly if it is not handled and trained properly, so legislation that provides the tools to target irresponsible ownership before it becomes a problem is very welcome. The rest of the UK should now look at Scotland and replace the failed breed-specific

| *legislation in England, Wales and Northern Ireland."*

The law is not yet final, but seems on pace to be soon. Great work by the folks in Scotland in listening to the professional experts in their community and making changes to a clearly failing law.

H/T to [Ryan O'Meara at Dog Magazine](#) and his great coverage of this law.

Posted at 04:21 PM in [BSL Repeals](#), [UK Dangerous Dogs Act](#) | [Permalink](#) | [Comments \(7\)](#) | [TrackBack \(0\)](#)

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November 14, 2009

Puerto Rico becomes the next to repeal ban on Pit Bulls

In 1998, Puerto Rico passed legislation that banned "pit bulls" and "Pit bull mixes" from the island. Earlier this week, they made a major step in repealing the 1998 ban when their legislature passed a bill to repeal this ban. (this article was run through Google Translate, so it's a little rough to read). The bill now just waits final signature from Governor Luis Fortuno.

The removal of the ban was strongly supported by the College of Veterinarians in Puerto Rico as well as the Pit Bull Association of Puerto Rico.

It is estimated 50,000 'pit bulls' currently live in Puerto Rico -- and because of the ban, more than 3,000 were killed in the past 2 years alone.

As people learn more and more about 'pit bulls' and the ineffectiveness of the laws that target them, more and more places are deciding to repeal their bans in favor of more effective (and rational) dangerous dog legislation that targets the dog based on its behavior, not "breed".

[Here's a second article](#), with the same, yet somewhat contradictory numbers (including some different population numbers, which should have translated well).

Congrats to the people and veterinarians in Puerto Rico.

Hat Tip to Jodi at [Bless the Bullies](#) on this, which is where I saw the news first.

Posted at 08:31 AM in [BSL Repeals](#) | [Permalink](#) | [Comments \(3\)](#) | [TrackBack \(0\)](#)

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November 09, 2009

Oak Harbor, WA Repeals Breed Specific Ordinance

In a 6-0 unanimous vote, the city of Oak Harbor, WA voted to repeal their breed-specific ordinance. The city's ordinance, originally passed in 2006, required all 'pit bulls' to be held in a secure pen, be muzzled while on leash, and other restrictions. The vote held last week repeals all breed specific language and is now focused on targeting dogs based on their behavior, not breed. Commissioners hope that the change will decrease the number of these types of dogs that are killed at the shelter.

In August, when the issue first came up for a repeal, the difficulty of enforcement became a major topic of the conversation:

*"From an animal control officer's point of view, this is a **really difficult issue**" said Police Chief Rick Wallace.*

The Burden would be on the city to prove any delinquent dog's breed, and that may mean Oak Harbor would have to foot the bill for a doggie DNA test.

***From an enforcement point of view, it's almost impossible**, Wallace said.*

*"I don't want this to turn into an emotional thing " City Administrator Paul Schmidt said **"We're looking at it strictly as a fact-based issue."***

And the fact is, breed determination can be tricky and costly business.

"Our own insurance doesn't recommend BSL," said Schmidt. "We support the behavior based approach."

When you take emotion out of the equation, and base your decision solely based on facts, breed neutral legislation -- that targets aggressive dogs based on behavior, not the way they look - becomes the only logical conclusion. More and more cities like Oak Harbor are realizing this, and bypassing BSL for more effective and enforceable laws, and repealing the ordinances that are already in place. Meanwhile, some who hold onto archaic ideals are being forced out of their positions.

Nice work by the fact-focused administrators in Oak Harbor.

Hat Tip: [Stop BSL](#).

Posted at 11:15 AM in [BSL Repeals](#) | [Permalink](#) | [Comments \(3\)](#) | [TrackBack \(0\)](#)

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October 23, 2009

BSL - An International Failure

Earlier this week, the German state of Schleswig-Holstein (one of 16 German States) repealed its ban on "Pit Bulls". According to [the article](#) (which is in German - this is the translation of the first two lines of the third paragraph that was sent to me from someone who lives there):

'CDU and FDP want to protect citizens against irresponsible dog holders. The race list (i.e breed ban) has turned out as not suitable for this and, hence, is abolished in the dangerous dogs law.'

It's been interesting trying to read about the "rasseliste" in Germany, and about how many of the same problems that exist with it in the US are the same in Germany - including [the cost of the impounding and keeping the animals](#), and [problems with accurate breed identification to determine which dogs are included in the breed ban](#), and which ones are not.

(Sorry for the rough translations -- I used Google Translate for the articles and they come by very rough -- the original links are [here](#) and [here](#) if you are fluent in German or know of a better translator).

While our friends in Western Europe followed us into the world of breed bans, it appears they are being quicker than us to jump off the bandwagon in search of more effective solutions to their dog bite problems. Schleswig-Holstein now joins other areas of Western Europe like [Italy](#) and [The Netherlands](#) to have repealed their breed bans just in the past 2 years.

BSL is not just a failure in the US -- it is truly an internationally failed policy. Time to learn from our mistakes, and move on.

Posted at 01:31 PM in [BSL Repeals](#) | [Permalink](#) | [Comments \(1\)](#) | [TrackBack \(0\)](#)

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April 02, 2009

News article on the Greenwood, MO Repeal

I noted this [a few weeks ago](#), but recently, Greenwood, MO repealed their long-standing ban on 'pit bull' type dogs. I'm bringing it up again because the Green Summit Dispatch, the monthly community newspaper that covers Greenwood, just released [their story about the repeal](#). I'm going to post most of it here - -if only because it's such a refreshing read. All of the emphasis is mine:

*"In a long anticipated move, the Greenwood Board of Aldermen **struck down a mistake commonly made in many municipalities** when they unanimously voted to drop the Breed Specific Legislation language in Greenwood's dangerous dog ordinance. Politicians in Greenwood have long been on the record that they do not believe specific breeds are necessarily dangerous dogs. In fact, it was the source of a citizen submitted question in the 2008 Candidate Forum where **candidates unanimously responded that they were against any laws which targeted specific breeds**. The revised ordinance is now **Dog Specific** rather than Breed Specific.*

*The resolution of this issue was a pleasure to observe. The system worked from start to finish. It may have taken nearly a year, but **the Board of Aldermen responded appropriately to what has been a common misconception about the American Pit-bull Terrier perpetuated by our mainstream media**. Greenwood is now **one of the leading small communities in the area with regard to dog legislation**."*

You can read the rest [here](#). With earlier stories on the topic [here](#) and [here](#) (and yes I was involved in the "Lengthy and boring" presentation noted in the latter article --gee, thanks guys.)

Posted at 11:58 AM in [BSL Repeals](#) | [Permalink](#) | [Comments \(4\)](#) | [TrackBack \(0\)](#)

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March 23, 2009

Greenwood, MO Repeals BSL

Last week, the Greenwood, MO city council voted unanimously to repeal their ban on 'pit bulls'.

Greenwood, is a small community that was once a small town, but now has become more or less an outer ring suburb of the Kansas City metro.

Greenwood passed a ban on 'pit bulls' 20 years ago when many cities passed breed bans due to the scare created by the Time and Sports Illustrated articles on the 'pit bulls'. The ban was so old in fact, that several of the city council members didn't even know they had a ban until we brought it to their attention.

The repeal represents an excellent case study in how to get a ban repealed. Several local residents got involved in following the political candidates in the most recent elections – asking questions about the ban at forums. They rallied others to vote and got dog-friendly candidates in office. Soon after, several members of KCDA were invited to give a presentation to the council where we talked about why they should repeal the breed ban.

A few months later, they had crafted a breed neutral ordinance which passed with a unanimous vote.

We are thrilled about the repeal. Greenwood has now joined Edwardsville, KS as Kansas City area communities that have repealed their long-standing breed bans. Rational thinking based on fairness, what actually works, and based on sound thinking is winning. Meanwhile, it also demonstrates that no matter where you are, it is important that you get involved in your local politics. Not only is it an option for you, it is your responsibility -- it's what makes our system work.

More on that later this week.

Posted at 04:45 AM in [BSL Repeals](#) | [Permalink](#) | [Comments \(8\)](#) | [TrackBack \(0\)](#)

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AGGRESSION AND DOGS

“NO SIGNIFICANT DIFFERENCE FOUND BETWEEN BREEDS.”

INTRODUCTION

On July 5, 2000 the government of Lower Saxony, Germany ruled that 14 breeds of dogs were especially dangerous and placed restrictions on the ownership, management and breeding of dogs of these breeds. The breeds cited included Bull Terriers, American Staffordshire Terriers, Pit bull Terriers, Staffordshire Bull Terriers, Rottweilers and Dobermans. Exemption from the restrictions required that the owner and dog pass a standardized temperament test administered by veterinary behaviorists at the University of Veterinary Medicine in Hannover, Germany. A passing score demonstrated that the dog displayed no exceptional aggressive behavior or aggressive behavior in inappropriate situations.

Dogs of
the targeted
breeds signal
their intent
just like
other dogs

MATERIALS AND METHODS

415 dogs of the targeted breeds were tested in 21 situations of dog-human contact and 14 situations of dog-environment contact. The dog's behavior in each situation was scaled from 1 to 7.

1	No aggressive behavior
2	Visual or acoustic threat behavior while backing away or remaining stationary
3	Bite movements while backing away or remaining stationary
4	Bite movements while moving forward but stopping at some distance
5	Bite with preceding threat signals
6	Bite with no preceding threat signals
7	Bite with no preceding threat signals and unable to calm within 10 minutes

70 Golden Retrievers, having been volunteered by their owners, were also tested using this same standardized temperament test.

RESULTS

- There was no significant difference between the volunteered Golden Retrievers and the dogs from the targeted breeds that were required to submit to the test in the occurrence of aggressive behavior in inappropriate situations.
- Dogs of the targeted breeds signal their intent just like other dogs.
- Dogs of the targeted breeds are statistically no more likely to show inappropriate aggressive behavior than are Golden Retrievers.

No indicators of greater dangerousness of any of the then-restricted dog breeds were found. Rather than regiment dogs by breed, more emphasis should be put on the dog owners' education.

This study contributed to the repeal of breed specific legislation in Lower Saxony.

For additional information:

Schalke et al., "Is breed specific legislation justified? Study of the results of the temperament test of Lower Saxony", *Journal of Veterinary Behavior*, (2008) 3: 97-103.

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Dr. Esther Schalke holds a degree in Veterinary Medicine from the University of Hannover in 1997 and a Doctorate in Veterinary Medicine from the Department of Animal Welfare and Behavior of the University of Veterinary Medicine of Hannover.

She has been a practicing animal behavior therapist since 1998 and runs the Animal Behavior Clinic at the University of Veterinary Medicine in Hannover, where she teaches courses in animal behavior, learning theory and behavior problems in dogs as well as in cats. She runs puppy socialization and pet dog training classes, training classes for SAR dogs and police dogs. She lectures nationally and internationally on various aspects of animal behavior.

Her recent areas of research include the various aspects regarding aggressive behavior in dogs. For example, temperament testing, assessing and comparing aggressive behavior in various dog breeds, including Pit Bull Terriers, Golden Retrievers, and others according to the guidelines of the Dangerous Animals Act of Lower Saxony, Germany (GefTVO) of 05.07.2000.



Esther Schalke, PhD., DVM

A COMPARISON OF VISUAL AND DNA IDENTIFICATION OF BREEDS OF DOGS

We are all aware of the newspaper articles, magazine stories, and TV segments that show pictures of dogs and then reveal DNA breed analyses of the dogs. Surprise – the DNA results are not what were expected based on the appearance of the dogs or the owners’ beliefs. Those of us who walk through shelters and animal control facilities compare the posted breed descriptions of the dogs to what they look like to us – with frequent differences of opinions. Those who have worked at shelters and similar facilities are aware that as dogs move through the steps in admission or during their stay that their breed descriptions may change. It is my impression, when visiting animal control or adoption agencies, that most medium to large size dogs with straight, short/ medium length brown hair coats are cast as German shepherds or shepherd

mixes, dogs with a black spot on their tongues are designated Chow mixes, and most medium sized, stocky, broad headed, small eared dogs with a short hair coats are pitbulls or pit-bull mixes.

“the DNA results
are not what
were expected
based on the
appearance of
the dogs or the
owners’ beliefs.”

It is not easy to visually identify the breeds of dogs of unknown parentage accurately. Sometimes dogs just don’t look like either parent. Scott and Fuller’s work on the genetics and social behavior of dogs involved studying purebred dogs, F1 crosses of purebreds, backcrosses and F2 crosses.¹ Photographs of some of these F1 and F2 puppies depict that they do not resemble either purebred parent, nor do the photographs of the F2 generations dogs look like their mixed breed parents. We don’t know how many of the offspring did look like their purebred ancestors, but clearly not all resembled parents or grandparents.

Shelter dog breed assignments may be based on what the dogs look like to someone at the shelter or because owners relinquishing their dogs have identified the dogs as a specific breed. Newborn and young puppies may be identified as a certain breed because the mother dog resembled a purebred dog. In the latter case, the sire of the litter could have been any breed or several dogs could have fathered puppies in the same litter. When the puppies grow up they don’t look anything like their mother or litter mates. These breed or mixed breed identifications may eventually find their way into data bases – be it through population data, dog bites, serious dog attacks, behavior problems, or disease statistics.

Rarely are owners permitted to simply fill out forms that ask about the breed by only stating that the dog is a mixed breed or of unknown parentage. If they do so, the follow-up question often is “What is it mostly?”, or “What is its most predominant breed?”, or “What does it look like mostly?” This information may be solicited by insurance companies, landlords, housing associations, licensing agencies, mandatory dog bite reports, veterinary

medical records, the media, and researchers trying to determine the likelihood of involvement of specific breeds in study populations. For example, in the methodology of one elegantly designed study, owners were asked “what breed they considered their dog: if more than one breed was specified, they were asked which breed they considered to be predominant.”² This article became part of the impetus for many recommendations and restrictions intended to reduce dog bites.

High profile articles in JAMA and JAVMA have reported dog bite fatalities and listed breeds involved in such attacks.^{3,4} The data used was obtained by “combining data from the National Center for Health Statistics

and computerized searching of news stories. Karen Delise has presented compelling arguments in her recent book, *The Pit Bull Placebo*, that undermines conclusions and implications of these reports.^{5,6}

A short report in press in the Journal of Applied Animal Welfare Science indicates low agreement between the identification of breeds of dogs by adoption agencies and DNA identification.⁷ The dogs in this study were of unknown parentage and had been acquired from adoption agencies. In only a quarter of these dogs was at least one of the breeds proposed by the adoption agencies also detected as a predominant breed by DNA analysis. (Predominant breeds were defined as those comprised of the highest percentage of a DNA breed make-up.) In 87.5% of the adopted dogs, breeds were identified by DNA analyses that were not proposed by the adoption agencies. A breed must have been detected at a minimum of 12.5% of a dog’s make-up to be reported in the DNA analysis.

“The discrepancy between breed identifications based on opinion and DNA analysis, as well as concerns about reliability of data collected based on media reports, draws into question the validity and enforcement of public and private polices pertaining to dog breeds.”

Reports of DNA analyses of percentages of pure-bred dog breed ancestry, while accurate most of the time, are not infallible. The laboratories providing such analyses may have qualifiers in their reports stating that there is an 85% or 90% validity of the results and indicate which results have lower confidence levels. Different testing laboratories

may report different results depending on which dogs were used to develop their standards and how the laboratories analyze the samples.⁸ As the tests are refined, the same laboratory may report slightly different results at different points in time.

The discrepancy between breed identifications based on opinion and DNA

analysis, as well as concerns about reliability of data collected based on media reports, draws into question the validity and enforcement of public and private polices pertaining to dog breeds.

Dr. Amy Marder, Animal Rescue League of Boston and Director for the Center for Shelter Dogs, has proposed that dogs adopted from shelters in the U.S. simply be identified as “American Shelter Dogs”. This might solve a lot of problems, as well as promote pride and ownership of an “American Shelter Dog.”

Victoria Lea Voith
PhD, DVM, DACVB
**Professor, Animal Behavior,
Western University**



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DOG BREED SPECIFIC LEGISLATION

The cost to people, pets and veterinarians, and the damage to the human-animal bond.

Veterinarians, their clients, and their clients' pets in 300 cities and towns in the United States live with special burdens and added costs because of ordinances banning or restricting dogs of one or more breeds and breed mixes. Thirty-six breeds of dogs and mixes of those breeds have been restricted, in various combinations and groupings. These restrictions and bans compromise the human-animal bond and complicate the professional landscape for veterinarians.

“There has never been any evidence that breed bans or restrictions contribute to improved public safety.”

AVMA, the CDC, the National Animal Control Association, the Association of Pet Dog Trainers, and virtually all animal welfare charities oppose breed-specific regulation.¹ AVMA PLIT recently released a statement opposing breed discrimination by insurers.

There has never been any evidence that breed bans or restrictions contribute to improved public safety. The Netherlands repealed its breed ban last year because, based upon a report from a committee of experts, the ban had not led to any decrease in dog bites.² Italy repealed its breed-specific regulations in April of this year.³

DEMONIZED DOGS THEN

As America's conflict over slavery intensified, public attitudes towards the bloodhound paralleled the increasingly negative attitudes towards the dogs' most publicized function: slave catching. The depiction of the slave catcher's dog in stage re-enactments of UNCLE TOM'S CABIN made him an object of dread to ordinary citizens, and an object of attraction to dog owners who wanted dogs for anti-social purposes. As these owners acquired more and more dogs, serious incidents – and fatalities – associated with dogs identified as bloodhounds became prominent in the public press.⁴

In the 20th century, other groups of dogs replaced the bloodhound as objects of dread, most notably the German Shepherd (In 1925, a New York City magistrate said they should be banned.⁵ Australia banned the importation of German Shepherds from 1928 until 1973⁶), the Doberman Pinscher (frequently associated with soldiers of the Third Reich), and the Rottweiler (portrayed as the guardian of Satan's child in the popular 1976 film THE OMEN).

DEMONIZED DOGS NOW

Early in the 20th century, pit bull type dogs enjoyed an excellent popular reputation. An American Bull Terrier had symbolized the United States on a

World War One propaganda poster. “Tighe”, a pit bull type dog, had helped sell Buster Brown shoes. Pete the Pup, the “little rascals” pit bull pal of the Our Gang comedies, was the first AKC-registered Staffordshire Terrier (Registration number A-103929).

In 1976, the Federal government amended the Animal Welfare Act to make trafficking in dogs for the purposes of dog fighting a crime. The media focused on the dogs, rather than on the people who fought the dogs; and the dogs made headlines. Monster myths of super-canine powers began to dominate the stories.⁷ As had happened to the bloodhound, the myths attracted the kind of owners who use dogs for negative functions. Sensationalized, saturation news reporting of

“Dog bite statistics are not statistics, and do not give an accurate representation of dogs that bite.”¹⁰

incidents involving dogs called pit bulls, linked them in the public mind almost exclusively with criminal activity. This small subset of dogs being used for these negative purposes came to define the millions of pit bull type dogs living companionably at home.

WRONG NUMBERS, NOT STATISTICS

The Centers for Disease Control (CDC) attempted to identify the breeds of dogs involved in fatal human attacks.⁸ The study period, 1979–1998, happened to coincide with the sensationalized media portrayal and resulting notoriety of pit bulls and Rottweilers.^{4,7}

In reporting their findings, the researchers made clear that the breeds of dogs said to be involved in human fatalities had varied over time, pointing out that the period 1975–1980 showed a different distribution of breeds than the later years.⁸ Subsequently, Karen Delise of the National Canine Research Council reported that, in the decade

1966–1975, fewer than 2% of all dogs involved in fatal attacks in the United States were identified as of the breeds that figured prominently in the CDC study.⁴

The CDC has since concluded that their single-vector epidemiological approach did not “identify specific breeds that are most likely to bite or kill, and thus is not appropriate for policymaking decisions related to the topic.”¹ AVMA has published a statement to the same effect.⁹

“Dog bite statistics are not statistics, and do not give an accurate representation of dogs that bite.”¹⁰ Nevertheless, the questionable data-set covering only one particular 20-year period, and not the

researchers’ conclusions and recommendations, is repeatedly cited in legislative forums, in the press, and in the courts to justify breed discrimination. Dr. Gail Golab of the AVMA, one of the researchers involved in the CDC project, said, “The whole point of our summary was

to explain why you can’t do that. But the media and the people who want to support their case just don’t look at that.”¹¹

The researchers had suspected that media coverage of “newsworthy” breeds could have resulted in “differential ascertainment” of fatalities by breed attribution. Relying on media archives, of the 327 fatalities identified within the 20-year period, the researchers located breed or breed-mix identifications for 238, approximately 72% of the total. More than 25 breeds of dogs were identified.⁸

Of those incidents for which the researchers could find no breed attributions ($n = 89$), Karen Delise of the National Canine Research Council later located breed attributions in 40; and 37 of these cases involved dogs identified as other than Rottweiler and pit bull, a result that confirmed the researchers concerns regarding “differential ascertainment” of incidents because of breed bias.¹²

In addition to the problem of the small, unrepresentative, and incomplete data sets, the researchers expressed concern about the reliability of the breed identifications they had obtained, and were uncertain how to count attacks involving “cross bred” dogs.⁸

It is estimated that at least one-half of the dogs in the United States are mixed breed dogs.¹³ What is the reliability or significance of a visual breed identification of a dog of unknown history and genetics?

Pit bull is not a breed, but describes a group of dogs that includes American Staffordshire Terriers, Staffordshire Bull Terriers, American Pit Bull Terriers, an increasing number of other pure breeds, and an ever-increasing group of dogs that are presumed, on the basis of appearance, to be mixes of one or more of those breeds. Ordinances restricting or banning dogs generally rely on someone’s visual assessment of their physical characteristics.

The modern science of genetics renders a breed label based on visual identification problematic. According to Sue DeNise, vice-president of MMI Genomics, creators the Canine Heritage Breed Test for mixed breed dogs, each test result is furnished to the dog owner with the following proviso: “Your dog’s visual appearance may vary from the listed breed(s) due to the inherent randomness of phenotypic expression in every individual.”¹⁴

Scott and Fuller, in their landmark genetic studies, produced offspring of considerable phenotypic variety from purebred and F1 crosses.

Breed identification of a mixed breed dog based on its phenotype is unscientific, and is likely to be contradicted by a DNA test. A study to be published in the Journal of Applied Animal Welfare Science points to a substantial discrepancy between visual

identifications of dogs by adoption agency personnel and the breeds identified in the same dogs through DNA analysis. Of 16 mixed breed dogs labeled as being partly a specified breed, in only 25% of these dogs was that breed also detected by DNA analysis.¹⁵

THE LANDSCAPE OF BREED SPECIFIC LEGISLATION

Legislative restrictions range from an outright ban in Denver, Colorado, where, since 1989, thousands of dogs have been seized and killed¹⁶; to a regulatory catalog of muzzling, neutering, and confinement mandates that only apply to the regulated group, however defined; and to requirements that owners pay special license fees and maintain higher levels of liability insurance. Apart from statutory requirements, some homeowners’ insurers are imposing special requirements before they will include liability coverage for dogs of certain breeds, or are declining to cover dogs of an increasing number

“Breed identification of a mixed breed dog based on its phenotype is unscientific, and is likely to be contradicted by a DNA test.”

of breeds altogether. Rental apartments, planned communities, campgrounds, and neighborhood associations impose a wide range of special rules or restrictions regarding many breeds of dogs.

In a jurisdiction with breed-specific regulations, veterinarians can easily be drawn into an official controversy. When a police officer in Maquoketa, Iowa identified a dog as a pit bull and served notice on the owner that she had to remove it from the town, the owner appealed to the state Office of Citizen’s Aide/Ombudsman. The 21-page report that resulted, chronicles the failure to arrive at an agreed-upon breed identification for the dog. Among other documents, the owner produced

vaccination certificates from her veterinarian that described the dog as a “Rott-mix.” The town countered with another veterinarian’s intake form that described the dog as a “pit mix”.¹⁷

In January, 2009, the U.S. Department of the Army banned Chows, Rottweilers, pit bulls, wolf hybrids and Doberman Pinschers from all privatized military housing. The previous July, Fort Hood, Texas banned pit bulls and pit bull mixes from government housing. The Fort Hood mission support order specifies that, in the event of a dispute, “the Fort Hood Veterinary Clinic [emphasis mine] will be the deciding authority to determine if a dog is a Pit Bull [sic] cross.”¹⁸

HUMANE COMMUNITIES ARE SAFER COMMUNITIES

In “A Community Approach to Dog bite Prevention,” the AVMA Task Force reported, “An often asked question is what breed or breeds of dogs are ‘most dangerous’? This inquiry can be prompted by a serious attack by a specific dog, or it may be the result of media-driven portrayals of a specific breed as ‘dangerous.’ . . . singling out 1 or 2 breeds for control . . . ignores the true scope of the problem and will not result in a responsible approach to protecting a community’s citizens.”¹⁰ Delise, based upon her study of fatal attacks over the past five decades, has identified poor ownership/management practices involved in the overwhelming majority of these incidents: owners obtaining dogs, and maintaining them as resident dogs outside of the household for purposes other than as family pets (i.e. guarding/ protection, fighting, intimidation/status); owners failing to humanely contain, control and maintain their dogs (chained dogs, loose roaming dogs, cases of abuse/neglect); owners failing to knowledgeably supervise interaction between children and dogs; and owners failing to spay or neuter resident dogs not used for competition, show, or in a responsible breeding program.⁴

Focusing on breed or phenotype diverts attention from strategies veterinarians and other animal experts have consistently identified as contributing to humane and safer communities.

BREED LABELING AND VETERINARY PRACTICE

In an environment of breed discrimination, the breed identification of a dog can have serious consequences with municipal authorities, animal shelters, landlords, and insurers, all of which will compromise the bond between a family and their dogs. Ordinances may obligate owners with expensive special housing and containment requirements. Owners may even be forced to choose between sending a beloved family pet away, or surrendering it to be killed.

Veterinarians who attempt to visually identify the breeds that might make up a dog do not derive any benefit from this activity, while the client may hold the veterinarians to the same professional standard as they would with respect to the delivery of medical services.

It is impossible to breed label dogs of unknown origin and genetics solely on the basis of their appearance. There is so much behavioral variability within each breed, and even more within breed mixes, that we cannot reliably predict a dog’s behavior or suitability based on breed alone. Each dog is an individual.¹⁹ Owners may be influenced as to what behavior to expect from their dog, based upon breed stereotypes.²⁰ Veterinarians must take the lead, and free themselves from stereotypes, in order to better serve their clients, their clients’ animals, and society.

Jane Berkey, President
Animal Farm Foundation, Inc.



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General information about the American Temperament Test Society, Inc. (ATTS)

The American Temperament Test Society, Inc. (ATTS) is a national not-for-profit organization (registered in the state of Missouri) for the promotion of uniform temperament evaluation of purebred and spayed/neutered mixed-breed dogs.

ATTS was established to:

- Provide for a uniform national program of temperament testing of purebred and spayed/neutered mixed-breed dogs.
- Conduct seminars to disseminate information to dog owners, dog breeders and evaluators (testers) concerning dog psychology, motivation, reaction and other aspects of temperament testing.
- Recognize and award certificates to dogs that pass the requirements of the temperament evaluation.
- Work for the betterment of all breeds of dogs.
- Select, train, prepare and register temperament evaluators.

Our motto says all:

"A SOUND MIND IN A SOUND BODY"

ATTS is the only non-profit organization that gives the TT (Temperament Tested) title for a dog. The TT, our logo and test procedures are copyrighted. The test is for all breeds and it is uniform throughout the country.

ATTS was founded by Alfons Ertel in 1977. The first test was held in September 1977; ATTS has held more than 960 tests as of December 31, 2003. The number of dogs tested as of December 2007 is 28,010 with 22,847 dogs earning a TT title. The average overall pass rate is 81.6 percent; the pass rate may vary for different breeds. The breed's temperament, training, health and age of the dog is taken into account. Minimum age for dogs to take the test is 18 months.

The test takes about 12 minutes to complete. The dog is on a loose six-foot (6') lead and three ATTS trained evaluators score the dog. Majority rules. Failure on any part of the test is recognized when a dog shows panic, strong avoidance without recovery or unprovoked aggression.

National breed clubs can request the list of their breed which earned the TT for the previous year by sending a request accompanied by a self addressed stamped envelope. A request for a complete list of all dogs of any one breed which have earned a TT is available, but breeds which have more than five pages of dogs will need to cover the cost of copying and postage.

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Temperament test pass rate for pit bull breeds is as high or higher than the 82.4% pass rate for all breeds.

ATTS Breed Statistics

as of June 12, 2010

Page 1: Afghan Hound - Belgian Malinois

<i>Breed Name</i>	<i>Tested</i>	<i>Passed</i>	<i>Failed</i>	<i>Percent</i>
AFGHAN HOUND	162	117	45	72.2%
AIREDALE TERRIER	101	78	23	77.2%
AKBASH DOG	15	13	2	86.7%
AKITA	514	387	127	75.3%
ALAPAHA BLUE BLOOD BULLDOG	10	7	3	70.0%
ALASKAN KLEE KAI	2	1	1	50.0%
ALASKAN MALAMUTE	222	189	33	85.1%
AMERICAN BULLDOG	178	151	27	84.8%
AMERICAN ESKIMO	82	68	14	82.9%
AMERICAN FOXHOUND	2	2	0	100.0%
AMERICAN PIT BULL TERRIER	772	664	108	86.0%
AMERICAN STAFFORDSHIRE TERRIER	608	510	98	83.9%
AMERICAN TUNNEL TERRIER	2	2	0	100.0%
AMERICAN WATER SPANIEL	7	6	1	85.7%
ANATOLIAN SHEPHERD DOG	31	25	6	80.6%
AUSTRALIAN CATTLE DOG	184	145	39	78.8%
AUSTRALIAN KELPIE	6	5	1	83.3%
AUSTRALIAN SHEPHERD	634	517	117	81.5%
AUSTRALIAN TERRIER	16	13	3	81.3%
AZAWAKH	1	1	0	100.0%
BASENJI	167	113	54	67.7%
BASSET HOUND	35	30	5	85.7%
BEAGLE	71	57	14	80.3%
BEARDED COLLIE	45	24	21	53.3%
BEAUCERON	19	15	4	78.9%
BEDLINGTON TERRIER	19	18	1	94.7%
BELGIAN LAEKENOIS	7	7	0	100.0%
BELGIAN MALINOIS	289	265	24	91.7%

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ATTS Breed Statistics

as of June 12, 2010

Page 2: Belgian Sheepdog - Cao de Fila de Sao Miguel

<i>Breed Name</i>	<i>Tested</i>	<i>Passed</i>	<i>Failed</i>	<i>Percent</i>
BELGIAN SHEEPDOG	486	391	95	80.5%
BELGIAN TERVUREN	466	372	94	79.8%
BERGER BLANC SWISS	0	0	0	0.0%
BERGER PICARD	2	2	0	100.0%
BERNESE MOUNTAIN DOG	176	150	26	85.2%
BICHON FRISE	30	23	7	76.7%
BLACK AND TAN COONHOUND	13	13	0	100.0%
BLACK RUSSIAN TERRIER	56	52	4	92.9%
BLOODHOUND	32	23	9	71.9%
BLUE MOUNTAIN SHEPHERD	1	1	0	100.0%
BLUETICK COONHOUND	2	2	0	100.0%
BOERBOEL	14	14	0	100.0%
BOLOGNESE	1	1	0	100.0%
BORDER COLLIE	265	215	50	81.1%
BORDER TERRIER	120	109	11	90.8%
BORZOI	103	92	11	89.3%
BOSTON TERRIER	65	55	10	84.6%
BOUVIER DES FLANDRES	893	759	134	85.0%
BOXER	418	351	67	84.0%
BOYKIN SPANIEL	2	2	0	100.0%
BRIARD	368	299	69	81.3%
BRITTANY SPANIEL	116	105	11	90.5%
BRUSSELS GRIFFON	11	10	1	90.9%
BULL TERRIER	73	66	7	90.4%
BULLDOG	134	94	40	70.1%
BULLMASTIFF	129	102	27	79.1%
CAIRN TERRIER	49	36	13	73.5%
CANAAN DOG	4	3	1	75.0%
CANE CORSO	96	79	17	82.3%
CAO DE FILA DE SAO MIGUEL	3	2	1	66.7%

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ATTS Breed Statistics

as of June 12, 2010

Page 3: Cardigan Welsh Corgi - Dogo Canario

<i>Breed Name</i>	<i>Tested</i>	<i>Passed</i>	<i>Failed</i>	<i>Percent</i>
CARDIGAN WELSH CORGI	70	55	15	78.6%
CAROLINA DOG	2	2	0	100.0%
CATAHOULA LEOPARD DOG	12	9	3	75.0%
CAUCASIAN OVCHARKA	7	6	1	85.7%
CAVALIER KING CHARLES SPANIEL	53	44	9	83.0%
CENTRAL ASIAN SHEPHERD	11	10	1	90.9%
CHART POLSKI	1	1	0	100.0%
CHESAPEAKE BAY RETRIEVER	108	93	15	86.1%
CHIHUAHUA	38	27	11	71.1%
CHINESE CRESTED	33	25	8	75.8%
CHINESE SHAR-PEI	210	149	61	71.0%
CHINOOK	8	6	2	75.0%
CHOW CHOW	98	70	28	71.4%
CLUMBER SPANIEL	12	10	2	83.3%
COCKER SPANIEL	227	186	41	81.9%
COLLIE	846	674	172	79.7%
CURLY-COATED RETRIEVER	174	159	15	91.4%
DACHSHUND (MINIATURE LONGHAIRD)	25	22	3	88.0%
DACHSHUND (MINIATURE SMOOTH)	33	26	7	78.8%
DACHSHUND (MINIATURE WIREHAIRD)	24	20	4	83.3%
DACHSHUND (STANDARD LONGHAIR)	34	25	9	73.5%
DACHSHUND (STANDARD SMOOTH)	48	33	15	68.8%
DACHSHUND (STANDARD WIREHAIRD)	30	25	5	83.3%
DALMATIAN	329	271	58	82.4%
DANDIE DINMONT TERRIER	7	5	2	71.4%
DOBERMAN PINSCHER	1,574	1,222	352	77.6%
DOGO ARGENTINO	13	12	1	92.3%
DOGO CANARIO	3	3	0	100.0%

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ATTS Breed Statistics

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Page 4: Dogue de Bordeaux - Havanese

<i>Breed Name</i>	<i>Tested</i>	<i>Passed</i>	<i>Failed</i>	<i>Percent</i>
DOGUE DE BORDEAUX	75	55	20	73.3%
DUTCH SHEPHERD	11	11	0	100.0%
ENGLISH BULL TERRIER	1	1	0	100.0%
ENGLISH BULLDOG	0	0	0	0.0%
ENGLISH COCKER SPANIEL	70	65	5	92.9%
ENGLISH FOXHOUND	3	2	1	66.7%
ENGLISH JACK RUSSELL TERRIER	3	3	0	100.0%
ENGLISH MASTIFF	2	2	0	100.0%
ENGLISH PITBULL	1	0	1	0.0%
ENGLISH POINTER	1	1	0	100.0%
ENGLISH SETTER	25	20	5	80.0%
ENGLISH SHEPERD	6	6	0	100.0%
ENGLISH SPRINGER SPANIEL	146	123	23	84.2%
ESTRELA MOUNTAIN DOG	1	1	0	100.0%
FIELD SPANIEL	9	7	2	77.8%
FILA BRASILEIRO	13	10	3	76.9%
FINNISH LAPPHUND	7	4	3	57.1%
FINNISH SPITZ	10	7	3	70.0%
FLAT-COATED RETRIEVER	86	79	7	91.9%
FRENCH BULLDOG	28	27	1	96.4%
GERMAN PINSCHER	16	14	2	87.5%
GERMAN SHEPHERD DOG	3,038	2,559	479	84.2%
GERMAN SHORTHAIRED POINTER	125	95	30	76.0%
GERMAN WIREHAired POINTER	17	14	3	82.4%
GIANT SCHNAUZER	253	193	60	76.3%
GOLDEN RETRIEVER	746	631	115	84.6%
GORDON SETTER	67	56	11	83.6%
GRAND BASSET GRIFFON VENDEEN	1	1	0	100.0%
GREAT DANE	275	219	56	79.6%
GREAT PYRENEES	140	118	22	84.3%
GREATER SWISS MOUNTAIN DOG	240	195	45	81.3%
GREYHOUND	66	54	12	81.8%
HAVANESE	10	8	2	80.0%

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ATTS Breed Statistics

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Page 5: Hovawart - Miniature Bull Terrier

<i>Breed Name</i>	<i>Tested</i>	<i>Passed</i>	<i>Failed</i>	<i>Percent</i>
HOVAWART	17	16	1	94.1%
IBIZAN HOUND	32	29	3	90.6%
ICELANDIC SHEEPDOG	2	2	0	100.0%
IRISH GLEN OF IMAAL TERRIER	2	1	1	50.0%
IRISH SETTER	142	128	14	90.1%
IRISH TERRIER	10	8	2	80.0%
IRISH WATER SPANIEL	28	25	3	89.3%
IRISH WOLFHOUND	98	88	10	89.8%
ITALIAN GREYHOUND	50	41	9	82.0%
JACK RUSSELL TERRIER	63	53	10	84.1%
JAPANESE CHIN	5	5	0	100.0%
KARELIAN BEAR DOG	3	3	0	100.0%
KEESHOND	82	66	16	80.5%
KERRY BLUE TERRIER	49	36	13	73.5%
KING SHEPHERD	1	1	0	100.0%
KOMONDOR	10	9	1	90.0%
KOREAN JINDO	1	1	0	100.0%
KUVASZ	47	36	11	76.6%
LABRADOR RETRIEVER	763	704	59	92.3%
LAKELAND TERRIER	8	6	2	75.0%
LEONBERGER	16	15	1	93.8%
LHASA APSO	27	19	8	70.4%
LOWCHEN	12	9	3	75.0%
LURCHER	5	5	0	100.0%
MAGYAR AGAR	1	1	0	100.0%
MALTESE	16	13	3	81.3%
MANCHESTER TERRIER	51	45	6	88.2%
MASTIFF	177	149	28	84.2%
MINIATURE BULL TERRIER	11	11	0	100.0%

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Page 6: Miniature Pinscher - Pungsan

<i>Breed Name</i>	<i>Tested</i>	<i>Passed</i>	<i>Failed</i>	<i>Percent</i>
MINIATURE PINSCHER	53	43	10	81.1%
MINIATURE POODLE	68	53	15	77.9%
MINIATURE SCHNAUZER	111	87	24	78.4%
MIXED BREED	968	832	136	86.0%
NEAPOLITAN MASTIFF	15	10	5	66.7%
NEWFOUNDLAND	174	152	22	87.4%
NORFOLK TERRIER	14	13	1	92.9%
NORWEGIAN ELKHOUND	121	90	31	74.4%
NORWICH TERRIER	14	10	4	71.4%
NOVA SCOTIA DUCK TOLLING RETRIEVER	22	15	7	68.2%
OLD ENGLISH BULL DOGGE	5	4	1	80.0%
OLD ENGLISH SHEEPDOG	47	36	11	76.6%
OTTERHOUND	10	7	3	70.0%
PAPILLON	85	68	17	80.0%
PARSON RUSSELL TERRIER	10	10	0	100.0%
PATTERDALE TERRIER	3	2	1	66.7%
PEKINGESE	15	14	1	93.3%
PEMBROKE WELSH CORGI	200	157	43	78.5%
PERRO DE PRESA CANARIO	1	1	0	100.0%
PETIT BASSET GRIFFON VENDEEN	9	8	1	88.9%
PHARAOH HOUND	52	42	10	80.8%
POINTER	19	17	2	89.5%
POLISH LOWLAND SHEEPDOG	1	1	0	100.0%
POLSKI OWCZAREK NIZINNY	10	5	5	50.0%
POMERANIAN	33	25	8	75.8%
PORTUGUESE WATER DOG	154	120	34	77.9%
PRESA CANARIO	30	27	3	90.0%
PUG	44	40	4	90.9%
PULI	24	22	2	91.7%
PUNGSAN	2	2	0	100.0%

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ATTS Breed Statistics

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Page 7: Pyrenean Shepherd - Swedish Vallhund

<i>Breed Name</i>	<i>Tested</i>	<i>Passed</i>	<i>Failed</i>	<i>Percent</i>
PYRENEAN SHEPHERD	1	1	0	100.0%
RAT TERRIER	19	15	4	78.9%
REDBONE COONHOUND	5	5	0	100.0%
RHODESIAN RIDGEBACK	424	358	66	84.4%
ROTTWEILER	5,357	4,470	887	83.4%
RUSSO - EUROPEAN LAIKA	2	2	0	100.0%
SAINT BERNARD	48	40	8	83.3%
SALUKI	61	42	19	68.9%
SAMOYED	282	224	58	79.4%
SCHIPPERKE	111	102	9	91.9%
SCOTTISH DEERHOUND	34	29	5	85.3%
SCOTTISH TERRIER	33	21	12	63.6%
SEALYHAM TERRIER	1	1	0	100.0%
SHETLAND SHEEPDOG	491	334	157	68.0%
SHIBA INU	25	16	9	64.0%
SHIH TZU	41	32	9	78.0%
SHILOH SHEPHERD	25	20	5	80.0%
SIBERIAN HUSKY	295	257	38	87.1%
SILKEN WINDHOUND	1	1	0	100.0%
SILKY TERRIER	19	14	5	73.7%
SKYE TERRIER	8	3	5	37.5%
SLOUGHI	1	1	0	100.0%
SMOOTH FOX TERRIER	55	42	13	76.4%
SOFT COATED WHEATEN TERRIER	36	26	10	72.2%
SPINONE ITALIANO	5	2	3	40.0%
STAFFORDSHIRE BULL TERRIER	115	103	12	89.6%
STANDARD POODLE	243	209	34	86.0%
STANDARD SCHNAUZER	60	40	20	66.7%
SUSSEX SPANIEL	4	4	0	100.0%
SWEDISH VALLHUND	1	1	0	100.0%

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ATTS Breed Statistics

as of June 12, 2010

Page 8: Texas Heeler - Yugoslavian Tricolor Hound; Totals

<i>Breed Name</i>	<i>Tested</i>	<i>Passed</i>	<i>Failed</i>	<i>Percent</i>
TEXAS HEELER	1	1	0	100.0%
TIBETAN KYAPSO	1	1	0	100.0%
TIBETAN MASTIFF	13	5	8	38.5%
TIBETAN SPANIEL	12	11	1	91.7%
TIBETAN TERRIER	14	8	6	57.1%
TOSA	3	3	0	100.0%
TOY FOX TERRIER	9	7	2	77.8%
TOY MANCHESTER TERRIER	14	13	1	92.9%
TOY POODLE	51	42	9	82.4%
TREEING FEIST	2	1	1	50.0%
TREEING WALKER COONHOUND	8	5	3	62.5%
VIZSLA	47	39	8	83.0%
WEIMARANER	215	173	42	80.5%
WELSH SHEEPDOG	1	1	0	100.0%
WELSH SPRINGER SPANIEL	6	6	0	100.0%
WELSH TERRIER	37	29	8	78.4%
WEST HIGHLAND WHITE TERRIER	60	53	7	88.3%
WHIPPET	193	165	28	85.5%
WHITE SHEPHERD	21	17	4	81.0%
WIRE FOX TERRIER	18	15	3	83.3%
XOLOITZCUINTLI	4	3	1	75.0%
YORKSHIRE TERRIER	40	33	7	82.5%
YUGOSLAVIAN TRICOLOR HOUND	1	1	0	100.0%
TOTALS	30,468	25,109	5,359	82.4%

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Page 8: Texas Heeler - Yugoslavian Tricolor Hound; Totals

<i>Breed Name</i>	<i>Tested</i>	<i>Passed</i>	<i>Failed</i>	<i>Percent</i>
TEXAS HEELER	1	1	0	100.0%
TIBETAN KYAPSO	1	1	0	100.0%
TIBETAN MASTIFF	13	5	8	38.5%
TIBETAN SPANIEL	12	11	1	91.7%
TIBETAN TERRIER	14	8	6	57.1%
TOSA	3	3	0	100.0%
TOY FOX TERRIER	9	7	2	77.8%
TOY MANCHESTER TERRIER	14	13	1	92.9%
TOY POODLE	51	42	9	82.4%
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TOTALS	30,468	25,109	5,359	82.4%

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Scientific research studies that found spaying and neutering do not reduce aggression in dogs

Michelle Bamberger, MS, DVM, and Katherine A. Houpt, VMD, PhD, DACVB
Signalment factors, comorbidity, and trends in behavior diagnoses in dogs: 1,644 cases (1991–2001)

Journal of the American Veterinary Medical Association, Vol 229, No. 10, November 15, 2006

Behavioral assessment of child-directed canine aggression

Ilana R Reisner, Frances S Shofer, Michael L Nance

Injury Prevention 2007; 13:348–351

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Non-reproductive Effects of Spaying and Neutering on Behavior in Dogs

Proceedings of the Third International Symposium on Non-Surgical Contraceptive Methods for Pet Population Control, 2006

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Applied Animal Behaviour Science 47 (1996) 75-89

The English Cocker Spaniel: preliminary findings on aggressive behaviour

V. O'Farrell and E. Peachey

Behavioural effects of ovario-hysterectomy on bitches

Small Animal Clinic, Royal (Dick) School of Veterinary Studies, Summerhall, Edinburgh EH9 1QH

Journal of Small Animal Practice (1990) 31, 595-598

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Effects of ovariohysterectomy on reactivity in German Shepherd dogs

The Veterinary Journal 172 (2006) 154–159

PRESENTATION SUMMARY & POWERPOINT

Non-reproductive Effects of Spaying and Neutering on Behavior in Dogs

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Although there are scattered reports in the literature of apparently adverse effects of spaying and neutering on canine behavior, there are very few quantitative studies and most of these have employed behavioral measures of unknown reliability and validity.

The present study used the Canine Behavioral Assessment and Research Questionnaire (C-BARQ)[®] to investigate the impact of spaying/neutering in various dog populations, including (1) a random sample of 1,552 dogs belonging to 11 common breeds and (2) a convenience sample of over 6,000 dogs of various breeds recruited via an online survey. The C-BARQ is a reliable, standardized method for evaluating and screening dogs for the presence and severity of behavioral problems. It was developed by behavioral researchers at the University of Pennsylvania (Hsu and Serpell, 2003) and consists of a 101-item questionnaire that is simple to use, takes about 15 minutes to fill out, and can be completed by anyone who is reasonably familiar with the dog's typical responses to ordinary, day-to-day events and stimuli. The C-BARQ is currently the only existing behavioral assessment instrument of its kind to be thoroughly tested for reliability and validity on large samples of dogs of various breeds. This process has resulted in the identification of the following 13 distinct behavioral factors or traits that are common to the majority of dogs, regardless of breed, age, sex or neuter status:

1. **Stranger-directed aggression:** Dog shows threatening or aggressive responses to strangers approaching or invading the dog's or the owner's personal space, territory, or home range.
2. **Owner-directed aggression:** Dog shows threatening or aggressive responses to the owner or other members of the household when challenged, manhandled, stared at, stepped over, or when approached while in possession of food or objects.
3. **Dog-directed fear/aggression:** Dog shows fearful and/or aggressive responses when approached directly by unfamiliar dogs.
4. **Familiar dog aggression:** Threatening or aggressive responses during competition for resources with other (familiar) dog(s) in the household.
5. **Stranger-directed fear:** Fearful or wary responses when approached directly by strangers.

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6. **Nonsocial fear:** Fearful or wary responses to sudden or loud noises, traffic, and unfamiliar objects and situations.
7. **Separation-related behavior:** Vocalizes and/or engages in destructive behavior when separated from the owner, often accompanied or preceded by behavioral and autonomic signs of anxiety, including restlessness, loss of appetite, trembling, and excessive salivation.
8. **Attachment and attention-seeking:** Maintains close proximity to the owner or other members of the household, solicits affection or attention, and becomes agitated when the owner gives attention to third parties.
9. **Trainability:** Shows willingness to attend to the owner, obeys simple commands, fetches objects, responds positively to correction, and ignores distracting stimuli.
10. **Chasing:** Pursues cats, birds, and other small animals, given the opportunity.
11. **Excitability:** Strong reaction to potentially exciting or arousing events, such as going for walks or car trips, doorbells, arrival of visitors, and the owner arriving home; difficulty settling down after such events.
12. **Touch sensitivity:** Fearful or wary responses to potentially painful procedures, including bathing, grooming, claw-clipping, and veterinary examinations.
13. **Energy level:** Highly energetic, boisterous, and/or playful behavior.

The results of the study suggest that spayed female dogs tend to be more aggressive toward their owners and to strangers than intact females, but that these effects of spaying on behavior appear to be highly breed-specific. Contrary to popular belief, the study found little evidence that castration was an effective treatment for aggressive behavior in male dogs, and may exacerbate other behavioral problems. Further research will be needed to clarify the relationship between age of spaying/neutering and these apparent effects on behavior.

Reference

Hsu, Y., and Serpell, J.A. 2003. "Development and validation of a questionnaire for measuring behavior and temperament traits in pet dogs." *J. Amer. Vet. Med. Assoc.*, 223: 1293-1300.

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Effects on Behavior
By Dr. Deborah Duffy

BEHAVIORAL EFFECTS OF SPAYING/NEUTERING
IN DOMESTIC DOGS

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OFTEN CITED BEHAVIORAL REASONS TO SPAY/NEUTER A PET:

(from websites of veterinary clinics, humane societies, trainers & animal shelters)

“Spaying and neutering makes
pets better, more affectionate
companions.”

“Female dogs, like males, have
an increased risk of aggression if
left intact.”

“It is true that unneutered dogs are often more aggressive and
territorial (urine marking, fighting), but these traits should not be
confused with loyalty and protection of their home and family.”

“The only behavior changes that
are observed after neutering
relate to behaviors influenced by
male hormones.”

“..any (behavioral) change would be for the better.
Altered pets are less aggressive toward other dogs and
cats, are less likely to urine mark and wander, and
generally have better personalities.”

“Unsterilized animals often exhibit
more behavior and temperament
problems than do those who have
been spayed or neutered.”

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QUESTIONS:

- ❖ What effects does spaying/neutering have on non-reproductive behaviors?
- ❖ Sex differences?
- ❖ Breed differences?



Canine Behavioral Assessment & Research Questionnaire (C-BARQ)

<http://www.vet.upenn.edu/cbarq/>

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101 Questions:

❗ 5-point scale

❗ mixture of severity scales and frequency scales

The image shows two pages of the C-BARQ questionnaire. The left page is titled 'SECTION 2: Aggression' and contains two questions (9 and 10) about aggression, each with a 5-point scale. The right page is titled 'Canine Behavioral Assessment & Research Questionnaire (C-BARQ)' and contains 'SECTION 1: Training and obedience' with eight questions about training and obedience, each with a 5-point scale.

The C-BARQ Factors or Traits

Stranger-directed aggression (10 items)

Trainability (8 items)

Owner-directed aggression (8 items)

Chasing (4 items)

Dog-directed fear/aggression (8 items)

Excitability (6 items)

Dog rivalry (4 items)

Touch sensitivity (4 items)

Stranger-directed fear (4 items)

Energy (2 items)

Nonsocial fear (6 items)

Separation-related behavior (8 items)

Attachment/attention-seeking (6 items)

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Miscellaneous C-BARQ Items

Item 78: Escaping/roaming	Item 89: Separation urination
Item 79: Rolling in scent	Item 90: Separation defecation
Item 80: Coprophagia (eating feces)	Item 91: Hyperactivity
Item 81: Chewing objects	Item 94: Staring (obsessive)
Item 82: Mounting	Item 95: Snapping at flies (obsessive)
Item 83: Food begging	Item 96: Tail-chasing
Item 84: Food stealing	Item 97: Shadow/light-chasing
Item 85: Fear of stairs	Item 98: Barking
Item 86: Pulling on leash	Item 99: Autogrooming (self)
Item 87: Marking with urine	Item 100: Allogrooming (others)
Item 88: Submissive/emotional urination	Item 101: Other abnormal/stereotypic

Random Sample Survey

Respondents:

- * 1,552 dog owners (breed club members)

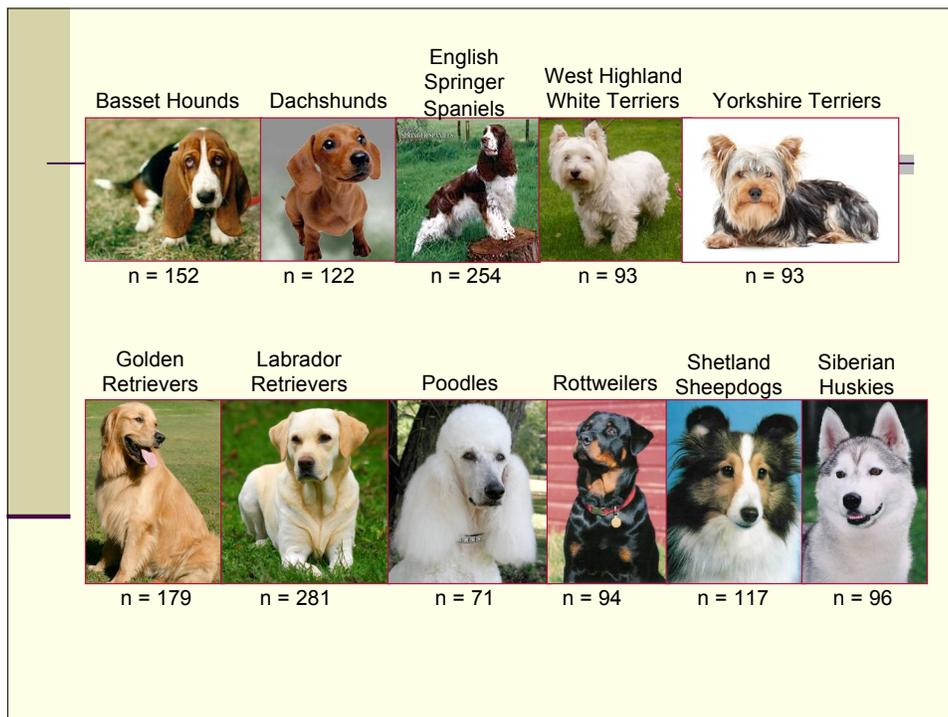
Dogs

- * Age: \geq 1 year old (mean 6 years, Std.dev. 3.2 yrs)
- * Sex: Male:Female ratio = 1:1
- * 40% Spayed/Neutered

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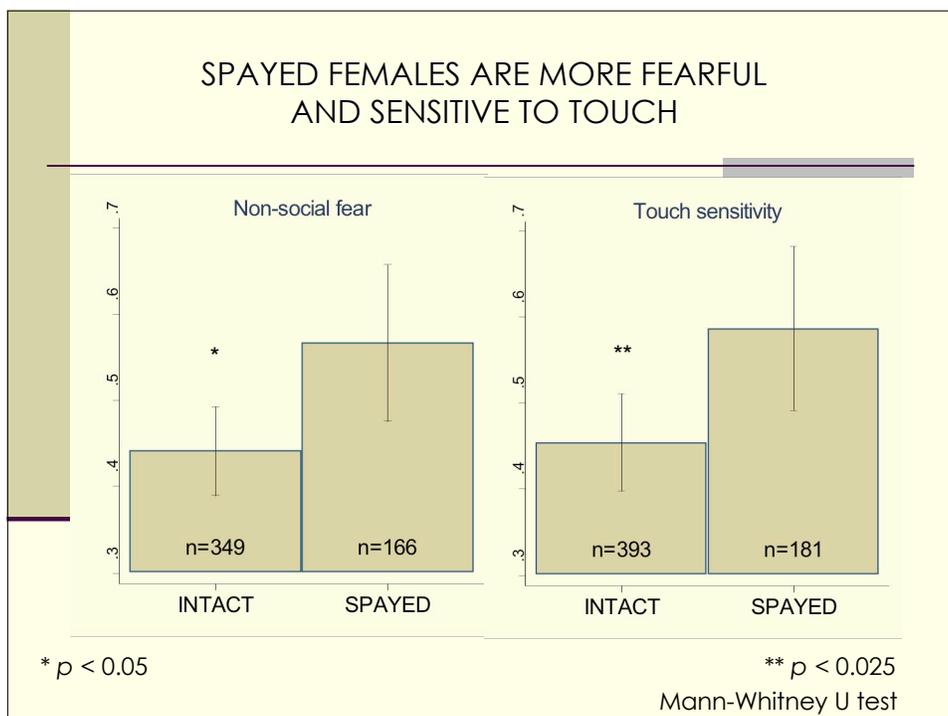
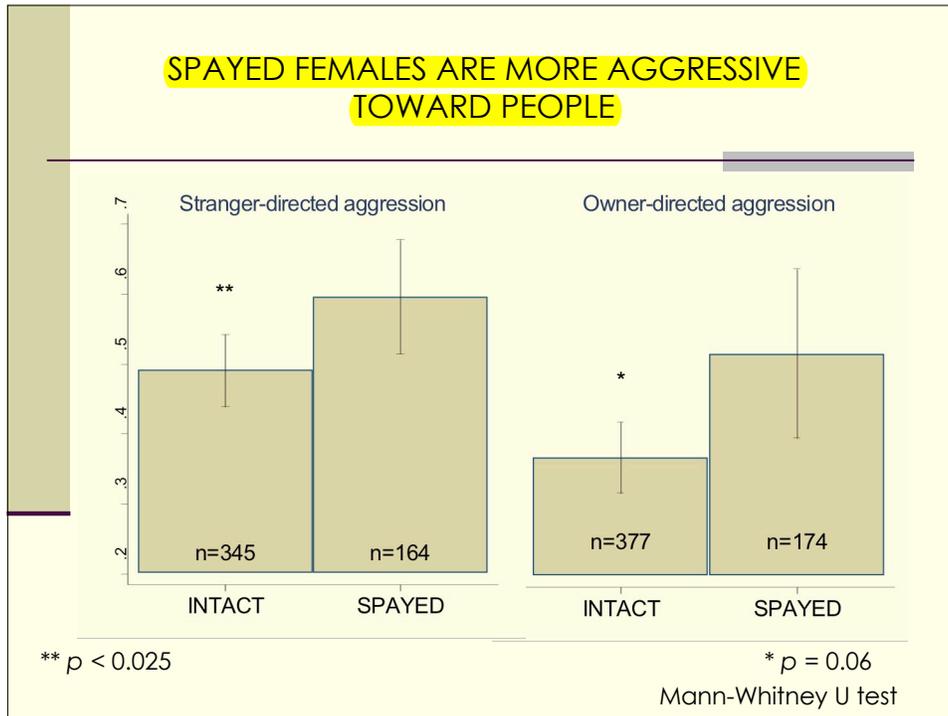
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Reasons for Spaying/Neutering:

	Percent
Birth Control	41.8
Required by Shelter/Breeder	2.2
Control/Prevent Behavior Problems	18.1
Control/Prevent Health Problems	31.4
Recommended by Veterinarian	.5
Other	6.0

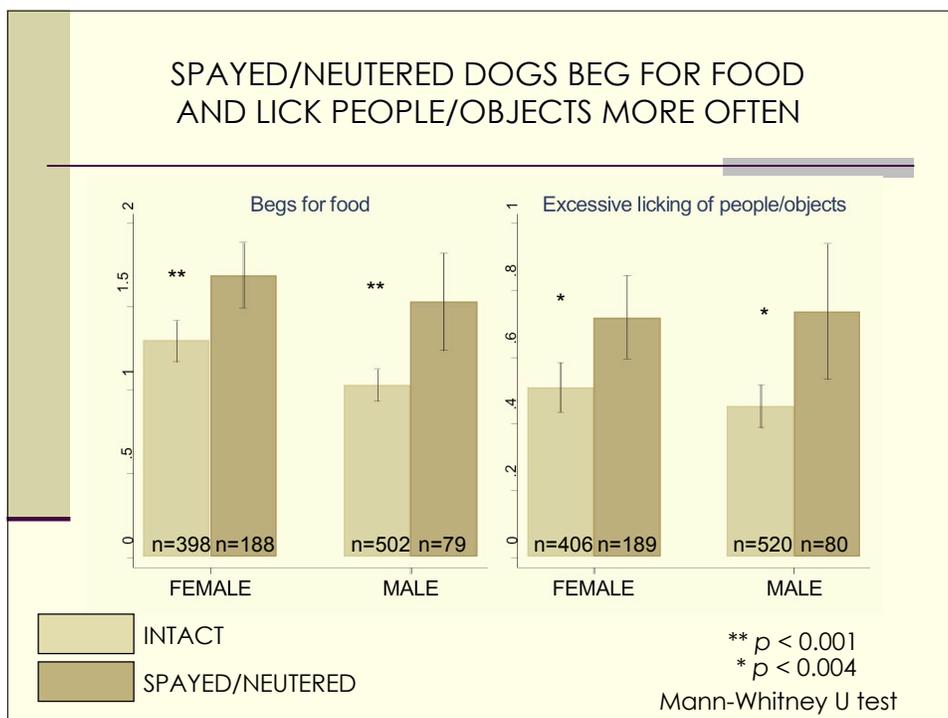
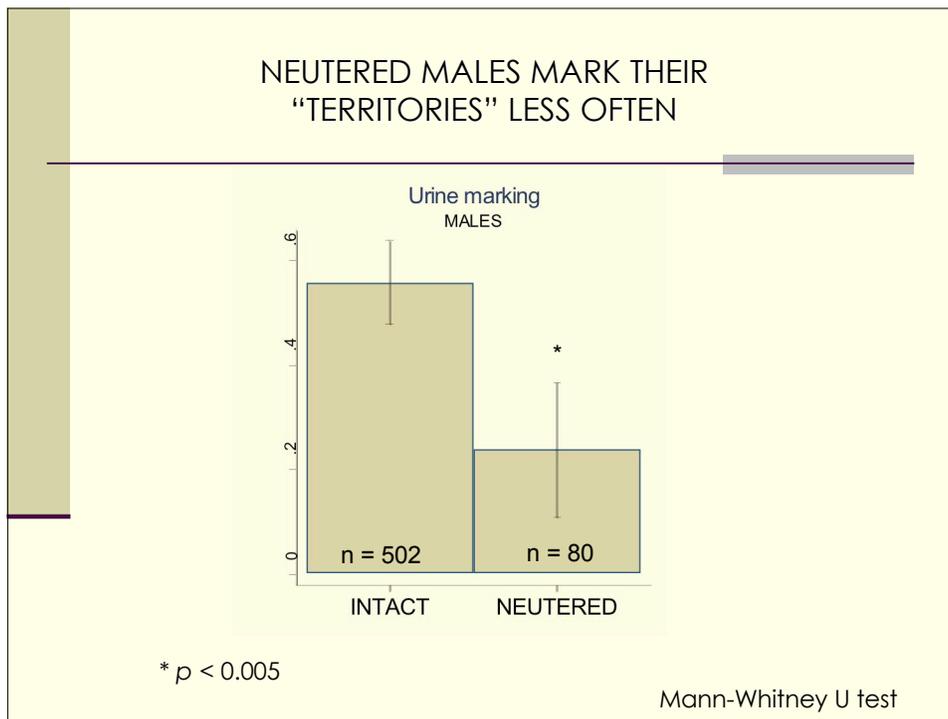
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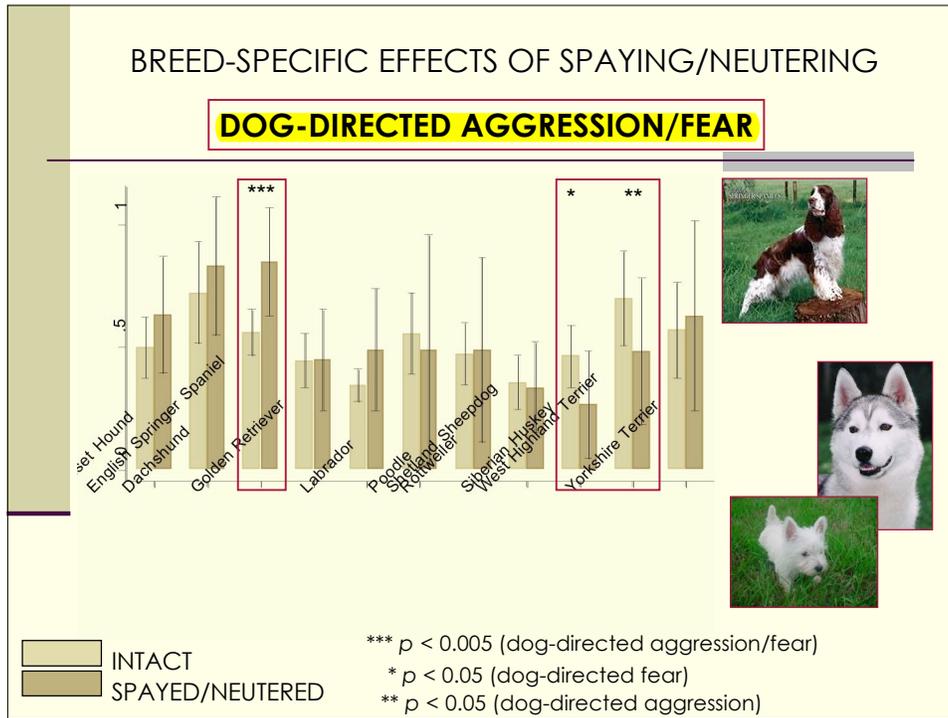
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Convenience Sample Survey






Respondents:

- ❖ 3,593 dog owners (open-access to C-BARQ website)
- ❖ Only 1 dog per owner

Dogs:

- ❖ Age: 6 months – 23 years (mean 4.8 years, Std.dev. 3.2 yrs)
- ❖ Sex: Male:Female ratio = 1:1
- ❖ 76% Spayed/Neutered
- ❖ 17 breeds (plus mixed breeds) with sample size of ≥ 50 dogs each

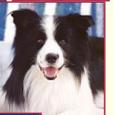
Reasons for spaying/neutering:

- ❖ Birth control (40%)
- ❖ Required by breeder/shelter (30%)







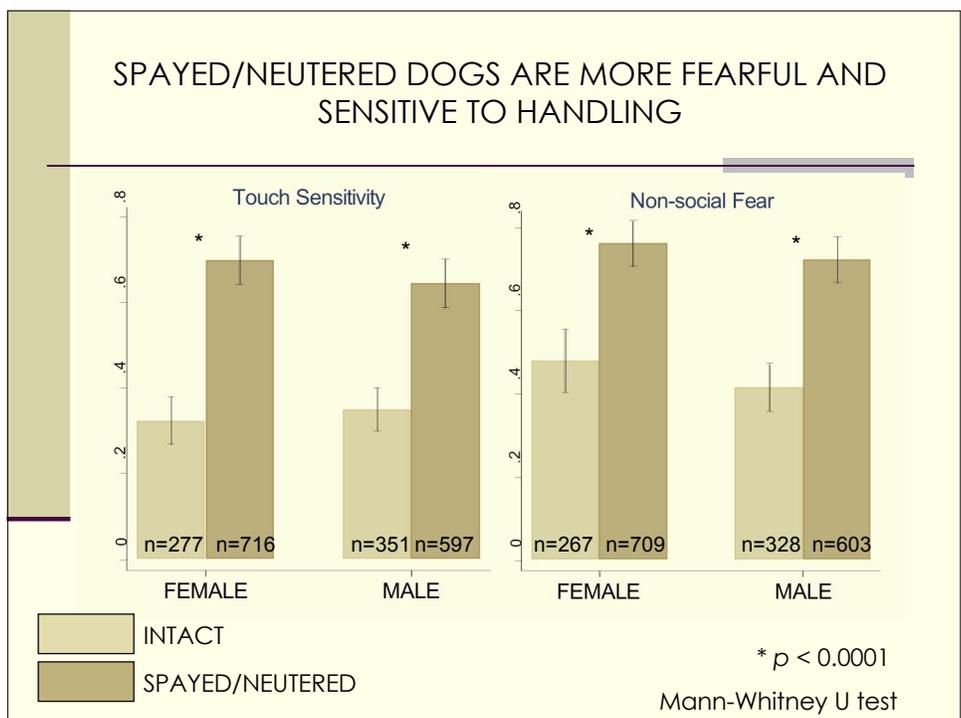
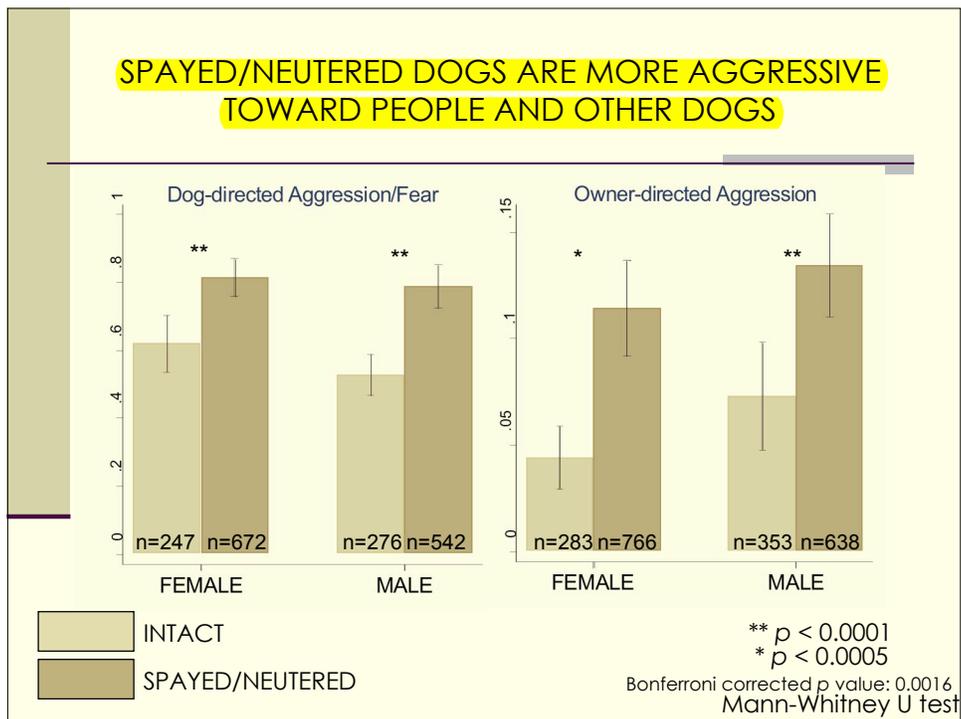





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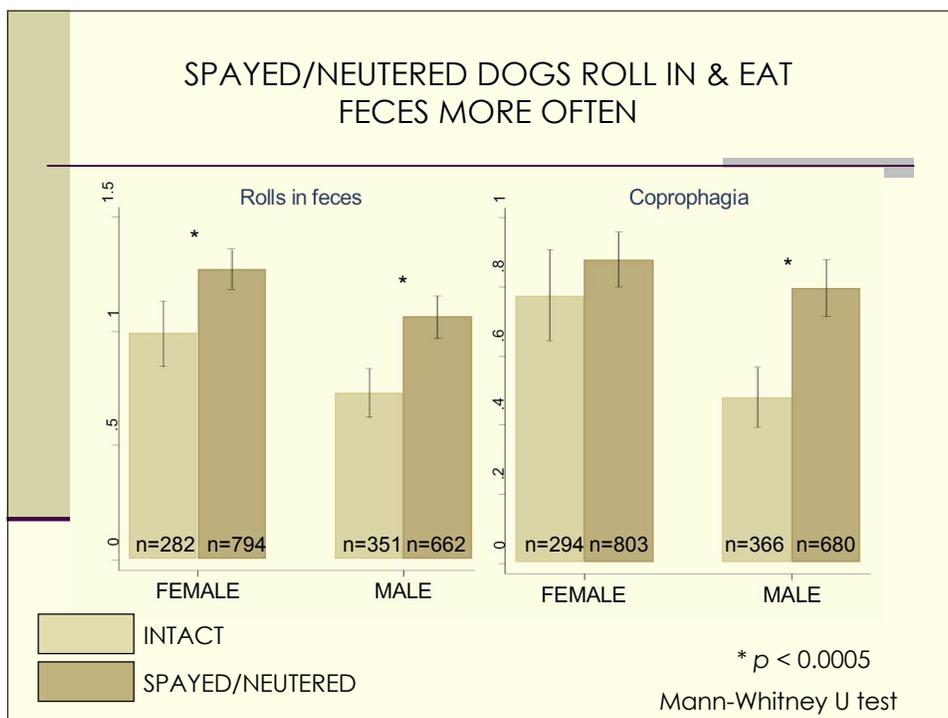
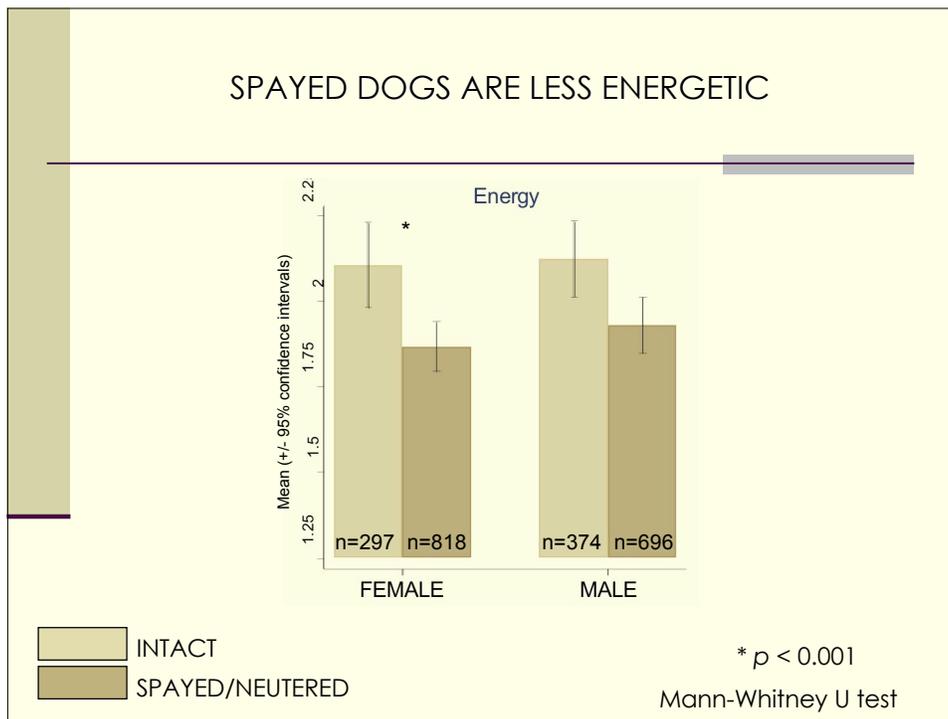
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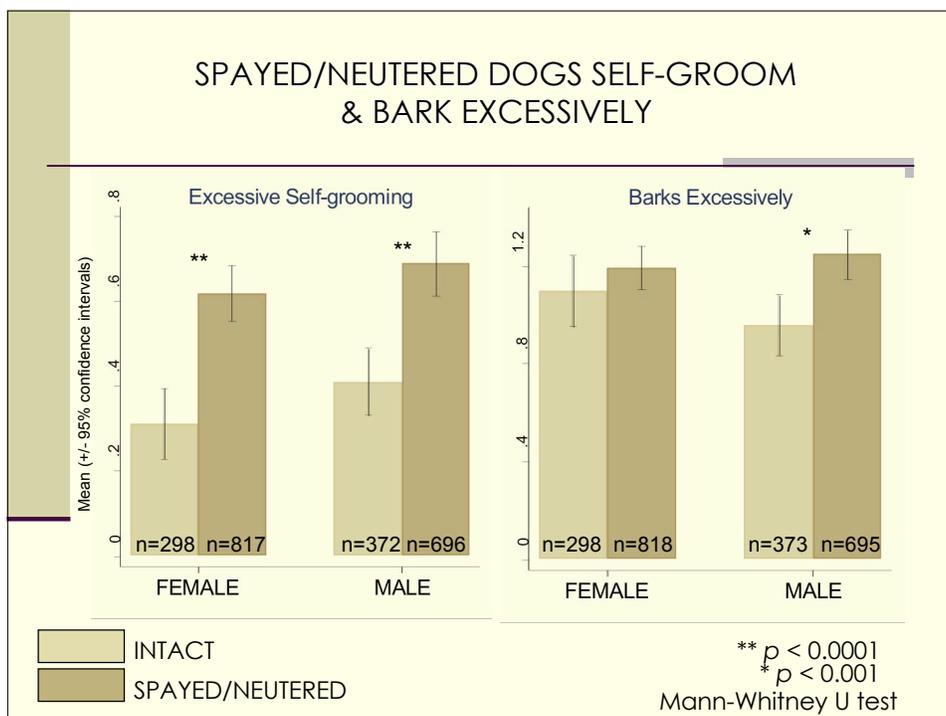
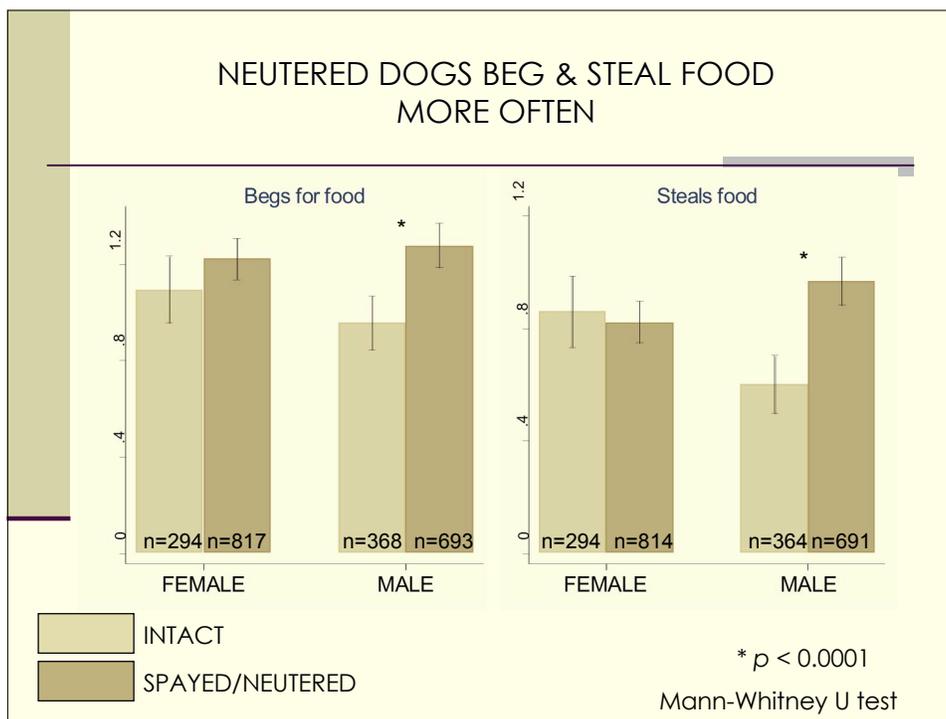
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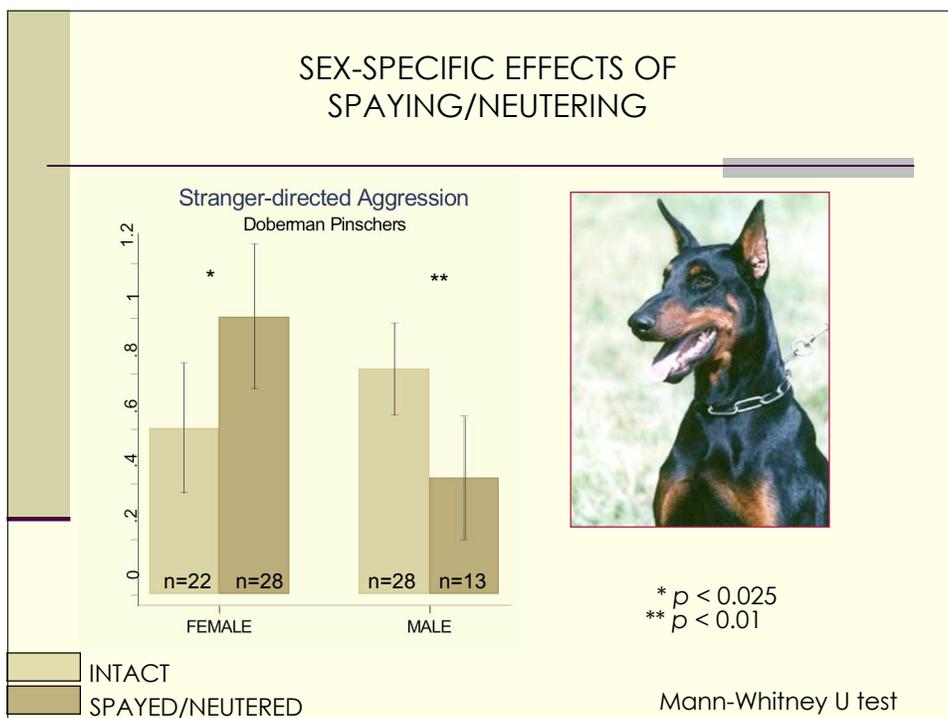
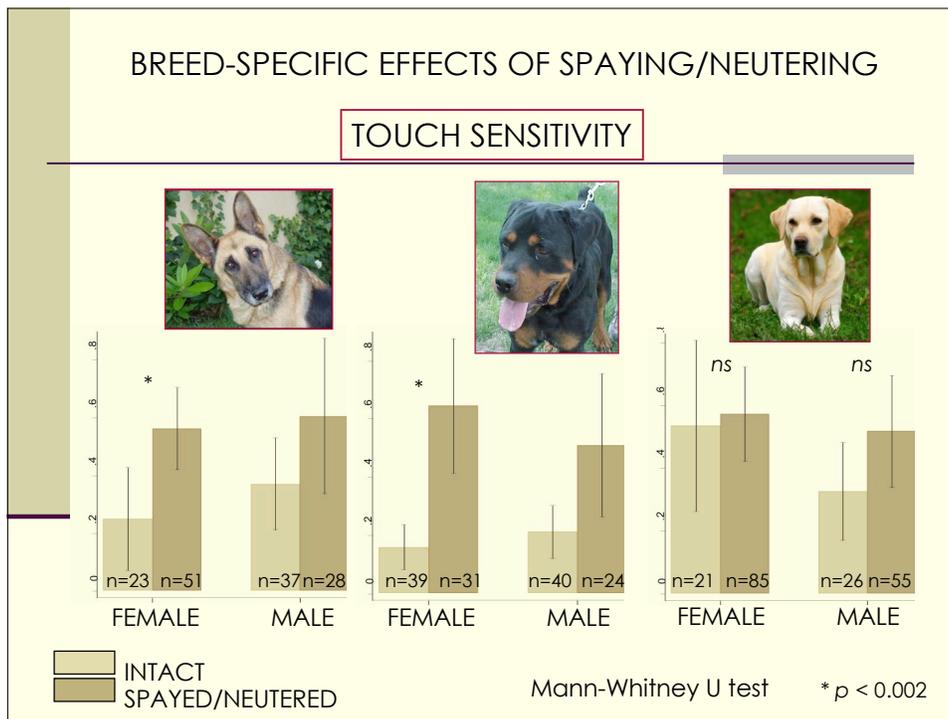
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SUMMARY

- ❖ For most behaviors, spaying/neutering was associated with worse behavior, contrary to conventional wisdom.
- ❖ A few behaviors (e.g., energy level, urine marking) were reduced in spayed/neutered dogs.
- ❖ The effects of spaying/neutering are often specific to certain breeds and are not always equivalent between sexes.

CONCLUSIONS

- ❖ Significant differences in scores do not necessarily indicate severe behavioral problems.
- ❖ Neutering male dogs does not render them useless for protection or guarding.
- ❖ We need to investigate mechanisms for behavioral effects of spaying and develop alternatives.
- ❖ Dog owners need to receive accurate information to help them form realistic expectations.

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- ✿ Various breed clubs.
- ✿ All participants.



The English Cocker Spaniel: preliminary findings on aggressive behaviour

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Abstract

Two thousand questionnaires were distributed randomly via the Kennel Club (UK) to owners of purebred English Cocker Spaniels (ECSs). Owners were asked to give details about the ECSs they owned: age, sex, neuter status, coat colour. They were also asked to indicate whether their dog showed aggression (on a 1–5 scale; 1, never or almost never; 5, always or almost always) in any of 13 situations. These were: aggression towards strange dogs (A1), towards strangers approaching the dog (A2), towards persons approaching/visiting the home (A3), towards persons approaching the owner away from home (A4), towards children in the household (A5), towards other dogs in the household (A6), when the owner gives attention to other person or animal (A7), toward owner or member of owner's family (A8), when disciplined (A9), when reached for or handled (A10), when in restricted spaces (A11), at meal times/ defending food (A12) and, suddenly and without apparent reason (A13).

A total of 1008 (50.4%) replies was received, of which 932 (owning 1109 dogs) were suitable for analysis. Solid colour ECSs were significantly more likely to show aggression than parti-colours in 12 out of the 13 situations (A2–A13) and red/goldens were more likely to show aggression than blacks in situations A1, A4, A5 and A7–A13 inclusive. Males were significantly more likely to show aggression than females in situations A1, A8, A9 and A10 while females were significantly more likely to show aggression towards other dogs in the household (A6). **When comparing ECSs which had been neutered before signs of aggression were apparent, with entire, neutered females were found more likely to show aggression towards children in the household (A5).** Cluster analysis revealed six groups of associated variables; these were labelled, 'protective (of itself and owner)', 'protective (of territory)', 'intraspecific (unfamiliar dogs)', 'competitive', 'possessive', and 'dominance-type' aggression. Most dogs showed 'protective (of territory)' aggression (45.7%) while 'dominance-type' aggression was the least common (11.7%).

* Corresponding author.

The results suggest a genetic and neuroendocrine basis for the within-breed differences in aggression. Neutering was not found to be useful as a preventative measure for aggression. From the cluster analysis, there was some evidence that so-called 'rage' syndrome, a condition often reported in the breed and one which is characterised by sudden and unpredictable aggression, is an expression of social dominance, rather than being a separate or pathological phenomenon. Follow-up projects are now underway and it is hoped they will lead to a better understanding of all types of canine aggression, and provide an answer as to whether or not 'rage' truly exists as a distinct phenomenon.

1. Introduction

Although the English Cocker Spaniel (ECS) is a popular breed in the United Kingdom, it has attracted some negative publicity, especially during the early 1980s because of problems with aggressive behaviour. Mugford (1984) reported that the ECS was the third most common breed seen at his behavioural referral practice in Britain and that most (74%) cases of aggression involved those of the red/golden coat colour type. In particular, the breed has become synonymous with a condition called 'rage' syndrome, where a dog suddenly and inexplicably is aggressive towards its owners or other household members. This type of aggression has also been reported in other breeds such as American Cocker Spaniels (Dodman et al., 1992), Bernese Mountain Dogs (Van der Velden et al., 1976), Chesapeake Bay Retrievers (Dodman et al., 1992), Dobermanns (Hart and Hart, 1985), English Bull Terriers (Neville, 1991), English Springer Spaniels (Dodman et al., 1992), German Shepherds (Hart and Hart, 1985), Golden Retrievers (Fisher, 1993), Pyrenean Mountain Dogs (Neville, 1991) and St. Bernards (Hart and Hart, 1985). However, it is a rare condition (Hart and Hart, 1985; Blackshaw, 1987; Blackshaw, 1991; Reisner, 1991) and there are no published data on its prevalence in ECSs.

There are two main theories as to what this syndrome could be. First, that it is an exaggerated or unusual form of dominance aggression (Mugford, 1984; Neville, 1991; Reisner, 1991; O'Farrell, 1992). Secondly, that it is a type of epilepsy, part of a group known as complex partial seizures (Colter, 1989). It closely resembles a form of subthreshold limbic epilepsy known as episodic dyscontrol syndrome (Dodman et al., 1992) a condition for which there is some electroencephalographic evidence. Beaver (1980) reported on a condition she labelled 'mental lapse' syndrome which is similar to 'rage' syndrome and episodic dyscontrol syndrome. However, there have been no further reports of it in the literature. To date, macroscopic and microscopic investigations of the brains of dogs euthanised because of unexplained, severe aggression have revealed only a mild degree of encephalitis in some cases (Hart, 1977). Mugford (1984) argued that there may be a genetic basis for 'rage' syndrome in ECSs and Van der Velden et al. (1976) has shown evidence for this in Bernese Mountain Dogs.

To learn more about aggression in the ECS and to determine whether 'rage' exists and if so, where it fits in the classification of canine aggression, a multi-layered study has been initiated at the University of Cambridge Veterinary School. This paper reports on the first stage of the programme which involved a large scale survey of owners of purebred ECSs.

2. Animals, materials and methods

Two thousand one-page (double-sided) questionnaires were distributed randomly through the postal system in November 1992 via the Kennel Club (UK) to UK owners of purebred ECSs. Professional breeders, however, were excluded from the study as it was thought unlikely that they would report truthfully on aggressive behaviour in their dogs. The replies were sent to the principal author using a FREEPOST address. Owners were asked to provide their name, address and phone number and to indicate how many adults and children (under 16 years of age) lived in the household. They were also asked about the number of ECSs they owned and for a description of each: name of dog, coat colour, age, sex, and whether or not it had been neutered. Finally, they were asked to consider whether their dog (a separate sheet was available for each dog) showed aggression in any of 13 situations (see Table 1). The owners indicated the relative frequency of such behaviour on a 1–5 scale for each of the 13 situations: 1, never or almost never; 2, rarely; 3, occasionally; 4, usually; 5, always or almost always.

All data were analysed using the statistical package SPSS for the Macintosh: Version 4.0. The Mann–Whitney *U* test (see Siegel and Castellan, 1988) was used to compare solids with particolours, red/goldens with blacks, males with females, neutered males with entire males, and neutered females with entire females in each of the 13 (A1–A13) situations in which aggression could occur (see Table 2 for *N* values). Agglomerative hierarchical cluster analysis, using Ward's method and squared Euclidean distances (see Hair et al., 1987), was performed on these 13 variables to determine clusters or groups of related situations. From these it was possible to label the clusters into 'types' of aggression.

In order to calculate the percentage of dogs aggressive in each of the 13 situations, the rating scale was reduced to a 'present' or 'absent' scoring system (1–2, 'absent'; 3–5, 'present'). The mean of the percentages related to each aggression group or cluster was then calculated to show the incidence of these in the ECS population.

Table 1

The 13 different situations about which the owners were asked to rate the relative frequency of their dog's likelihood to show aggression

Aggressive situation	Code
Towards strange dogs	A1
Towards strangers approaching the dog	A2
Towards persons approaching/visiting the home	A3
Towards persons approaching owner away from home	A4
Towards children in the household	A5
Towards other dogs in the household	A6
When owner gives attention to other person or animal	A7
Toward owner or member of owner's family	A8
When disciplined	A9
When reached for or handled	A10
When in restricted spaces	A11
At meal times/defending food	A12
Sudden and without apparent reason	A13

3. Results

A total of 1008 (50.4%) replies was received, of which 932 (owning 1109 dogs) were suitable for analysis. A good representation of registered ECSs was achieved as the distribution of coat colours of the survey dogs compared well with the coat colours of ECSs registered in 1992 in the UK.

Registration figures for the breed, including coat colour of the dogs, were obtained from the Kennel Club (UK) for the period 1982–1992. This was done to see if the negative publicity of the early 1980s had had an effect on preferences for the breed and for coat colour. Although the percentage of ECSs registered fell from 1982 to 1987, they then rose and continued to do so through to 1992 (Fig. 1). However, coat colour preferences showed a more sustained change. The popularity of solid colours decreased from a time when they were the most popular colour type, 1982; particolours have been more popular ever since (Fig. 2). This change in solid colour preference is due to a decrease in the number of red/goldens being registered (Fig. 3).

3.1. Demographics

The mean number of adults in the households was 2.3 (range 1–10, mode 2) and the mean number of children was 0.7 (range 0–5); only 40% of owners had children.

The mean number of ECSs owned was 1.2: 86% owned one, 11% owned two and 3% owned three or more. The mean age of these dogs was 2.7 years (range 0.25–17 years, mode 2.5 years). Solid colour dogs made up 38.6% of the sample and particolours 61.4%. Of the solid colours, 47.9% were blacks while 52.1% were red/goldens. There were similar numbers of males (545, 49.1%) and females (564, 50.9%) in the sample and most were entires (66.8% females, 82.7% males).

Table 2
N values for the various Mann–Whitney *U* tests which were performed

Variable	Aggressive situation												
	A1	A2	A3	A4	A5 ^a	A6 ^a	A7	A8	A9	A10	A11	A12	A13
Solid colour	426	428	428	426	142	373	425	428	427	428	423	426	428
Particolour	679	679	680	679	272	622	678	677	680	680	677	678	680
Red/golden	221	223	223	222	78	192	222	223	222	223	220	222	223
Black	205	205	205	204	64	181	203	205	205	205	203	204	205
Male	544	544	545	543	199	478	543	545	545	545	541	542	545
Female	562	564	564	563	215	518	561	561	563	564	560	563	564
Neutered male	94	93	94	94	33	76	93	94	94	94	94	94	94
Entire male	447	448	448	446	165	399	447	448	448	448	444	445	448
Neutered female	183	184	184	183	53	160	182	184	183	184	182	183	184
Entire female	370	371	371	371	158	349	370	368	371	371	369	371	371

^a N values are smaller than for the other aggressive situations because not every owner could respond to these, i.e. because not every owner had other dogs in the house and because most (60%) did not have children.

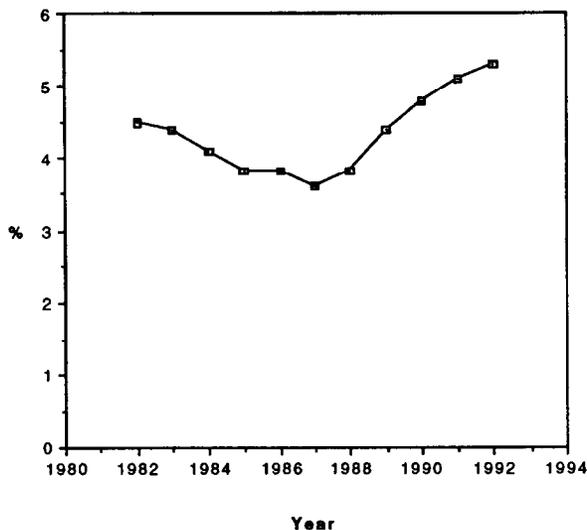


Fig. 1. The percentage of the total number of dog registrations with the Kennel Club (UK) which were English Cocker Spaniels (1982–1992).

3.2. *Solid vs. particolour English Cocker Spaniels*

Solid colours were significantly more likely to show signs of aggression than particolours in 12 out of the 13 situations. These included A2 (towards strangers

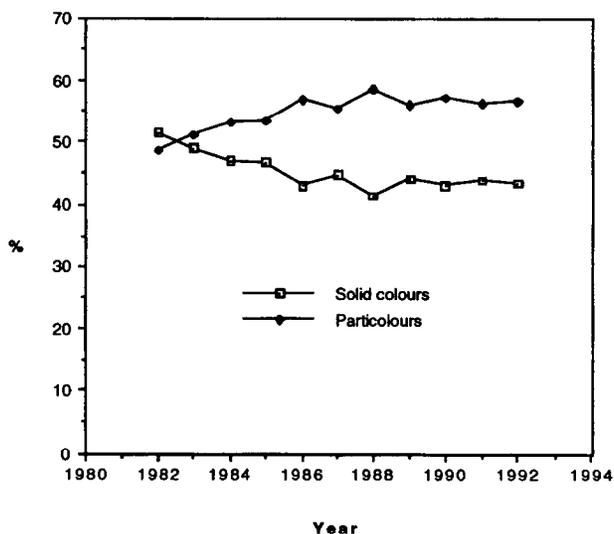


Fig. 2. The percentage of English Cocker Spaniels registered with the Kennel Club (UK) which were either solid colour or particolour (1982–1992).

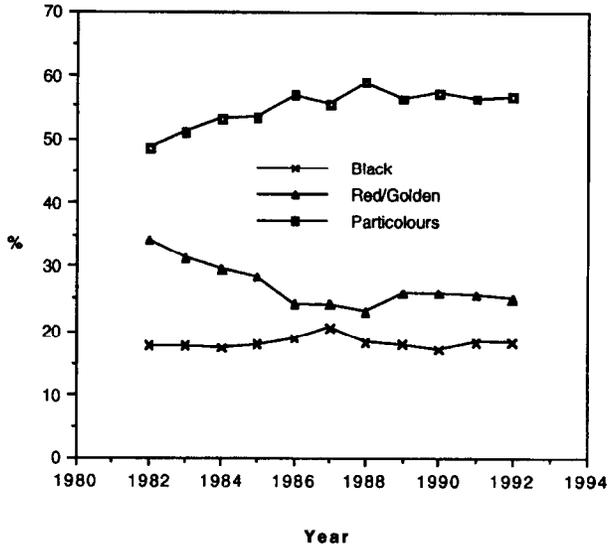


Fig. 3. The percentage of English Cocker Spaniels registered with the Kennel Club (UK) which were either red/golden, black or particolour (1982–1992).

approaching the dog; Mann–Whitney U test, $Z = 3.723$, $P < 0.001$), A3 (towards persons approaching/visiting the home; $Z = 4.213$, $P < 0.001$), A4 (towards persons approaching owner away from the home; $Z = 4.514$, $P < 0.001$), A5 (towards children in the household; $Z = 6.462$, $P < 0.001$), A6 (towards other dogs in the household; $Z = 2.163$, $P < 0.05$), A7 (when owner gives attention to other person or animal; $Z = 4.452$, $P < 0.001$), A8 (toward owner or member of owner's family; $Z = 9.766$, $P < 0.001$), A9 (when disciplined; $Z = 8.623$, $P < 0.001$), A10 (when reached for or handled; $Z = 7.255$, $P < 0.001$), A11 (when in restricted spaces; $Z = 7.631$, $P < 0.001$), A12 (at meal times/defending food; $Z = 9.547$, $P < 0.001$), and A13 (sudden and without apparent reason; $Z = 8.057$, $P < 0.001$).

3.3. Red / goldens vs. black English Cocker Spaniels

Within the solid colour group, red/goldens were compared with blacks. Here it was found that red/goldens were significantly more likely to be aggressive in a number of situations. These included, A1 (towards strange dogs; Mann–Whitney U test, $Z = 2.582$, $P < 0.01$), A4 (towards persons approaching owner away from home; $Z = 2.774$, $P < 0.01$), A5 (towards children in the household; $Z = 3.365$, $P < 0.001$), A7 (when owner gives attention to other person or animal; $Z = 3.336$, $P < 0.001$), A8 (toward owner or member of owner's family; $Z = 4.988$, $P < 0.001$), A9 (when disciplined; $Z = 4.524$, $P < 0.001$), A10 (when reached for or handled; $Z = 3.161$, $P < 0.01$), A11 (when in restricted spaces; $Z = 2.4$, $P < 0.05$), A12 (at meal times/defending food; $Z = 3.492$, $P < 0.001$), A13 (sudden and without apparent reason; $Z = 3.643$, $P < 0.001$).

3.4. Males vs. females

Males were more likely to be aggressive than females in situations A1 (towards strange dogs; Mann–Whitney U test, $Z = 2.02$, $P < 0.05$), A8 (toward owner or member of owner's family; $Z = 2.089$, $P < 0.05$), A9 (when disciplined; $Z = 4.459$, $P < 0.001$) and A10 (when reached for or handled; $Z = 2.235$, $P < 0.05$). Females were more likely to be aggressive than males in situation A6 (aggression towards other dogs in the household; $Z = 2.763$, $P < 0.01$) only.

3.5. Neutered males vs. entire males

Neutered males were found to be significantly more aggressive than entire males in situations A5 (towards children in the household; Mann–Whitney U test, $Z = 3.967$, $P < 0.001$), A8 (toward owner or member of owner's family; $Z = 4.066$, $P < 0.001$), A9 (when disciplined; $Z = 4.032$, $P < 0.001$), A10 (when reached for or handled; $Z = 4.28$, $P < 0.001$), A11 (when in restricted spaces; $Z = 2.917$, $P < 0.01$), A12 (at meal times/defending food; $Z = 2.724$, $P < 0.01$), and A13 (sudden and without apparent reason; $Z = 4.736$, $P < 0.001$).

3.6. Neutered females vs. entire females

Neutered females were found to be significantly more likely to be aggressive than entire females in situations A2 (towards strangers approaching the dog; Mann–Whitney U test, $Z = 1.963$, $P < 0.05$), A3 (towards persons approaching/visiting the home; $Z = 2.494$, $P < 0.05$), A4 (towards persons approaching owner away from home; $Z = 2.74$, $P < 0.01$), A5 (towards children in the household; $Z = 3.246$, $P < 0.01$), A8 (toward owner or member of owner's family; $Z = 3.289$, $P < 0.01$), A9 (when disciplined; $Z = 4.127$, $P < 0.001$), A10 (when reached for or handled; $Z = 2.805$, $P < 0.01$), A11 (when in restricted spaces; $Z = 2.211$, $P < 0.05$), A12 (at meal times/defending food; $Z = 2.465$, $P < 0.05$), and A13 (sudden and without apparent reason; $Z = 2.458$, $P < 0.05$).

3.7. Follow-up study

As the neutering results were surprising it was decided to further investigate the effects of neutering by contacting the owners of all neutered ECSs and asking for details on (1) age at which aggression started (if dog was aggressive at all), (2) age at which the dog was neutered and (3) why the dog was neutered. Data were collected on 149 (81%) neutered females and 73 (78%) neutered males. The mean age at which aggression started was 0.9 years (11 months) for males and females, while the mode was 0.5 years (6 months) and 0.2 years (2 months), respectively. Neutered dogs were once again compared with entires using the Mann–Whitney U test for each of the 13 situations in which aggression could occur. However, this time dogs which were neutered because they were aggressive and those which were neutered after aggressive behaviour had first started, were excluded (neutered males $N = 55$, neutered females $N = 139$). This would

Table 3
The components of each cluster and the labels assigned

Cluster label	Components
Protective (of itself and owner)	Aggression towards: strangers approaching the dog (A2) persons approaching owner away from home (A4)
Protective (of territory)	Aggression towards persons approaching/visiting the home (A3)
Intraspecific (unfamiliar dogs)	Aggression towards strange dogs (A1)
Competitive	Aggression: towards other dogs in the household (A6) when owner gives attention to other person or animal (A7)
Possessive	Aggression at meal times/defending food (A12)
Dominance-type	Aggression: toward owner or member of owner's family (A8) when disciplined (A9) when reached for or handled (A10) when in restricted spaces (A11) sudden and without apparent reason (A13)

then tell us if neutering was in some way a precursor to aggression. The results of this analysis revealed that neutering was probably the consequence of aggressiveness rather than the cause. All statistically significant differences between neutered and entire males disappeared when dogs which had been neutered either after or because they became aggressive were removed from the sample. The same was largely true for females,

Table 4
Mean percentage of English Cocker Spaniels showing a particular category of aggression

Aggression category	Components	N (aggression present)	Total N	%	Mean % for category
Protective (of itself and owner)	A2	198	1108	17.9	15.2
	A4	138	1106	12.5	
Protective (territory)	A3	507	1109	45.7	45.7
Intraspecific (unfamiliar dogs)	A1	317	1106	28.7	28.7
Competitive	A6	184	996	18.5	17.8
	A7	190	1104	17.2	
Possessive	A12	266	1105	24.1	24.1
Dominance-type	A5	44	414	10.6	11.7
	A8	124	1106	11.2	
	A9	184	1108	16.6	
	A10	124	1109	11.2	
	A11	126	1101	11.4	
	A13	91	1109	8.2	

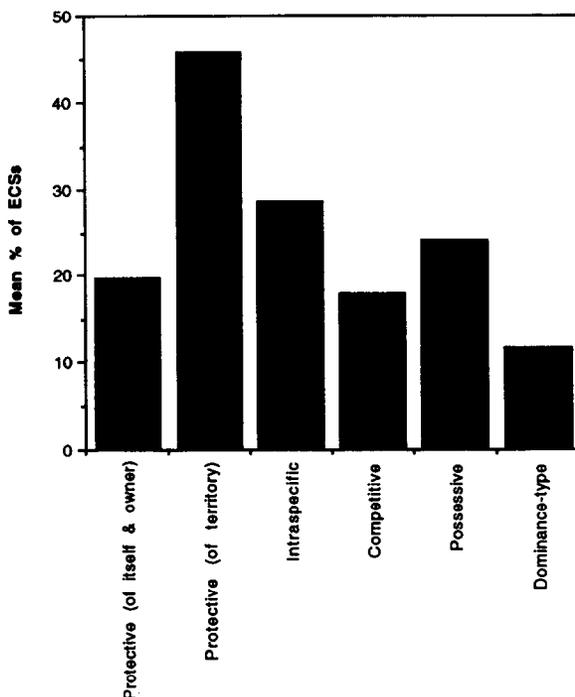


Fig. 4. The mean percentage of English Cocker Spaniels showing any of the six types of aggression determined by the cluster analysis.

except that neutered females were now found to be significantly more likely to display aggression towards children in the household (Mann–Whitney U test, $Z = 2.015$, $P < 0.05$).

3.8. Cluster analysis

Changes in agglomeration coefficients between cluster stages were used to determine the number of significant clusters; a six cluster solution was achieved. This solution was cross-validated using the technique of split sample replication (see Hair et al., 1987 for details). The six groups or clusters were labelled ‘protective (of itself and owner)’, ‘protective (of territory)’, ‘intraspecific (unfamiliar dogs)’, ‘competitive’, ‘possessive’, and ‘dominance-type’ aggression (see Table 3).

The percentage of dogs which were aggressive (scored 3, 4 or 5 on the rating scale) in any of the 13 situation variables and the mean percentage which displayed a particular type or category of aggression are provided in Table 4. Most ECSs (45.7%) showed protective (of territory) aggression while dominance-type aggression was least common (11.7%; Fig. 4).

4. Discussion

The interpretation of the results of this study rests heavily on the reliability and validity of the methods used to measure aggressive behaviour. When completed by persons familiar with the animals being assessed, subjective rating scales of the type employed here have been found to provide reliable measures of individual differences in behaviour in laboratory rhesus monkeys (Stevenson-Hinde et al., 1980; Stevenson-Hinde, 1983) and domestic cats (Feaver et al., 1986). However, although comparable techniques have also been used to elicit owner assessments of both dog (Serpell, 1983; Serpell and Jagoe, 1995) and cat (Turner and Stambach-Geering, 1990) behaviour, their accuracy and reliability have not been tested. This raises the possibility that any observed differences between different subgroups within the same population of ECSs are simply artefacts of biases in owners' perceptions. For example, it is possible (though unlikely) that the owners of solid colour ECSs tend to perceive them as being more aggressive than do the owners of particolour dogs, regardless of any actual differences in behaviour. The use of quantitative rather than qualitative rating scales would be expected to reduce the likelihood of these kinds of subjective biases.

It should also be emphasised that, while the present findings are statistically highly significant in many cases, the overall effect sizes are relatively small. In other words, a finding that is probably true for the sampled population as a whole, for example, solid colour ECSs are more aggressive than particolours, is unlikely to be reliable at the level of the individual dog.

Coinciding with the negative publicity about the breed during the early 1980s, the percentage registered with the Kennel Club (UK) dropped but then rose again in the latter part of that decade. However, a more decided change occurred with coat colour preference. The decrease in popularity of the solid colours, especially the red/goldens, suggests that the negative publicity had a sustained effect. The ability of the print media to affect human attitudes and preferences to particular breeds of dog has been discussed previously by Podberscek (1994).

The existence of significant behavioural differences between the different colour morphs of the breed is interesting in the light of the view of Hemmer (1990) that coat colour in domestic animals is often closely associated with temperament (the hypothesis is based on the fact that the pigment melanin shares a common biochemical synthesis pathway with the catecholamine group of neurotransmitters). The fact that solid colour animals were more aggressive than particolours in 12 out of the 13 different contexts certainly suggests a genetic basis for this difference. It does not, however, provide support for Hemmer's theory since the bloodlines of these two colour variants are known to be quite distinct (Lloyd Carey, 1992). In addition, within the solid colour group, the red/golden variety was more aggressive, on average, than the black, and this agrees with the findings of Mugford (1984) who also noted that the red/golden variant appeared to be more inbred. Current follow-up research on the pedigrees of a subset of aggressive and non-aggressive dogs should help to clarify this issue.

A further interesting theoretical issue raised by the present findings concerns the apparent evidence for 'global' genetic effects on aggressiveness. According to the conventional view, different forms of aggressive behaviour, such as territorial or

dominance-related aggression, are differently motivated and therefore likely to be under the influence of separate genetic and physiological controls (see Serpell and Jagoe, 1995). Indeed, the ways in which the different behaviour patterns grouped in the cluster analysis is broadly consistent with this idea. The differences in aggressiveness between solid and particolour ECSs were, however, virtually consistent across all the different aggressive contexts, and this would suggest some underlying causal link. It is possible that solid colour forms (especially red/goldens) are simply more 'reactive' to stimuli (sensu Hart and Hart, 1985) than particolours in a general way. Unfortunately, the reactivity of the dogs in other, non-aggressive contexts was not measured in the present study. In any case, the possible genetic and neuroendocrine basis for these apparent within-breed differences in overall aggressiveness would probably repay more detailed investigation.

Although there are many examples in the literature suggesting that male dogs are more likely to be aggressive than females (see Borchelt, 1983; Mugford, 1984; Wright and Nesselrote, 1987; Podberscek and Blackshaw, 1990; Blackshaw, 1991; Landsberg, 1991; Wright, 1991; Beaver, 1993; Podberscek and Blackshaw, 1993) this was only supported in four out of the 13 situations recorded, and females were more aggressive than males in one situation (aggression towards other dogs in the household). One of the reasons for this difference could be that some researchers have not looked for sex differences in the different types of aggression, rather they have lumped all types together. Also, and more importantly, most studies do not have a control group of randomly selected dogs and therefore it is not possible to say whether either sex is actually overrepresented. To support the present findings, Scott and Fuller (1965, p. 419) found reduced sex differences in aggressiveness in relatively non-aggressive breeds, such as the (American) Cocker Spaniel, compared with aggressive breeds such as Fox Terriers and Basenjis, particularly with respect to social dominance. Males in the present study were more likely to be aggressive towards strange dogs and this also was the only component of the 'intraspecific (unfamiliar dogs)' cluster. Most cases of this sort of aggression have been attributed to males and usually involve male to male fighting and may be affected by circulating androgens (Borchelt, 1983; Hart and Hart, 1985; O'Farrell, 1992).

Females were more likely to be aggressive towards other dogs in the household and this may be because these households owned other female dogs; females rarely fight with males (see Borchelt, 1983). Unfortunately, the composition of the households in terms of the number and sex of other dogs was unknown.

Male dogs neutered before signs of aggression had appeared were not different from entire males in their likelihood of showing aggression in any of the 13 situations. This implies that neutering was not effective in preventing aggression and agrees with the findings of Le Boeuf (1970) and Salmeri et al. (1991). Other research, however, has indicated that neutered dogs are less aggressive than entires (Beaver, 1983; Borchelt, 1983; Wright and Nesselrote, 1987; Blackshaw, 1991). These previous studies, however, are based on cases presented to behavioural clinics without data on the age at which neutering took place being collected or at least this was not taken into account in the analyses. Hopkins et al. (1976) found that intermale fighting decreased when adult dogs were castrated but that territorial and fear-induced aggression were not.

Compared to entire bitches, female ECSs which were neutered before they showed any signs of aggression were only more likely to show aggression towards children in the household. There are a number of studies which have indicated that neutered females are more likely to be aggressive than entires (Borchelt, 1983; Wright and Nesselroete, 1987; O'Farrell and Peachey, 1990). However, Blackshaw (1991) in her study of 87 cases of canine aggression, found that neutered females were the smallest group. Only O'Farrell and Peachey (1990) have conducted a systematic and scientific study on the effects of neutering in bitches. Their study of 150 bitches whose behaviour was assessed before and after neutering and compared with a control group of 150 entires showed that dominance aggression increased significantly after neutering compared with controls. This increase was most likely to be shown in puppies under one year of age which were already showing signs of aggression. A difference in the present study is that dogs aggressive before neutering are not included in the analyses thus indicating that neutering is not a preventative measure for aggression in bitches and should be avoided especially if there are children in the household.

The mean age at which aggression started for both the neutered males and females in the follow-up study was 11 months while Mugford (1984) reported a mean age of onset of 7.4 months from his sample of ECSs. Females in the present study most commonly started to show signs of aggression at 2 months of age while males started most commonly at 6 months. This difference is most probably related to the onset of puberty in males with its associated large rise in testosterone secretion (Hart and Hart, 1985).

The types of aggression determined by cluster analysis generally fitted the classification schemes detailed by Borchelt (1983) and Beaver (1993). However, the present study did not cover all possible types of aggression; for example, pain-induced or maternal aggression were not explored. The most common type of aggression shown by the ECSs was protective (territorial) and the least common, dominance-type. This does not agree with most of the available literature on canine aggression. Dominance aggression is usually reported as the most common type of aggression treated at behavioural clinics (Beaver, 1983; Borchelt, 1983; Line and Voith, 1986; Blackshaw, 1991; Beaver, 1993) while the percentage of dogs showing territorial aggression has ranged from 5.5% of aggression cases (Beaver, 1993) to 29% (Blackshaw, 1991). However, Scott and Fuller (1965) found exceptionally low levels of social dominance in (American) Cocker Spaniels compared with some of their other breeds. In the present study, intraspecific aggression was high (28.7%) but this is not commonly treated at behavioural clinics (Borchelt, 1983; Blackshaw, 1991; Landsberg, 1991). Possessive aggression was a common form of aggression seen in the ECS and this has also been reported by Mugford (1984); however, it is not a commonly treated problem at behaviour clinics (Borchelt, 1983; Beaver, 1993). The reasons for the differences between the present data and those reported from behavioural clinics are most probably related to the owners wants or needs; that is, they want their dog to be aggressive towards strangers, to protect them, but they don't want their dog to bite them. Therefore not many protective dogs will be taken to a behaviourist. That being said, reports based on behavioural clinic cases offer a biased view on the behaviour of dogs in general; the dogs are usually showing extreme expressions of an 'abnormal' or distressing behaviour. Also, the samples are biased because only a select number of people actually take their dog to a specialist behavioural

clinic; others either tolerate the behaviour or the dog is abandoned or euthanised. Therefore, clinical data sets provide information on the types of aggression that are unacceptable to owners but do not necessarily provide any data on the prevalence of behaviour problems. Also, many of the previous studies have not taken breed differences into account. The present study overcomes these biases and puts the various types of aggression of a particular breed, into a societal context.

The results of the cluster analysis revealed that the tendency of ECSs to display aggression 'suddenly and without apparent reason' was clearly associated with other typical symptoms of dominance-type aggression. This finding offers some evidence that so-called 'rage' syndrome, which is usually characterised by its sudden and unpredictable onset, is an expression of social dominance conflicts, rather than being a separate or pathological phenomenon. Although we cannot be certain at this stage that dogs exhibiting aggression 'suddenly and without apparent reason' are actually suffering from 'rage' as it is generally defined clinically, we will be investigating this possibility further in the second stage of this project.

Breed-specific studies of canine aggression are rare. They are, however, extremely useful as a means of eliminating the potentially confounding effects of breed differences in temperament. This study provides important information on the prevalence of different types of aggression in the English Cocker Spaniel. It is also the first published study to validate scientifically the popular reports of aggressive problems with the solid, and in particular the red/golden, colour dogs. Follow-up studies will consider other factors which may be relevant to the development of aggression in this breed and to provide an answer as to whether or not 'rage' truly exists as a distinct phenomenon.

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Behavioral assessment of child-directed canine aggression

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BRIEF REPORT

Behavioral assessment of child-directed canine aggression

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Objective: To characterize behavioral circumstances of bites to children by dogs presented to a veterinary behavior clinic.

Methods: Retrospective case series examining medical records of dogs presenting by referral to a university veterinary hospital for aggression and which had bitten a child <18 years old. Behavioral data included age of victim, familiarity with dog, and circumstances of bites.

Results: Records of bites to 111 children were examined. Children <6 years old were most commonly bitten in association with resource guarding (44%), whereas older children were most commonly bitten in association with territory guarding (23%). Similarly, food guarding was the most common circumstance for bites to familiar children (42%) and territory guarding for bites to unfamiliar children (53%). Behavioral screening of the 103 dogs examined revealed resource guarding (61%) and discipline measures (59%) as the most common stimuli for aggression. Anxiety screens revealed abnormalities in 77% of dogs. Potential contributory medical conditions were identified/suspected in 50% of dogs. When history before presentation was known, 66% of dogs had never previously bitten a child, and 19% had never bitten any human.

Most dogs (93%) were neutered, and 66% of owners had taken their dogs to obedience training classes.

Conclusions: Most children were bitten by dogs with no history of biting children. There is a high rate of behavioral abnormalities (aggression and anxiety) in this canine population. Common calming measures (neutering, training) were not routinely effective deterrents.

Most dog bites reported to public health authorities are inflicted on children.¹ Whereas there are a number of studies reporting the epidemiologic characteristics of dog bite injury, information about the behavior of the dog or bite victim is limited.^{2–4}

Veterinary behavioral medicine is a recently recognized specialty in veterinary medicine.^{5,6} Data obtained in a veterinary behavior clinic can help pediatricians, parents, and other care givers to better understand the behavioral aspects of child-directed canine aggression, which, in turn, should lead to more effective prevention measures.

METHODS

The records of dogs presenting to the Behavior Clinic of the Matthew J Ryan Veterinary Hospital of the University of Pennsylvania (MJR-VHUP) for human-directed aggression from January 2002 to December 2005 were reviewed retrospectively. All cases in which the dog had bitten a child under the age of 18 years were included. However, bitten children for whom age or the circumstances of the bite were unknown were excluded.

A questionnaire, which included information about the dog, the owners' family, description of aggressive incidents as well as screening questions for aggressive and anxious behaviors

exhibited by the dog, was completed by each dog owner at the time of the initial appointment. In addition to completed questionnaires and aggression and anxiety screens, each medical record included referring veterinary examination and laboratory results as well as physical examination and laboratory findings conducted at the time of the veterinary behavior consultation.

Bite occurrences were categorized by familiarity of the victim with the dog and by circumstances surrounding the event. Familiar children included members of the family and/or household, or frequent visitors who were not household members. Unfamiliar children did not live in the household and were either unknown to the dog or were infrequent visitors to the home. Circumstances of bites to familiar children included resource guarding or food guarding, benign (non-aversive) interaction, aversive but non-painful interaction, aversive and painful interaction, or interaction while the dog was resting or sleeping. Circumstances of bites to unfamiliar children were categorized relative to the dog's perceived territory (house, yard, and surrounding area), and as either interactive or non-interactive.

Statistical analysis

Data are presented using frequencies and percentages. To compare children in different age groups by biting circumstances, the Fisher exact test was used. Where applicable, data are presented as differences with 95% CI. Statistical significance was defined as $p < 0.05$. All analyses were performed using SAS V.9.1 (SAS Institute, Cary, North Carolina, USA).

RESULTS

Children

A total of 145 children under the age of 18 years were bitten. Of these, 111 met inclusion criteria. Thirty four children (31%) were younger than 6 years old, and 77 (69%) were 6–17 years old. Half were boys and half were girls.

Familiar children were most commonly bitten in relation to food or resource guarding ($n = 29$; 26%) and "benign" interactions ($n = 20$; 18%) such as petting, hugging, bending over, or speaking to the dog. Presence in or entering the dog's territory was the most common situation in which unfamiliar children were bitten, regardless of whether the child was ($n = 10$; 9%) or was not ($n = 21$; 19%) actively interacting with the dog. Unfamiliar children were also bitten away from the dog's home or yard, regardless of interaction ($n = 4$; 4%) or lack of interaction ($n = 5$; 5%).

Table 1 summarizes the circumstances of the biting episode relative to both age of the child and familiarity with the dog. Children <6 years old were significantly more likely than older children to be bitten in relation to food guarding or other resource-associated aggression (44% vs 18%, difference = 26%, 95% CI 4 to 45%, $p = 0.009$) or in aversive, potentially pain-eliciting interactions such as stepping or falling on the dog (18% vs 0%; difference = 18%, 95% CI 7 to 35%, $p = 0.0006$). No differences were noted between girls and boys in any of these stimulus categories.

Table 1 Circumstances of aggression to 111 children by dogs presented to a veterinary behavior service

Category	Stimulus description	<6 years (n = 34)	6–17 years (n = 77)	p Value
Aggression to familiar children				
Resource guarding	Approaching, reaching for or touching dog while dog is near or eating/chewing food, bone or toy	15 (44)	14 (18)	0.009
Benign (non-aversive)	Petting, hugging, kissing, bending over, reaching, speaking	5 (15)	15 (19)	NS
Resting	Waking dog; interacting while dog is resting; approaching while dog is resting/lying down; lying beside recumbent dog; pushing/pulling dog off furniture	1 (3)	8 (10)	NS
Aversive, painful	Stepping on dog; pulling on hair or body; falling on to dog; trimming nails; punishment by hitting or use of leash correction	6 (18)	0 (0)	0.0006
Aversive, non-painful	Restraint/pulling by collar; grooming, towel drying; bathing; lifting; verbally scolding	0 (0)	5 (6)	NS
Aggression to unfamiliar children				
Territorial, non-interactive	In/on dog's territory, including house, yard, area surrounding home, car; child does not interact	3 (9)*	18 (23)	NS
Territorial, interactive	In/on dog's territory, including house, yard, area surrounding home, car; child interacts, eg, by speaking to dog, petting, reaching, attempting to feed, removing objects, restraining	2 (6)*	8 (10)	NS
Not territorial, interactive	Not on dog's territory; child interacts, eg, by speaking to dog, petting, reaching, attempting to feed, removing objects, restraining	0 (0)	4 (5)	NS
Not territorial, non-interactive	Not on dog's territory; child does not interact	1 (3)	4 (5)	NS
Aggression - other		2 (6)	7 (9)	†

Values are number (%). Columns may add up to more than total because children could have been bitten in more than one context (one child in <6-year-old group; six children in 6–17-year-old group).

*Total N = 33; circumstances of territorial bite were unknown for one child.

†Comparison was not performed because bite circumstances varied.

Dogs

A total of 103 dogs had bitten a child under the age of 18 years. Three quarters of the dogs were male (n = 77; 75%), and **all but four males and three females had been neutered**. Forty one breeds were represented. English Springer Spaniels and German Shepherd Dogs each comprised 9% of pure-bred dogs (7% of all dogs), followed by 5% each of Labrador Retrievers, Golden Retrievers, and American Cocker Spaniels (4% of all dogs). The total number of times a dog had bitten (historically) was known for 98 dogs. Nineteen (19%) presented for the single bite incident involving a child, and had never previously bitten a person of any age. The remaining 79 (81%) dogs had bitten at least one person (the same child, or a different child or adult) more than once (two bites, 15%; three bites, 18%; four

bites, 13%; five bites, 9%; more than five bites, 24%). When the historical details of bites before the current bite were known, 66% (n = 48) of dogs had never previously bitten a child. Forty four dogs (45%) had bitten a child who was a member of the family or household, and 65% had bitten either child or adult members of the family or household. Thirty five (35%) dogs had bitten only unfamiliar children. In some cases, histories were largely unknown because of age at acquisition.

Aggression screens completed by the owner of each dog revealed that the most common circumstance associated with aggression historically, to either adults or children, was resource guarding (61%) (table 2). Similarly, dog anxiety screening demonstrated common abnormal or reactive behavioral tendencies (table 2).

Table 2 Responses to canine aggression and anxiety screens by owners of 103 dogs presented to a veterinary behavior clinic with a history of biting children

Stimulus category	Positive (aggressive or anxious)	Negative (not aggressive or anxious)	Situation does not apply
Aggression screen			
Remove dog food, special food, toys (resource guarding)	48 (61)	31 (39)	24
Punish (verbally scold, correct with leash, hit)	24 (59)	17 (41)	62
Disturb while sleeping or resting; push or pull off furniture	38 (49)	40 (51)	25
Reach over or toward dog	34 (38)	56 (62)	13
Bathe, groom, or towel	21 (26)	59 (74)	23
Anxiety screen			
Anxiety related to separation from owner(s) while owner is absent	34 (35)	62 (65)	
Anxiety related to separation from owner(s) while owner is present but inaccessible	49 (51)	47 (49)	
Anxiety or fear related to thunderstorms/fireworks	47 (50)	47 (50)	
Any anxiety (either separation or storm/noise-related anxiety, or both)	78 (77)	23 (23)	

Values are number (%) or number. Aggression was directed to children, adults, or both. "Situation does not apply" refers to situations or provocations that do not occur for the particular dog. For example, resource guarding cannot be assessed if owners have not attempted to remove food or toys. In the aggression screen, positive responses refer to growling, baring teeth, lunging, snapping, or biting a person in response to the listed stimulus. In the anxiety screen, positive responses refer to trembling, panting, pacing, vocalization, destructiveness, urination, or defecation. Anxiety screen rows may not add up to 103 because of missing values.

On the basis of clinical assessment, fear-related aggression was the most common primary behavioral diagnosis in the dogs (n = 90; 87%), followed by resource guarding (n = 53; 51%), territorial defense (n = 52; 51%), social conflict (n = 40; 39%), and pain (n = 14; 14%). Additional diagnoses included generalized anxiety (n = 64; 62%), inappropriate or excessive attention-seeking behavior (n = 36; 35%), and clinically significant noise or thunderstorm fear (n = 30; 29%) and separation anxiety (n = 18; 17%).

On the basis of physical examination, laboratory findings, and observation, a medical problem was identified or suspected in 51 (50%) dogs. Orthopedic (n = 18; 20% of all dogs examined) and dermatologic (n = 18; 20%) conditions were most commonly identified. Other medical problems included dermal or epidermal masses and ophthalmologic, metabolic (eg, renal and hepatic), endocrinologic, and infectious (eg, *Borrelia burgdorferi*) disease.

Most owners (66%) had taken their dogs through formal obedience training classes. Twenty one families had no prior experience, as adults, with dog ownership; however, prior experience or its lack had no significant association with biting.

DISCUSSION

In this study, we describe the circumstances surrounding bites to children by dogs evaluated for aggressive behavior at a university-based veterinary behavior service. Although the epidemiology of bitten children has been reported in a number of studies, there have been few studies on the circumstances of aggression, or behavioral or medical information about the biting dogs themselves. This is the first study to examine the behavioral aspects of child-directed canine aggression from the point of view of a veterinary behavioral assessment.

Although 66% of the evaluated dogs had no prior history of biting children, behavioral abnormalities were universally present in this canine population. Historically, although 19% of dogs had never bitten before presentation, a history of aggressive behavior other than biting (eg, baring teeth) was common. Furthermore, although some types of human-directed aggression tend to be observed only in behaviorally mature dogs (starting at 1–3 years of age),⁷ aggression related to food or pain may be seen in juvenile dogs.⁸ Thus, aggression even in a puppy, and even in the absence of biting, should raise concern and consideration should be given to referral for behavioral evaluation of the dog.

Anxiety screening identified abnormalities in 77% of animals. Historical evidence of fearful or anxious behavior in response to loud noises and thunderstorms or separation from the owner may signal a predisposition to biting in threatening situations related to anxiety or fear.⁷ Dogs that react with anxiety to threatening stimuli may be more likely to react aggressively to

children, who, particularly when very young, are at risk because of their high-pitched voices, sudden movements, and inappropriate interactions.

Medical conditions were identified or suspected in 50% of the dogs evaluated. There were a number of dogs with orthopedic, dermatologic, and other disease both at the time of consultation and historically. These associated medical or painful conditions may have increased the risk of aggression. However, because of the lack of a well-animal clinic for comparison of presented dogs, it was not possible to determine whether this was higher, lower, or as expected in the patient population. Because disease and pain can increase irritability in dogs,^{9–11} even if a causal relationship is not confirmed, their presence should be an indication to separate the dog from young children until the disease has been treated or the pain reduced.

Previous reports of dog bites to children have made safety recommendations, such as neutering male dogs,² canine obedience training,¹² and avoiding specific breeds.¹³ The prevalence of males (75%) in our study is similar to other studies.² **Almost all dogs, both male and female, were neutered. Although our data did not include age at neutering or whether the surgery occurred before or after the appearance of aggressive behavior, it is apparent that neutering does not guarantee a reduction of aggression in dogs.** It is interesting to

note that the predominant canine behavioral diagnosis, fear-related aggression, lacks sexual dimorphism,⁷ and therefore neither sex should be over-represented. However, even male-associated aggression such as territorial defense is unlikely to be eliminated by neutering.¹⁴ Regardless of neuter status, parents seeking a pet dog might be advised to seek a female. Two-thirds of the dogs in this study had been taken to training classes by their owners. It is not known whether owners had made specific efforts to train or socialize dogs to be comfortable with children. Although the success of obedience training for individual dogs was not measured, the results of this study suggest that obedience training, like neutering, will not ensure prevention of future bites to children. However, the efficacy of obedience training in reducing aggression was not specifically measured. Cohort studies would be needed to evaluate whether training (or neutering) reduces biting behavior. With the exception of the English Springer Spaniel, the breeds included in our study ranked high in American Kennel Club breed registrations and appear to reflect breed popularity. Because the total number of English Springer Spaniels in our study was small, and the study was performed at a referral hospital with a highly selected group of patients, it is safest to conclude that any breed of dog is capable of biting a child.

The findings for younger children were not unexpected. Food or resource guarding is a common behavior problem in dogs and was noted in almost two thirds of the dogs in this study.¹⁵ To be safe, children of any age should not be permitted near the dog whenever food (including human food) is present.

The meaning of “provocation” has been inconsistent in the literature and should be interpreted with caution.^{16–19} The mere presence of a parent, who may underestimate the risk of bites to young children,²⁰ may not be sufficient to prevent bites.²¹ Although it is natural to assume that hitting and other pain-inducing interactions can elicit aggression, parents and dog owners may be less vigilant when a child simply approaches or pets a dog. Similarly, for unfamiliar children, walking or cycling near a dog’s home may be provocative enough when dogs are tethered outdoors or are not securely fenced.²²

Our study focuses on children bitten by pet dogs evaluated in a secondary and tertiary care veterinary behavior clinic with a history of aggression to children. We recognize the limitations of a retrospective case series study at a referral center. Our patients are a highly selected group of dogs, and the ability to

Key points

- Children are at risk of dog bite in association with resource guarding by the dog or pain-causing interactions. Unfamiliar children are at risk of dog bite while in the dog’s home, yard, or perceived territory, regardless of whether or not they are interacting with the dog.
- All dogs evaluated for human-directed aggression in our study had a behavior and/or medical abnormality.
- **Episodes of aggression were not limited to specific dog breeds, gender, neuter status, or history of training.**
- The risk of biting may be increased in the presence of pain or disease in the pet.

draw generalizable inferences from them is limited. We also acknowledge the limitations of a retrospective study of self-report and self-assessment (of their pets) by dog owners seeking help for problem behavior. However, we do attempt to better characterize this common clinical problem from the unique perspective of the canine behavioral analysis.

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Webcast: International Forum on Quality and Safety in Health Care

Plenary sessions at this year's International Forum on Quality and Safety in Health Care were filmed and broadcast live over the internet. The sessions are still available to view free, on demand and at your own convenience at <http://barcelona.bmj.com>. Each session is accompanied by a panel discussion.

The webcast includes the following, in either English or Spanish translation:

- **Donald M Berwick**: Can health care ever be safe?
- **Richard Smith**: What the quality movement can learn from other social movements
- **Lucian Leape and Linda Kenney**: When things go wrong: communicating about adverse events
- **John Prooi and Harry Molendijk**: Partnering for patient safety

Signalment factors, comorbidity, and trends in behavior diagnoses in dogs: 1,644 cases (1991–2001)

Michelle Bamberger, MS, DVM, and Katherine A. Houpt, VMD, PhD, DACVB

Objective—To determine trends in behavior diagnoses; assess the relationship between diagnoses and age, sex, reproductive status, and breed; and evaluate associations between diagnoses within the same dog (comorbidity).

Design—Retrospective case series.

Animals—1,644 dogs.

Procedures—Medical records of dogs evaluated for behavioral problems were reviewed for breed, sex, reproductive status, consultation year, birth date, and diagnoses.

Results—Numbers of dogs with aggression, anxiety, and unruly behavior increased over the course of the study, as did the total number of dogs evaluated for behavioral problems. In general and for aggression, Dalmatians, English Springer Spaniels, German Shepherd Dogs, and mixed-breed dogs were evaluated more often than expected, whereas Labrador Retrievers and Golden Retrievers were evaluated less often than expected. Labrador Retrievers were also underrepresented for anxiety, whereas mixed-breed dogs were overrepresented. Males were overrepresented except for interdog aggression, anxieties, and phobias, whereas females were overrepresented for phobias. Dogs with phobias were evaluated at a median age of 6.5 years, compared with dogs with other problems (median age, 2.5 years). A mean of 1.6 diagnoses/dog was observed, with certain diagnoses clustered.

Conclusions and Clinical Relevance—Results suggested that in dogs, behavioral problems changed over the course of the study; age, sex, and breed distributions varied among diagnoses; and certain diagnoses were likely to occur together. (*J Am Vet Med Assoc* 2006;229:1591–1601)

Owners' perceptions of behavioral problems in dogs as well as practitioners' interest in managing behavioral problems may lead to changes over time in the numbers and types of cases evaluated by general practitioners and referred to major university centers. An understanding by general practitioners of current trends as well as age, sex, and breed distributions of such dogs may aid them in making the correct diagnosis.

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ABBREVIATIONS

ABC Animal Behavior Clinic at Cornell University
CUHA Cornell University Hospital for Animals

sis. Knowledge of comorbidity may also help the practitioner focus questions during evaluation of the dog's history, resulting in a more efficient consultation. With such knowledge, general practitioners can educate their clientele, who may then be more likely to report behavioral problems and seek resolution. Also, if educators understand current behavioral trends and case demographics, clinical training of veterinary students as well as continuing education may be benefited.

Behavioral problems have been evaluated via owner surveys^{1-8,a,b} as well as case-review studies.⁹⁻²⁰ Several studies^{4,8,a} based on owners' opinions have revealed unruly behavior (barking and jumping up) as the most common problem confronting dog owners, whereas others have revealed house soiling^{2,3,5,b} or non-behavioral concerns (sadness when the pet dies, finding care when away, and shedding)^{6,7} as the primary problem. In contrast, results of most canine case studies^{9-15,17,18,20} indicate that aggression is the most prevalent behavioral diagnosis in dogs. Reports of several studies describe age, sex, and breed distributions in dogs with behavioral problems^{1,4,6,7,9-14,17-21} and associations among diagnoses.¹¹⁻¹⁸

Most behavioral studies involve analysis of data during a specified period and do not evaluate trends over time, although a few have evaluated monthly and seasonal trends in overall behavioral problems^{10,b} or have provided yearly overview data^{2,3,5-7,10} with some analysis from year to year.^{7,10} The primary objective of the study reported here was to determine trends in behavior diagnoses made at the ABC from 1991 to 2001. Secondary objectives included assessing the relationship between behavior diagnoses and signalment factors (age, sex, reproductive status, and breed), assessing the distribution of these factors over time, and evaluating comorbidity.

Criteria for Selection of Cases

Medical records for 1,668 dogs evaluated at the ABC from January 1, 1991, through December 31, 2001, were evaluated for this study; 24 dogs were excluded from the population because of incomplete data; therefore, 1,644 dogs were included in the study.

Procedures

Data on breed, sex, reproductive status, consultation year, birth date, and behavior diagnoses were gathered on each dog. A maximum of 3 diagnoses were

taken for each dog; these diagnoses were the first 3 listed in the record. Dogs ($n = 57,196$) evaluated at the CUHA over the same period served as the reference population for breed, sex, reproductive status, and age comparisons. Breed, sex, reproductive status, and age data from the reference population were gathered independently. Over the entire study, a breed was assigned to all dogs and sex and reproductive status were specified for > 98% of the dogs. The owners were able to specify the age in 75% of the dogs. Ninety-six individual diagnoses taken from original records were assigned to the following general categories: aggression, anxieties, locomotor behaviors, ingestive behaviors, self-directed aggression, grooming behaviors, fears, house soiling, phobias, sexual behaviors, unruly behaviors, vocalization behaviors, and miscellaneous behaviors (cognitive dysfunction, depression, pseudocyesis, psychogenic salivation, and hyperesthesia syndrome; **Appendix**). Individual diagnoses listed under the general categories of aggression, fears, and house soiling were divided into several subcategories. In the aggression category, subcategories were defined by target; defined as people (owners or strangers), animals, and things; and then further defined into individual diagnoses by motivation or etiology. Fears were grouped into subcategories by triggers as fear of people, animals, or situations. House soiling diagnoses were placed into either marking or elimination subcategories.

Statistical analysis—Diagnoses were analyzed on the levels category, subcategory, and individual. For any given level of diagnosis, no dog was counted more than once. Each diagnosis was initially evaluated by determining the number of dogs with that diagnosis over the 11-year study period, compared with the total number of dogs with any diagnosis, and expressing this as a percentage value. Each diagnosis assigned to an absolute number of 32 or more dogs over the entire study was then analyzed for trends over time and, secondarily, for the relationships between diagnoses and age, sex, reproductive status, and breed. Diagnoses assigned to < 32 dogs over the entire study typically had 2 or fewer dogs in most years, making analysis of trends over time difficult or impossible. Where an individual diagnosis was assigned to $\geq 95\%$ of the dogs in a particular subcategory (eg, barking comprised 97.7% of the vocalization cases), only the subcategory was reported and discussed because the results (relationship with age, sex, reproductive status, and breed) were the same. To detect trends over time for all diagnoses, a least squares linear regression was performed by use of the square root of the number of cases (ie, the No. of dogs with a specific diagnosis) within a given year as the dependent variable and the year of diagnosis as the independent variable.^{22,23} A trend was defined as a slope that was significantly ($P < 0.05$) different from 0. An upward trend in a diagnosis was defined as an increasing annual percentage of total cases over time (positive slope), and a downward trend in a diagnosis was defined as a decreasing annual percentage of total cases (negative slope). A square root transformation was used to normalize errors in the data set.^{23,24} To detect trends over time for each diagnosis, logistic regression was per-

formed by use of a proportion (the No. of cases of that particular diagnosis in a given year divided by the total No. of cases in that year) as the dependent variable and the year of diagnosis as the independent variable. Because the dependent variable was a proportion and not a direct count, logistic regression was used instead of linear regression.^{22,25} Neither regression was weighted because no individual value for a dependent variable was more important than any other.²⁶

To determine the relationship between the age of dogs and each diagnosis, descriptive statistics (median and interquartile range) were first calculated for all dogs with each diagnosis over the 11-year study period as well as for all remaining dogs (dogs that did not have that diagnosis) over the same period. Median and interquartile range were used because the histogram of the number of cases (1-year bins) versus age did not follow a Gaussian distribution.²⁶ To determine whether a significant difference between the ages of these 2 groups (dogs with a diagnosis and those without) existed, the log of the age was compared by use of a 2-sample t test²² to more closely approximate a Gaussian distribution. To determine clinical importance, a difference of > 2 years was set to account for dogs in which age was estimated. These same methods were also used over all diagnoses for use of breed (mixed breed vs purebred), sex, and reproductive status as grouping variables. To assess the relationship between age of dogs over all diagnoses from year to year, the median age was determined for each year and a least squares linear regression was performed with the median age for each year as the dependent variable and the year of diagnosis as the independent variable.

To assess the relationship between the caseload (the total No. of dogs evaluated) and sex of dogs over the study period, the percentage of total dogs for total (intact and neutered), sexually intact, and neutered males as well as total, sexually intact, and spayed females was determined. The 2-sample proportion test was used to compare percentages between males and females and between sexually intact and neutered dogs within the ABC population; this test is used to compare proportions in 2 independent samples.²² Between the ABC and CUHA populations, the 1-sample proportion test was used to compare total males with total males, castrated males with castrated males, and spayed females with spayed females; the corresponding proportion in the CUHA population was treated as fixed and was used to define the null hypothesis for this test. The 1-sample proportion test is used to test whether a proportion differs from a hypothesized value.²² To assess the relationship between the caseload and sex of dogs from year to year, the percentage of total dogs for total males, neutered males, and spayed females was determined for each year and analyzed by use of logistic regression; regressions between the ABC and the CUHA populations were compared by use of a Wald test that treated the CUHA population as fixed. Specifically, a test statistic for the equality of slopes was computed by taking the absolute value of the difference of the slopes from the 2 regressions divided by the SE of the slope in the ABC population.²⁵ A 2-tailed P value was then computed by use of a normal distribution.

To assess the relationship between the caseload and breed of dog during the total study period, the percentage of total dogs of each breed (total No. of dogs of each breed divided by all dogs of all breeds) during the study was determined. Breeds with ≥ 30 dogs during the study were compared with the percentage of total dogs of each breed of CUHA dogs during the same time by use of a 1-sample proportion test. The relationship between each diagnosis and breed of dog was analyzed in the same manner; the percentage of total dogs of the 4 top breeds (including mixed breed) in each diagnosis was compared with the percentage of total dogs of the same breeds evaluated by the CUHA over the same time by use of a 1-sample proportion test. To assess the relationship between the caseload and breed of dog from year to year, the percentage of total dogs for breeds with 30 or more dogs over the study was analyzed via logistic regression; regressions between the ABC and CUHA populations were compared in the same manner as described previously.

The level of association between 2 diagnoses occurring within the same dog was assessed by first determining the probability of each diagnosis given that the other diagnosis was present. The significance of this association was then evaluated by use of the Pearson χ^2 test.^{22,26}

All analyses were performed with standard software.^c All tests were 2-tailed, and values of $P < 0.05$ were considered significant.

Results

The number of dogs evaluated at the ABC increased significantly ($P = 0.002$) between 1991 and 2001 (Figure 1). This trend was also seen in the CUHA population over the same period (slope of the regression line = 1.114; SE = 0.14; $r^2 = 0.87$; $P < 0.001$); a significant ($P < 0.001$) difference was found between the ABC and CUHA populations when regressions were compared—the CUHA population increased at a greater rate than the ABC population.

Distribution of diagnoses—The number of dogs affected by each diagnosis (and percentages, compared with the total No. of affected dogs) for all major category

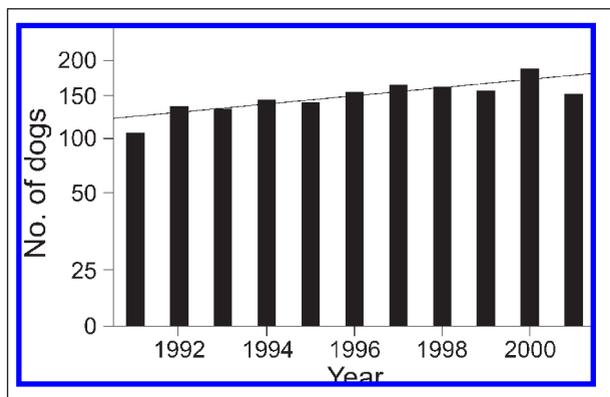


Figure 1—Plot of the number of dogs evaluated for behavioral problems at the ABC from 1991 to 2001. The y-axis is scaled as the square root of the number of dogs. The straight line represents the linear regression line for the data (slope = 0.214; SE = 0.05; $r^2 = 0.67$; $P = 0.002$).

diagnoses and all diagnoses that affected ≥ 32 dogs/y over the study period were determined (Table 1). Because each dog may have had up to 3 diagnoses, the sum of the individual percentages was $> 100\%$. The category of aggression accounted for the largest percentage of affected dogs during the study period, followed by anxieties, unruly behavior, house soiling, phobias, excessive vocalization behavior, abnormal ingestive behavior, abnormal locomotor behavior, miscellaneous, fears, self-directed aggression, grooming behavior, and sexual behavior.

Trends in diagnoses—Trends were detected for several diagnoses (Table 2). In the category of aggres-

Table 1—Distribution (number of affected dogs [%]) of diagnoses among 1,644 dogs evaluated for behavioral problems at the ABC from 1991 to 2001.

Diagnosis	No. of dogs (%)
Aggression	1,191 (72.4)
People-directed aggression	997 (60.6)
Owner-directed aggression	724 (44.0)
Dominance-related aggression	667 (40.6)
Fear aggression directed at owners	85 (5.2)
Stranger-directed aggression	535 (32.5)
Fear aggression directed at strangers	276 (16.8)
Territorial aggression	339 (20.6)
Animal-directed aggression	304 (18.5)
Interdog aggression	268 (16.3)
Anxieties	324 (19.7)
General anxiety	93 (5.7)
Separation anxiety	236 (14.4)
Locomotor behavior	16 (1.0)
Ingestive behavior	23 (1.4)
Self-directed aggression	8 (0.5)
Grooming behavior	9 (0.5)
Fears	11 (0.7)
House soiling	124 (7.5)
Elimination	117 (7.1)
Urination and defecation	99 (6.0)
Miscellaneous	14 (0.9)
Phobias	64 (3.9)
Storm phobia	37 (2.3)
Sexual behavior	2 (0.1)
Unruly behavior	201 (12.2)
Attention-seeking behavior	126 (7.7)
Destructive behavior	40 (2.4)
Vocalization behavior	45 (2.7)
Barking	44 (2.7)

Percentages do not add to 100% because each dog may have had up to 3 diagnoses. Major category diagnoses and all other diagnoses with > 32 cases/y over the study period are listed.

Table 2—Results of logistic regression analysis of the frequency of various behavior diagnoses in dogs from 1991 to 2001.

Diagnosis	Slope	SE	P value
Dominance-related aggression	-0.038	0.016	0.019
Fear aggression directed at owners	0.142	0.039	< 0.001
Stranger-directed aggression	0.122	0.018	< 0.001
Fear aggression directed at strangers	0.199	0.024	< 0.001
Anxieties	0.141	0.021	< 0.001
General anxiety	0.171	0.038	< 0.001
Separation anxiety	0.107	0.024	< 0.001
House soiling	-0.097	0.031	0.002
Elimination	-0.104	0.031	0.001
Urination and defecation	-0.145	0.035	< 0.001
Unruly behavior	0.069	0.025	0.006
Attention-seeking behavior	0.263	0.037	< 0.001
Destructive behavior	-0.135	0.053	0.011

Slope = Slope of the regression line. P value indicates comparison with a slope of 0.

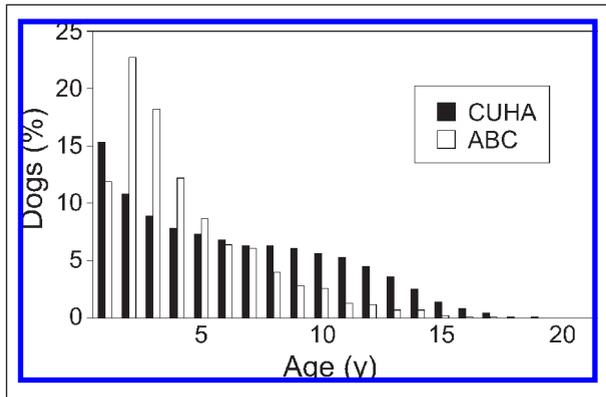


Figure 2—Distribution of ages (% compared with overall population) among dogs evaluated for behavioral problems at the ABC and all dogs evaluated at CUHA (reference population).

Table 3—Distribution of sexes for dogs with various behavior diagnoses from 1991 to 2001.

Diagnosis	Male (%)	Female (%)
All diagnoses	56.6*	43.4
Aggression	60.1*	39.9
People-directed aggression	64.6*	35.4
Owner-directed aggression	66.2*	33.8
Dominance-related aggression	67.8*	32.2
Stranger-directed aggression	64.7*	35.3
Fear aggression directed at strangers	56.5*	43.5
Territorial aggression	68.4*	31.6
Animal-directed aggression	44.7	55.2†
Interdog aggression	42.5	57.5†
Anxieties	45.0	54.9†
General anxiety	24.7	75.3*
Phobias	39.1	60.9†

*Significantly ($P \leq 0.05$) greater than values in the opposite sex in the ABC population and values for the same sex in the corresponding reference CUHA population. †Significantly ($P \leq 0.05$) greater than values in the opposite sex in the ABC population only. For the CUHA population, percentages of male and female dogs were 48.5% and 51.5%, respectively.

sion, upward trends were seen in fear aggression directed at owners, stranger-directed aggression, and fear aggression directed at strangers. A downward trend was found in dominance-related aggression. Upward trends were also detected in anxieties as well as in general and separation anxiety. Downward trends were observed in house soiling, elimination, and urination and defecation. Upward trends were observed in unruly and attention-seeking behaviors, whereas a downward trend was observed in destructive behavior.

Relationship between diagnoses and age—The distribution of age for the CUHA population differed from that of the ABC population (Figure 2). Because of differences between the 2 populations, the relationship between age and diagnosis was determined by making comparisons within the ABC population (dogs with the diagnosis vs dogs without the diagnosis). Overall, median age at evaluation was 2.5 years, mean age was 3.7 years, and interquartile range was 1.5 to 5.5 years. Because exact age was estimated to the nearest month or year in some dogs, only diagnoses in dogs with an age difference (between dogs with the diagnosis and those without) of > 2 years were considered to have clinical importance. Only phobias (median age, 6.5 years; interquartile range, 4.8 to 9.5 years) and storm phobia (median age, 6.5 years; interquartile range, 5.5 to 9 years) were significantly ($P < 0.001$) different between dogs with the diagnosis and dogs without the diagnosis (median age, 2.5 years; interquartile range, 1.5 to 4.5 years) and considered clinically important. No difference was detected in median ages from year to year; corresponding data from the CUHA also yielded no difference in median ages.

Relationship between diagnoses and sex—Sex differences among dogs with various diagnoses were determined (Table 3). Overall, more total male dogs and more neutered dogs were seen in the ABC population, compared with the CUHA population. Sex differ-

Table 4—Distribution (%) of breeds in a reference (CUHA) population and among dogs with various behavior diagnoses evaluated at the ABC from 1991 to 2001.

Breed	CUHA	All diagnoses	Aggression	Anxiety	House soiling	Phobias	Unruly behavior	Vocalization
Beagle	1.9			3.4	5.6*			
Bichon Frise	0.7				4.8*			
Cairn Terrier	0.6							8.9*
Cocker Spaniel	3.8	2.9			6.5			
Dachshund	1.2							4.4
Dalmatian	1.0	2.6*						
Doberman Pinscher	1.7							4.4
English Springer Spaniel	1.7	4.1*	5.2*					
German Shepherd Dog	4.8	5.8*	6.5*	4.0		6.3	4.5	4.4
Golden Retriever	5.5	3.3†				7.8	5.5	
Jack Russell Terrier	0.8							4.4*
Labrador Retriever	9.5	4.9†	4.5†	5.6†		4.7	8.5	4.4
Miniature Dachshund	0.3							4.4*
Rottweiler	2.4	2.2						
Shetland Sheepdog	1.5							8.9*
Mixed	24.7	30.7*	29.6*	39.2*	22.6	34.4	32.8*	24.4

For the CUHA population, values indicate percentage distribution of dogs for each breed.

*Significantly ($P \leq 0.05$) greater than that of the corresponding CUHA population. †Significantly ($P \leq 0.05$) less than that of the CUHA population. All diagnoses = breeds with 30 or more cases; for all other diagnoses, values are given for the top 4 breeds with regard to the number of dogs with each diagnosis, except for the category vocalization, for which the diagnosis was equally evident in > 4 breeds.

ences were observed in the categories of aggression, anxieties, and phobias, with more total males in most of the aggression diagnoses categories but more total females in the interdog aggression, anxieties, and phobias categories. **General anxiety was the only diagnosis for which the percentage of neutered dogs (males) was not higher than the corresponding percentage in the CUHA population.** The only change in sex or reproductive status over time was an upward trend in spayed females (slope of the regression line, 0.044; SE = 0.017; $P = 0.009$). A similar trend was observed in the CUHA population (slope of the regression line, 0.036; SE = 0.003; $P < 0.001$). There was no significant difference when these regressions were compared ($P = 0.646$).

Relationship between diagnoses and breed—For breeds that had ≥ 30 dogs with any diagnosis and for breeds with the 4 highest percentages of dogs with each category of diagnosis, the percentages of affected dogs, compared with all affected dogs, were determined for the ABC population; corresponding percentages for these breeds were also determined for the CUHA population (Table 4). Across all diagnoses, affected Dalmatians, English Springer Spaniels, German Shepherd Dogs, and mixed-breed dogs constituted a significantly higher percentage of the total number of dogs in the ABC population, compared with the CUHA population; cases involving Golden Retrievers and Labrador Retrievers constituted a lower percentage of the total number of cases. With regard to

Table 5—Results of logistic regression analysis of various breeds of dogs evaluated at the ABC (1991–2001) versus year, and analysis of breed versus year in a reference population of dogs at the CUHA.

Population	Slope	SE	P value
ABC			
Mixed breed	0.061	0.017	< 0.001
Cocker Spaniel	-0.107	0.048	0.025
English Springer Spaniel	-0.083	0.041	0.04
German Shepherd Dog	-0.071	0.036	0.046
CUHA			
Mixed breed	0.019	0.003	< 0.001
Cocker Spaniel	-0.018	0.007	0.007
English Springer Spaniel	-0.06	0.01	< 0.001
German Shepherd Dog	-0.031	0.006	< 0.001

P value indicates comparison with a slope of 0.

breed distribution for all diagnoses over time, an upward trend was detected in mixed-breed dogs and a downward trend was detected in Cocker Spaniels, English Springer Spaniels, and German Shepherd Dogs (Table 5); these trends were also detected in the CUHA population. When regressions between the ABC and CUHA populations were compared, significant differences were detected in mixed-breed dogs ($P = 0.012$) and English Springer Spaniels ($P < 0.001$). In both breeds, the ABC population changed at a faster rate than did the CUHA population.

Comorbidity—Of all dogs, 55.4% had 1 diagnosis, 26% had 2 diagnoses, and 18.6% had ≥ 3 diagnoses made at the time of evaluation. The mean number of diagnoses per dog was 1.6, and certain diagnoses occurred in clusters. Significant associations between 2 diagnoses were detected (Table 6). Most of the significant associations involved cases with both diagnoses from the aggression category.

Discussion

Aggression was diagnosed in nearly 75% of all dogs evaluated, mostly because of aggression directed at humans (mostly owners) rather than other animals. Dominance-related diagnoses accounted for the majority of owner-directed aggression (92%), whereas fear aggression directed at owners accounted for most of the remaining cases. Clearly, owner-directed aggression has been^{10,19,27-31,d} and continues to be a difficult problem for veterinarians and owners to manage. Although not as prevalent as aggression, anxieties are often considered to be the next most frequently reported problem, with separation anxiety being the most commonly seen problem in this category.^{10,13}

Upward trends were detected in several diagnoses in the categories of aggression (stranger-directed aggression, fear aggression directed at strangers, and fear aggression directed at owners) and anxieties (general and separation). It is imperative that veterinarians, in training and at the level of continuing education, be aware of current behavioral problems and understand how to advise clients in prevention and management. This is especially important in the case of stranger-directed aggression, for which upward trends may be a sign of the increasingly litigious nature of society. It is

Table 6—Associations between pairs of diagnoses in 1,644 dogs evaluated at the ABC from 1991 to 2001.

Diagnosis 1	Diagnosis 2	No.	D1	D2	P value
Fear aggression directed at strangers	Territorial aggression	105	276 (38.0)	339 (30.9)	< 0.001
Fear aggression directed at owners	Fear aggression directed at strangers	56	85 (65.9)	276 (20.3)	< 0.001
Dominance-related aggression	Fear aggression directed at owners	52	667 (7.8)	85 (61.2)	< 0.001
Dominance-related aggression	Interdog aggression	47	667 (7.0)	268 (17.5)	< 0.001
Interdog aggression	Territorial aggression	37	268 (13.8)	339 (10.9)	0.003
Dominance-related aggression	Separation anxiety	21	667 (3.1)	236 (8.9)	< 0.001
Fear aggression directed at strangers	Separation anxiety	17	276 (6.2)	236 (7.2)	< 0.001
Dominance-related aggression	General anxiety	15	667 (2.2)	93 (16.1)	< 0.001
Territorial aggression	Separation anxiety	10	339 (2.9)	236 (4.2)	< 0.001
Noise phobia	Separation anxiety	10	27 (37.0)	236 (4.2)	< 0.001
General anxiety	Interdog aggression	6	93 (6.5)	268 (2.2)	0.008

No. = Number of dogs with both diagnoses. D1 = Number of dogs with diagnosis 1 (percentage of dogs that also had diagnosis 2 in parentheses). D2 = Number of dogs with diagnosis 2 (percentage of dogs that also had diagnosis 1 in parentheses). The last column gives the value of P as determined by the Pearson χ^2 test.

interesting that the percentage of dominance-related aggression cases decreased over time. This may be partially because of trends in current terminology. Few studies have tracked caseloads over extended periods of time. However, in a review of canine cases in 2000,¹⁰ the referral rate of status-related aggression had declined and fear aggression had increased since 1996; these results support our findings. Although Appleby et al¹⁰ reported a decline in the referral rate for separation anxiety from 1996 to 2000, an increase among dogs obtained from rescue was detected. In the study reported here, the upward trends detected in separation anxiety may have been attributable to greater awareness of this problem by veterinarians as well as pet owners and the emergence during this time period of an approved medication to treat separation anxiety.³²

Breed incidence of behavioral problems varies depending on many factors including breed distribution, sample size, geographic location, time of study, reference population, and source of puppies. When a behavioral problem has been clearly identified within a breed, it is important that veterinarians, breeders, dog owners, and prospective owners be alerted that such problems exist. Overall, in our study, many more (30.7%) dogs of mixed breed (unknown crosses as well as known crosses) were evaluated than dogs of any pure breed, although purebred dogs as a group were more than twice as numerous as mixed-breed dogs. This was also true of the CUHA population that included 24.7% mixed-breed dogs and has been reported by others.^{13,17,20,31} Golden Retrievers and Labrador Retrievers were underrepresented in general and specifically for aggression problems, whereas Dalmatians, English Springer Spaniels, German Shepherd Dogs, and mixed-breed dogs were overrepresented in these areas. Some or all of the breeds in the latter group have also been reported more frequently by others for general problems^{11,17,27,33,34} as well as for aggression.^{1,11,13,17,27,30,33-35} In our study, Beagles, Dalmatians, and mixed-breed dogs had separation anxiety more often than expected and the number of mixed-breed dogs (n = 104) with separation anxiety far outnumbered the group of purebred dogs (17) with separation anxiety. However, breed distribution of separation anxiety varies among previous studies. Results implicate mixed-breed dogs³⁵ and purebred dogs⁶ as being evaluated more frequently than expected or that there is no difference between these groups.³⁶

Regarding the incidence of all diagnoses over the study period for various breeds, an upward trend was detected in mixed-breed dogs and downward trends in Cocker Spaniels, English Springer Spaniels, and German Shepherd Dogs. These trends were also seen in the CUHA population, but changes in incidences of all diagnoses in mixed breeds and English Springer Spaniels were significantly greater in the ABC population. It is important to note that all of these breeds except Cocker Spaniels were evaluated more often than would be expected for many diagnoses in the aggression category; perhaps the popularity of these breeds in our geographic location has decreased because of behavioral problems such as aggression.

In addition to breed distribution, veterinarians and owners need to know at what age certain problems are

more likely to appear to prevent them altogether or to diagnose them in the early stages of development. Median age at evaluation of all dogs for behavior problems was 2.5 years, and mean age was 3.7 years. Others have reported similar findings^{17,18,21} or found that the largest age categories included these ages.^{9,10,13} In the study reported here, phobias and storm phobias occurred at a median age of 6.5 years, compared with a median age of 2.5 years for all other diagnoses. Landsberg¹⁷ did not analyze differences among ages in various diagnoses but reported that all diagnoses occurred at a mean of 2 to 3 years of age, except for phobias, which occurred at a mean of 5 years of age. The older age at evaluation implies that learning plays an important role in development of phobias in dogs, even more so than in other diagnoses, for which median ages ranged from 2.5 to 3.5 years. In assessing age distribution over time, median ages for a given year were remarkably static because all were 2.5 years except the year 1992, for which median age at evaluation was 3.5 years.

It is also necessary to understand whether sex plays a role in development of problem behaviors. In the study reported here, males were evaluated more often than expected overall and for many aggression problems (56.6% overall; 60.1% aggression); others have reported similar results.^{1,9-14,17-21,27,28,30,33-35,37-39,d}

Neutered dogs were evaluated more frequently than sexually intact dogs by more than a factor of 4, which was most likely because male and female dogs are often routinely castrated and spayed before puberty. For most behavior diagnoses, neutered dogs were also evaluated more often than expected, compared with the CUHA population. Although similar findings have been reported in recent studies,^{10,13,14} other studies covering periods before neutering is typically performed have detected a preponderance of sexually intact males^{20,37,d} or sexually intact males and spayed females^{11,18,34} evaluated for aggression. It is important to note that animal-directed and interdog aggression (including household and nonhousehold aggression) were the only aggression diagnoses for which females were evaluated more often than expected in our study. However, reported sex differences in interdog aggression vary. Some authors have found that males are more likely to fight than females, especially with other males,^{11,33} whereas others have found no sex differences.¹⁷ Sherman et al,⁴⁰ using data from 3 of the years (1991 to 1993) reported in our study, determined that females are more likely to initiate interdog household aggression, whereas males are more likely to attack nonhousehold dogs. We also found that females were evaluated more often than males for anxieties, general anxiety, and phobias. Lund et al²¹ reported that males had a significantly lower risk of general anxiety, and Appleby et al¹⁰ reported that phobic behavior was higher in females in the 1994 caseload analysis. However, Overall et al⁴¹ found that there was no sex difference in regard to the relative percentage of total cases of thunderstorm phobia, noise phobia, and separation anxiety (discrepancy may be attributable to higher sample size of the present study). Numbers of spayed females increased over the study in the ABC population as well

as the CUHA population, with a significantly greater change seen in the ABC population; this difference was most likely attributable to more sexually intact females being evaluated at CUHA because of referrals for reproductive problems.

In the study reported here, certain diagnoses occurred together more often than chance would predict. The practitioner could use this knowledge during evaluation of the dog's history to help focus questions and uncover problems of which even the owner may have been unaware. The highest number of combinations of diagnoses occurred within the category of aggression, and the next most frequently occurring group of combinations was diagnoses in the aggression and anxiety categories. Owners with dogs with fear aggression toward strangers should be questioned specifically on issues of fear aggression toward family members because these diagnoses are often associated. Also, contexts and postures during aggressive incidents in the home should be clearly defined because we found an association with fear in dogs with dominance-related aggression. Dogs that fight with other dogs may also have issues in the home with owners (dominance-related) or with strangers (territorial). We found 6 pairs of aggression-anxiety diagnoses in at least 6 dogs over the study. This is not surprising because anxiety may lower a dog's threshold for aggression.^{42,43} Because of this, dogs with aggression (dominance-related, fear towards strangers, interdog, and territorial) should be observed carefully during the consultation for signs of anxiety and inability to relax,⁴⁴ and owners should be questioned for signs of separation anxiety or general anxiety in their dogs. Noise phobia and separation anxiety also occurred together more often than chance would predict. Such results have been reported in 2 other studies.^{36,41} It is important to keep in mind that these data represent only those dogs referred to veterinary behaviorists and that breed distributions reported in this study do not necessarily reflect breed prevalence of behavioral problems.

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Appendix

Definitions of behavioral diagnoses for cats and dogs.

Aggression—a general term that includes all features of defense, threat, and attack behavior directed at people, animals, or things and excludes all features of affiliative behavior.

People-directed**Owner-directed**

Dominance-related aggression—formerly known as dominance aggression, also known as conflict-related, impulse/control, and status-related aggression; includes 2 or more of the following signs: growling, barking aggressively, blocking, snapping, snarling, lunging, and biting (dogs) or hissing, growling, and biting (cats) directed at owners or family members over control of resources such as space, food, possessions, proximity to owner, or situations.

Aggression to children—includes 2 or more of the following signs: growling, barking aggressively, blocking, snapping, snarling, lunging, and biting (dogs) or hissing, growling, and biting (cats) directed at familiar children.

Fear—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, and biting (dogs) or hissing, growling, and biting (cats) directed at owners and accompanied by attempts to escape; fearful postures such as tucked tail, crouched body, or supine with abdomen exposed; and flattened or pinned ears. This aggression may occur in any location, either on or off the owner's property or in both locations.

Herding—nipping, barking, and biting at the feet and ankles in an attempt to move owners in 1 direction.

Idiopathic—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, and biting (dogs) or hissing, growling, and biting (cats) directed at owners for which no medical or behavioral stimulus or cause has been discovered.

Irritable—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, and biting (dogs) or hissing, growling, and biting (cats) directed at owners in response to a broad range of situations, such as stress, frustration, or pain.

Noise-triggered aggression—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, or biting (dogs) or hissing, growling, and biting (cats) directed at owners that is solely initiated by a sound.

Pain-based—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, and biting (dogs) or hissing, growling, and biting (cats) that may be triggered by an action, either internal or external to the pet, that the pet perceives as painful and that is directed at the owner.

Petting-induced aggression—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, and biting (dogs) or hissing, growling, and biting (cats) directed at a person after a certain number of pets to the animal's head or body.

Play—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, and biting (dogs) or hissing, growling, and biting (cats) directed at the owner or family members during a play session.

Predatory—stalking and hunting accompanied by attempts to kill or killing directed at owners, usually infants.

Redirected—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, and biting directed at the owner when a pet is prevented from pursuing aggressive behavior directed at another target.

Stranger-directed

Aggression to children—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, and biting (dogs) or hissing, growling, and biting (cats) directed at unfamiliar children.

Fear—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, and biting (dogs) or hissing, growling, and biting (cats) directed at strangers and accompanied by attempts to escape and fearful postures such as tucked tail, crouched body or supine with abdomen exposed, and flattened or pinned ears. This aggression may occur in any location, either on or off the owner's property, or in both locations.

Idiopathic—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, and biting (dogs) or hissing, growling, and biting (cats) directed at strangers, for which no medical or behavioral stimulus or cause has been discovered.

Irritable—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, and biting (dogs) or hissing, growling, and biting (cats) directed at strangers in response to a broad range of situations, such as stress, frustration, or pain.

Pain-based—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, and biting (dogs) or hissing, growling, and biting (cats) that may be triggered by an action, either internal or external to the pet, that the pet perceives as painful and that is directed at a stranger.

Petting-induced aggression—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, and biting (dogs) or hissing, growling, and biting (cats) directed at a stranger after a certain number of pets to the animal's head or body.

Play—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, and biting (dogs) or hissing, growling, and biting (cats) directed at strangers during a play session.

Predatory—stalking and hunting accompanied by attempts to kill or killing directed at strangers, usually infants.

Redirected: includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, and biting (dogs) or hissing, growling, and biting (cats) directed at a stranger when a pet is prevented from pursuing aggressive behavior directed at another target.

Territorial—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, and biting (dogs) directed at strangers on the owner's property or what the animal considers to be the property.

Animal-directed

Fear—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, and biting (dogs) or hissing, growling, and biting (cats) directed at animals and accompanied by attempts to escape and fearful postures such as tucked tail, crouched body or supine with abdomen exposed, and flattened or pinned ears. This aggression may occur in any location, either on or off the owner's property, or in both locations.

Intercat—includes 3 or more of the following signs: staring, blocking, hissing, vocalizing, stalking, swatting, lunging, and biting among 2 or more cats within a household or among cats from different households.

Interdog—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, and biting among 2 or more dogs within a household or among dogs from different households.

Interspecies—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, and biting (dogs) or hissing, growling, and biting (cats) directed at another species (exclusive of people) within the household or outside of the household, exclusive of predation.

Play—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, or biting (dogs) or hissing, growling, and biting (cats) directed at other animals, exclusive of people during a play session.

Predatory—stalking and hunting accompanied by attempts to kill or killing other animal species, exclusive of people.

Redirected—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, and biting (dogs) or hissing, growling, and biting (cats) directed at another animal when a pet is prevented from pursuing another aggressive behavior.

Thing-directed

Aggression to cars—includes 2 or more of the following signs: growling, barking aggressively, snapping, snarling, lunging, and biting directed at parked or moving cars.

Appendix

Definitions of behavioral diagnoses for cats and dogs (continued).

Anxieties—conditions resulting from the anticipation by the animal of danger or harm.

Anxiety-related pruritis—itching occurring during situations of stress, frustration, or conflict and having no medical cause.

Barrier frustration—inability to stay or be enclosed or confined in any way without extreme anxiety.

General anxiety—increased vigilance, motor activity, and autonomic activity that interfere with normal functioning.

Hyperattachment—remaining within sight or touch of the owner at all times.

Separation anxiety—includes 1 or more of the following signs: destructive behavior, vocalization, salivation, and elimination caused by physical or visual separation from the owner.

Travel anxiety—increased vigilance, motor activity, and autonomic activity during any type of travel.

Locomotor behavior—out of context, repetitive body movements that are difficult or impossible to interrupt and interfere with the animal's normal routine.

Circling—repetitive walking or running in a circular pattern for no apparent reason.

Light chasing—following light from any source in attempt to catch it, such that normal function is interfered with.

Shadow chasing—following shadows produced by any source in attempt to catch them, such that normal function is interfered with.

Tail chasing—repetitive and excessive chasing of the tail that may or may not result in alopecia, abrasions, or ulcerations.

Ingestive behavior—out of context, repetitive oral movements that are difficult or impossible to interrupt and interfere with the animal's normal routine and abnormal appetite or abnormal ingestion of nonfood items.

Air biting—repetitive snapping at the air for no obvious reason, exclusive of normal activities.

Abnormal suckling—preference by an animal to suckle on a human finger, body part, or clothes.

Anorexia—loss or lack of the appetite for food.

Chewing telephone cords—repetitive chewing with the molars on telephone cord or wires.

Cloth chewing—repetitive chewing with the molars on cloth material.

Coprophagy—ingestion of feces.

Excessive chewing—repetitive mastication when there are no longer any food materials in the mouth.

Fabric licking—repetitive and excessive licking of cloth material.

Foraging—searching for food.

Hyperphagia—eating a greater than optimal quantity of food.

Pica—ingestion of a variety of nonfood items and not limited to 1 particular substrate.

Psychogenic polydipsia—drinking of excessive amounts of water because of stress and not because of a medical condition.

Wood chewing—repetitive chewing with the molars on wood or wooden material.

Wool chewing—repetitive chewing with the molars on woolen material.

Wool sucking—repetitive sucking on woolen material.

Self-directed aggression—repetitive oral or body movements that are self-afflicted, cause the animal severe harm, are difficult or impossible to interrupt, and interfere with the animal's normal routine.

Self-mutilation—repetitive and excessive actions that result in ulcerations, bruises, or abrasions.

Tail chewing—repetitive and excessive chewing of the tail that may result in alopecia, abrasions, or ulcerations.

Grooming behavior—out of context, repetitive self-grooming movements that may injure the animal but do not cause severe harm, are difficult or impossible to interrupt, and interfere with the animal's normal routine.

Lick granuloma—licking in excess of normal grooming that results in areas of alopecia and abrasion.

Licking—licking in excess of normal grooming that does not result in areas of alopecia.

Excessive grooming—hair-pulling, licking, or chewing in excess of normal grooming that results in areas of alopecia.

Fears—behaviors resulting from the avoidance of triggers such as people, other animals, situations, or activities that the animal perceives as dangerous.

Fear of people

Fear of men—reluctance to be near or in the vicinity of men.

Fear of strangers—reluctance to be near or in the vicinity of an unfamiliar person.

Shyness—preferring to be alone and not interacting with the owners.

Fear of animals

Antisocial behavior—reluctance to be in the company of other members of the same species.

Fear of insects—reluctance to be near or in the vicinity of any type of insect.

Fear of other dogs—reluctance by a dog to be near or in the vicinity of other dogs.

Fear of situations

Agoraphobia—fear of open spaces.

Resistance to handling—fear or reluctance to being picked up, held, or handled by a person.

House soiling—the release or deposition of feces or urine in an indoor location that is unacceptable to the owner.

Elimination—normal amounts of urine or feces deposited outside of areas the owner considers acceptable and variable amount of urine released during periods of excitement or while the animal is in any type of submissive posture.

Excitement urination—releasing small amounts of urine during periods of excitement.

Submissive urination—releasing small amounts of urine while in any type of submissive posture.

Urination and defecation—normal amounts of urine and feces deposited outside of areas the owner considers acceptable.

Defecation—normal amounts of feces deposited outside of areas the owner considers acceptable.

Urination—normal amounts of urine deposited outside of areas the owner considers acceptable.

Marking—depositing less than normal amounts of urine or stool in socially or olfactory important locations.

Urine marking—depositing less than normal amounts of urine on a vertical surface (spraying) or horizontal surface in socially or olfactory important locations, in response to social or olfactory stimuli, or both.

Miscellaneous—behaviors with criteria that do not fit well into any of the listed categories.

Cognitive dysfunction—an age-related syndrome caused by degeneration in the brain and a decline in higher brain functions, causing a group of signs such as disorientation, changes in interactions with owners, and changes in sleep-wake cycles and elimination patterns.

Depression—changes in appetite and sleep-wake cycle, often accompanied by social withdrawal.

Pseudocyesis—the condition of false pregnancy in which hormonal changes consistent with pregnancy result in similar behavioral changes.

Psychogenic salivation—salivating excessively because of stress and not because of a medical condition.

Appendix

Definitions of behavioral diagnoses for cats and dogs (continued).

Hyperesthesia syndrome—a poorly understood syndrome also known as twitchy cat disease, rolling skin disease, and feline neurodermatitis. Behaviors seen include rippling of skin, rolling on the floor, and self-directed mutilation; these behaviors are usually accompanied by vocalization.

Phobias—an extreme fear response that is excessive and disproportionate to any real or potential threat or situation perceived as threatening.

Hysteria when approached—profound and extreme response to being approached by a person or another animal.

Noise phobia—profound and extreme response to noise other than thunder, resulting in escape, avoidance, and anxiety behaviors.

Panic attack—a profound response to a situation causing extreme anxiety.

Storm phobia—profound escape, avoidance, or anxiety behaviors in response to thunderstorms and their manifestations (rain, noise, lightning, darkness, wind, and changes in barometric pressure and ozone).

Sexual behavior—sexual activity that is either excessive or inappropriately directed.

Masturbation—self-manipulation of the genitals.

Mounting—thrusting the pelvis against animate or inanimate objects.

Unruly behavior—behaviors resulting from control and obedience problems, including medical causes for inadequate control.

Attention-seeking behavior—intrusive behavior initiated by the pet and continued until the pet has the owner's attention. The behavior may be active (such as jumping, vocalizing, pawing) or passive (such as staring, leaning against).

Destructive—destroys household property by digging, scratching, or chewing in presence or absence of owner.

Difficult to control—all situations in which the owner is unable to adequately control the dog, including jumping on people, running away, car chasing, and pulling while on lead.

Hyperactive—unable to relax, high heart and respiratory rates, and high temperature at rest with little increase when exercised.

Hyperexcitable—being overly stimulated or excited by situations, people, or objects.

Roaming—leaving the property for extended periods before returning, usually for sex, food, or hunting prey.

Running away—escaping from the property.

Scratching destructively—use of the claws on a surface the owner considers undesirable.

Vocalization behavior—excessive annoying sounds emitted by the animal in play, excitement, greeting, social facilitation, and attention-seeking behavior, but excluding vocalizations secondary to serious behavioral problems such as separation anxiety, aggression and cognitive dysfunction.



Selected abstract for JAVMA readers from the American Journal of Veterinary Research

Influence of halothane, isoflurane, and sevoflurane on gastroesophageal reflux during anesthesia in dogs

Deborah V. Wilson et al

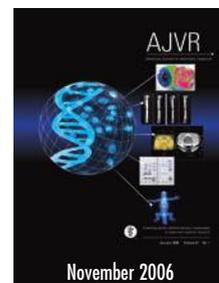
Objective—To determine whether maintenance of anesthesia with halothane or sevoflurane is associated with a lower incidence of gastroesophageal reflux (GER) than the use of isoflurane in dogs undergoing orthopedic surgery.

Animals—90 dogs.

Procedures—Dogs were evaluated during elective orthopedic surgery. Dogs with a history of vomiting or that had received any drugs that would alter gastrointestinal tract function were excluded from the study. The anesthetic protocol used was standardized to include administration of acepromazine maleate and morphine prior to induction of anesthesia with thiopental. Dogs were allocated to receive halothane, isoflurane, or sevoflurane to maintain anesthesia. A sensor-tipped catheter was placed to measure esophageal pH during anesthesia. Gastroesophageal reflux was defined as an esophageal pH < 4 or > 7.5.

Results—51 dogs had 1 or more episodes of acidic GER during anesthesia. Reflux was detected in 14 dogs receiving isoflurane, 19 dogs receiving halothane, and 18 dogs receiving sevoflurane. In dogs with GER, mean \pm SD time from probe placement to onset of GER was 36 ± 65 minutes and esophageal pH remained < 4 for a mean of 64% of the measurement period. There was no significant association between GER and start of surgery or moving a dog on or off the surgery table. Dogs that developed GER soon after induction of anesthesia were more likely to regurgitate.

Conclusions and Clinical Relevance—Maintenance of anesthesia with any of the 3 commonly used inhalant agents is associated with a similar risk for development of GER in dogs. (*Am J Vet Res* 2006;67:1821–1825)



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Behavioural effects of ovariohysterectomy on bitches

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Journal of Small Animal Practice (1990) 31, 595-598

ABSTRACT

A questionnaire about their dogs' behaviour was administered to the owners of 150 spayed bitches at the time of spaying and again six months later. It was also administered twice with the same time interval to a control group of 150 unsplayed bitches, group matched for breed and age. Principal component analysis of the questionnaire responses yielded 13 factors. On two of these factors, 'indiscriminate appetite' and 'dominance aggression towards family members', the scores of the spayed bitches showed a significant increase compared with their controls. The spayed bitches most likely to show an increase in dominance aggression were puppies under one year, already showing some aggression.

INTRODUCTION

In bitches, the most frequently performed surgical operation is that of ovariohysterectomy, or spaying. Although it is sometimes performed for medical reasons, its most usual purpose is the avoidance of pregnancy and the inconveniences of a bitch in oestrus. It is occasionally undertaken as a treatment for a behavioural problem. It is sometimes stated that spaying affects temperament adversely (for example that spayed bitches 'lack personality' or are 'frankly neurotic' (Jones and Joshua 1982)). It has been observed clinically (Voith and Borchelt 1982, O'Farrell 1986) that owners of bitches presenting with problems of aggression frequently report an exacerbation after spaying. However, there are no objective and controlled studies in this area. The aim of the present study was to fill this gap.

MATERIALS AND METHODS

The owners of 150 bitches were interviewed at the time that the bitch was spayed and again six months later. They were an unselected sample, being the first 150 owners contacted through veterinary practices who were available for interview. These formed the experimental group. The control group was composed of 150 unsplayed bitches: their owners were also interviewed twice with an interval of six months. The controls were matched for breed with the bitches in the experimental group and the groups were matched for age. No dog was included in the study which was less than four months old at initial interview or which had been acquired less than one month previously.

Questionnaire

The interview took the form of a questionnaire with 60 items. Twenty of the items were concerned with basic information about the dog and its circumstances: age, age when acquired, number of dogs and people in the household, number of pregnancies, etc. The rest of the questionnaire was concerned with the dog's behaviour over the previous month. The following areas were covered: aggression (to owners, visitors, other dogs), fears, activity level, excitability, destructive chewing, reactions to separation from owner, behaviour in the car, roaming, feeding, urination and defecation and scavenging. Most of the questions were phrased in such a way that the replies were in the form of an estimated absolute or relative frequency of the behaviour.

RESULTS AND DISCUSSION

To simplify the results of the responses to the 40 behavioural items, the correlations between the items were subject to principal component analysis. The results are shown in Table 1.

Table 1. Principal component analysis of questionnaire items (Varimax rotation)

	Factor loadings
Factor 1. Protective aggression (9.8% of variance)	
Threatens people outside family	0.76
Barks, growls when owner opens door to someone	0.68
Gets excited when owner opens door to someone	0.60
Factor 2. Aggression towards other dogs (7.2% of variance)	
Growls at other dogs	0.85
Growls at dogs outside the household	0.83
Factor 3. Urination or defecation indoors (5.2% of variance)	
Urinating in house	0.83
Defecates in house	0.78
Factor 4. Destructive behaviour (4.8% of variance)	
Destructive when left alone	0.88
Destructive chewing generally	0.81
Factor 5. Phobias (4.4% of variance)	
Afraid of visitors	0.73
Afraid of specific kind of person (eg, men)	0.76
Afraid of things (eg, vacuum cleaner)	0.57
Factor 6. Dominance aggression towards family members (4.3% of variance)	
Threatens if disturbed when resting	0.78
Threatens family members	0.72
Threatens when groomed	0.50
Threatens when something taken away (eg, food)	0.35
Factor 7. Excitement in car (3.6% of variance)	
Sits quietly in car	-0.85
Jumps about or barks in car	0.81
Factor 8. Indiscriminate appetite (3.5% of variance)	
Eats meals quickly	0.83
Eats any commercial dog food	0.83
Eats rubbish, carrion, etc	0.36
Factor 9. Dislike of separation from owner (3.3% of variance)	
Follows owner to door on departure	0.74
Looks miserable when owner leaves	0.63
Takes no notice when owner leaves	-0.55
Factor 10. Territorial urination (3.1% of variance)	
Adopts non-squatting posture when urinating	0.74
Urinating frequently on walks	0.72
Factor 11. Activity level in the house (2.8% of variance)	
Moves around constantly	0.74
Reacts to noises	0.48
Follows owner around house	0.38
Factor 12. Perverse appetite (2.7% of variance)	
Eats dog faeces	0.87
Eats rubbish, carrion, etc	0.57
Factor 13. Reactivity (2.6% of variance)	
Reacts to noises	0.72
Threatens when groomed	0.45
Barks when left	0.43

Table 2. Differences between experimental and control groups at first interview

Spayed group	
1 Was acquired at older age	P<0.001
2 Had fewer administrations of synthetic progestogen	P<0.01
3 Had fewer dogs in household	P<0.0001
4 Reacted less to separation (factor 9)	P<0.01
5 Jumped about less in car	P<0.01
6 Roamed more from house	P<0.02

Table 3. Change in factor scores in unspayed group between first and second interview

Factor	Change
1 Protective aggression	+
2 Aggression towards other dogs	+
3 Urination or defecation in the house	- (P = 0.002)
4 Destructive behaviour	-
5 Phobias	-
6 Dominance aggression towards family members	-
7 Excitement in car	- (P < 0.05)
8 Indiscriminate appetite	- (P < 0.01)
9 Reaction to separation from owner	-
10 Territorial urination	+ (P < 0.01)
11 Activity level in the house	-
12 Perverse appetite	-
13 Reactivity to stimuli	-

Where changes are significant, significance level is shown (Wilcoxon test)

For each interview, a score on each factor was calculated by summing the score on the relevant items, weighted by their factor loadings. In analysing the results, for the most part, these factor scores were used, rather than the scores on the individual items.

Next, the results were examined to see if there were any significant differences between the spayed and unspayed groups at initial interview. Any significant differences between the groups would mean that groups were not matched on those variables. The mean age of the experimental group was 33.47 months (SD 33.95). The mean age of the control group was 33.29 months (SD 30.52). These ages were not significantly different: the groups, therefore, had been successfully matched for age. There were, however, significant differences between the groups on some variables: these are shown in Table 2. The relevance of these differences is discussed later.

The factor scores on first and second interview for the unspayed bitches were then compared (Wilcoxon test for matched pairs) to determine what changes in behaviour had occurred due only to the passage of time. The changes in the factor scores are shown in Table 3. It can be seen from this table that significant decreases occurred in urination and defecation in the house, excitement in the car and indiscriminate

Table 4. Change in factor scores in unspayed group between first and second interview by age

Factor	Change		
	11 months and under	12-24 months	25 months and over
1 Protective aggression	+	+	-
2 Aggression towards other dogs	+	+	-
3 Urination or defecation in the house	- (P = 0.003)	-	-
4 Destructive behaviour	-	-	+
5 Phobias	+	+	- (P = 0.002)
6 Dominance aggression towards family members	-	-	-
7 Excitement in car	- (P = 0.02)	-	-
8 Indiscriminate appetite	- (P = 0.01)	-	-
9 Reaction to separation from owner	+	-	-
10 Territorial urination	+ (P = 0.005)	+	+
11 Activity level in the house	-	+	-
12 Perverse appetite	-	+	-
13 Reactivity to stimuli	-	+	-

Where changes are significant, significance level is shown (Wilcoxon test)

appetite: a significant increase occurred in territorial aggression. The unspayed group was then divided into three age groups: 11 months and under (puppies), one to two years and over two years. The changes occurring in these groups over the six months were examined. These are shown in Table 4. It can be seen that where significant changes occurred in the group as a whole, these were due to changes in the puppy group. These changes are not surprising: they are the changes one would expect in puppies as they mature. The finding, however, is reassuring, as it confirms the validity of the questionnaire. It is interesting that fears do not follow the same pattern: they do not decrease until the bitch is over two years old.

The changes in the spayed group from first to second interview were then calculated and the changes compared with the changes in the unspayed group (Wilcoxon test). The comparison was also made with the puppies excluded, in case changes in the puppy group were masking changes due to spaying. The factors for which the changes in the spayed and unspayed group differed significantly are shown in Table 5.

The first question to be considered is whether these differences are due to spaying or whether they might be accounted for by any of the differences between the two groups at initial interview. It seems unlikely that the difference on factor 6 (dominance aggression) or on factor 8 (indiscriminate appetite) could be accounted for by any of the initial differences. However, in the case of factor 7 (excitement in the car) the items which loaded on this factor were 'does not sit quietly in the car' and 'jumps about in the car'. On examining the changes on these two items, it was found that changes in the 'jump about' item were solely responsible for the significant difference in the changes between the groups on factor 8. The initial scores of the two groups on the

Table 5. Change in factor scores between first and second interview: significant differences between experimental and control groups

Factor		
6 Dominance aggression towards family members	Spayed group increase Unspayed group decrease	P<0.05
7 Excitement in car	Spayed group increase Unspayed group decrease	P<0.05
8 Indiscriminate appetite (puppies excluded)	Spayed group increase Unspayed group decrease	P<0.05

Table 6. Changes in dominance aggression by age

Age	Aggression			Total
	Aggression increases	Aggression stays the same	Aggression decreases	
11 months or less	S = 13 U = 4	S = 28 U = 31	S = 4 U = 6	S = 45 U = 41
12-24 months	S = 6 U = 6	S = 31 U = 26	S = 5 U = 7	S = 42 U = 39
2 years +	S = 14 U = 11	S = 38 U = 43	S = 11 U = 16	S = 63 U = 70
Total	S = 33 U = 21	S = 97 U = 100	S = 20 U = 29	

S Number of bitches in spayed group

U Number of bitches in unspayed group

'jump about' item were significantly different (Table 2); it cannot be concluded, therefore, that spaying caused an increase in excitement.

With regard to factor 8 (indiscriminate appetite), it seems safe to conclude that the relative increase in the experimental group when puppies were excluded was due to the effects of spaying. Presumably this behavioural change

Table 7. Changes in dominance aggression by initial aggression score

Initial Aggression	Aggression			Total
	Aggression increases	stays the same	Aggression decreases	
Some aggression	S = 16 U = 8	S = 7 U = 5	S = 20 U = 29	S = 43 U = 42
No aggression	S = 17 U = 13	S = 90 U = 95	—	S = 107 U = 108
Total	S = 33 U = 21	S = 97 U = 100	S = 20 U = 29	

S Number of bitches in spayed group

U Number of bitches in unspayed group

Table 8. Changes in dominance aggression by age and initial aggression

	Aggression			Total
	Aggression increases	stays the same	Aggression decreases	
Bitch under 12 months showing some initial aggression	S = 6 U = 1	S = 2 U = 0	S = 4 U = 6	12 7
Bitch over 12 months showing no initial aggression	S = 10 U = 10	S = 64 U = 64	—	74 74

sometimes results in the weight gain which is often cited as a possible side-effect of spaying.

Similarly, it seems safe to attribute the change in factor 6 (dominance aggression towards family members) to spaying. The results were examined more closely in an attempt to discover which bitches are most at risk of developing increased aggression following spaying. Table 6 shows the changes occurring in bitches spayed at different ages. It can be seen that although there is no clear trend with increasing age, the greatest difference between experimental and control group occurs in the youngest age group. Table 7 shows a comparison between bitches showing some aggression at initial interview and those showing none. It can be seen that there is a greater risk of aggression increasing in those already showing some aggression. Combining the variables age and initial aggression, Table 8 compares puppies under one year old already showing some aggression with dogs over one year showing none. If a puppy showing some aggression is spayed, there is a 50/50 chance that her aggression will increase. If she is not spayed, the chances are 6 to 1 that her aggression will decrease. On the other hand, if an adult bitch showing no aggression is spayed, this does not increase at all the chances that she will subsequently show some aggression: these are 6 to 1 in either case.

CONCLUSIONS

There is no evidence that spaying has beneficial effects on behaviour (excluding, of course, behaviour directly connected with oestrus).

The operation should not be undertaken as a treatment for behavioural problems.

Spaying is accompanied by the risk of certain behavioural changes. There is a risk of increase in indiscriminate appetite. More importantly, there is a risk of increase in dominance aggression towards family members. This risk is greatest in puppies under one year already showing some aggression. For these, some alternative method of controlling oestrus (eg, a synthetic progestogen or a surgical procedure which does not remove all ovarian tissue) might be preferable. (Unfortunately, the figures do not, of course, indicate whether the risk diminishes for these dogs as they get older). On the other hand, there seems no risk of increased aggression resulting from spaying for older dogs not showing any aggression. In addition the study showed no adverse effects on other kinds of behaviour.

ACKNOWLEDGEMENTS

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BOOK RECEIVED

Handbook on Animal Diseases in the Tropics

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Effects of ovariectomy on reactivity in German Shepherd dogs

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Abstract

This study investigated the effects of ovariectomy on reactivity of German Shepherd dogs. Fourteen healthy dogs ranging in age from 5 to 10 months were assigned to an ovariectomy or a sexually intact group. Their behaviours were digitally video recorded 4–5 months after treatment and analysed for treatment effects on reactivity. Responses to the approach of an unfamiliar human leading an unknown dog were assigned the following reactivity scores: severe reactivity, 3; moderate reactivity, 2; defensive or mild reactivity, 1; attentive or no reactivity, 0. Median reactivity scores in response to the approach of an unfamiliar human walking with an unknown dog were calculated for each observation period.

Dogs in the ovariectomized group showed more reactivity, and median reactivity scores were higher in the ovariectomy group compared with those of the sexually intact group. Ovariectomy of 5–10 month old German Shepherd bitches specifically, and perhaps bitches of any breed generally, may induce an increase in reactivity. Practitioners may benefit from recognizing that a range of behavioural changes may occur post-ovariectomy.

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1. Introduction

Ovariectomy is one of the most frequently performed surgical operations in dogs. The usual recommendation is to perform the surgery when a bitch is between 5 and 8 months old and after the first oestrus (Jackson, 1984; Johnston, 1993; Salmeri et al., 1991; Stone et al., 1993).

The most common reason for performing an ovariectomy is to prevent unwanted pregnancy (Salmeri et al., 1991) but other reasons include prevention and treatment of pyometra, metritis, neoplasia, cysts, trauma, uterine torsion and subinvolution of

placental sites (Cotchin, 1961; Dow, 1958; Durfee, 1968; Fidler et al., 1966; Fingland, 1998; Hedlund, 2002; Jergens et al., 1987; Sandholm et al., 1975; Stone et al., 1993). Although ovariectomy has been performed for many of the reasons given above, the side effects of the operation, particularly any changes in behaviour, have been quantified in only few studies (Hardie et al., 1997; O' Farrell and Peachey, 1990).

Houpt et al. (1979) reported that ovariectomized bitches gained more weight than sham-operated controls and food intake also was significantly greater. On the basis of a survey of owners, O' Farrell and Peachey (1990) noted that spaying was accompanied by a risk of increased indiscriminate appetite and by aggression towards family members but only if the puppies already exhibited some aggression at less than one year

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of age. Salmeri et al. (1991) found that ovariohysterectomized bitches showed more general activity than a sexually intact group, and Thrusfield (1985) reported that urinary incontinence occasionally followed ovariohysterectomy.

A dog's 'reactivity' can be inferred by visual signals, from the ears, mouth, facial expression, tail, the hair on shoulders and rump, overall body position and posture (Abrantes, 1997; Beaver, 1999; Houpt, 1998; Landsberg et al., 2003; Overall, 1997; Schaffer, 1993; Voith and Borchelt, 1996). In order to investigate behavioural changes after ovariohysterectomy we exposed the dogs in the present study to a strong social stimulus: a stranger and a strange dog approaching the front of the dog's kennel. We observed the dogs' behaviour, and the visual, auditory signals shown. On the basis of these observations, we evaluated the effects of ovariohysterectomy on canine behaviour.

2. Materials and methods

2.1. Experimental animals

Fourteen healthy German Shepherd (GSD) bitches at the Korean Air Force Dog Training Center were studied. Their ages were between 5 and 10 months (mean \pm SD, 6.5 ± 1.8) at the time of surgery and between 10 and 15 months at the time of behavioural testing. Dogs were housed in 180×240 cm wire mesh kennels with 250 cm walls. Each kennel contained a $180 \times 60 \times 140$ cm dog house.

The animals were handled according to the Laboratory Animal Control Guidelines of Gyeongsang National University, which are based on the *Guide for the Care and Use of Laboratory Animals* of the US National Institutes of Health (1996).

2.2. Experimental design and surgery protocol

The dogs were assigned randomly to either the ovariohysterectomy (OVH) or to the sexually intact group (SIG).

OVH dogs were premedicated with glycopyrrolate (0.01 mg/kg, IM), acepromazine (0.02–0.05 mg/kg, IM), butorphanol (0.02–0.04 mg/kg, IM) or oxymorphone (0.05 mg/kg, IM). General anaesthesia was induced by administration of thiopental sodium (10–12 mg/kg, IV) and anaesthesia was maintained with isoflurane (1–2.5%) during OVH (surgery group). SIG dogs were anaesthetized as above and then allowed to recover from the anaesthesia.

During the first 18–24 h after surgery, IM injections of either oxymorphone (0.05 mg/kg) or butorphanol (0.02–0.04 mg/kg) were administered every 6 h for man-

agement of pain. To control for genetic and early environmental influences, littermates were assigned equally to both groups.

The responses of the bitches to the approach of a unfamiliar human with a dog unknown to the test dog to within 1 m of the dog's kennel were recorded using a Digital Palmcorder four and five months after surgery when the dogs were 10–15 months old. The 14 dogs were observed twice one week apart at 4 months and twice one week apart at 5 months making a total of 56 observations. Only the focal dog remained in a run; the other dogs were confined indoors.

The unfamiliar human and dog stood in front of the kennel and the observations ended when the dog calmed down. Behaviours were analysed for 2–3 min during each observation.

2.3. Behaviour analysis

A single observer performed all analyses of the videos.

Parameters observed were ear, eye and lip-positions, tooth exposure and posture. Any vocalization was also recorded.

On the basis of previous descriptions (Abrantes, 1997; Beaver, 1999; Houpt, 1998; Landsberg et al., 2003; Overall, 1997; Reisner, 2003; Schaffer, 1993; Voith and Borchelt, 1996), all behaviour used for analysis was scored by an observer blind to the dog's reproductive condition. Individual reactivity scores in response to the approach of a stranger with a strange dog (the stimulus to reactivity) were determined, and a median reactivity score was calculated for each observation time (Table 1).

If a dog reacted with barking and growling, snarling, lips lifting or curling, head up, ears forward, staring, widely opened eyes and was lunging and jumping it was given a score of 3 (Fig. 1). If one to three of these actions were not exhibited the dog was given a score of 2 (Fig. 2). If four or more were not exhibited the dog was given a score of 1 (Fig. 3). If the dog did not respond at all it received a 0 score (Fig. 4).

Table 1
Evaluation and grading of reactivity

Grade	Description of body expression and vocalization
3	Vocalization: bark or growling, movement: lunging or jumping, snapping, head: up, ear: forward, eye: large palpebral fissure staring, lip: lifting or curling
2	Body expression and vocalization were changed by ≤ 3 items, being compared with grade 3
1	Body expression and vocalization were changed by ≥ 4 items, being compared with grade 3
0	No response or attentive



Fig. 1. The posture of grade 3 reactivity. Dog barks and shows growling, jumping, snapping, head up, ear forward, large palpebral fissure staring and lip curling.

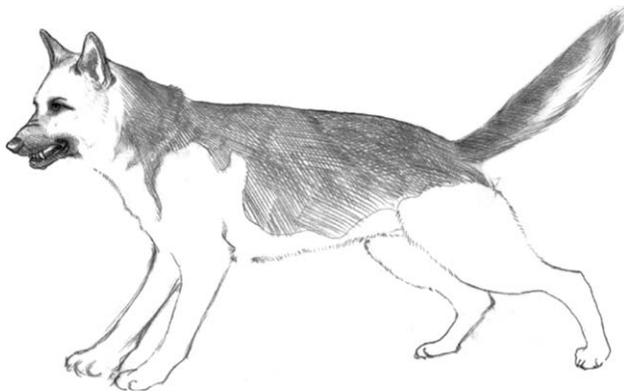


Fig. 2. The posture of grade 2 reactivity. Dog shows growling, snapping, ears forward, large palpebral fissure, staring, lip curling and tail up.

2.4. Statistical analysis

The behavioural effect of OVH was evaluated by comparing the scores of the two groups. The non-parametric repeated measures analysis of variance and Mann–Whitney *U*-test were used for comparisons between the OVH and sexually intact groups. Wilcoxon matched-pairs signed-ranks test was used to make comparison within groups between the observation times. All statistical tests were performed by use of computer software SPSS 9.

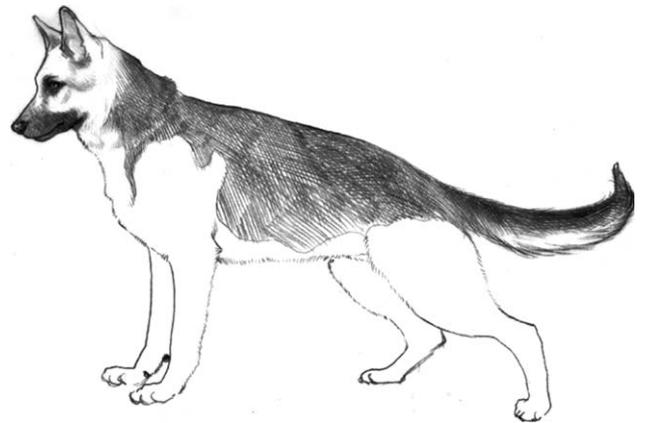


Fig. 3. The posture of grade 1 reactivity. Dog shows ears forward, large palpebral fissure staring and tail swing.

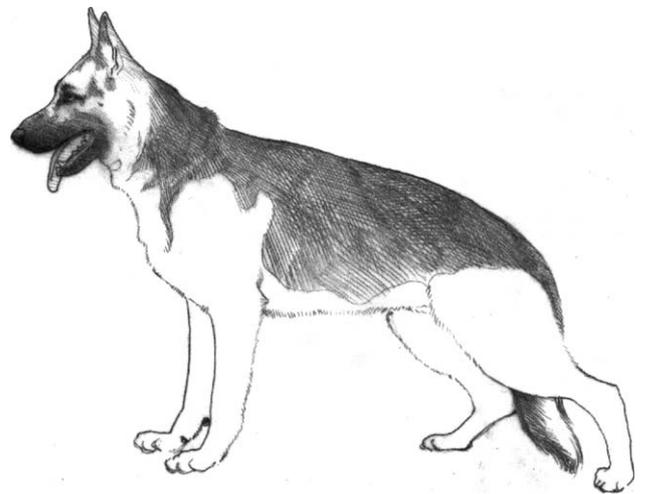


Fig. 4. The posture of grade 0 reactivity. Dog shows ears forward and a relaxed tail.

3. Results

Dogs in the OVH group showed increased reactivity based on facial expression and activities. Median reactivity scores were higher in the OVH group compared to those of the sexually intact group ($P < 0.05$) (Table 2). Median reactivity scores of the OVH group decreased significantly from 3 during the first observation to 1.1 during the fourth observation ($P < 0.001$). Median reactivity scores of the SIG group decreased from 1 at first observation time to 0.4 during the fourth observation ($P = 0.218$).

Of the 56 observations (4×14 dogs), head up was observed 43 times – 25 OVH and 18 SIG. The ears were forward 32 times – 25 OVH and 7 SIG. Staring with widely opened eyes was observed 22 times but only in the OVH group. The commissures of the lips were drawn forward 17 times and all in the OVH group.

Table 2
Individual reactivity scores in response to the approach of a stranger with a strange dog (the stimulus to reactivity)

Observation time	Group													
	OVH (<i>n</i> = 7)							SIG (<i>n</i> = 7)						
Dog ID:	A	B	C	D	E	F	G	H	I	J	K	L	M	N
<i>4th month</i>														
1st week	3	3	2	2	2	2	1	1	1	1	1	1	1	0
2nd week	3	3	2	2	2	2	1	1	1	1	1	1	1	0
<i>5th month</i>														
1st week	3	3	2	2	2	1	1	1	1	1	1	1	1	0
2nd week	3	2	2	2	2	1	1	1	1	1	1	1	1	0

Note: OVH, ovariectomy group; SIG, sexually intact group.

Table 3
Items and frequencies of observed behaviours

Items	Behaviour	SIG	OVH	Items	Behaviour	SIG	OVH
Head	Up	18	25	Tail	High, wagging rapidly	5	3
	Down	10	0		High, wagging slowly	2	3
Ears	Forward	7	25		Horizontal, wagging rapidly	3	12
	Flanked	16	0		Horizontal, wagging slowly	3	10
	Flattened	5	3		Down	8	0
Eyes	Big, staring	0	22	Posture	Down, wagging rapidly	2	0
	Averted	7	3		Down, wagging slowly	5	0
	Moved	11	0		Shifted to front	6	25
	In nature	10	3		Shifted to middle	16	3
Lips	Drawn forward	0	17	Vocalization (sum of call numbers)	Shifted back	6	0
	Drawn back	10	6		Bark	311	1314
	In nature	18	5		Bark and growl		105
Movements	Jump	5	5	Teeth	Bark and whine	533	
	Lunge	0	2		Bark, growl, and whine		45
	Jump and lunge	0	10		No	19	5
	Retreat	8	0		Incisor	0	6
	Sit	2	0		Canine	1	9
	Circle	2	0		Premolar	7	7
	Come and go	10	10		Molar	1	1
	No movement	1	1				

Note: SIG, sexually intact group; OVH, ovariectomy group.

Raised and a rapidly wagged tail was observed 8 times, 3 OVH and 5 SIG. A neutral posture – leaning neither forwards nor backwards was observed 19 times, 3 OVH and 16 SIG. Leaning back was observed 6 times, all by SIG (Table 3).

4. Discussion

The study was carried out to investigate the effects of OVH on reactivity in German Shepherd bitches 4 and 5 months after surgery. **The results revealed that reactivity was increased in the OVH dogs in comparison to the intact group. It is unlikely that post-operative pain or side effects of analgesics was responsible for any of the increased reactivity due to the time that had elapsed since surgery.**

Although this is the first prospective study of the effects of spaying on reactivity, there have been two retrospective studies indicating an increase in reactivity after surgery. The risk of post OVH reactivity is higher if the bitches had already exhibited reactivity before their first birthday (O' Farrell and Peachey, 1990). A recent study indicated no difference in aggressiveness between bitches ovariectomized before or after they had reached 5.5 months of age (Spain et al., 2004). Other less serious changes after OVH include an increase in activity and an increase in food intake, which, combined with a decreased metabolic rate, leads to an increase in body weight and urinary incontinence (which may be due to oestrogen deficiency or to adhesions or granulomas of the stump that interfere with the bladder sphincter mechanism) (Hardie et al., 1997; Houpt et al., 1979; Kyles et al., 1996; Salmeri et al., 1991).

In the present study, overall body expression and specific facial expressions were used to determine the level of reactivity. **More spayed bitches than intact bitches exhibited wide open staring eyes. These results are similar to broad findings cited for self-confident or offensively aggressive dogs** (Abrantes, 1997; Beaver, 1999; Houpt, 1998; Landsberg et al., 2003; Overall, 1997; Reisner, 2003; Schaffer, 1993; Voith and Borchelt, 1996). In our study, we found that more of spayed than intact GSD bitches had erect ears, although the erect ear could be simply an expression of an attentive or solicitous dog.

In previous descriptions (Abrantes, 1997; Beaver, 1999; Houpt, 1998; Landsberg et al., 2003; Overall, 1997; Reisner, 2003; Schaffer, 1993; Voith and Borchelt, 1996), shifting weight to the front was considered to be offensively aggressive, shifting the weight back to be withdrawal due to fear. Although shifting weight to the front feet could be ambivalent, we considered it as offensive reactivity if the dog showed other offensive behaviour.

Lifted lips were considered to be reactivity and relaxed lips as non-reactivity. If the commissures of the lips were drawn forward the dog was considered to be offensively reactive, but if they were drawn back she was considered to be defensively reactive. Based on overall body expression, OVH bitches showed more offensive reactivity than sexually intact dogs. Median scores decreased during the two months of observation time. The dogs probably had habituated to the stimuli eliciting behaviour.

Dogs communicate with various signals as human do. Common visual communication signals of dogs are ear-position, lip-position, facial expression, tail carriage, piloerection and overall body posture. These communications are different according to the dog's interpretation of and response to those of other individual in the environment. Relaxed dogs will show ears and tail that are down and will stand in a relaxed posture, but reactive dogs show erect ears, head and tail up and staring eyes. In this study, we observed head posture, eyes and ear position with the overall body posture. The results indicated that the postures of the dogs in OVH group presented with more offensive reactivity than those of the sexually intact group. Because the German Shepherd breed in general, and these military dogs in particular, have been selected for aggression and guard work, studies should be undertaken to measure the effect of ovariectomy on the behaviour of bitches of other breeds.

Reactivity was induced by the approach of a stranger with a strange dog to the front of the study animal's own kennel, and dogs ovariectomized between 5 and 10 months of age exhibited an increase in intensity of reactivity as measured by visual signals. Whether either earlier or post pubertal OVH would have had similar ef-

fects is unknown, but veterinary practitioners should inform owners that a bitch may become more reactive after spaying either because they have lost the calming effects of progesterone or because elevated gonadotropins stimulate release of adrenal androgens.

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