



**REPLACING MYTH WITH MATH:
USING EVIDENCE-BASED PROGRAMS TO
ERADICATE SHELTER OVERPOPULATION**

PETER MARSH

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INTRODUCTION

The toll has been staggering: during the last 40 years, more than 250 million cats and dogs have been put to death at animal shelters in the United States. As one veterinary epidemiologist put it “(o)f all the issues affecting the welfare of companion animals in the United States, there can be none larger in scope, greater in magnitude, longer in duration, or more worthy of disgrace than that of pet overpopulation.”ⁱ

At the peak in the 1970s, more than a fifth of all the cats and dogs in the country met their death in shelters every year. Little formal research had been done to understand the causes of overpopulation or assess the effectiveness of possible interventions. Sheltering costs consumed the budgets of animal control agencies and humane societies; they spent very little on pet sterilization or other preventive programs.

Much has changed over the past 15 years. We have learned a great deal about the dynamics of cat and dog populations. We know much more than we did about how cats and dogs become homeless and why. And governments and foundations now spend tens of millions of dollars every year on programs to reduce overpopulation.

Greater resources and understanding should have accelerated our progress in reducing overpopulation, but it has not. In recent years we have made less progress, not more. During the past ten years, the number of cats and dogs put to death in shelters has dropped by only one per cent a year compared to an average decline of three per cent a year for the previous thirty years (See Figure 23 on Page 109).

What accounts for the slower gains? One likely reason is that as fewer animals enter shelters, programs must be targeted more accurately to those that remain at greater risk of impoundment to make further progress. Recent research has identified some of the characteristics of animals and their owners that increase this risk, but shelter overpopulation programs have not used that information to its full advantage. For the most part, researchers and people who put together shelter overpopulation programs have lived in separate worlds, isolated from each other. As a result, program designers have rarely made use of research findings to effectively target their programs.

This book attempts to fix that by creating a crosswalk between the worlds of shelter overpopulation researchers and people who develop remedial programs. It includes:

- Concrete and comprehensive recommendations about how animal control agencies, veterinarians, humane societies, and advocacy groups can employ shelter statistics and data from surveys and research studies to reduce shelter overpopulation in their communities;
- Suggestions about future research that could increase shelter adoption and pet retention rates and improve the effectiveness of pet sterilization and feral cat management programs;
- Summaries of significant research findings and suggestions about how they can be used to full advantage in program design and implementation.

Despite the slower progress of recent years, there is reason for hope. The slower pace has not been universal; some communities have sustained the momentum of earlier years. Some have even eliminated the use of population control euthanasia in their shelters. Without exception, people in these communities have made great use of data to inform and drive their shelter overpopulation programs. This is an important lesson.

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Concord, New Hampshire
January, 2010

ⁱ Kass PH (2007). Cat Overpopulation in the United States. The Welfare of Cats, I. Rochlitz (ed.) New York, N.Y.: Springer Publishing, 119.

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Chapter 1

Replacing Myth with Math: Using Data to Design Shelter Overpopulation Programs

Reducing the incidence of overpopulation in animal shelters critically depends on applying data about the magnitude, dynamics, and root causes of overpopulation in animal shelters; until recently, however, shelters have operated in a data-poor environment.¹

In the 1970s, a surge of articles in both lay and scientific presses drew attention to the great number of pets being put to death in animal shelters in the United States.² More than a decade later, though, Dr. Andrew Rowan pointed to the lack of data about the causes of overpopulation and the effectiveness of programs to reduce it as a “statistical black hole,” lamenting in 1992 that:

“(g)iven that close to \$1 billion are spent by animal shelters every year to deal with unwanted companion animals, it is unfortunate that we have so little reliable data that could be used to plan more effective programs or even to evaluate where we are headed.”³

GLOSSARY OF TERMS

Pet overpopulation was originally used to describe a situation in which the volume of kittens and puppies overwhelmed the capacity of pet owners and shelters to care for them all and the excess were humanely destroyed in shelters. Over time, as puppies and kittens came to make up an increasingly smaller share of shelter admissions, some continued to refer to the overpopulation of animal shelters as pet overpopulation even though many of the impounded animals were unsocialized cats that had never been kept as pets and the reasons for many impoundments arose from a characteristic of the animal or pet owner, not the overall size of the pet population. Although there continued to be overpopulation, it was in the sheltering system, not in the total pet population. For this reason, the term **shelter overpopulation** will be used to describe a situation in which the total number of animals impounded from all sources substantially exceeds the carrying capacity of shelters in a community and the rate at which sheltered animals can be placed in appropriate adoptive homes.

Euthanasia in its common usage refers to taking steps to end the life of a person suffering from a terminal illness or incurable condition. With reference to animal shelters, the term has been applied both to taking steps to end the life of an animal that is severely injured or dying and to taking the life of an animal that is healthy or suffers from a treatable condition in order to control the size of the shelter population. To differentiate between these two contexts, **medical euthanasia** will be used to refer to the former situation and **population control euthanasia** to the latter. This will allow the population control euthanasia rate to serve as a measure of shelter overpopulation. Shelter overpopulation will have been eliminated when the only euthanasias performed in shelters are medical euthanasias that have not been induced by conditions at the shelter.

The following year, a consortium of animal protection groups, veterinary organizations, animal control groups, and pet products manufacturers formed the National Council on Pet Population Study and Policy (National Council) with three goals: (1). to gather and analyze data regarding the number, origin, and disposition of cats and dogs in the United States; (2). to promote responsible stewardship of companion animals; and (3). based on the data gathered, to recommend programs to reduce the number of homeless pets in the United States.⁴

During the past 15 years, the National Council has sponsored several epidemiological studies about the magnitude and dynamics of companion animal populations in the United States and the risk factors for the relinquishment of pets to animal shelters. A Regional Shelter Relinquishment Survey (Shelter Survey) of 12 animal shelters in four regions of the United States was undertaken to compile data on the characteristics of relinquished animals and their owners, the relative frequency of selected behaviors of the relinquished animals, and the relinquishers' general animal husbandry knowledge.⁵

Data collected in the National Council's Shelter Survey were analyzed in several studies about the demographics and dynamics of pet relinquishment.^{6, 7, 8, 9, 10} To secure a comparison group, in 1997 the National Council sponsored a national survey of households that owned at least one dog or cat to secure comparable data regarding the characteristics of all pet owners and their pets, the frequency of selected behaviors of the animals and their owners' animal-related knowledge. Together with data from the Shelter Survey, the National Pet-Ownning Household Survey (Household Survey) supplemented earlier research regarding relinquishment-related risk factors^{11, 12} and provided insights for the development of interventions to reduce them.¹³

"The benefits of improving the current data collection process could be quite substantial. First, appropriate information could be used to develop targeted programs to combat overpopulation in a particular community. For instance, recognition of a sharp rise in the number of stray cats or excess kitten litters in a community may suggest the initiation, expansion or revamping of spay and neuter or Trap, Test, Vaccinate, Alter and Release Programs. Alternatively, an influx of young adult dogs into area shelters may indicate a need for behavioral training programs or owner education programs addressing the transition from puppy to adult.

Second, information could be employed to track the effectiveness of programs, compare seasonal trends, and alert the shelter to changes in underlying cat and dog population dynamics. Finally, the data could be shared in shelters across a community (or the nation, for that matter) to help understand the overall problem rather than merely the experiences of a lone shelter, which may be driven more by mission, policies, size, effectiveness, or affiliation than by underlying problems."

Wenstrup J & Dowidchuk A (1999). Pet overpopulation: Data and measurement issues in shelters. *J. Appl. Animal Welfare Sci.* **2** (4), 304.

Data from the National Council's Household Survey were also used to estimate the size of the cat and dog populations in the United States, their sterilization status, birth and death rates, the frequency of planned and unplanned litters, the disposition of litters, and the frequency of and reasons for animals leaving households.¹⁴

In 1998, shortly after the Household Survey was completed, 186 animal shelters in 42 states were surveyed to collect demographic data regarding incoming animals and their disposition and information about the economics of sheltering (National Shelter Survey).¹⁵ In addition to outlining a suggested community assessment and planning methodology, the researchers identified a set of criteria to assess the value of the data collected.

Advances in the collection and standardization of shelter data have enabled researchers to more accurately assess the impact and effectiveness of remedial programs. In recent years, a foundation that has sponsored pet sterilization and adoption programs in several states since 1999 has undertaken rigorous statistical analyses of the impact of its programs and the association between various human and pet demographics and shelter intake and euthanasia rates.^{16, 17} The results of these studies—in addition to data collected in the National Council's Shelter Survey and the 1998 National Shelter Survey—broadened the scope of available data beyond relinquished pets to all sources of shelter admissions.

As part of its rabies control program, in 1970 the State of California began to require all public and private agencies that provided animal control services to collect and report basic intake and disposition data to the Department of Health Services.¹⁸ In recent years, several other states have passed laws requiring public and private animal shelters to collect and report basic intake and exit demographic

THE IMPORTANCE OF GOOD DATA

In the late 1980s and early 1990s, Dr. Andrew Rowan highlighted the need for data regarding pet populations and their dynamics. Without such information, he questioned how the humane community could determine if it was allocating its resources wisely.

Since then, a growing body of epidemiological studies has provided some answers to the questions Dr. Rowan raised. These data can be used to develop coherent, effective companion animal welfare policy.

Scarlett JM (2008). Interface of epidemiology, pet population issues and policy. *Prev. Vet. Med.* **86**, 189-190.

data, such as species, age, sex, sterilization status, and method of disposition. In addition, beginning in 1997, the editor of a periodical that specializes in reporting animal-related news, *Animal People*, has collected and published annual summaries of statewide and local shelter exit data. It has employed the same statistical protocol over the years to estimate the national shelter euthanasia rate. All of these data can provide an increasingly reliable basis to assess trends in shelter intake, adoption, redemption and euthanasia rates.

The collection and analysis of data have confirmed some widely held impressions previously derived from anecdotal information, such as the finding of relinquishment studies that problem behaviors increase a pet's risk of being surrendered to a shelter.¹⁹ At the same time, they have contradicted impressions long accepted as shelter dogma, such as the belief that animals given as gifts are at greater risk of relinquishment than those acquired in other ways.^{20,21} Another study found that special adoption promotions and alternative adoption locations resulted in adoptive placements with retention rates comparable to traditional, in-shelter placement programs.²² And a study of subsidized pet sterilization programs found that increases in the number of subsidized surgeries not only were not associated with a drop in the volume of non-subsidized surgeries, but that the number of non-subsidized surgeries increased as well, perhaps as a result of the positive effects of social marketing campaigns undertaken in connection with the subsidy programs.²³

Myth, in other words, has begun to be replaced with math. Although still far from sufficient, this growing body of data and analysis has provided some answers to the questions raised by Dr. Rowan,²⁴ as discussed below.

I. During the Past 30 Years, the Euthanasia Rate in U.S. Animal Shelters Has Been Greatly Reduced.

The best longitudinal picture of shelter intake and exit trends is contained in data collected by the California Department of Health Services since 1970. Under California law,²⁵ all public and private agencies that perform animal care and control services in the state are required to report basic shelter admission and disposition data to the Department. In the early 1970s—when the number of cats and dogs put to death in the state's shelters reached its peak—21% of the state's entire populations of household cat and dogs were euthanized each year.²⁶ The shelter death toll was

similar in other states. In 1973, 21-22.5% of the national population of owned cats and dogs were euthanized in U.S. animal shelters.²⁷ By 1982, the shelter euthanasia rate had fallen to 8.2-10.9% of the household cat and dog populations.²⁸

Additional progress has been made since then. By 1996, the statewide euthanasia rate in California shelters had dropped to 4.1% of the owned cat and dog populations.²⁹ In 2003, 2.6% of Michigan's estimated dog population were euthanized in the state's animal shelters and 3.1% of the owned cat population.³⁰ Euthanasias in Virginia shelters in 2002 included 3.9% of the state's estimated dog population and 4.1% of the owned cat population.³¹ In 2007, 4.2 million cats and dogs were euthanized in American animal shelters,³² about 2.6% of the owned cat and dog populations.³³

TOTAL EUTHANASIAS (U.S.)		
YEAR	CATS & DOGS EUTHANIZED (MILLIONS)	EUTHANASIAS PER 1,000 AMERICANS
1970	23.4	115.0
1985	17.8	74.8
1997	4.9	21.1
1998	4.9	19.4
1999	4.5	16.6
2000	4.5	16.8
2001	4.4	15.7
2002	4.2	15.3
2003	4.5	14.8
2004	4.9	17.4
2005	4.4	14.8
2006	4.0	13.6
2007	4.2	13.8

SOURCE: July/August 2008 *Animal People*, 8.

II. The Drop in Shelter Euthanasia Rates Over the Past 30 Years Has Been Produced Almost Exclusively by a Decline in Shelter Intake Rates.

Three changes can produce a drop in a shelter's euthanasia rate: a decline in the number of pets admitted to the shelter, an increase in the number that are reclaimed by their owners, or an increase in the number placed with new owners. Shelter data show that the substantial drop in the national shelter euthanasia rate over the past 30 years has been produced almost entirely by a drop in the number of pets that have been admitted to shelters. As the following comparison of canine shelter intake and euthanasia data from California animal care and control agencies reflects, these two variables rose and then fell in tandem between 1970 and 1995:

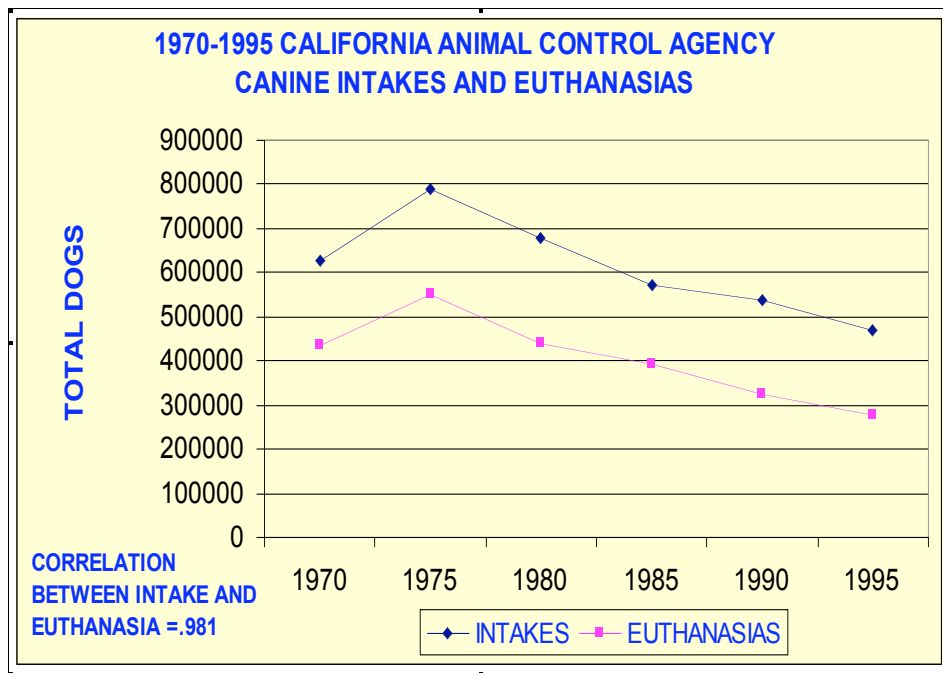


Figure 1.³⁴

The strong correlation between shelter intake and euthanasia rates is also reflected in more recent data from Hillsborough County (Florida) Animal Services from 1997 to 2009:

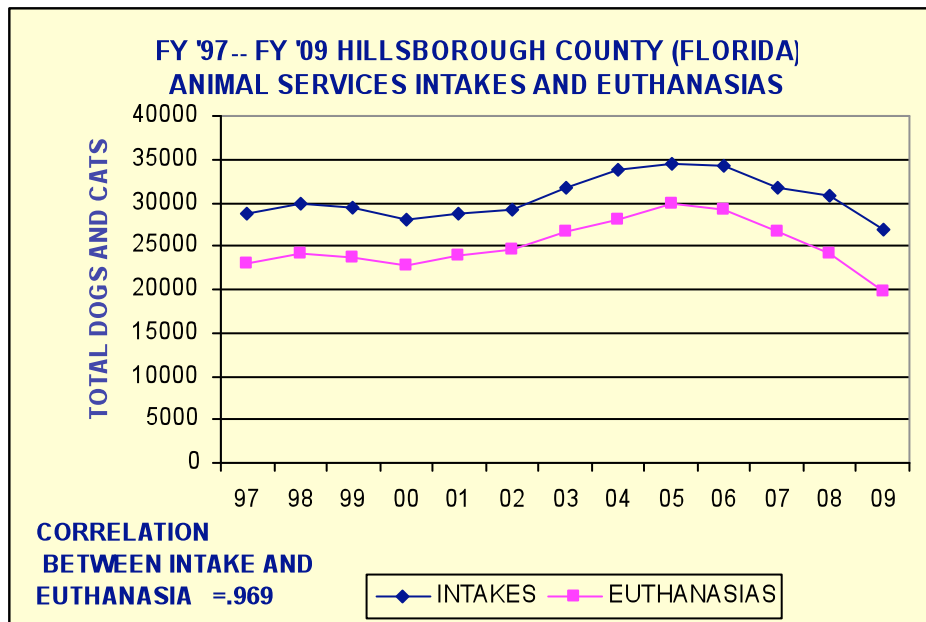


Figure 2.³⁵

Despite substantial changes in the canine euthanasia rate in California animal care and control shelters between 1970 and 1995—in which it first rose by more than a quarter and then was cut in half—the adoption rate in these shelters remained relatively constant:

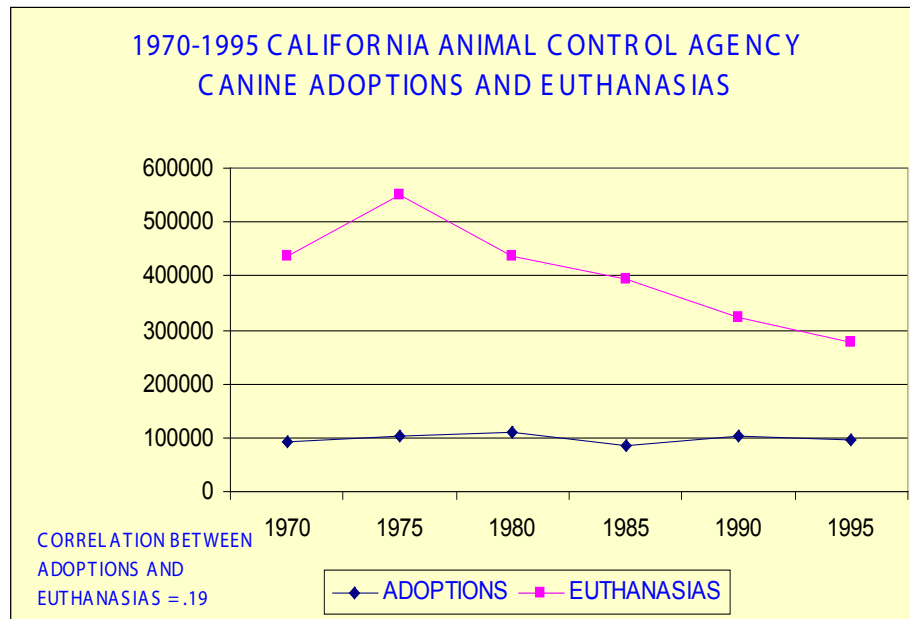


Figure 3.³⁶

Shelter statistics from other states that have collected complete data for canine and feline intakes, adoptions, and euthanasias show the following, expressed in cats and dogs per 1,000 residents:

STATE	YEAR	ADOPTION RATE	INTAKE RATE	EUTHANASIA RATE
NH ³⁷	2007	9.4	12.6	2.1
MICHIGAN ³⁸	2003	7.2	24.2	13.2
OHIO ³⁹	2004	9.0	26.4	14.9
VIRGINIA ⁴⁰	2003	9.2	32.2	18.1
UTAH ⁴¹	2007	9.1	29.2	12.9

Figure 4.

The correlation between intake and euthanasia rates in these five states was .964, while the correlation between adoption and euthanasia rates was -.215. As with

the county-by-county California data, adoption rates in these states vary within a relatively small range despite significant differences in shelter intake and euthanasia rates, suggesting that there is great potential to achieve a significant reduction in population control euthanasia through interventions to reduce intakes. As a result, the process of designing and implementing the most effective strategies to reduce population control euthanasia rates begins with identifying modifiable factors that are associated with reductions in shelter intake rates.

III. Communities with Low Pet Sterilization Rates Tend to Have Relatively High Shelter Intake Rates.

As soon as surgical pet sterilization became widely available, evidence began accumulating that increased sterilization rates were associated with lower shelter intakes. In 1970, only 5% of licensed dogs in Los Angeles had been sterilized, and more than 144,000 dogs and cats were impounded in the city's shelters.⁴² Twelve years later, 49% of licensed dogs had been sterilized, and the number of cats and dogs impounded had dropped to 72,454.⁴³ The trend of increases in canine sterilization rates accompanied by declines in impoundments has continued to the present. By 2006-2007, cat and dog impoundments had dropped to 45,016, despite substantial human population growth, and the sterilization rate of licensed dogs had increased to 89.5%.⁴⁴

Animals impounded in U.S. animal shelters are almost evenly split between stray animals (including lost pets) and those relinquished by owners.⁴⁵ The demographic characteristics of relinquished animals have been more extensively studied than those of strays largely due to the Regional Shelter Relinquishment Survey sponsored by the National Council.

One study compared cats and dogs relinquished by their owners to the 12 animal shelters in the National Council's Shelter Survey with the national population

"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."

ASPCA Position Statement on Mandatory Spay/Neuter Laws, <http://www.asPCA.org/about-us/policy-positions/mandatory-spay-neuter-laws.html>

of owned pets regarding several characteristics, including sterilization status. It was found that sexually intact dogs were twice as likely to have been relinquished as those that had been sterilized and that intact household cats were 3.3 times more likely to have been relinquished than their sterilized counterparts, both of these differences being statistically significant.⁴⁶ These findings were consistent with earlier studies indicating that intact dogs were 3.5 times more likely to be relinquished than sterilized ones⁴⁷ and that intact cats had a 4.8 times greater risk of relinquishment.⁴⁸

Data from the 2003 Michigan shelter census suggest that the association between sterilization status and the risk of impoundment extends beyond relinquished pets to other sources of shelter intakes. Of the 92,714 adult dogs admitted to Michigan shelters during the census period, 74,609 (80.4%) were sexually intact, as were 79.8% of adult cats.⁴⁹ During this period, national surveys found that only 30% of all dogs and less than 20% of all household cats remained intact.⁵⁰ The reproductive status of cats and dogs admitted to 16 Texas animal shelters in 1997 was similar. Only 17.7% of dogs and 19.7% of cats admitted to these shelters had been sterilized.^{51, 52}

IV. Communities with Relatively High Poverty Rates Tend to Have Higher Shelter Intake Rates.

In 2005, a foundation that had provided funding for several programs to reduce shelter euthanasia rates sponsored a study to identify the human and companion animal demographic factors associated with changes in shelter intake rates. The influence of several variables already known to affect pet ownership rates—and as a result, shelter intakes—such as local home ownership rates and educational levels, were controlled through a statistical regression analysis. Higher local poverty rates, as measured by the percentage of the population living below the federal poverty threshold, were found to be statistically associated with higher shelter intake rates.⁵³

The link between poverty levels and shelter intake rates can be partly explained by the higher pet relinquishment rates of low-income households. In a case-control study of the rates at which pets were relinquished to an Indiana shelter, researchers found that 25.6% of all dogs relinquished to the shelter were from households with annual incomes of less than \$20,000.⁵⁴ At the time, households with incomes of less than \$20,000 made up only 12.3% of the dog-owning households in the county.⁵⁵ Dogs living in the households with the lowest incomes faced the greatest risk of

relinquishment: Those living in households with annual incomes of less than \$20,000 had the highest relinquishment rate of any income group and more than four times the risk of relinquishment of those living in households with incomes greater than \$75,000 a year.⁵⁶

Cats living in low-income households also faced a greater risk of being relinquished to the shelter. In the Indiana study, 23.4% of cats relinquished to the shelter came from households with annual incomes of less than \$20,000, while only 12.4% of cats living in households in the county were from households of that income level.⁵⁷ Cats living in the lowest-income households also faced the greatest risk of relinquishment: Those living in households with incomes of less than \$20,000 a year had the highest relinquishment rate of any income group and more than four times the risk of relinquishment of those living in households with incomes higher than \$75,000 a year.

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“Cost is one of the primary barriers to spay/neuter surgery in many communities. In fact, low household income and poverty are statistically associated with having a sexually intact cat, with relinquishment of pets to shelters, and with shelter intake. As a result, the proportion of pets from poor communities who are being euthanized in shelters remains high; shelter euthanasia rates in the poorest counties in states including California and New Jersey are several times higher than those in the most affluent counties.” (Reference citations omitted)

ASPCA Position Statement on Mandatory Spay/Neuter Laws.

Another factor is the lower sterilization rate of cats living in low-income households. As mentioned above, low pet sterilization rates in a population are associated with relatively high shelter intake rates. A 2007 national telephone survey found that cats living in U.S. households with annual family incomes of less than \$35,000 were significantly less likely to be sterilized than those living in households with annual incomes of between \$35,000 and \$75,000 or in households with annual incomes greater than \$75,000.⁵⁹ Only 51.4% of cats living in the low-income households surveyed were reported to have been sterilized, compared to 90.4% of cats living in the middle-income households and 96.2% of cats living in the upper-income households.⁶⁰ The survey results showed that cats living in the low-income households were 26 times more likely to be intact than those living in the upper-income households.⁶¹

Cats and dogs living in low-income households surveyed in 2008 for the 2009/2010 American Pet Products Association (APPA) National Pet Owners Survey were also less likely to be sterilized than those living in middle- and upper-income households, as shown below:

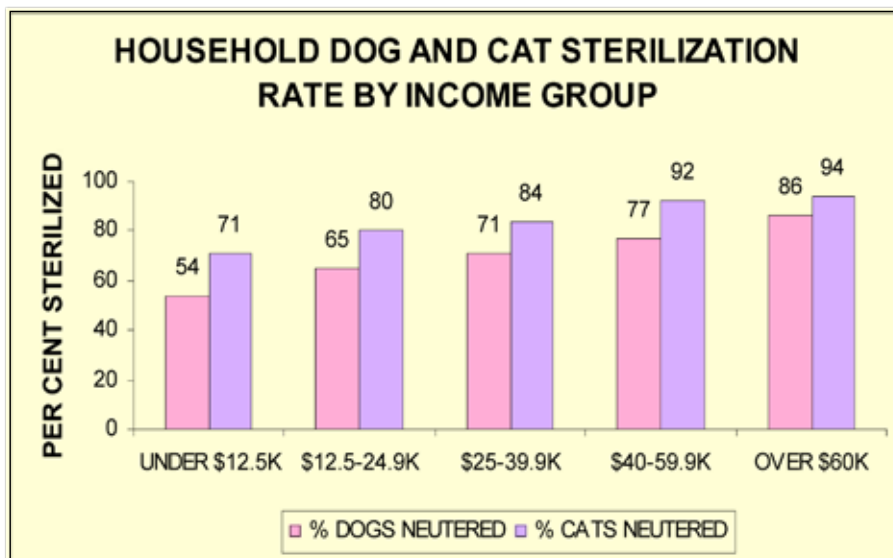


Figure 5.⁶²

These data suggest that for a significant number of dog and cat owners, cost is a factor in pet sterilization decisions.

V. Shelters That Sterilize Intact Pets Prior to Their Release Tend to Have Lower Future Intake Rates

Public and private animal sheltering policymakers have long recognized that it would greatly undermine attempts to curb pet overpopulation if the intact cats and dogs they placed back in their community were not sterilized by the people who adopted them. They were often instrumental in helping pass legislation intended to increase the rate at which the adopted animals were sterilized by requiring all adopters to post neutering deposits or sign contracts agreeing to comply with the pet sterilization requirement and threatening them with civil penalties for any failure to follow through. By 1998, 21 states had passed laws requiring animal shelters to take refundable neutering deposits when placing intact cats and dogs.⁶³

California passed such a neutering deposit law in 1986. Twelve years later, legislators were concerned that the placement of intact cats and dogs by the state's animal shelters—despite the mandatory statewide neutering deposit and the threat

of a fine for noncompliance with the sterilization requirement—may actually have been contributing to pet overpopulation in the state⁶⁴ and amended the law to require all public and private shelters in counties with over 100,000 residents to sterilize all cats and dogs they placed unless a veterinarian certified that sterilization would be detrimental to the animal's health.⁶⁵

"There is evidence that sterilizing very specific, at-risk sub-populations of companion animals such as animals in shelters can contribute to reductions in overpopulation."

ASPCA Position Statement on Mandatory Spay/Neuter Laws.

Because the neutering deposit mandate had been in effect for more than a decade before the pre-release sterilization law took effect, it is possible to compare intake rates in the same jurisdiction for periods in which a neutering deposit was required to those after pre-release sterilization was required. Total dog and cat intake rates in the six largest counties with complete animal control agency data dropped by 10% between 2000 and 2005, the first five years after the pre-release sterilization law took effect:

COUNTY	'00 INTAKE	'05 INTAKE	% CHANGE
LOS ANGELES	193,190	184,723	-4.4
ORANGE	44,200	41,081	-7.1
SAN DIEGO	50,798	43,078	-15.2
RIVERSIDE	55,947	42,794	-23.5
SANTA CLARA	30,114	22,910	-24.0
FRESNO	51,963	48,911	-5.9
TOTAL	426,212	383,497	-10.0

Source: California Department of Health Services. Veterinary Public Health Section, Annual Reports of Local Rabies Control Activities. 2000, 2005.

Figure 6.

This drop in shelter intakes occurred during a period when the human population in these counties grew by 8.2%. In contrast, during the five-year period before the pre-release sterilization law took effect—that is, between 1995 and 2000—the total dog and cat intakes at animal control shelters in these six counties increased by 8.6%.⁶⁶

VI. The Rate at Which the Sterilization of Female Cats and Dogs is Delayed Beyond the Optimal Age Greatly Affects the Reproductive Rate of the Household Pet Population in the United States.

Based on the age-specific birth and survival rates of pet cats in a Kansas town, population ecologists estimated that when 76-88% of the females had been sterilized—depending on the percentage of the remaining intact animals that reproduced—the population would reach a state of zero population growth.⁶⁷ Using a similar methodology, they calculated that the sterilization of 66% of the female dogs in the population would result in reproduction at the replacement rate or less.⁶⁸

About 87% of all owned cats and 75% of all owned dogs are now sterilized⁶⁹—exceeding the level at which zero population growth should have been achieved in populations with the same birth and death rates as those of the Kansas studies—but more than 4 million cats and dogs are still euthanized in American shelters each year⁷⁰ and in recent years the household cat and dog populations have continued to grow at the rate of about one million dogs and two million cats per year.⁷¹ The likely explanation for this discrepancy lies in an assumption upon which the estimates in the Kansas studies were made: Those estimates were based on an assumption that all the sterilized female pets had not reproduced before having been sterilized.⁷²

Not only is it common in the United States for pets to have litters of kittens or puppies before sterilization, the number of these litters is substantial. A study of household pet populations in four Massachusetts towns found that female cats and dogs that had been sterilized were almost as productive before their sterilization (.313 litters per female) as those females that remained intact (.4 litters each), a difference that was not statistically significant.⁷³ This is consistent with other surveys, which found that 17% of intact female dogs had given birth, as had 16% of intact female cats,⁷⁴ a rate comparable to the pre-sterilization reproductivity of spayed dogs (21%) and cats (20%).⁷⁵

Because female pets that have been sterilized now far outnumber their intact counterparts and their lifetime litter productivity approaches that of those that remain intact, they make a substantial contribution to the reproductive rate of the entire population. In the four towns included in the Massachusetts survey, female cats and dogs that had been sterilized after having had at least one litter accounted for 87% of all the litters of kittens and puppies born.⁷⁶

Allowing pets to have a litter before being sterilized ignores the clinical evidence that the optimal age to sterilize female cats and dogs is before their first estrus.⁷⁷ Compared with its incidence in sexually intact dogs, those spayed before their first estrus have .5% of the risk of developing mammary gland cancer.⁷⁸ Cats spayed before their first estrus have 9% of the risk of developing mammary gland cancer of intact cats.⁷⁹ But the protective benefit of sterilization from mammary gland neoplasms dissipates quickly with delay: Cats spayed later than 24 months of age and dogs spayed after 30 months of age have the same or greater risk of developing mammary gland cancer as if they had remained intact.^{80, 81}

The widespread delay in having female pets sterilized may arise in part from a significant knowledge deficit of cat and dog owners. Surveys consistently find that more than half of all dog and cat owners either do not know whether a pet would be better off by having a litter before being spayed or mistakenly believe that she would.^{82, 83} The extent of this knowledge deficit was almost identical among owners who had visited a veterinarian within the past year and those who had not.⁸⁴ The mistaken belief that a female cat would benefit from having a

“When we examine the responses to general knowledge questions, it is disturbing to see that significantly more people relinquishing dogs and cats felt that the female animal would be better off if she had one litter before being spayed and that significantly fewer people relinquishing animals knew this was false.

Furthermore approximately half of the owners in the Household Survey (51.2% of the dog owners and 49.3% of the cat owners) wrongly felt this was a true statement or did not know the answer. Although scientific evidence does not support this belief, it might explain some of the difficulty experienced by many individuals and groups who try to encourage the spaying of family pets and documents a clear need for educational efforts aimed at this myth.”

New, JC, Jr., Salman MD, King M, Scarlett JM, Kass PH, & Hutchinson JM (2000). Characteristics of shelter-relinquished animals and their owners compared with animals and their owners in U.S. pet-owning households. *J. Appl. Animal Welfare Sci.* 3(3), 199.

litter before being sterilized is so widespread that it was the most common reason given by respondents in a 2007 national survey for not having had an intact cat sterilized.⁸⁵

Reducing the age at which cats and dogs in a population are sterilized can have a substantial impact on its reproductive rate. Population modeling of the age-specific birth, death, and reproductive rates of owned dogs in an Italian province found that a sterilization rate of 55% of the female dogs would be necessary to reach the replacement fertility rate if the average age at which dogs were sterilized was three years old, but that it could be reduced to as low as 26% if the average age of spaying was reduced to one year or less.⁸⁶ Another population modeling study found that 71% of the females of reproductive age would have to be sterilized to halt the growth of a feral cat population but that if no females younger than a year old were sterilized, it would be necessary to sterilize 91% of those older than that to maintain a stable population.⁸⁷

VII. The Optimal Allocation of Resources Depends on Developing Programs That Target the Specific Sources of Shelter Overpopulation in a Community.

A key finding of the 1998 National Shelter Survey was that incoming animal demographics varied greatly from one sheltering system to another.⁸⁸ The county-by-county shelter statistics collected by the California Department of Health Services show the same variability in shelter animal demographics from one county to another.⁸⁹ In 2005, the shelter intake rate was as low as 12.48 cats and dogs per 1,000 residents in one county and as high as 60.52 in another. In addition to the great variation in the volume of incoming animals, there was substantial variation by species, too. In several counties, dogs made up more than two-thirds of the incoming animals; in several others, they made up less than 40%.⁹⁰

The great variability in the demographics of homeless animal populations in different communities must be taken into account in the design of interventions. Different subsets of homeless animals are the product of different root causes that require different remedial programs.^{91, 92} As a result, the effective allocation of resources requires that local intake demographics drive the planning process⁹³ and that communities use local statistics to identify, prioritize, and evaluate their programs.^{94, 95}

“Each community is unique, however, in terms of the particular sources and causes of companion animal population and the primary barriers that exist to having pets altered. No one-size-fits-all solution is therefore possible. In examining communities around the country that are having significant success in reducing companion animal overpopulation, it appears that the common denominator is a multi-faceted, targeted community program that:

- ◆ Is based on careful research to determine which segments of the animal population are actually significantly contributing to shelter intake and euthanasia and then targets efforts to those segments of the population;
- ◆ Focuses on the particular barriers to spay/neuter that are predominant and strives to overcome them;
- ◆ Is well-supported and well-funded; and
- ◆ Has an efficient voluntary spay/neuter infrastructure in place to service the populations it targets.”

ASPCA Position Statement on Mandatory Spay/Neuter Laws.

Researchers who conducted the 1998 National Shelter Survey identified four criteria to decide which types of data should be collected by local sheltering agencies: (1) The data must have a practical value for developing remedial interventions that exceeds the cost of collection; (2) They must be sufficiently specific to local conditions to allow planners to develop programs tailored to address the root causes of overpopulation in a community; (3) They must be adequately standardized to allow the consolidation of data from different communities; and (4) They must be scalable, so that local data can be compared to data from other communities.⁹⁶ Another analyst advises that despite its many benefits, consistent data collection is unlikely to be performed if it is overly burdensome or if those responsible for collecting the data never see the results of their work.⁹⁷

Not all demographic data satisfy these criteria. Differentiation by species and gender does because it is easy to collect and composite data obscure important species- and gender-specific differences in neutering status, reproductive history, and annual turnover.⁹⁸

It is also useful to differentiate animals that have entered a shelter as strays from those that have been relinquished by their owners, because the demographics of the two populations may differ significantly⁹⁹ and the underlying causes that led the animals to become homeless may require different strategies. For instance, programs to increase the rate at which owners provide their pets with adequate identification might substantially increase the rate at which stray animals are successfully returned to their owners, but would not affect relinquishment rates. On the other hand, obtaining information regarding the reasons for animals' relinquishment would be of great value in identifying major risk factors and designing programs to reduce them.¹⁰⁰

"[I]ncoming animal demographics vary dramatically by shelter, implying high variance in localized problems, root causes, and efficacy of shelter activity to date. For instance, the average age of animals euthanized ranged from 6 months in one shelter to 6 years in another. As a result, any blanket policy or program recommendations may be of limited relevance to an increasingly large portion of shelters and, if followed, could result in a dramatic misallocation of funding to programs with less potential for a major impact."

Wenstrup J & Dowidchuk A (1999). Pet overpopulation: Data and measurement issues in shelters. *J. Appl. Animal Welfare Sci.* **2**(4), 308.

Information about the age of incoming animals can help differentiate pet overpopulation—which can be effectively addressed by programs to increase the community's pet sterilization rate—from shelter overpopulation, which comes from a diverse array of sources and requires complex and manifold solutions beyond simply decreasing the number of animals born.

Information about the sterilization status of incoming animals can help determine the relative value of pet sterilization programs compared to other possible interventions. As long as intact household animals make up a significantly greater percentage of shelter admissions than that of the overall household population, pet sterilization programs will continue to be of value and the magnitude of difference in sterilization rates between the two populations should provide a sound basis for planners to determine whether sterilization programs should continue to be prioritized.

VIII. Because It Is an Aggregate Problem, Shelter Overpopulation Requires Aggregate Solutions.

Almost all animals entering shelters come from one of two sources: Either their owners have relinquished them or they are stray, lost, or free-roaming animals that have been impounded.¹⁰¹ Neither source, though, is monolithic with respect to the root causes that resulted in the animals entering a shelter. Some relinquished animals are from litters of kittens or puppies that have been brought to the shelter; others are healthy adolescent or adult animals that have been returned to a shelter after an unsuccessful placement; and still others have been surrendered because of an owner's health or housing or financial issues or issues related to the animal's health or behavior.

Stray animals are similarly diverse. Some have been abandoned by their owners; others have wandered from home and become lost; and others have migrated from homes to join free-roaming colonies. Even the subsets of stray animals are diverse: Cats in free-roaming colonies include some that are fully or partially socialized and others that are unsocialized.

While no single source of incoming animals may outstrip a community's sheltering capacity, the total from all sources can. And it often does. Shelter overpopulation is an aggregate problem.

No single strategy addresses all of the major causes of companion animal homelessness; eradicating it requires aggregate solutions. Pet sterilization programs can reduce the number of kittens and puppies that are relinquished to shelters. Problem behaviors of reproductively intact animals are responsible for nearly a third of all adult dog and cat relinquishments,^{102, 103} so sterilization programs can help with that, too.

"[T]he animal shelter population is actually very heterogeneous, with no single cause or source. Many social, cultural and economic factors as well as animal health and behavioral issues contribute to shelter intake; therefore, no single program or law can be relied upon to solve the problem." (Reference citations omitted).

ASPCA Position Statement on Mandatory Spay/Neuter Laws.

Pet sterilization is not a remedy for many of the factors that are associated with an increased risk of relinquishment, however. Approximately 40% of all relinquished

dogs and 28% of relinquished cats have an unwanted behavior cited as a reason for their relinquishment, such as aggression toward people or animals, destructive behavior, or inappropriate elimination in the house.¹⁰⁴ Other major risk factors—such as lack of participation in a dog obedience class, lack of frequent veterinary care, and owners' inappropriate expectations¹⁰⁵—require veterinary care and counseling and access to dog training classes. Subsidies to bring the necessary services within the economic reach of indigent pet owners may be needed to remediate the disproportionate risk of relinquishment faced by pets living in low-income households.^{106, 107}

Sterilization is associated with a reduced tendency to roam, at least for male dogs,¹⁰⁸ and can help reduce stray populations. More than 97% of all free-roaming cats are intact,¹⁰⁹ suggesting that sterilization programs deserve to be a primary strategy to manage feral cat populations and reduce the migration of household cats to free-roaming status.¹¹⁰ But sterilization programs are not the only interventions needed to reduce stray and free-roaming populations. Increased rates of pet identification can help increase the number of impounded stray and lost pets successfully returned to their owners.¹¹¹ And veterinary counseling about the protective benefits of maintaining a cat indoors can also reduce the rate at which cats become lost or stray from home.¹¹²

As the above discussion makes clear, no one group is in a position to provide the array of services and programs needed to eradicate companion animal homelessness in a community. Different groups and agencies serve the different subsets of animals that become or are at risk of becoming homeless. Public and private animal shelters provide care to animals that have entered their shelters. Veterinary practitioners serve animals owned by their clients. And local advocacy groups can provide needed services to homeless animals living in the community and those pets whose owners cannot afford veterinary care.

As a result, the contributions of veterinarians, animal care and control agencies, humane organizations, and advocacy groups are all necessary. As set forth in the following chapters, each group—because of its unique resources, mission, and authority—must play a role that cannot be filled by any other.

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Chapter 2

Animal Care and Control Agencies

Upon first impression, it may seem that a municipal animal care and control agency can play only a reactive role while protecting citizens in its community and providing shelter to stray and lost animals. After all, the agency must respond the best it can to problems created by irresponsible pet owners, and the extent to which citizens in the community act responsibly seems far beyond its control.

But it's not. To a great extent, the agency can provide greater protection for citizens and reduce the population of lost and homeless pets through a set of proactive policies and procedures.

Multnomah County, Oregon
Incident bite rate
(per 1,000 licensed dogs)
6/30/02—7/1/03

Intact male	55.1
Neutered male	7.7
Intact female	31.1
Spayed female	3.0

Shuler CM, DeBess EE, Lapidus JA, & Hedberg K (2008). Canine and human factors related to dog bite injuries. *J. Am. Vet. Med. Ass'n.* **232**: (4), 544.

These programs begin with recognizing that sexually intact dogs and cats cause a disproportionate share of injury in the communities where they live. The frequency of dog bites in Multnomah County, Oregon is shown in a sidebar on the previous page.

Intact cats and dogs are also responsible for a disproportionate share of a community's animal sheltering expenses. Intact dogs are more likely to stray from home.^{113, 114} Intact dogs are twice as likely to be relinquished to an animal shelter as sterilized dogs; intact household cats are 3.3 times more likely to be relinquished to an animal shelter than

"An effective animal control program not only saves cities and counties on present costs—by protecting citizens from dangerous dogs, for example—but it also helps reduce the cost of animal control in the future. A city that impounds and euthanizes 4,000 animals in 2001—at a cost of \$50 to \$90 per animal—but does not promote spaying and neutering will probably still euthanize 4,000 animals a year in 2010. A city that euthanizes 4,000 animals a year in 2001 and institutes differential licensing, funds a subsidized spay/neuter program, and has an educational program for both adults and children will likely euthanize significantly fewer animals in 2010 and save on a host of other animal-related costs as well."

Handy G (2001). Animal Control Management: A Guide for Local Governments. Washington, D.C.: International City/County Management Association, 18.

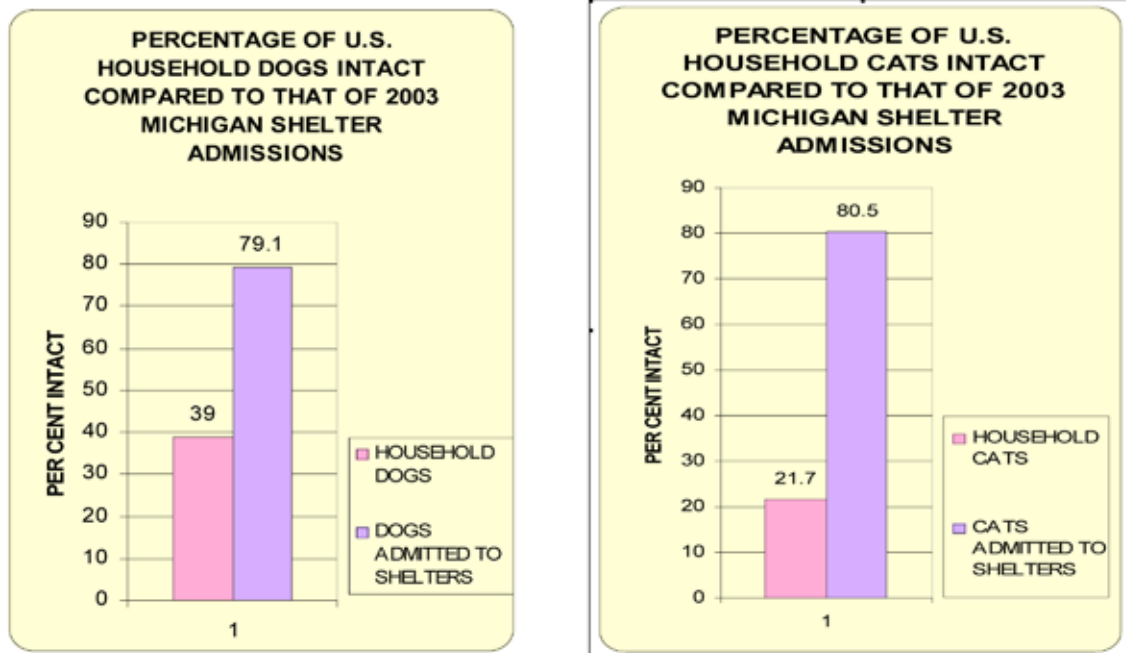


Figure 7.

their sterilized counterparts.¹¹⁵ Feral cats make up a substantial share of the homeless animals admitted to shelters and more than 97% of them are sexually intact.¹¹⁶ As a result, shelter intake rates and the resulting expenses are largely determined by a community's pet sterilization rate. While only about one-fifth of American household cats and less than two-fifths of dogs remain sexually intact,¹¹⁷ intact cats and dogs accounted for almost four-fifths of the adult cats and dogs admitted to Michigan animal shelters in 2003¹¹⁸ (See Figure 7 on the previous page).

Programs that increase a community's pet sterilization rate are the foundation of any effective animal control program.¹¹⁹ And many of the most effective ways to accomplish this are uniquely within the control of animal care and control agencies.

I. Sterilization at Adoption of Intact Cats and Dogs Adopted from Animal Shelters

Pet sterilization rates have increased to the point that there are only about 22 million intact dogs in America and about 15 million intact household cats.¹²⁰ As mentioned above, intact dogs and cats made up about four-fifths of all the cats and dogs admitted to Michigan animal shelters in 2003. If this holds true throughout the rest of the country, one-seventh of all the intact dogs in the country and perhaps the same proportion of intact household cats enter animal shelters every year.¹²¹ While the admission of intact cats and dogs places a disproportionate burden on the sheltering system, it also provides an excellent opportunity to increase a community's pet sterilization rate if the impounded animals are sterilized and returned to the community.

As set forth in the introductory section (Figure 6 on Page 13), after California passed a sterilization-at-adoption law, shelter intakes at animal care and control shelters in the six largest counties with complete data dropped by 10% in the first five

A study of cats and dogs adopted from a Louisiana animal care and control agency from 1988-1990 found that only 41% of owners complied with their agreement to have an intact adopted animal sterilized even though all had paid a \$25 fee that entitled them to have the cat or dog sterilized at a private veterinary hospital.

Alexander SA & Shane SM (1994). Characteristics of animals adopted from an animal control center whose owners complied with a spaying/neutering program. *J. Am. Vet Med Ass'n.* **205**(3): 474.

years. During the five-year period before that, state law had only required adopters to post a neutering deposit when adopting an intact pet and total dog and cat intakes at animal control shelters in these counties grew by 8.6%, roughly matching the growth of the counties' human population.¹²²

Adopting a pre-release sterilization policy is the prerogative of any animal care and control agency. Much—if not all—of the cost can be recovered through adoption fees. In some cases, the cost of sterilization turns out to be no greater than the sterilization deposit that had been taken previously. Whatever the case, pre-release sterilization programs are an essential component of a proactive program to reduce the population of stray and homeless animals.

II. Adoption of Sterilized Shelter Animals Through Transfers to Humane Societies and Rescue Groups

The benefits of a sterilization-at-adoption program are compounded when animal control agencies increase the number of animals they sterilize and place back in a community through collaborative programs with humane societies and animal rescue groups. Two recent trends have significantly increased the number of pets that can be placed through transfers to non-governmental humane organizations: the rapid proliferation of animal rescue groups and the increasing use of the Internet as a tool to facilitate the placement of homeless pets.

For every one of the 3,000 municipal animal care and control agencies in the country, there are two non-profit humane organizations that work to place homeless pets; half of these are non-sheltered rescue groups with foster care programs.¹²³ Many of these groups use the Internet to promote the re-homing of cats and dogs, often with remarkable success. The most popular pet adoption website, Petfinder, estimates that it helps facilitate 1,500,000 adoptions every year.¹²⁴

Humane societies and rescue groups have the potential to place a significant share of the animals that enter shelters. For instance, in 2005, municipal animal control agencies accounted for only 39.7%¹²⁵ of all the cats and dogs adopted from animal shelters in Utah, with humane societies accounting for 21.2% of the adoptions and rescue groups 39.1%. Shelter adoptions in the state had increased by half over a six-year period, from 18,150 in 1999 to 27,229 in 2005.¹²⁶ Utah's statewide pet adoption rate in 2005 was 10.5 Pets Per Thousand People (PPTP), almost 40% above the national average of 7.7 PPTP.¹²⁷ Most of the increase came from transfers of animals

from animal care and control agencies to rescue groups. To make certain that these placements will not add to a community's pet population, however, it is necessary that all intact animals placed through humane societies and rescue groups be sterilized prior to placement, too.

III. Sterilization of Dogs and Cats Reclaimed From Shelters

About 13% of all dogs who enter U.S. animal shelters are reclaimed by their owners, as are 3% of cats.¹²⁸ Among the redeemed animals are about 400,000 intact dogs and 100,000 intact cats.¹²⁹ Like other intact animals that have been impounded, these animals provide an excellent opportunity for an animal control agency to increase the local pet sterilization rate.

The same public benefits that accrue from the pre-release sterilization of intact stray and relinquished animals also flow from the sterilization of reclaimed dogs and cats. Since 2000, sterilization has been required for all intact animals released from municipal shelters in New York City, whether the animals are being placed with new owners or returned to their original owner. By FY 2007, intakes at New York City Animal Care & Control had dropped to 4.7 Pets Per Thousand People,¹³⁰ the lowest shelter intake rate of any city in the country.

A similar policy has been adopted in St. Louis, Missouri. All intact animals picked up by animal control officers there are sterilized and microchipped before being returned to their owners.

Other jurisdictions bundle sterilization incentives for owners redeeming intact animals with incentives for them to comply with local animal control and public health laws. For instance, the Hillsborough County (Florida) Department of Animal Services charges a \$50 redemption fee for an impounded animal but waives the fee entirely if the animal is sterilized and the owner has complied with local licensing and rabies immunization laws.

In some jurisdictions, agencies ratchet up sterilization incentives or require the sterilization of redeemed animals only after a subsequent violation of local animal control laws. For instance, Utah law requires the owner of a redeemed intact animal to post a sterilization deposit, but only when a second impoundment has occurred during a 12-month period.¹³¹ And the City of Sacramento, California requires that intact animals be sterilized before being returned to their owners if the animal has been impounded twice within a three-year period.

IV. Differential License Fees

Municipal animal control agencies are not limited to policies and programs that reach only those animals that have been impounded; some of the most effective programs lead to the sterilization of animals before they are impounded. Because they help prevent these animals from entering shelters in the first place, these programs are very cost-effective.

Communities that have adopted differential license fees—in which owners of unsterilized pets pay a higher fee to license their pet—tend to have lower shelter intake rates than those that have not. A 1985 study compared 61 jurisdictions that had differential licensing programs with 86 that had none and found that shelters in jurisdictions with differential licensing enjoyed a 12.3% reduction in shelter intakes over a five-year period, while shelters in areas without differential licensing saw a small increase in admissions.¹³²

“Because of evidence linking unsterilized dogs to biting behavior—intact dogs account for 95 percent of all fatal maulings—programs and incentives such as differential licensing that promote spaying and neutering also help reduce the incidence of dog bites.”

Handy G (2001). Animal Control Management: A Guide for Local Governments. Washington, D.C.: International City/County Management Association, 7.

Recent experience with differential licensing surcharge programs has been similar. In the first 13 years after a \$45 surcharge was imposed on licenses for intact pets in King County, Washington in 1993, the number of cats and dogs admitted to King County Animal Services shelters dropped by 14.6%¹³³ despite a 21.1% increase in the county’s population during this period.

Differential license fees are not only effective in reducing shelter intakes, they are also fair. Pets kept by irresponsible citizens cause a disproportionate share of an animal control agency’s expenses, so allocating a greater share of licensing costs to them is sensible public policy.¹³⁴ Perhaps for this reason, more than 80% of cities and counties in the United States impose a differential license surcharge.¹³⁵

A national licensing survey completed 12 years ago found the average differential for licensing an intact dog to be \$10.39 and \$11.87 for an intact cat.¹³⁶ By now, though, intact dogs cause greater public expense than that through increased impoundment expenses alone:

	Total Population ^{137, 138}	Annual Impoundment Cost ¹³⁹	Annual Impoundment Cost Per Animal
INTACT DOGS	21,900,000	\$574,056,000	\$26.21
STERILIZED DOGS	51,100,000	\$139,944,000	<u>\$ 2.74</u>
			\$23.47
Difference in Average Impoundment Expense Per Intact Dog = \$23.47			

Figure 8.

A differential licensing fee of \$20 per intact dog is justified on the basis of increased impoundment expense alone and would generate approximately \$.60 a year in revenue for every person residing in the jurisdiction, if reasonable steps are taken to increase compliance with dog licensing laws, as shown below:

TOTAL DOG POPULATION PER 1,000 RESIDENTS ¹⁴⁰		255
PERCENT OF DOGS INTACT ¹⁴¹	x	.29
INTACT DOGS PER 1,000 RESIDENTS		<u>74</u>
PERCENT OF ALL DOGS LICENSED ¹⁴²	x	.40
LICENSED DOGS PER 1,000 RESIDENTS		<u>30</u>
AMOUNT OF DIFFERENTIAL	x	\$20
Annual Revenue Per 1,000 Residents Generated by \$20 Differential		\$600.00

Figure 9.

A fair differential licensing surcharge would not only provide a disincentive for pet owners to maintain intact pets, it also could provide sufficient revenue for programs to increase sterilization rates and reduce future intakes, such as a low-income pet sterilization subsidy program.

V. Low-Income Neutering Assistance Programs

As mentioned above, a differential license fee is an ideal source of revenue for a subsidy program to bring pet sterilization within the reach of indigent pet owners. Those who will not have their pets sterilized at least help those who cannot. It is critical, however, that the revenue from differential license fees be used to fund pet sterilization subsidy programs for low-income pet owners. Otherwise, the imposition of a licensing surcharge can be counterproductive. Any gains through increased sterilization can be lost through the abandonment or relinquishment of pets by those who cannot afford either to have their pets sterilized or pay the licensing surcharge.

The estimated cost of operating a subsidized pet sterilization program for low-income pet owners can be derived from a program operated in Alabama in 2000-2003. Over a twenty-four month period, 36,046 surgeries were performed through the program—an annual volume of about four surgeries per resident—at a cost of \$2,384,414, about 27 cents a year per resident.

http://maddiesfund.org/Funded_Projects/Targeted_SpayNeuter/Completed.html#Maddies%20Big%20Fix%20for%20Alabama.

Targeted low-income neutering subsidy programs benefit the entire community. The establishment of a low-income neutering assistance program in New Hampshire in 1994 was accompanied by a drop in shelter intakes of more than a third during its first six years:

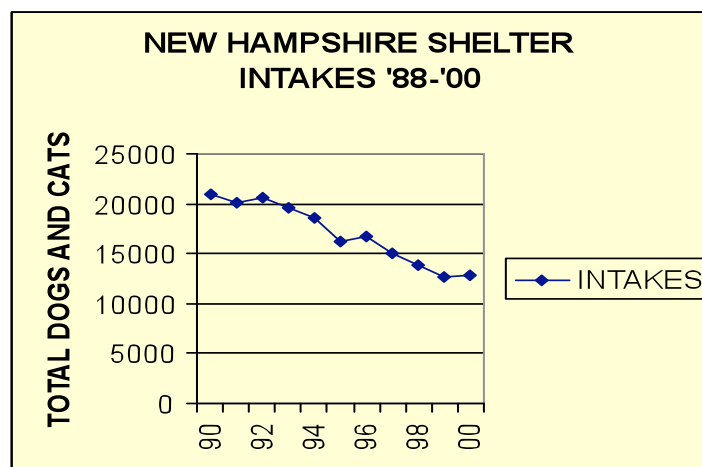


Figure 10.¹⁴³

During the program's first six years, impoundment expenses dropped by \$3.2 million, while only \$1 million was spent on the sterilization subsidy program.¹⁴⁴ Targeted sterilization subsidies have proven to be a core component of any effective animal care and control program.¹⁴⁵

VI. Increasing the Rate at Which Lost Pets are Returned to Their Owners

Animal control agencies can use pet sterilization-related policies and programs to reduce shelter intake rates. Other programs and policies are available to them, too. Returning lost pets promptly to their owners can reduce sheltering expenses and increase the sheltering system's capacity to care for other animals that subsequently become homeless. One way to do this is to increase the rate at which owners provide their pets with identification.

Increasing compliance with dog licensing laws is central to efforts to raise the rate at which lost pets have been provided with identification and are successfully returned home. It is also critical to the enforcement of laws that require owners to have their pets immunized against rabies. A 1996 survey found that the average rate of compliance with pet licensing laws in the United States was 34% for dog owners and 14% for cat owners.¹⁴⁶ These findings are consistent with those of a 2002 North Carolina survey, which found that only 25% of owners living in jurisdictions that had a licensing law complied with the law.¹⁴⁷ In addition, only 48% of owned cats and dogs in these jurisdictions had been immunized against rabies.¹⁴⁸ The lack of compliance with pet licensing laws was associated with a lack of compliance with the state law requiring the owners of cats and dogs to have them immunized against rabies; as shown on Figure 11 on the next page, the jurisdictions in North Carolina with higher pet licensing rates tended to have higher rabies immunization rates, too:¹⁴⁹

CALGARY (BRITISH COLUMBIA) 2007 ANIMAL SERVICES DOG IMPOUNDMENT DATA

Dogs Impounded	4,746
Dogs Returned to Owner	4,062 (85.6%)
---Picked up at Shelter	2,692
---Driven Directly Home	1,370
Dog Licensure Compliance	
Rate (estimated)	90%

City of Calgary Animal and Bylaw
Services, 2007 Shelter Statistics

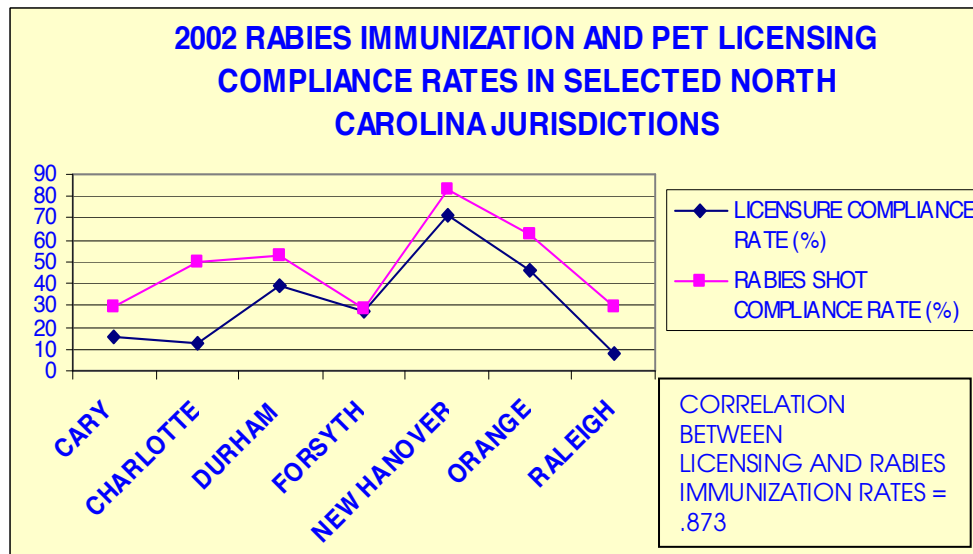


Figure 11.

Compliance with licensing laws can be increased in several ways:

- ◆ Making licensing easier by allowing owners to license pets through the mail, on the Internet, at animal shelters, and at veterinary clinics;
- ◆ Mailing renewal applications automatically to pet owners;
- ◆ Allowing multi-year licensing with the use of three-year rabies vaccines;
- ◆ Requiring all major sources of pets, including shelters, pet shops, and professional breeders to report the transfer of ownership of pets to licensing officials.¹⁵⁰

Requiring veterinarians to report rabies immunization information to licensing officials and linking rabies and licensure records in a single database can also be used to build an effective licensing program.¹⁵¹ In the first five years after the passage of a law requiring veterinarians in New Hampshire to send copies of rabies immunization certificates to local licensing officials, the number of dogs licensed in the state jumped by 90%.¹⁵²

VII. Evidence-Based Impoundment and Shelter Admission Policies

The central mission of a municipal animal control agency is to protect the health and welfare of citizens by minimizing the frequency with which animals damage property, threaten or injure people, cause automobile accidents, disturb the peace, or spread disease.¹⁵³ Pursuit of this mission often requires the impoundment of homeless animals. Each impoundment results in public expense, however, and the cost of each impoundment must be weighed against the public benefit.

Many of a municipal animal control agency's impoundment and shelter admission policies are set by local laws and ordinances, such as impounding animals that have been victims of cruelty or neglect and those who pose an obvious risk to citizens, including dangerous dogs and animals that show signs of having contracted rabies. In other cases, however, the agency has some latitude in determining which animals to impound or admit to its sheltering system. For example, some agencies routinely impound free-roaming cats in response to complaints, others do not. Some accept pets that citizens seek to relinquish, others do not.

"There is evidence that sterilizing very specific, at-risk subpopulations such as feral cats can contribute to reductions in overpopulation."

ASPCA Position Statement on Mandatory Spay/Neuter Laws.

In setting its impoundment and admission policies, an agency necessarily weighs the cost of handling an animal against the benefit to citizens, generally in the form of reduced risk of injury or disease. In addition to the fiscal expense that necessarily results from sheltering an animal, the agency should also consider the humane costs as well, in terms of its ability to provide safe and sanitary conditions for all the animals it decides to impound. Admission policies that foster overcrowding almost always result in more disease, animal deaths, and ultimately more euthanasias.¹⁵⁴

Applying these principles to impoundment and admission policies for feral and free-roaming cats, from a public health perspective there does not appear to be any current justification for impounding them absent specific evidence of risk. There has not been a case of human infection associated with exposure to a rabid cat in the United States for more than 30 years.¹⁵⁵ With respect to non-zoonotic infectious diseases, large epidemiologic studies found that the infection rates of feline leukemia virus and feline immunodeficiency virus in feral cats are not substantially different from those of pet cats.¹⁵⁶

Given the large population of free-roaming cats—which may approach the number of pet cats ¹⁵⁷—the cost of any wide-scale impoundment of free-roaming cats can be enormous. For instance, the cost of reducing the population of free-roaming cats by 50% through impoundment and euthanasia over an eight-year period in a Florida county with slightly more than a million residents was estimated to be between \$28.5 and \$56.6 million dollars.¹⁵⁸

Because the impoundment of feral cats usually leads to their being euthanized, blanket impoundment or admission policies raise humane considerations, too. It would be a mistake to underestimate the growing societal resistance to the use of population control euthanasia as a means of regulating companion animal populations.¹⁵⁹ If substantial public health risks arise in the future, this resistance may be reduced, but recent data suggest that a large majority of citizens appear to prefer non-lethal strategies to manage free-roaming cat populations, such as trap/neuter/vaccinate/release (TNVR) programs (See Figure 12). Failing to control the migration of household cats to free-roaming colonies, though, can substantially limit the

Results of 2007 survey of Ohio residents regarding management of feral cat populations				
	Agree or Strongly Agree	Neutral	Disagree or Strongly Disagree	Don't Know
Trap-neuter-return programs are a good way to manage free-roaming cats	538 (76.5)	78 (11.0)	70 (10.0)	17 (2.4)
I support using tax dollars to support low-cost spay/neuter programs for cats	334 (47.5)	101 (14.4)	258 (36.7)	10 (1.4)
Lord LK (2008). Attitudes toward and perceptions of free-roaming cats among individuals living in Ohio. <i>J. Am. Vet. Med. Ass'n.</i> 232 (8): 1165.				

Figure 12, success of TNVR programs.¹⁶⁰ Less than 3% of all free-roaming cats have been previously sterilized,¹⁶¹ suggesting that sterilized household cats tend not to migrate to free-roaming status. As a result, programs to promote the sterilization of household

cats—such as the low-income pet sterilization subsidy programs described above—are critical to prevent migration.

Applying these principles to owned pets, the optimal allocation of resources requires that an agency prioritize the impoundment and admission of those animals that pose the greatest risk to citizens. Animals that have already become homeless, such as stray and lost dogs, plainly present heightened risks. If an agency does not have sufficient resources to adequately shelter all the pets its citizens seek to surrender, however, it may want to leave that mission to nongovernmental humane organizations. It may choose to prioritize the strict enforcement of laws against pet abandonment instead.

In summary, to effectively allocate its resources and achieve its mission, an animal control agency's programs and policies—like those of any other agency charged with protecting the citizens in its community and funded by taxpayers—should be driven by the best available current data.

The cost of operating a large-scale feral cat sterilization subsidy program can be estimated from one operated in California in 1999-2002. Over a 33 month period, 170,334 feral cats were altered—an annual volume of about two cats per resident—at a cost of \$9,479,099 or about ten cents a year per resident.

http://maddiesfund.org/Funded_Projects/Targeted_SpayNeuter/Completed.html#The%20California%20Veterinary%20Medical%20Association's%20Feral%20Cat%20Altering%20Program.

¹¹³ Neilson JC, Eckstein RA, & Hart BL (1997). Effects of castration on problem behaviors in male dogs with reference to age and duration of behavior. *J. Am. Vet. Med. Assoc.* **211** (2): 182.

¹¹⁴ Maarschalkerweerd RJ, Edenburg N & Kirpenstein J (1997). Influence of orchiectomy on canine behavior. *Vet. Rec.* **140**: 617-619.

¹¹⁵ New JC Jr., Salman, MD, King M, Scarlett JM, Kass PH, & Hutchinson, JM (2000). Characteristics of shelter-relinquished animals and their owners compared with animals and their owners in U.S. pet-owning households, *J. Appl. Animal Welfare Sci.* **3**(3): 185.

¹¹⁶ Wallace JL & Levy JK (2006). Population characteristics of feral cats admitted to seven trap-neuter-return programs in the United States. *J. Fel. Med. & Surgery* **8**: 280.

- ¹¹⁷ New, Jr. et al., Characteristics of shelter-relinquished animals, 185.
- ¹¹⁸ Bartlett P, Bartlett A, Walshaw S, & Halstead S (2005). Rates of euthanasia and adoption for dogs and cats in Michigan animal shelters., *J. Appl. Animal Welfare Sci.* **8** (2): 100.
- ¹¹⁹ Handy G (2002) Animal Control Management: A Guide for Local Governments. Washington, D.C.: International City/County Management Association, 33.
- ¹²⁰ 2005-2006 National Pet Owners Survey, Greenwich, CT: American Pet Products Manufacturers Association (APPMA); New, Jr. et al., Characteristics of shelter- relinquished animals, 185.
- ¹²¹ In the absence of national data that break down shelter intakes between household cats and free-roaming cats, it is not possible to calculate the total percentage of intact household cats who enter U.S. shelters in a year with complete accuracy, however, in jurisdictions where free-roaming cats make up a quarter of all shelter admissions in any year, as they did at the Sacramento County Department of Animal Control in 1994-1995 [Lepper M, Kass PH & Hart LA (2002). Prediction of adoption versus euthanasia among dogs and cats in a California animal shelter. *J. Appl. Animal Welfare Sci.* **5** (1): 31], one-fifth of all intact household cats will have entered area shelters during that year.
- ¹²² California Department of Health Services, Annual Reports of Local Rabies Control Activities, 1995; 2000.
- ¹²³ Maddie's Fund, Shelter management: Petfinder--An equal opportunity lifesaver <http://www.maddiesfund.org/organizations/petfinder.html> at 1.
- ¹²⁴ Maddie's Fund, Petfinder at 3.
- ¹²⁵ No More Homeless Pets in Utah, 2005 Utah shelter statistics (unpublished).
- ¹²⁶ No More Homeless Pets in Utah, 1999-2005 Utah shelter statistics (unpublished).
- ¹²⁷ Wenstrup J & Dowidchuk A (1999). Pet overpopulation: data and measurement issues in shelters, *J. Appl. Animal Welfare Sci.* **2** (4): 310; Clifton M (2006) First regions with low-cost dog & cat sterilization still making fastest progress, *Animal People* **Jul/Aug** 2006: 18.
- ¹²⁸ Wenstrup & Dowidchuk, Pet overpopulation: data and measurement issues, 310.
- ¹²⁹ Bartlett P et al., Rates of adoption and euthanasia, 100; Wenstrup & Dowidchuk, Pet overpopulation: data and measurement issues, 310.
- ¹³⁰ Animal Care & Control N.Y., N.Y. 2007 Intake and Outcome Totals of Cats and Dogs.
- ¹³¹ Utah Code Title 18 § 10-17-105.5.

- ¹³² Rowan A & Williams J (1987). The success of companion animal management programs: A review. *Anthrozoos* **1** (2): 118.
- ¹³³ King County Animal Shelter and Euthanasia Rates 1993-2006, King County Animal Services.
- ¹³⁴ Handy, Animal Control Management, 17-18.
- ¹³⁵ *Ibid.*, 24.
- ¹³⁶ License Survey Results (1996). Vacaville, CA: The Fund for Animals. *Spay/Neuter Legislation Bulletin*, **July 1996**: 4.
- ¹³⁷ 2005-2006 National Pet Owners Survey (APPMA).
- ¹³⁸ New, Jr. et al., Characteristics of shelter-relinquished animals, 185.
- ¹³⁹ Wenstrup & Dowidchuk, Pet overpopulation: data and measurement issues, 306, 311.
- ¹⁴⁰ 2005-2006 National Pet Owners Survey (APPMA).
- ¹⁴¹ *Ibid.*
- ¹⁴² A 1995 national licensing survey found that the average rate for dog licensure compliance was 34%, License Survey Results, *Spay/Neuter Legislation Bulletin*, **4**.
- ¹⁴³ Handy, Animal Control Management, 38.
- ¹⁴⁴ *Ibid.*, 37.
- ¹⁴⁵ *Ibid.*, 39.
- ¹⁴⁶ License Survey Results, *Spay/Neuter Legislation Bulletin*, **4**.
- ¹⁴⁷ Clark CM (2002). The truth about cats and dogs: Vaccinations, licenses, service, revenue. *Popular Government* **67**: 41.
- ¹⁴⁸ *Ibid.*
- ¹⁴⁹ Clark, The truth about cats and dogs, 41-42.
- ¹⁵⁰ Handy, Animal Control Management. 24-25.
- ¹⁵¹ Clark, The truth about cats and dogs, 42.

- ¹⁵² Records of New Hampshire Department of Agriculture, Markets & Food, 1995-2000.
- ¹⁵³ Moulton C, Wright P, & Rindy K (1991). The role of animal shelters in controlling pet overpopulation. *J. Am. Vet. Med. Assoc.* **198** (7): 1172.
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- ¹⁵⁵ Texas Department of State Health Services, <http://www.dshs.state.tx.us/idcu/disease/rabies/cases/statistics/reports/us.pdf>
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- ¹⁵⁸ Hamilton F (2006) Are we prepared to pay the price? *Feral Cat Activist* **5** (1): 3. <http://www.tricountytnr.org/prepared%20to%20pay%20price.pdf>.
- ¹⁵⁹ Patronek GJ (1998). Free-roaming and feral cats—their impact on wildlife and human beings. *J. Am. Vet. Med. Assoc.* **212** (2): 225.
- ¹⁶⁰ Natoli E, Maragliano L, Cariola G, Faini A, Bonnani R, Cafazzo S & Fantini C (2006). Management of feral domestic cats in the urban environment of Rome (Italy). *Prev. Vet Med.* **77** (3-4): 184; Levy & Crawford, Humane strategies, 1358.
- ¹⁶¹ Wallace & Levy, Population characteristics of feral cats, 280.



Chapter 3

Veterinary Practitioners

Veterinarians have led successful efforts against all past epidemic-scale threats to companion animals in the United States, including rabies, distemper, and parvovirus.¹⁶² The single remaining threat of comparable magnitude is the wide-scale use of population control euthanasia in animal shelters. In this case, too, practitioners have made a substantial contribution to reducing the incidence of euthanasia in shelters during the past 25 years by making pet sterilization widely available and effectively counseling their clients about its benefits.¹⁶³ Even more can be done, though. As discussed below, practitioners can help eradicate the use of euthanasia as a means of controlling animal shelter populations by providing services that are of great benefit to clients and their pets and, at the same time, are compatible with the practical requirements of delivering the highest-quality veterinary services.

I. Counseling Clients About the Protective Benefits of Surgically Sterilizing Cats and Dogs.

The health benefits of canine and feline ovariohysterectomy (e.g., prevention of pyometra and reduction of mammary gland neoplasms) and castration (e.g., prevention of testicular neoplasms and reduction of prostatitis) are well known.¹⁶⁴

There can be behavioral benefits as well: Surgical sterilization of dogs and cats is associated with a reduction in undesirable or dangerous behaviors that could otherwise have led to the animal being relinquished to an animal shelter and euthanized. For instance, sexually intact dogs are more likely to exhibit inappropriate elimination and unwanted chewing than sterilized dogs.¹⁶⁵ Intact cats are more likely to exhibit inappropriate elimination and aggression toward people.¹⁶⁶ Aggression, inappropriate elimination, and destructive behavior are considered to be serious problems by pet owners¹⁶⁷ and are among the most significant behavioral risk factors associated with the relinquishment of cats¹⁶⁸ and dogs¹⁶⁹ to an animal shelter. Although there are some detriments associated with surgical sterilization,¹⁷⁰ considering that population control euthanasia in animal shelters results in more canine and feline deaths in the United States than any infectious or non-infectious disease,¹⁷¹ veterinary practitioners serve their clients well by counseling them about the protective benefits of pet sterilization.

Data suggest that the benefits of pet sterilization to clients and their pets have been substantial. In the early 1970s, the pet sterilization rate was only about 5% and more than one-fifth of all owned cats and dogs in the United States were put to death in shelters every year.¹⁷² By 1996, the sterilization rate of owned pets had grown to 59.9% for dogs and 77.3% for cats,¹⁷³ and the shelter death toll had dropped by more than 75%.¹⁷⁴

II. Providing Incentives for Canine and Feline Ovariohysterectomies Performed Prior to the Animal's First Estrus.

Clinical evidence suggests that the optimal age to surgically sterilize female cats and dogs is before their first estrus.¹⁷⁵ As discussed more fully in the introductory chapter (Pages 14-16), while most pet owners recognize the benefits that flow from having their pet sterilized, many do not appreciate the critical importance of timeli-

ness in maximizing these benefits. Surveys consistently show that more than half of all dog and cat owners either do not know whether a pet would be better off by having a litter before being sterilized or mistakenly believe that she would.^{176, 177} The extent of this knowledge deficit is not significantly different between owners who had visited a veterinarian within the past year and those who had not,¹⁷⁸ suggesting that many practitioners have not effectively communicated the time-dependent nature of the benefits of pet sterilization to their clients.

This knowledge deficit has likely led many pet owners to delay having female pets sterilized until after the optimal age. In a 2007 national survey, more than two-fifths of all owners of intact cats cited the benefits of having a litter before being sterilized as a reason they had not had a cat spayed.¹⁷⁹

By delaying having female pets sterilized until after the optimal age, owners jeopardize the animal's health with no benefit. The timing of the kitten and puppy immunization series affords practitioners an excellent opportunity to insure that clients appreciate the importance of timeliness in having female pets sterilized, not only for the health benefits, but also for the protection it may provide in preventing cats that are allowed to remain intact from migrating away from home. Less than 3% of all free-roaming cats have previously been sterilized,¹⁸⁰ suggesting that sterilized cats do not tend to wander from their homes and roam freely. To encourage clients to have female pets sterilized at the optimal age, practitioners may want to offer incentives for spays performed at five months of age or earlier, such as discounts that reflect the reduction in labor and supplies required or "wellness packages" that include discounts on immunizations, microchipping, and puppy socialization classes when purchased with the timely sterilization.

Responses to statements contained in 1995-1996 National Pet-Ownning Household Survey

Statement: A female dog/cat will be better off if she has one litter before being fixed.

	True	Don't Know	False
Dog Owners	528 (15.5)	1,230 (35.8)	1,656 (48.2)
Cat Owners	444 (12.8)	1,265 (36.5)	1,742 (50.3)

New, Jr. JC, Salman MD, King M, Scarlett J.M., Kass PH, & Hutchinson JM (2000). Characteristics of shelter-relinquished animals and their owners compared with animals and their owners in U.S. pet-owning households. *J. Appl. Animal Welfare Sci.* 3(3), 192.

III. Counseling Clients About Behavioral Issues and Animal Husbandry.

In the National Council's Shelter Survey, behavioral problems were the most common reason given when adult dogs were surrendered to a shelter and the second-most common reason for cats.¹⁸¹ In the 12 shelters surveyed, problem behaviors were given as reasons for relinquishment by 28.8% of those who surrendered dogs and 21.1% of those surrendering cats.¹⁸² Practitioners have an opportunity to reduce the rate at which their clients surrender pets to shelters because many of the behaviors associated with the greatest risk—such as inappropriate elimination and destructive behavior—^{183, 184} can be modified¹⁸⁵ and many of those who relinquish pets are veterinary clients. Seventy percent of adult dogs and 50% of adult cats relinquished to shelters in the National Council's Shelter Survey had received veterinary care at least once during the year prior to being relinquished.¹⁸⁶ Making sure clients understand that treatment options exist for modifying problem behaviors can lead to improved veterinary care, increased veterinary income, and fewer deaths from euthanasia.¹⁸⁷ For instance, inappropriate elimination is the behavior problem associated with the highest risk of relinquishment for cats¹⁸⁸ and owners who were aware that prescription medications were available to modify inappropriate elimination were half as likely to relinquish a cat as those who were not.¹⁸⁹

"This concern that pet owners will wait too long to have their animals neutered is supported by at least two studies of randomly contacted pet owners, in which 15% and 16% of adopted female cats and dogs had unplanned litters before the owners had them neutered. The major reason cited by owners for these pregnancies before neutering was accidental breeding. Studies suggest that routine neutering 2 to 3 weeks following the final vaccination of client-owned animals can now be done safely and will ensure that accidental breeding is minimized. There is no data supporting 6 months as the ideal age for neutering. That coupled with many veterinarians' concerns that client-owned animals complete their vaccination series before neutering suggests that recommendations for age at neutering be lowered to 4 to 5 months of age for client-owned animal, depending on when the vaccination series is completed." (Reference citations omitted.)

Spain CV, Scarlett JM, & Cully SM (2002). When to neuter dogs and cats: A survey of New York State veterinarians' practices and beliefs. *J Amer. Anim. Hosp. Ass'n* **38**, 487.

Counseling clients during their initial visit about animal husbandry, techniques for house training, and veterinary availability for assistance with a pet's behavioral problems can help prevent many misconceptions about pets and pet behaviors and strengthen the human-animal bond.¹⁹⁰ The window of opportunity for counseling and intervention can be small, however, because of the frequency with which cats and dogs are relinquished shortly after having been acquired.¹⁹¹ For example, more than 40% of all relinquishments of adult dogs and more than one-third of adult cat relinquishments occur within the first nine months after the pet has been acquired.¹⁹² In many cases, the administration of puppy and kitten vaccinations provides practitioners with an excellent opportunity to inquire about animal husbandry issues and the success of house training and to provide timely assistance with problems that arise.¹⁹³

Practitioners can often fill a critical need by helping clients understand normal canine and feline behavior and better manage problem behaviors, which frequently are normal behaviors expressed at an inappropriate time or place.¹⁹⁴ If they fail to fill that need, however, clients may well secure advice from sources that provide less accurate or protective information. Compared to having received advice from veterinarians, having received canine behavioral advice from a breeder, trainer, or groomer was associated with a risk of relinquishment almost three times greater and having received advice from a friend or neighbor had a six times greater risk.¹⁹⁵

The protective benefit of effective counseling about animal husbandry and house training is reflected in relinquishment studies. People who relinquished cats, for example, exhibited relatively significant knowledge deficits compared to other cat owners regarding the estrus cycle of cats, the concept of spite as a

"There is no doubt in my mind that in a Northern European or North American veterinarian's practice career she or he will have more opportunities to save lives for behavior reasons than for medical ones. To save a life because of a behavior problem is as important as saving a life by controlling a medical condition. In Britain and North America the greatest reasons why people relinquish their dogs to animal welfare organizations are behavior problems or inappropriate expectations. Even in the most sophisticated of veterinary practices in Europe or North America, where most animal deaths are due to age and disease, it is estimated that five out of every one hundred deaths is a euthanasia for behavior problems."

Fogel B (1999). The changing role of animals in western society: Influences upon and from the veterinary profession. *Anthrozoos* **12** (4), 238.

“VETERINARIANS AND OTHER ANIMAL PROFESSIONALS
COULD MAKE A DIFFERENCE.

“It isn’t just puppies and kittens anymore. There are other issues causing people to give up their animal, some issues that could be addressed in ways that would allow the animal to remain part of the family.

People have unrealistic expectations. When those aren’t met, they give up. Knowing why some human-animal relationships are unsuccessful is the first step toward prevention. From a mountain of data, some patterns and possible solutions are emerging.

The majority of dogs and cats relinquished had been in the home for less than a year. This leaves a narrow window of opportunity for salvaging the relationship. Education must be implemented during the initial health examination at a veterinary clinic or source of acquisition. Here misconceptions can be clarified, obedience training can be recommended and potential behavior problems could be identified and/or discussed.

A few minutes of time in the clinic could result in years of trust, respect and loyalty from a client experiencing a lasting, successful relationship with a companion animal. Animal professionals are encouraged to utilize the information from this research to begin their own program of building successful human-animal relationships.”

Exploring the surplus cat and dog problem: Highlights of five research publications regarding relinquishment of pets. National Council on Pet Population Study and Policy, <http://www.petpopulation.org/exploring.pdf>, 5.

motivating factor behind some types of cat behavior, the need for immediate correction when a cat behaves improperly, the behavioral problems that can occur as the number of cats in a household increases, and the tendency of cats to pounce, scratch, or bite as a form of play.¹⁹⁶ Similarly, people who relinquished dogs had relatively significant knowledge deficits regarding the estrus cycle of female dogs, the concept of spite as a motivating factor behind some types of dog behavior, and appropriate methods of house training.¹⁹⁷ By insuring that clients have a basic understanding of animal husbandry and recognize that, with effort, many of their pets’ undesirable behaviors can be modified, practitioners can help prevent the often fragile bond between clients and their pets from being broken.¹⁹⁸

IV. Including Dog Training Classes as Part of a Small Animal Practice

Pets do not instinctively acquire behaviors that are necessary for their positive interaction with their owners.¹⁹⁹ Effective training and socialization programs, however, can strengthen the bond between owner and pet by modifying both the animal's behaviors and the owner's expectations.²⁰⁰

Participation in dog training classes is associated with pets having fewer and less prevalent problem behaviors.²⁰¹ The National Council's Shelter Survey found that only 4% of relinquished dogs had participated in obedience classes after their acquisition.²⁰² Dogs that had not participated in obedience classes after being acquired were at five times greater risk of being relinquished to an Indiana shelter than those that had.²⁰³ Indeed, an analysis of the modifiable factors associated with the greatest risk of relinquishment (i.e., failure to participate in a dog obedience class after acquisition, lack of frequent veterinary care, owner's inappropriate care expectations, being sexually intact, and daily or weekly inappropriate elimination) found that participation in an obedience class would result in a greater reduction of canine relinquishments than any other intervention.²⁰⁴ Approximately two-thirds of canine relinquishments to the shelter in the study could theoretically have been prevented if the owner and animal had participated in dog training classes.²⁰⁵

Practitioners can provide a valuable service to their clients and the community by offering dog-training classes as part of their practice.²⁰⁶ These services, which can be delivered by well-trained technicians, not only can help reduce pet relinquishments, they also can bring clients to—and keep clients at—a practice.²⁰⁷

V. Providing Puppy Socialization Classes As Part of a Small Animal Practice

Behavioral issues are the leading cause of death for dogs under three years of age.²⁰⁸ Participation in socialization classes as a puppy is associated with fewer problem behaviors and a reduced risk of relinquishment. A 2003 survey of puppies adopted from a Minnesota animal shelter found puppies that had participated in socialization classes before they were 16 weeks old were significantly more likely to be retained in their adoptive homes than those that received no formal socialization training.²⁰⁹

In much the same way that practitioners can provide a life-saving service to clients and the community by incorporating dog-training classes in their practice, puppy socialization classes can be of similar benefit. If a single practice is not able to provide classes on its own, a group of clinicians and trained technicians can work together to set up a socialization program and rotate the responsibility of teaching the classes.

VI. Counseling Clients About the Importance of Providing Their Pets with Identification

A 2005 study of lost pets conducted in Ohio found that only 48% of all lost dogs²¹⁰ and 19% of all lost cats²¹¹ had been wearing an identification tag or had a microchip at the time they became lost. This study also found, not surprisingly, that lost pets with some form of identification were more likely to be returned home than those with none. More than three-fourths of all the dogs with identification were returned home, compared to two-thirds of those with none.²¹² Cats with identification also tended to have a greater chance of being returned to their owner: 61.2% of the cats with identification were returned home compared to 51.3% of those without identification.²¹³

U.S. pet owners' failure to provide their pets with identification is likely related to the relatively low rate at which lost and stray pets are successfully returned to their owners. The 1998 National Shelter Survey found that less than 25% of stray and lost

"Because the first three months are the period when sociability outweighs fear, this is the primary window of opportunity for puppies to adapt to new people, animals and experiences. Incomplete or improper socialization during this important time can increase the risk of behavioral problems later in life including fear, avoidance, and/or aggression. Behavioral problems are the greatest threat to the owner-dog bond. In fact, behavioral problems are the number one cause of relinquishment to shelters. Behavioral issues, not infectious diseases, are the number one cause of death for dogs under three years of age.

While puppies' immune systems are still developing during these early months, the combination of maternal immunity, primary vaccination, and appropriate care makes the risk of infection relatively small compared to the chance of death from a behavioral problem." (Reference citations omitted.)

American Veterinary Society of Animal Behavior Position Statement on Puppy Socialization.http://avsabonline.org/avsabonline/images/stories/Position_Statement/

dogs that entered shelters were recovered by their owners and less than 6% of stray and lost cats.²¹⁴ In 2007, the City of Calgary (Alberta) Animal Services Department returned almost 86% of all the stray and lost dogs that came into its custody to their owners and 48% of all the cats.²¹⁵ This return-to-owner rate was very similar to the city's pet licensure rate; officials estimated that in 2007, approximately 90% of dogs and 40% of cats living in Calgary households had been licensed by their owners.²¹⁶

Not being provided with identification plainly increases the risk that a pet will not be recovered by its owner if it strays from home and becomes lost. As part of a wellness exam, practitioners should check for identification in the same way they check for lymphadenopathy or fleas or any other condition that indicates the animal's well-being is at risk.²¹⁷ To make it easier for clients to provide adequate identification for their pets, practices can make temporary tags available whenever a client mentions an address change or vacation plans, sell permanent ID tags or have mail-in forms available in the waiting area, and promote microchipping with every new pet visit or procedure requiring anesthesia.²¹⁸

VII. Providing Discounted Post-Adoption Counseling Services to People Who Adopt Pets From Shelters and Rescue Groups.

A substantial percentage of adoptive placements by shelters and rescue groups are unsuccessful. A 1992 survey found that 20% of dogs adopted from a California shelter were no longer in their adoptive homes after six months.²¹⁹ This was consistent with the rate at which first-time adopted dogs were returned to a Pennsylvania shelter in the early 1990s²²⁰ and the rate at which cats and dogs adopted through rescue groups at pet supply stores were no longer retained in their adoptive homes a year after they had been adopted.²²¹ Dogs adopted from an Indiana shelter were at greater risk of subsequent relinquishment than those acquired from all other sources (i.e., purchased from a breeder, private owner, or pet store, born in the owner's home, or adopted as a stray).²²²

In much the same way that practitioners can provide a potentially life-saving service by effectively counseling their clients about a pet's behavioral problems, as discussed above, they can provide the same critical service to people who adopt pets from shelters or rescue groups. The underlying dynamic is much the same: The frequency of problem behaviors in failed adoptions closely resembles the patterns of behavior in all dogs that have been relinquished to an animal shelter.²²³

It is probably unrealistic to expect owners to be able to successfully correct their pet's problem behaviors without assistance, whether the pet has been acquired from a shelter or another source.²²⁴ Not only would most pet owners benefit from receiving post-adoption assistance, they recognize a need for it. Eighty-eight percent of those who adopted dogs from an Indiana shelter reported that it would have been helpful to have visited a veterinarian after acquiring the dog specifically to discuss the dog's behavior and training issues.²²⁵

Practitioners are uniquely situated to provide pet owners with critically needed counseling. Having unrealistic expectations about the amount of work required to care for a pet^{226, 227} or its role in the family²²⁸ is associated with significantly increased risks of relinquishment, and veterinary counseling has been shown to be an especially effective way to modify a pet owner's expectations.²²⁹

By offering those who adopt pets from shelters or rescue groups a heavily discounted or free first visit to discuss pet care and behavior-related issues, practitioners can not only assist local humane organizations by providing a valuable service, they also can introduce a practice to the growing number of people who acquire pets from shelters or rescue groups.

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Chapter 4

Humane Societies and Rescue Groups

The first private American animal shelters were established in the latter half of the nineteenth century. At the time, people on the streets of major cities regularly encountered roaming, hungry dogs and cats and the violent means used to dispatch them in the name of public health.²³⁰ In Manhattan, dogs were placed in iron cages that were lowered into the East River; in Brooklyn, dogs were clubbed to death each morning.²³¹

In these early years, the primary concern of humane societies was to prevent cruelty, not to preserve life. Henry Bergh, the founder of the American Society for the Prevention of Cruelty to Animals (ASPCA) characterized the miserable life led by stray animals as the real cruelty, commenting that “it is more a question of death than cruelty and I am free to confess that I am not quite satisfied in my own mind whether life or a speedy dissolution is most to be coveted.”²³² Consistent with the

anti-cruelty ethic of humane organizations at the time, their central concern was not the large number of unwanted animals that were being destroyed, but the method of destruction and its impact on the animals and shelter staff.²³³ So, for instance, the ASPCA's annual report for 1895 reported that it was considered to have been a successful year because more animals were euthanized in its shelters that year than in prior years.²³⁴ While the question of "how" animals were killed has been a major concern of humane organizations since their earliest days, the question of "how many" did not become a major issue until the last third of the twentieth century.²³⁵

Attempts to increase the number of cats and dogs adopted from shelters became more and more common in 1950s.²³⁶ Less than 1% of the cats and dogs that entered shelters operated by the ASPCA were adopted in 1946; by 1954, the percentage had grown to 6.8% and by 1965 to 14%.²³⁷

The percentage of sheltered animals that were placed in new homes grew throughout the 1970s and 1980s until by the time the National Shelter Survey was completed in 1998, 32% of dogs and 29% of the cats that entered shelters were adopted.²³⁸ At that time, cats and dogs acquired from animal shelters had come to make up more than 11% of all the cats and dogs that entered American households each year.²³⁹

As they worked to increase the quantity of adoptive placements, humane organizations also attempted to ensure their quality by establishing adoption guidelines and criteria that included the following:

- ◆ the pet would be provided with appropriate veterinary care;
- ◆ the pet's social, behavioral, and companionship needs would be met;
- ◆ the pet would be provided with a livable environment, including appropriate food, water, shelter and exercise;
- ◆ the pet would be spayed or neutered; and
- ◆ the pet would be provided with adequate identification at all times.²⁴⁰

By scrupulously following these guidelines when making adoptive placements and increasing their market share of new pet acquisitions, humane organizations sought to become "ambassadors of the humane ethic" to their communities and to set standards for responsible pet care.²⁴¹ To be effective ambassadors, though, humane organizations must meet the standards that they themselves have set for pet caretakers by following the policies and procedures that are discussed below.

I. Pre-Release Sterilization Of Intact Animals

In the 1970s, humane organizations began to require all people adopting intact shelter pets have them sterilized as part of responsible pet ownership.²⁴² They attempted to enforce this mandate through various strategies, such as taking deposits and requiring the owners to enter into sterilization agreements, but the compliance rate of adopters with the post-adoption sterilization requirement averaged only 60%;²⁴³ In one Louisiana shelter that collected compliance data in the late-1980s, it was only 41%.²⁴⁴

The advent of pre-pubertal pet sterilization in the 1990s made it possible for the first time to sterilize all cats and dogs at the time of their placement. This has also made it possible to compare the future intake rates of shelters that release intact pets to adoptive homes with sterilization agreements to those that sterilize all intact pets upon or before their placement.

As discussed in the introductory chapter (Pages 12-13), after a pre-release sterilization law was enacted in California, shelter intakes in the six largest counties with county-wide animal control shelter data dropped by 10% in the first five years. In the five years before the law was passed, when intact pets were placed with the posting of a neutering deposit, shelter intakes in these counties had increased by 8.6%.

Pre-release sterilization of intact cats and dogs, then, is associated with lower future intake rates. Not only will a placement agency's failure to adopt a sterilization-at-adoption policy forfeit an opportunity to increase local pet sterilization rates, it will also tend to increase the rate at which its adoptive placements fail, because being sexually intact has been identified as one of the leading risk factors for owner relinquishment of cats and dogs.²⁴⁵

II. Evidence-Based Adoption Counseling and Support Programs

Using retention rates as a criterion, many adoptive placements made by shelters are unsuccessful. A 1992 survey found that 20% of dogs adopted from a California shelter were no longer in their adoptive homes after six months.²⁴⁶ This was comparable to the rate at which dogs and cats adopted through humane groups at special off-site events and in pet supply stores were no longer in their adoptive homes after one year.²⁴⁷ Dogs adopted from an Indiana shelter in the mid-1990s were at greater risk

of relinquishment than those acquired from all other sources studied (i.e., those purchased from a breeder, pet store, or private owner; those born in the adopter's home or adopted as a stray) and were at six times greater risk of relinquishment than those purchased from a private owner or breeder at a cost of more than \$100.²⁴⁸

Relinquishment studies have identified the demographics and attributes of adopters that are associated with the greatest risk that a pet will not be successfully retained in an adoptive home. In many cases, the increased risk of relinquishment arises from a knowledge deficit that can be effectively addressed through a pre-adoption counseling program.

Placements in the homes of first-time pet owners are associated with a greater risk of failure than other placements. A survey of dog and cat adoptions from San Francisco-area shelters in the early 1990s found that adopters who had not owned a pet before made up 62% of those who had failed to retain an adopted pet in their home for at least six months, a significantly higher rate of failed placements than that of adopters who had previously owned pets.²⁴⁹

The increased rate at which dogs adopted by first-time pet owners were returned to a shelter may arise from those owners having unrealistic expectations about the amount of work required to care for a pet or the pet's role in a family. Underestimating the amount of time required to care for a pet is associated with a significantly greater risk of relinquishment in both dog²⁵⁰ and cat owners.²⁵¹ Nearly one-third of all canine relinquishments to an Indiana shelter in the mid-1990s were attributed

"When the benefits of ownership are outweighed by the liabilities or problems of that ownership, then the risk of relinquishment increases. Almost twice as many respondents who obtained a dog from a shelter reported that the amount of effort required in caring for the dog exceeded their expectations compared to those sourcing dogs elsewhere. The success rate of animal adoptions is enhanced when new owners have realistic and sensible expectations of the time, expense and effort required by the pet. The use of pre-adoption counseling to adjust adopter expectations may be of benefit. Such counseling would assist adopters in making an appropriate selection in terms of size, activity level and genetic predisposition for their lifestyle and therefore reduce the risk of later relinquishments (estimated to account for 13% of such relinquishments)." (Reference citations omitted.)

Marston LC & Bennett PC (2003). Reforging the bond—towards successful canine adoption. *Appl. Animal Behavior Science* **83**: 231-232.

to the owner having discovered that caring for the dog was more work than expected.²⁵² And people who had adopted a dog from the shelter were significantly more likely to find that pet care was more work than they expected compared to those who had acquired a dog from another source.²⁵³

Having unrealistic expectations about a pet's role in a family is also associated with an increased risk of relinquishment, especially for cats. Adopters from an Indiana shelter who expected a cat to act as a companion to household members were at significantly greater risk of relinquishing the cat than those who did not expect the cat to have any particular role in the household.²⁵⁴ A 1992 study of cats and dogs adopted from San Francisco-area shelters found that parents who expected an adopted pet to keep their children busy or teach them love were also at greater risk of relinquishing the pets than adopters who did not expect an adopted pet to fill those roles.²⁵⁵

Research also sheds some light on the substantive pre-adoption counseling that may help reduce the rate of failed placements. The knowledge deficits that are associated with the highest risk of relinquishment are different for dog- and cat-owners. Dog owners would likely benefit from counseling about the value to their pet of receiving frequent veterinary care and participating in a dog training class.²⁵⁶ For cat owners, the greatest knowledge deficits are a failure to appreciate the protective benefits of maintaining a cat indoors and having unrealistic expectations about the cat's role in the adoptive household.²⁵⁷ Information about the benefits of pet sterilization, the amount of work necessary to care for a pet, and the extent to which problem behaviors, such as inappropriate elimination, can be modified would likely be of benefit to both prospective dog and cat adopters.^{258, 259}

Effectively communicating all of the information that may prove critical to the success of an adoptive placement may well require more time than shelters commonly set aside for pet selection and pre-adoption counseling. People who adopted dogs and cats from an Indiana shelter reported spending a median of two hours selecting a pet; three-fourths indicated that it would have been helpful to spend more time with shelter staff.²⁶⁰ Because having unrealistic expectations about the role of a pet in the household or the amount of work required to keep a pet are associated with a significantly increased risk that a placement will fail, as discussed above, much of the necessary counseling will need to take place prior to pet selection.

Post-adoption counseling can be critical, too. A good adoption follow-up program

is often a key factor in the long-term success of adoptions.²⁶¹ Pet behavior problems that arose after adoption accounted for more than one-third of all reasons given for returning a cat or dog to a Midwestern shelter in 2005.²⁶² Relinquishment data from the National Council's Household Survey suggest that the bond between pet and owner is most fragile during the first six months, underscoring the importance of advice and support during this period.²⁶³ Follow-up contacts can lead to effective interventions for problems that have arisen, such as referral to a veterinarian or a dog training class. A general recommendation for the timing of follow-up contacts with new adopters is:

- ◆ First contact within 3 days of pet's arrival in the home;
- ◆ Second contact 3 weeks after placement; and
- ◆ Final contact 3 months after placement unless additional contact seems necessary.²⁶⁴

For adopters at increased risk of a failed placement—such as first-time adopters—monthly telephone contacts to inquire about behavior problems and remind owners of the availability of interventions may be worthwhile.

To assess the success of an adoption program, it is necessary to survey adopters six months after placement to determine whether the pet has been retained in the home. The results of post-adoption surveys can be used to regularly assess the efficacy of pre- and post-adoption counseling programs and address the types of placements that are associated with the highest rates of failure.²⁶⁵

III. Puppy Socialization and Dog Training Classes

While studies suggest that dogs acquired from shelters are at greater risk of relinquishment than those acquired from other sources, as discussed above, other research suggests that puppy socialization classes and dog training classes can significantly reduce canine relinquishment rates.

As discussed earlier (Page 49), in a 2003 study of puppy adoptions from a Minnesota shelter over a seven-year period, puppies that had participated in a post-adoption puppy socialization class at the shelter were more frequently retained in their adop-

tive homes than either puppies that did not participate in a puppy socialization class at all or those that participated in a socialization class somewhere outside the shelter.²⁶⁶ Owner education was a major component of the classes provided at the shelter—including the provision of information about canine development and learning theory and instruction in the use of motivation and restraint to manage puppy behavior²⁶⁷—suggesting that owner education may play a significant role in the success of a puppy socialization program.

**Population Attributable Risk (PAR)
factors for relinquishment of dogs**

Not participating in dog training class	67%
Infrequent veterinary care	66%
Amount of work greater than expected	33%
Dog not sterilized	31%
Inappropriate elimination	19%

Patronek, GJ (1996). Promoting successful pet ownership: challenges for shelters and veterinarians. Proceedings Shelter Veterinarian Educational Program. Denver, Colorado: American Humane Association, 3.

This study also found that the window of opportunity for an effective puppy socialization class was small: Puppies that attended socialization classes at four months of age or older were no more likely to be retained in their adoptive home than those that did not attend any puppy socialization class at all.²⁶⁸ Concerns about participation in a socialization program before puppies have completed an immunization series against parvovirus can be mitigated by rigorously following a prophylactic protocol.^{269, 270} While puppies' immune systems are developing during their early months, the combination of maternal immunity, primary vaccination, and appropriate precautions makes the risk of infection relatively small compared to the chance of death from a behavior problem and subsequent relinquishment if socialization is deferred beyond the optimal period.²⁷¹

Research consistently shows that participation in dog obedience classes is also associated with pets having fewer and less severe behavior problems²⁷² and a significantly lower risk of relinquishment.²⁷³ Dogs that had not participated in obedience classes after being acquired were at five times greater risk of being relinquished to an Indiana shelter than those that had.²⁷⁴

As with puppy socialization programs, there is some evidence that the protective benefit is increased when dog training classes include an owner education component. Most training classes are not designed to address behavior problems that may have arisen and as a result tend not to affect them; consequently, obedience training coupled with counseling about problem behaviors can be more protective than obedience training alone.²⁷⁵

Shelters may benefit from establishing their own training classes, instead of referring adopters to programs operated by others. This would allow them to ensure that the classes are based on the most current relinquishment studies, a research-based approach that other obedience-oriented programs may not follow. In addition, by having its own program, a shelter can also provide training to dogs available for adoption, which is associated with both an increased likelihood of being adopted²⁷⁶ and being successfully retained in the adoptive home.²⁷⁷

IV. Offsite Adoption Programs

The adoption of pets at a location other than an animal shelter raises the concern that people may be more likely to acquire an animal on impulse and later relinquish or abandon the animal. Limiting the site of adoptions exclusively to shelters, however, can result in some inconvenience to prospective adopters who live a distance from a shelter and exclude those who are reluctant for whatever reason to visit a shelter.

Preliminary research suggests that the retention rates of off-site adoptions may not be significantly different from adoptions that take place at a shelter. A 2002 study that compared adoption outcomes of cats and dogs adopted at an Arizona shelter to those of pets adopted at a special off-site adoption event in New Mexico and those of pets adopted at various PetSmart locations in the United States found that the one-year post-adoption retention rates were similar for adoptions made in all the venues.²⁷⁸

Offsite adoptions can substantially increase adoption rates. More than 400,000 dogs and cats were placed through adoption events at PetSmart stores in the United States in 2007.²⁷⁹ In 2005, off-site adoptions accounted for 39.1% of all the dogs and cats adopted in the State of Utah.²⁸⁰ This helped increase the statewide pet adoption rate there to 10.5 Pets Per Thousand People (PPTP),²⁸¹ almost 40% above the national average of 7.7 PPTP.²⁸²

Survey data also suggest that offsite adoptions made through veterinary clinics could increase substantially. The National Council's Household Survey found that only 1.2% of all the dogs and .5% of all the cats acquired by U.S. households had been placed through a veterinary clinic.²⁸³ A 1992 study of cat and dog adoptions made through veterinary clinics in the San Francisco area found that pets placed through the clinics were significantly more likely to be in the adoptive home after six months than those placed by local humane societies.²⁸⁴

Increasing adoption rates through offsite adoptions can help reduce present and future shelter euthanasia rates, but only if those placements follow the best practices of adoptions made at shelters: Adopters should be carefully matched with the appropriate pet for their family and provided with pre- and post-adoption counseling and assistance. Of course the pets they adopt should be sterilized and microchipped prior to placement.

V. Pet Identification Program

Cats that enter animal shelters in the United States are much more likely to be euthanized than dogs. The difference lies almost entirely in the higher rate at which dogs are reclaimed by their owners. Animals admitted to the shelters included in the 1998 National Shelter Survey were almost evenly split between cats and dogs,²⁸⁵ and an almost equal number of each was adopted.²⁸⁶ Almost two-thirds (65%) of all the cats admitted to these shelters were ultimately euthanized, however, compared to just over half (52%) of the dogs.²⁸⁷ The difference in outcomes was due almost entirely to the higher rate at which dogs were reclaimed by their owners: 24.5% of stray dogs were reclaimed by their owners, compared to only 5.5% of stray cats.²⁸⁸

Part of the difference in redemption rates between dogs and cats is likely due to the larger number of cats that are free-roaming and do not have owners to reclaim them. The lower rate at which owned cats are provided with identification by their owners is likely to be a factor, too. Studies of lost pets in Ohio found that those with some form of identification were recovered more often by their owners than those with no identification, but that only 19% of the lost cats had been wearing a tag or had a microchip, compared to 48% of the lost dogs.^{289, 290}

When placing dogs and cats in a new home, shelters and rescue groups cannot eliminate all future risks the adopted pets may encounter. They can, however, ensure

that all adopted pets have been immunized against major health threats. They can increase the likelihood that the adoptive placement will be successful by ensuring that all intact adoptees are sterilized before their placement. And they can increase the likelihood of an adopted pet that becomes lost being successfully returned home by microchipping all adopted pets.²⁹¹ In the same way that it is no longer the best practice for shelters and rescue groups to delegate the responsibility for having intact pets sterilized to the adopter, data regarding the protective benefit of providing a dog or cat with identification establish that it is no longer the best practice to place the responsibility of providing a pet with permanent identification on the adopter.

Dogs with identification tags are significantly more likely to be recovered than those without tags,²⁹² so all adopted dogs should be furnished with a collar and an identification tag with the adopter's contact information. In addition, they should be microchipped as a back up in case they lose their collar or tag.²⁹³ Due to the widespread belief that cats could be injured if wearing a collar or would not tolerate one,²⁹⁴ it may be more practical to microchip all adopted cats as a primary form of identification.²⁹⁵ Even though deficiencies in the microchip registration system undermine its potential, the high rate at which microchipped cats and dogs are returned to their owners show that microchipping is a worthwhile way to provide pets with permanent identification.²⁹⁶

VI. Shelter Medicine Program

Humane organizations recognize the importance of providing appropriate care for pets and reflect that in their adoption criteria: They decline to place a pet unless there is a reasonable likelihood that the caretaker will see that the pet receives adequate veterinary care in the future.²⁹⁷ Animals that are living in a shelter have an even more critical need for veterinary care than pets living in households. Infectious diseases are common in shelters and can result in death, either directly or through the use of euthanasia to limit the spread of infectious disease.²⁹⁸ The greater population density of shelters increases the contact rate between animals and the likelihood that asymptomatic carriers of disease will be present, shedding disease.²⁹⁹ Indeed, the eradication of infectious diseases is not an attainable goal for animal shelters.³⁰⁰

Given these factors, access to adequate veterinary care is critical, both to the health of individual animals in shelters and the population as a whole. Any attempt to manage the health of a shelter population without adequate information regarding

the magnitude of problems and the response to interventions is like treating a very sick person without diagnostic or follow-up testing.³⁰¹ Such information is of little value, of course, except to someone with the specialized skills and training needed to interpret it, a veterinarian trained in shelter medicine.

Not only can shelter veterinarians contribute unique skills and training that improve the health of shelter animals and reduce the incidence of shelter-acquired disease, their evidence-based approach can improve the effectiveness of the entire sheltering system. Until recently, veterinarians were “conspicuously absent” from the field of animal sheltering³⁰² and the impact of many interventions employed

to reduce population control euthanasia rates has not been measured or analyzed scientifically.³⁰³ The research that has been undertaken to date has contradicted assumptions long accepted as shelter dogma, such as that animals given as gifts are at greater risk of relinquishment³⁰⁴ or that animals adopted at special off-site adoption events or at retail stores face a heightened risk of being relinquished.³⁰⁵ In addition to assessing the effectiveness of various strategies to improve the health of shelter animals, shelter medicine programs can employ case-control studies and statistical analysis to measure the impact of different adoption counseling programs or pet behavioral strategies on post-adoption retention rates. In sum, the consistent application of veterinary principles of population health can provide a powerful tool not only to keep shelter animals alive, but also to help them leave the shelter alive.³⁰⁶

Benefits of Data Collection and Analysis in Animal Shelters

- ◆ Identification of baseline disease/problem levels and tracking patterns;
- ◆ Identification of risk factors for disease, adoption, euthanasia and other outcomes;
- ◆ Development of intervention strategies;
- ◆ Assessment of interventions;
- ◆ Identification and effective response to outbreaks and emerging problems;
- ◆ Comparison between shelters/establishment of goals and benchmarks;
- ◆ Budgeting and justification of programs and funding; and
- ◆ Education of the public, volunteers, staff and colleagues.

Hurley K (2004). Implementing a population health plan in an animal shelter. Shelter Medicine for Veterinarians and Staff, L. Miller and S. Zawistowski (eds.) Ames, Iowa: Blackwell Publishing, 212-213.

VII. Evidence-Based Shelter Admission Policies

Until recent years, most traditional humane societies employed an “open-door” admission policy in which they accepted any dog or cat that an owner sought to relinquish, even though the shelter was at capacity and the admission of another animal would require the euthanasia of an animal already at the shelter. For open-admission shelters, it is “an article of faith, source of pride, and guide for action that the shelter will never turn an animal away.”³⁰⁷ An anti-cruelty ethic underlies the open-admission philosophy as one of its leading proponents, Phyllis Wright, explained in an article she wrote in 1978:

“I know it is difficult to put animals to sleep. I’ve put 70,000 dogs and cats to sleep and I’m aware of the trauma. But I tell you one thing: I don’t worry about one of those animals that was put to sleep. And I worry a great deal about dogs and cats that have to spend their lives shut in small cages or runs, or left chained to the back porch day-in and day-out, without affection or companionship. Being dead is not cruelty to animals. Being half alive is.”³⁰⁸

This rationale is based on an assumption that if a shelter declines to admit all animals that owners seek to relinquish, so many would suffer a “fate worse than death” through neglect, abuse, or abandonment that on balance, an open-admission policy is ethically justified even if admissions exceed shelter capacity and every new admission will require that an animal already in the shelter be euthanized.³⁰⁹

One policy analyst has pointed out that an open-admission policy is based on untested assumptions that “trade off a vast number of certain deaths to ward off an indeterminate amount of speculative suffering.”³¹⁰ He points out that while the suffering of strays is often far from hypothetical, few guardian-accompanied animals suffer “fates worse than death” and as a result, it cannot be reliably assumed that the admission of every animal a guardian seeks to relinquish is in the best interests of that animal or the other animals already in the sheltering system.³¹¹ He suggests that an individualized admission assessment be made whenever a guardian seeks to release an animal to a shelter and that the release not be accepted unless there is a “clear and present danger” that the animal will be abused or abandoned if not admitted to the shelter.³¹²

Others have questioned whether another assumption on which an open-admission rationale is based—that all homeless animals lead lives of such deprivation and risk that their admission to a shelter and the possibility of being placed in a good home outweigh the risk of being euthanized in the shelter—can reliably be applied to unsocialized free-roaming cats. The likelihood that unsocialized cats can be placed in a home is so remote that the only humane justification for admitting them is that the misery of their lives is worse than death.³¹³ Data that have been collected on feral cats sterilized at a Florida spay/neuter clinic showed, however, that although all the cats were homeless, their general body condition was adequate and that less than one-half of one percent had to be euthanized for humane reasons.³¹⁴ This rate of medical euthanasia was consistent with that of seven other large scale trap-neuter-return programs in the United States, in which .4% of the trapped cats were euthanized because of debilitating conditions.³¹⁵ After staff at a New York shelter evaluated the health of all the feral cats brought to them and found that 73% were in excellent health, the shelter discontinued its policy of admitting healthy feral cats for euthanization.³¹⁶

Data from formerly open-admission shelters that began to limit their acceptance of pets owners initially wanted to relinquish suggest that the adoption of limited-admission policies can reduce overall shelter intake rates, even when other open-admission shelters serve the area. After the Jacksonville Humane Society changed from an open-admission to a limited-admission policy on October 1, 2005, admissions dropped by 9,747 during the next 12 months, while intakes at the remaining open admission shelter, Jacksonville Animal Care and Control, increased by only 5,042 animals.³¹⁷ Overall, shelter admissions in the area served by the shelters dropped by 17.3% during the first year after the humane society modified its admission policy.³¹⁸ Staff at the shelter found that after providing assistance to caretakers who originally sought to surrender their pets, 40% reconsidered and decided to keep the pet.³¹⁹ The reduction in overall intakes at area shelters continued during the following two years:

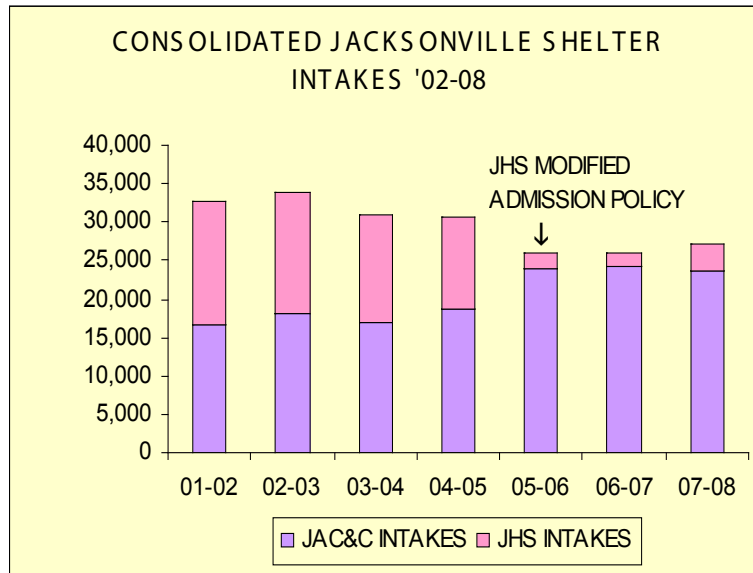


Figure 13.³²⁰

The limited-admission policy adopted by the Jacksonville Humane Society was modeled after one adopted by the Richmond SPCA on January 1, 2002. The following year, total admissions at the Richmond SPCA and Richmond Animal Control—which retained its open-admission policy—dropped by 21%.³²¹ This decline in shelter admissions continued for the following three years:

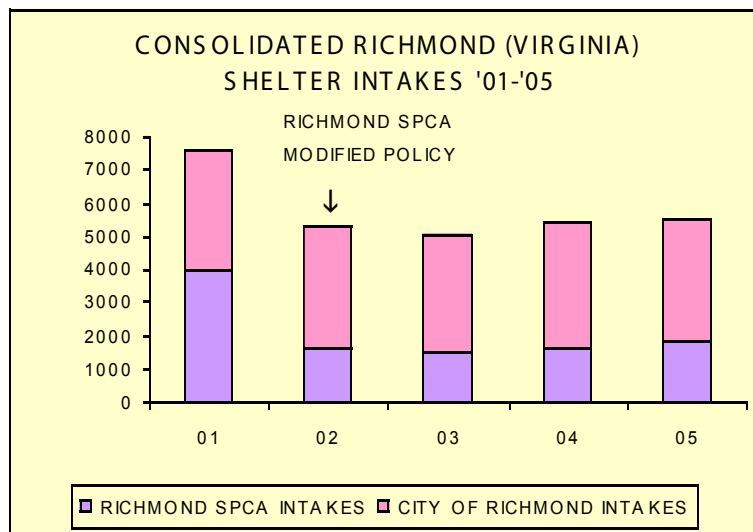


Figure 14.³²²

An open-admission policy necessarily results in substantial costs, both for the shelter and the animals that are admitted. The justification for incurring these costs rests on the assumption that, overall, the animals admitted would suffer worse outcomes if they had not been admitted. The rationale of a limited-admission policy also rests on an assumption: that individualized assessments of the risks and benefits which would result from not admitting an animal can be made with sufficient accuracy to justify not admitting every animal that an owner seeks to relinquish or that does not have a home. The stakes are so high that a shelter must subject its admission policy to rigorous, evidence-based scrutiny. Only then can it rest assured that it is advancing its worthy mission to protect animals and prevent their suffering.

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Chapter 5

Advocacy Groups

As discussed more fully in the introductory section (Pages 19-20), the dynamic that can overwhelm a sheltering system's capacity is cumulative. The animals entering the system come from several discrete sources. Some have been abandoned by their owners, others have been relinquished by their owners to shelters, and still others have never had an owner to abandon or relinquish them. Some are in good health, others have health or behavioral problems, and others have been surrendered to shelters for reasons that have nothing to do with their health or behavior, such as when their owner is no longer able to care for them. No single source outstrips the capacity of a sheltering system. Only the total does.

Because the root causes of shelter overpopulation are diverse, no one group is in a position to provide the broad array of services needed to eradicate it. Different subsets of animals that have become homeless or are at risk of it are served by different groups and agencies. An advocacy group dedicated to eliminating shelter

overpopulation in its community can fill a critical need by coordinating the contributions of other groups and providing essential services and programs that the others are not able to provide themselves.

Public and private shelters and veterinary practitioners can provide protective programs and services to the animals they serve, but that typically does not include two populations: pets living in households that cannot afford veterinary care and homeless cats and dogs that are not in shelters. To eradicate overpopulation, an advocacy group will need to provide services to these underserved populations.

Making it even more complex, not only does shelter overpopulation come from several sources, each with a different root cause, each cause requires a different set of interventions³²³ and the prevalence of each varies from one community to the next.³²⁴ The outcome can be the same in different places—the capacity of a community’s sheltering system is overwhelmed—while the causes differ.³²⁵ As a result, the optimal allocation of resources requires the use of local shelter data to develop programs that target the particular sources of overpopulation in a community.³²⁶ While there will necessarily be some differences in the plans developed in different communities because of the variation in local sources of overpopulation, well-designed community intervention plans share several common features.

I. Well-Designed Intervention Plans are Collaborative

As discussed earlier, animal care and control agencies can help reduce shelter overpopulation (Pages 27-42), as can veterinary practitioners (Pages 43-56) and humane societies and rescue groups (Pages 57-77). In many cases, each group is uniquely situated—because of its mission, resources, and authority—to provide an essential program or service that no other group can provide.

Their law enforcement powers give animal care and control agencies opportunities that no other group has. For example, differential licensing programs are associated with lower shelter intake rates (Pages 32-33). The benefits that can be derived from differential licensing laws can be generated, though, only when animal care and control agencies enforce them.

Other benefits flow from the enforcement of licensing laws. For example, lost

dogs that are wearing license tags are more likely to be returned home than those without tags.³²⁷ This benefit, too, is uniquely within the power of an animal care and control agency to secure through its enforcement of licensing laws.

Humane societies and rescue groups can increase a community's pet sterilization rate and reduce future shelter intakes by ensuring that all the intact pets they re-home have been sterilized at the time of their placement. Even if shelters still account for only 13% of all new cat and dog acquisitions in the United States, as they did in 1996,³²⁸ a community's pet sterilization rate will inevitably increase if all of the pets acquired from shelters have been sterilized. In the absence of a law requiring the pre-release sterilization of intact pets, it is the sole prerogative of each shelter to adopt such a policy.

Veterinary practitioners counsel pet owners about pet care on a daily basis and have what sociologists call Aesculapian authority, the increased credibility that cultures bestow upon those with the power to heal.³²⁹ This may explain why pet owners in a Gulf Coast study reported that they valued the opinions of veterinarians about pet-related issues more than those of any other source.³³⁰ Not only are practitioners best able to counsel clients about the protective benefits of sterilizing their pets and providing them with adequate identification, because of their ongoing relationship with owners they have the best opportunity to provide protective programs to their pets, such as puppy socialization and dog training classes.

For all of these reasons, it is critical that an advocacy organization effectively engage local animal control agencies, veterinarians, and humane organizations in a collaborative effort to eradicate shelter overpopulation in their community. Indeed it is doubtful whether the effort can succeed unless each group makes a substantial contribution.

II. Well-Designed Intervention Plans are Comprehensive

To eliminate shelter overpopulation, an advocacy group must effectively engage others in the effort, as discussed above. Each group and agency provides services that are of value in its community. Animal care and control agencies protect the public, manage local pet populations, prevent animal cruelty, and ensure that animals enhance people's quality of life.³³¹ Small animal practitioners protect and enhance the

health of their clients' pets. Humane organizations rescue animals that have become homeless, provide them with shelter, rehabilitate them if necessary, and attempt to place them in good homes. As worthy as the missions of these groups are, though, some programs and services that are essential to ending overpopulation do not fall within their missions and will need to be provided by an advocacy group.

Veterinary practitioners can provide services to their client's pets that greatly reduce the risk that they will become homeless, including sterilization, puppy socialization and dog training classes, and counseling about pet behavioral issues and the importance of providing their pets with identification. These services are critical to protect the health of pets, but low-income pet owners are not as likely to secure them as their middle- and upper-income counterparts. For instance, a 2007 survey of cat-owning households in the United States found that cats living in low-income households (i.e., with annual incomes of less than \$35,000) were 9 times more likely to be unsterilized than those living in middle-income households (with annual incomes between \$35,000 and \$75,000) and 26 times more likely to be intact than those living in upper-income households (with annual incomes exceeding \$75,000).³³² The feline sterilization rate for each group is shown in Figure 15.

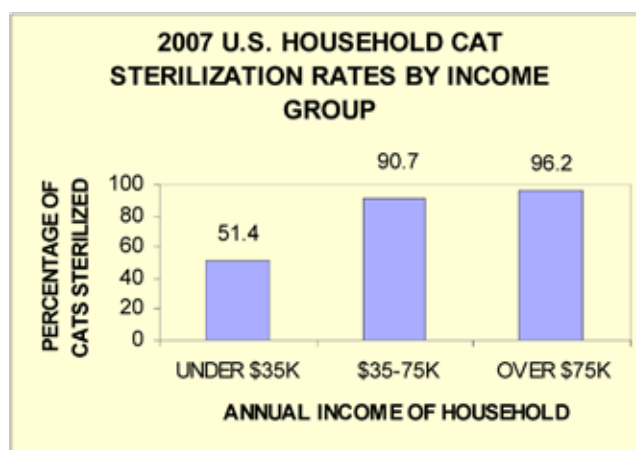


Figure 15.

More than three-fourths (75.8%) of all the intact cats in the surveyed households lived in the low-income households.³³³

Not only are low-income pet owners less likely to have access to pet sterilization, they are also less likely to have access to other veterinary services that are associated with a reduced risk of shelter admission, such as counseling about pet behavioral problems, puppy socialization classes, and dog training programs.

In some cases, shelters and practitioners may not be able to provide all the animals they serve with the full array of services and programs of protective benefit. A shelter may not be able to sterilize all the intact pets it places prior to their release or provide all adopted pets with identification. Or practitioners may not be able to provide their clients with dog training or puppy socialization classes as part of their practice. An advocacy group can assist by providing these services itself or providing funding or resources that enable others to provide them.

Free-roaming cats are another population that is usually underserved by shelters and practitioners. An advocacy group can help reduce the risk that they will be impounded and euthanized by operating trap/neuter/return programs or providing funding and other resources to other groups that operate them.

To address all of the major sources of shelter overpopulation in its community, an advocacy group must ensure that all the populations at risk of being admitted to a shelter receive a comprehensive set of protective services. Pet sterilization programs are necessary, of course, but are not sufficient by themselves to eradicate overpopulation. Approximately 40% of all relinquished dogs and 28% of relinquished cats have at least one unwanted behavior cited as the reason for their relinquishment, such as aggression toward people or animals, destructive behavior, or inappropriate elimination in the house.³³⁴ Other major risk factors—such as a failure to participate in a dog training class, lack of frequent veterinary care, and inappropriate expectations of owners—require veterinary care and counseling and access to dog training classes. An advocacy group can fill a critical need in its community by providing subsidized pet sterilization programs, pet behavioral counseling, puppy socialization classes, and dog training programs to low-income pet owners.

III. Well-Designed Intervention Plans are Preventive

Over the years, three types of interventions have been employed to reduce the gap between a community's sheltering capacity and the number of animals that are admitted to its shelters: (1). programs to increase shelter and sanctuary space; (2). programs to increase the number of pets that are reclaimed by their owners and those that are placed with new owners; and (3). programs to reduce the number of pets that enter shelters in the first place. The last has proven to be the most effective.

Cats and dogs admitted to the 186 shelters included in the 1998 National Shelter Survey, on average, remained in a shelter only 9.5 days before exiting through euthanasia, redemption, or adoption.³³⁵ Fifty-nine percent of the cats and dogs admitted to these shelters were euthanized.³³⁶ Of this total, 34% were euthanized to make space for incoming animals.³³⁷ The gap between our current sheltering capacity and intake rate is so great that if intake, adoption, and redemption rates remain unchanged, overall shelter capacity would have to be increased many fold each year for several years to build sufficient space for all the cats and dogs that are euthanized because of a lack of shelter space.

Shelter statistics from five states that have collected complete data for dog and cat intakes, adoptions, and euthanasias (Page 8) show that intake rates vary within a much larger range than adoption rates:

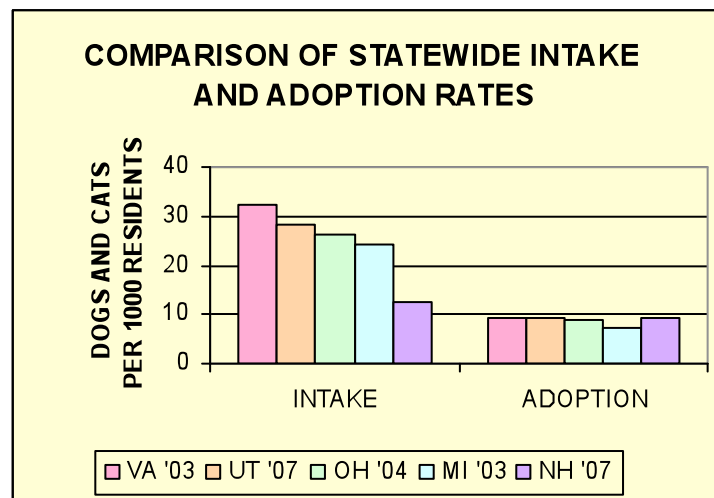


Figure 16.

These data also suggest that shelter intake rates are subject to much greater modification through effective interventions than adoption rates.

The relative cost of each strategy is a factor that must be considered, too. Reducing population control euthanasia rates through the construction and maintenance of increased shelter or sanctuary space is significantly more expensive than programs to increase adoptions or reduce intakes, because neither of the latter incurs the ongoing cost of maintaining sheltered pets for the balance of their lives.

The average cost of impounding, sheltering, and, if necessary, euthanizing the animals admitted to shelters included in the 1998 National Shelter Survey was \$176 per animal.³³⁸ It is difficult to measure the direct impact of subsidized spay/neuter programs, but many jurisdictions that have invested in such programs have seen a stabilization or actual decline in the number of animals impounded by local shelters.³³⁹ In the first six years after New Hampshire established publicly funded neutering subsidy programs in 1994, 30,985 fewer cats and dogs entered its animal shelters than in the six years before the program started.³⁴⁰ The total cost to operate neutering subsidy programs during this period was \$1,008,024.³⁴¹

In assessing the relative costs of various possible interventions, an advocacy group must consider the cost of each intervention to the animals affected, too. Sheltering and adoption strategies, even when they result in a successful placement, fail to prevent the significant stress and dislocation that an animal suffers as a result of becoming homeless and being admitted to a shelter. Shelter placements, too, can come at the expense of non-sheltered animals that are also homeless. In 1996, Americans took into their homes one non-sheltered stray or abandoned dog for every dog they adopted from a shelter and two and a half times as many non-sheltered stray and abandoned cats as those adopted from a shelter.³⁴² Increasing the number of cats and dogs that are adopted from shelters can reduce the number of non-sheltered stray and abandoned pets that find homes.

Historical data suggest that preventive strategies have the greatest likelihood of success. Shelter intake and exit data collected by the California Department of Health Services since 1970 show that between 1975 and 1995, canine shelter euthanasias at animal control agencies dropped from 550,943 in 1975 to 276,789 in 1995.³⁴³ This drop in euthanasias resulted entirely from a decline in intakes from 789,443 to 467,481 during this period.³⁴⁴

The City of San Francisco achieved a substantial reduction in shelter euthanasias between 1990 and 2003, from 8,072 to 1,696.³⁴⁵ A drop in intakes during this period of 5,925 animals was largely responsible for the 6,376 fewer animals that were euthanized.³⁴⁶

Shelters in New Hampshire saw a similar drop in shelter euthanasias during this period. In 2000, 8,919 fewer cats and dogs were euthanized in New Hampshire shelters than in 1993, in large part because 8,746 fewer cats and dogs were impounded.³⁴⁷ These data suggest not only that intake rates can be modified to a greater degree than adoption rates, but also that they can be reduced sufficiently to eliminate shelter overpopulation.

IV. Well-Designed Intervention Plans Are Strategic

While preventive programs can end shelter overpopulation in a community, data accumulated to date suggest that this can only be accomplished over a substantial period of time. Canine intake and euthanasia rates dropped steadily in California over a 20-year period, from 1975 to 1995 (Page 7, Figure 1). It took that long for intakes to drop by 40% and euthanasias to be cut in half. After publicly funded neutering subsidy programs were established in New Hampshire in 1994, shelter intakes dropped by a third, but it took six years to achieve that (Page 34, Figure 10).

One factor that may limit the rate at which newly established spay/neuter programs affect a community's overall pet sterilization rate is the tendency of pet owners to have cats and dogs sterilized at an early age or not at all. More than three-fourths (78.5%) of dogs and 92.3% of cats sterilized through a Tennessee spay/neuter program over a two-year period were three years of age or younger:

Age at Sterilization of All Dogs and Cats Sterilized at Spay Shuttle Program (Knoxville, Tennessee) 7/07-5/09

AGE AT STERILIZATION	DOGS	CATS
6 WEEKS—12 WEEKS	292 (5.7)	201 (3.6)
3 MONTHS—6 MONTHS	624 (12.2)	1399 (25.1)
6 MONTHS—1 YEAR	1190 (23.3)	1708 (30.6)
1 YEAR—3 YEARS	1904 (37.3)	1844 (33.0)
3 YEARS--5 YEARS	662 (13.0)	324 (5.8)
5 YEARS--7 YEARS	310 (6.0)	81 (1.5)
7 YEARS--10 YEARS	113 (2.2)	23 (.4)
OVER 10 YEARS	12 (.2)	0
TOTAL	5,107	5,580

Figure 17.³⁴⁸

A 1981 study of the age-dependent birth rates of dogs and cats in the Las Vegas, Nevada area found that the primary reproductive age of dogs and cats extended well beyond three years of age, to nine years for dogs and six years for cats.³⁴⁹ As a result of the age-skewed rate at which pets are customarily sterilized, newly established programs will not achieve their full impact for several years, as cohorts of young females with higher sterilization rates age through their reproductive years.

The need to sustain its programs for several years affects the design of an advocacy organization's programs and their funding sources. Spay/neuter programs of short duration cannot achieve the necessary impact unless they achieve high volume and are repeated regularly over several years.

Adequate funding levels must be sustained as well. Periodic grants can be used to build infrastructure that generates sustained revenue—such as high-volume spay/neuter clinics—but cannot be depended on as a steady source of long-term revenue. If a clinic establishes a sliding-scale fee structure in which pet owners who do not meet income eligibility guidelines pay fees that exceed the clinic's per-unit cost (but which, due to the great productivity of a specialized clinic are less than the cost of services at a full service veterinary hospital), grants used to build the clinic can generate long-term revenue for the subsidy programs that are necessary to eradicate shelter overpopulation.

Public funding can provide sustained revenue, too, if it generates periodic funding that is deposited into a dedicated account for pet sterilization subsidies. Pet licensing fees can generate substantial amounts of funding if steps are taken to maximize compliance with local licensing laws.

To sustain its programs over the long term, an advocacy organization must not only develop programs with strategic designs and funding sources, it must also become a durable organization itself so that it can sustain the necessary programs over many years. As with any organization that achieves longevity, this will require investing in leadership and organizational development programs. To increase their durability, local advocacy organizations can also benefit by forming networks and alliances with their counterparts in other communities, to share information about their successes and failures. The stakes are high. The services a local advocacy organization provides are so critical that if the organization fails, the community plan will likely perish with it.

V. Well-Designed Intervention Plans Generate Adequate Revenue for Subsidies

Pet sterilization rates in the United States increased throughout the 1970s. For example, 16% of female dogs that received treatment in 1968 at Kansas State University's College of Veterinary Medicine were sterilized; by 1978 the percentage of pets

treated at the clinic that were sterilized had grown to 41.3%.³⁵⁰ And between 1970 and 1983, the percentage of licensed dogs that were sterilized jumped in Los Angeles from a little over 5% to 49%.³⁵¹

As the overall pet sterilization rate rose, some challenged the efficacy of allowing pet owners who could afford to pay the full cost access to reduced-fee pet sterilization programs.³⁵² A guide for establishing spay/neuter programs published in 1985 by The Humane Society of the United States (HSUS) advised against limiting publicly funded spay/neuter clinics to low-income pet owners:

“If you regard a sterilization clinic as a solution to a serious community problem, it must be available to all residents. Also, the goal is to reduce the pet overpopulation problem as much as possible, and that depends on sterilizing as many animals as possible. In addition, limiting the clinic to low-income pet owners requires checking into their personal finances, which is time-consuming for the clinic staff and discouraging to pet owners, who may avoid the clinic as a result.”³⁵³

Several open-access spay/neuter programs operated in New Hampshire throughout the 1980s, offering pet sterilization to all pet owners at about one-half the regular cost. The total shelter intake rate in the state remained relatively constant during this period, with a decline in dog intakes being offset by an increase in the number of cats that were impounded:

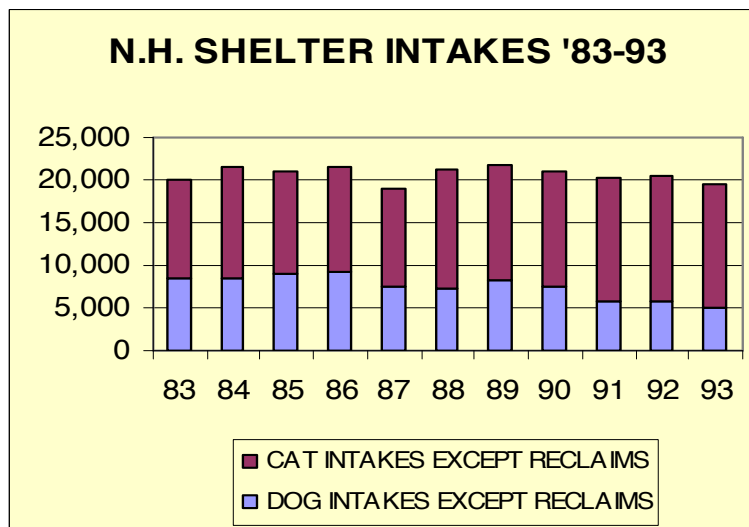


Figure 18.³⁵⁴

Beginning in July 1994, a program was established that enabled New Hampshire residents who met the income eligibility criteria for one of seven public assistance programs to have a cat or dog sterilized for \$10, 10% or less of the full cost. During the first seven years after the program was established, shelter intake rates declined substantially:

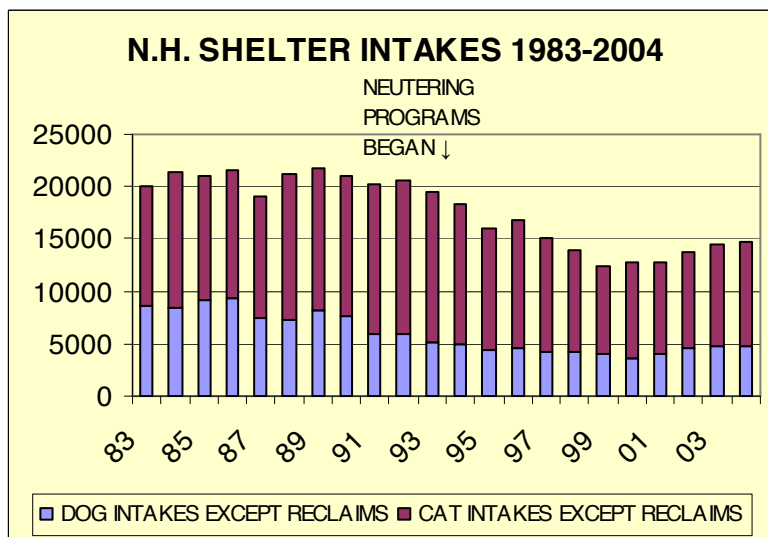


Figure 19.³⁵⁵

Cat intakes dropped by 29.7% during the first 10 years after the program was established, and dog intakes dropped by 6.9%. From the outset, many more cats were sterilized through the program than dogs, even though the eligibility criteria and amount of co-payment were the same for both dog and cat owners. For example, in 2004, 3,661 cats were sterilized through the program and 921 dogs.³⁵⁶ As discussed earlier in this chapter, a national survey completed in 2007 found that more than three-fourths of all intact owned cats lived in households with annual incomes of less than \$35,000.³⁵⁷ It appears that a community cannot eliminate shelter overpopulation—at least for cats—without providing affordable and accessible pet sterilization subsidy programs for low-income pet owners.

Shelter intake rates also dropped in Jacksonville after a pet sterilization subsidy program was established in 2002 that made it affordable for low-income pet owners to have pets sterilized. During the first six years after the program was established, dog and cat intakes at local shelters dropped by 24.4%, from 33,847 in FY '03 to 25,603 in FY '09.³⁵⁸

The cost of maintaining a subsidized pet sterilization program for low-income pet owners can be estimated from a program operated in Alabama in 2000-2003. Over a 24-month period, 36,046 surgeries were performed through the program—an annual volume of about four surgeries per resident—at a cost of \$2,384,414, about 27 cents a year per resident.³⁵⁹

In many communities, feral and free-roaming cats have come to make up a substantial share of all shelter admissions. Reducing the rates at which these cats are impounded can reduce shelter overpopulation. Population data from large-scale feral cat sterilization programs suggest that they can stabilize feral cat populations and result in a slow rate of population decline if the population is not replenished by immigrants.³⁶⁰ Controlling the reproduction of owned pet cats that may migrate from households, then, is critical to effectively managing feral cat populations.³⁶¹ Since more than 97% of all feral cats are intact³⁶² and the great majority of owned intact cats reside in low-income households,³⁶³ the establishment of adequately funded pet sterilization subsidy programs for low-income pet owners may be as important in the management of feral cat populations as it is to the prevention of shelter overpopulation.

The cost of maintaining a large-scale feral cat sterilization subsidy program can be estimated from one that operated in California in 1999-2002. Over a 33-month period, 170,334 feral cats were altered—an annual volume of about two cats per 1,000 residents—at a cost of \$9,479,099 or about \$.10 a year per resident.³⁶⁴ In comparison, in 1998 public and private shelters spent approximately 1.4 billion a year to impound and shelter homeless animals, an annual cost of about \$5 per resident.³⁶⁵

VI. Well-Designed Intervention Plans Include Legislative Programs

One of the primary challenges in establishing pet sterilization subsidy programs is to secure adequate and sustained funding for them. It would cost \$120 million a year to fund low-income pet sterilization subsidy programs and feral cat sterilization subsidy programs throughout the United States, at a combined cost of \$.40 per resident. It has been estimated that foundations will provide approximately \$30 million in 2009 for spay/neuter and shelter adoption programs in the United States.³⁶⁶ As a result, it is unlikely that foundations will be able to provide a level of funding sufficient to sustain necessary pet sterilization subsidy programs over the long term. That will require advocacy organizations to secure sufficient public funding.

Just as legislative initiatives can secure funding for subsidy programs that enable low-income pet owners to have their dogs and cats sterilized, they can also create the incentives others may need to have their pets sterilized, such as differential license fees (Pages 32-33). Pre-release sterilization laws (Pages 12-13) can help increase a community's pet sterilization rate, too.

To decide what types of legislation will be the most effective in reducing shelter overpopulation in its community, an advocacy group should follow the same evidence-based approach it uses to develop its strategic plan. Each community is unique in terms of the local sources and causes of shelter overpopulation and the primary barriers to increasing the local pet sterilization rate.³⁶⁷ Communities that have achieved success have established multifaceted programs which address all of the populations that contribute significantly to local shelter intake and euthanasia rates.³⁶⁸ Laws that create incentives for pet owners to properly care for their animals—and disincentives for irresponsible conduct—are an essential component of such a community plan.

VII. Well-Designed Intervention Plans Contain Educational Programs

The intake rate at shelters operated by the City of Los Angeles dropped by 50% between 1970 and 1983, while the sterilization rate of licensed dogs jumped from a little over 5% to 49%.³⁶⁹ During that period, publicly funded pet sterilization clinics in the City sterilized about 8,000 cats and dogs each year.³⁷⁰ While this volume was significant, more than four of five pet sterilizations were performed at private veterinary hospitals in the City each year.³⁷¹

This is not unusual; the overwhelming majority of pet sterilizations in the United States are performed at private veterinary hospitals. In 2005, an estimated 11,000,000 pet sterilizations were performed by private veterinary hospitals, while 2,112,000 were performed through shelters, spay/neuter programs, and feral cat sterilization programs.³⁷² The high proportion of veterinary clients with neutered pets reflects veterinarians' and shelters' successful efforts in persuading owners to have their pets sterilized.³⁷³ While targeted subsidy programs are an essential component of an effective community overpopulation plan, private veterinary clinics sterilize five cats and dogs without a subsidy for every one sterilized through a shelter or subsidy program. Public information and awareness programs about the benefits of pet sterilization are critically important to maintain this high volume of unsubsidized surgeries.

Subsidized and unsubsidized sterilizations do not have to be a zero-sum system in which low-cost sterilization programs only change the place where surgeries are performed, shifting the site from private clinics to a low-cost program. A study of targeted low-income spay/neuter subsidy programs operating in five states found that not only was the establishment of a subsidy program not associated with a drop in the number of non-subsidized surgeries performed at private veterinary hospitals, the volume of unsubsidized surgeries actually increased.³⁷⁴ The marketing and publicity campaigns undertaken to promote subsidy programs emphasized the benefits of pet sterilization and may have created a “bandwagon” of social pressure to sterilize pets that reached the clients of private veterinary hospitals as well.³⁷⁵

While educational initiatives promoting pet sterilization have likely contributed to the dramatic increase in pet sterilization rates in the United States during the past 30 years, some work remains undone. Pet owners still have some mistaken ideas and lack of knowledge that contribute to higher relinquishment and pet reproduction rates. People who relinquish dogs and cats to animal shelters are more likely to have knowledge deficits about pet reproductive biology, appropriate methods of house training, and the availability of effective interventions for many problematic behaviors.³⁷⁶ These deficits can create unrealistic expectations that lead pet owners to respond inappropriately to their pet’s problematic behaviors.³⁷⁷ Focused educational programs about the basic reproductive biology of pets and the availability of interventions that can modify many undesirable behaviors could reduce the number of cats and dogs that are relinquished and euthanized each year.³⁷⁸

One knowledge deficit that appears to have greatly compromised efforts to effectively manage dog and cat populations is the widespread failure of pet owners to realize that the optimal age to sterilize a female cat or dog is before her first estrus.³⁷⁹

Delays in having a pet sterilized frequently lead to unplanned or unexpected litters. A 1991 telephone survey of Massachusetts households found that the overwhelming majority of pet owners eventually had their pets sterilized, but not before 20% of the female cats and 21% of the dogs had given birth to at least one litter.³⁸⁰ A 1993 survey of cat-owning households in parts of Santa Clara County, California found that 16.3% of the owned, altered cats had at least one litter before having been spayed,³⁸¹ and a 2007 national telephone survey found that 18.3% of sterilized female cats had given birth to at least one litter before having been sterilized.³⁸²

Owners frequently delay having a female pet sterilized until well after her first estrus. The following table shows the age at which female cats and dogs were sterilized through a Tennessee spay/neuter program:

**Age at Sterilization of Female Dogs and Cats
Sterilized at Spay Shuttle Program (Knoxville, Tennessee) 7/07-5/09**

AGE AT STERILIZATION	FEMALE DOGS	FEMALE CATS
6 WEEKS--12 WEEKS	140 (5.1)	97 (3.0)
3 MONTHS--6 MONTHS	312 (11.4)	707 (21.7)
6 MONTHS--1 YEAR	639 (23.3)	961 (29.5)
1 YEAR--3 YEARS	1012 (36.9)	1185 (36.4)
3 YEARS--5 YEARS	396 (14.4)	235 (7.2)
5 YEARS--7 YEARS	174 (6.3)	54 (1.6)
7 YEARS--10 YEARS	65 (2.4)	15 (.5)
OVER 10--YEARS	3 (.1)	0
TOTAL	2,741	3,254

Figure 20.³⁸³

Only 16.5% of dogs and 24.7% of cats were spayed at 6 months of age or younger; more than 60% of dogs and 45% of cats were at least one year old when they were spayed.

Recent data confirm that while the great majority of cat and dog owners ultimately have their female cats and dogs sterilized, many delay the sterilization until the pet has had one or more litters. The frequency with which female cats and dogs sterilized at a Tennessee spay/neuter program between July of 2007 and May of 2009 had litters is shown on the next page:

**Numbers of Pre-Sterilization Litters of Female Dogs and Cats
Sterilized at Spay Shuttle Program (Knoxville, Tennessee) 7/07-5/09**

NUMBER OF LITTERS BEFORE STERILIZATION	NUMBER OF FEMALE CATS (% OF TOTAL)	NUMBER OF FEMALE DOGS (% OF TOTAL)
NONE	2426 (75.3)	2100 (77.7)
ONE	469 (14.6)	346 (12.8)
TWO	198 (6.1)	154 (5.7)
THREE	63 (2.0)	66 (2.4)
FOUR	35 (1.0)	27 (1.0)
FIVE	8 (.2)	2 (.1)
SIX	7 (.2)	3 (.1)
MORE THAN SIX	16 (.5)	6 (.2)
	3,222	2,704

Figure 21. ³⁸⁴

The average litter production rate of cats spayed through the program during this period was .43 litters of kittens; the litter production rate of the dogs spayed through the program averaged .38 litters of puppies. Using an average of 5.73 kittens per litter,³⁸⁵ each cat sterilized through the Tennessee program would have had an average of 2.46 kittens before being sterilized, above the reproductive fertility rate of a stable population. Using an average of 7.57 puppies per litter,³⁸⁶ each dog sterilized through the program would have had an average of 2.88 puppies before being sterilized, which also exceeds the replacement fertility rate. If this frequency of pre-sterilization litters is representative of cats and dogs in the United States, with the current birth and death rates the entire female population of cats and dogs in the country could be sterilized without achieving population stability, unless the rate of pre-sterilization litters is reduced.

Even small reductions in the incidence of pre-sterilization litters could contribute greatly to population management efforts. For instance, in 1996 12.67 million kittens and puppies were born to female dogs and cats in U.S. households, 3.61 million more than the 9.06 million household dogs and cats that died.³⁸⁷ If 80% of the 12.67 million puppies and kittens born that year came from female dogs and cats that were sterilized later, a total of 10.14 million kittens and puppies would have been born to female

pets that were ultimately sterilized. Reducing the frequency of these pre-sterilization litters by 35% would have resulted in 3.55 million fewer kittens and puppies being born. Because births of household cats and dogs exceeded deaths by 3.61 million that year, as mentioned above, reducing the number of litters that resulted from “spay delay” by 35% would have stabilized the size of the household cat and dog populations by bringing the birth rate into balance with the death rate. Plainly, public information and awareness campaigns about the critical importance of timeliness in pet sterilization deserve to be a central part of the effort to effectively manage cat and dog populations.

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- ³⁵² How to Establish Spay/Neuter Programs and Clinics (1985). Washington, D.C.: The Humane Society of the United States, 3.
- ³⁵³ How to Establish Spay/Neuter Programs and Clinics, 15.
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- ³⁵⁶ N.H. Department of Agriculture, Markets and Food, Animal Population Control Program Summary, 2004.
- ³⁵⁷ Chu et al., Population characteristics and neuter status of cats, 1026.
- ³⁵⁸ Consolidated Jacksonville shelter statistics, 2002-2008 (unpublished).
- ³⁵⁹ <http://maddiesfund.org/FundedProjects/TargetedSpayNeuter/Completed.html=Maddies%20BigFix%20for%20Alabama>.
- ³⁶⁰ Levy JK & Crawford PC (2004). Humane strategies for controlling feral cat populations. *J. Am. Vet. Med. Assoc.* **225** (9): 1358.
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- ³⁶⁵ Wenstrup & Dowidchuk, Pet overpopulation: Data and measurement issues in shelters, 311.
- ³⁶⁶ <http://www.maddiesfund.org/Documents/No%20Kill%20Progress/Getting%20to%20No%20Kill%20by%2015.pdf>, 5.
- ³⁶⁷ ASPCA Position Statement on Mandatory Spay/Neuter Laws. <http://www.aspc.org/about-us/policy-positions/mandatory-spay-neuter-laws.html>, 2.
- ³⁶⁸ Ibid.
- ³⁶⁹ Rowan & Williams, The success of companion animal management programs, 119.
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- ³⁷² Briggs J (2006). Analysis of the annual spay/neuter surgeries in the United States, Proceedings of the Third International Symposium on Non Surgical sterilization, "The math, myth, and the management of pet populations," <http://www.cdoca.org/test/share/files/Math%20Myth%20Management.pdf>, 68.

- ³⁷³ Scarlett, The role of veterinary practitioners in reducing dog and cat relinquishments, 309.
- ³⁷⁴ Frank JM & Carlisle-Frank PL (2007). Analysis of programs to reduce overpopulation of companion animals: do adoption and low-cost spay/neuter programs merely cause a substitution of sources? *Ecological Economics* **62** (3-4), 745.
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- ³⁷⁶ New Jr. JC, Salman MD, King M, Scarlett JM, Kass PH, & Hutchinson JM (2000). Characteristics of shelter-relinquished animals and their owners compared with animals and their owners in U.S. pet-owning households. *J. Appl. Animal Welfare Sci.* **3** (3): 199.
- ³⁷⁷ New, Jr. et al. Characteristics of shelter-relinquished animals, 200.
- ³⁷⁸ Ibid.
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- ³⁸¹ Johnson K, Lewellen L, & Lewellen J (1994). National Pet Alliance's Survey Report on Santa Clara County Pet Population. *Cat Fanciers' Almanac*, **January 1994**, 75.
- ³⁸² Chu et al. Population characteristics and neuter status of cats, 1025.
- ³⁸³ Intake Summaries 7/07—5/09 (unpublished), Spay Shuttle Program, Knoxville, TN.
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- ³⁸⁷ Ibid., 233-234.



Chapter 5

Building Evidence-Based Programs to Eradicate Shelter Overpopulation

During the past 15 years, a great deal of preliminary information has been collected about the demographics and dynamics of homeless cat and dog populations in the United States, but much basic data still elude us.³⁸⁸ In many areas, substantial gaps persist in the information needed to build strong evidentiary foundations for policies and programs:

- ◆ **SHELTER ADMISSION POLICIES:** In recent years, a vigorous debate has developed about whether the “open-door” policy followed by many traditional animal shelters is over-inclusive, admitting more cats and dogs than is necessary to serve the interests of the animals or the public. Some previously open-admission shelters have started to limit their acceptance of cats and dogs that owners seek to surrender or homeless cats in good health (Pages 68-71). Such limited-admission policies have been challenged as being under-inclu-

sive, resulting in non-admitted animals suffering inhumane treatment or lives of deprivation and disease that are “fates worse than death” (Pages 68-69).

Data have been collected that shed some light on this issue. In 1997, researchers interviewed 38 people who had relinquished a cat or dog to a Massachusetts shelter. They found that in most cases, the decision to relinquish the pet was not arrived at casually or for trivial reasons, suggesting that shelters may be able to reduce relinquishment rates by offering practical assistance and alternatives to relinquishment.³⁸⁹ During the first four years after the Richmond SPCA offered counseling and assistance to those seeking to relinquish pets, 34.6% of the owners either rehomed the pet themselves or kept the pet and attempted to resolve behavior problems.³⁹⁰ This was similar to the rate at which relinquishers decided to keep their pets after the Jacksonville Humane Society began offering them counseling and assistance.³⁹¹ These initiatives can help better inform relinquishment admission policies if follow-up studies are conducted to determine the outcome for each pet that has not been accepted by a shelter.

In the same way that an open-admission shelter accepts responsibility for every animal it admits, a limited-admission shelter must accept a measure of responsibility for every animal it declines to admit. When it helps a pet owner re-home a pet instead of admitting it to the shelter, a limited-admission shelter should follow up on the placement to find out how it worked out, just as if it had made the placement itself. The data collected can be used to identify risk factors for adverse outcomes that can follow if an animal is not accepted. Then programs to reduce these risks can be devel-

“Researchers, donors, and shelters all suffer as a result of the existing process. Researchers seek access to thorough, accurate and comparable data from shelters, yet often work with only a subset of moderately reliable information and have limited evidence to make broad recommendations across shelters. In addition, donors find it difficult to track the impact of their contributions and the effectiveness of various programs and organizations. Consequently, many funding decisions are currently made with only limited data. Finally, shelters often lack proper data to create tailored programs to address the most pressing problems in their communities. In many cases, time and money are likely misallocated to less important programs, directly affecting the amount of euthanizing performed each year.”

Wenstrup J & Dowidchuk A (1999). Pet overpopulation: data and measurement issues in shelters. *J. Appl. Animal Welfare Sci.* 2 (4), 304.

oped and evaluated. In the absence of comprehensive information about outcomes, however, it will not be possible to determine whether a policy of accepting all cats and dogs an owner seeks to relinquish is too protective from the standpoint of animal welfare or a limited-admission policy regarding potential relinquishments is not protective enough.

A similar debate has developed in recent years regarding shelter admission policies for feral cats. Some animal welfarists believe that the feral lifestyle is so fraught with potential risk that the widespread admission of feral cats by shelters is humane, even if they must be euthanized.³⁹² Others believe that sterilized feral cats can enjoy a good quality of life over an extended period, even though they are homeless.³⁹³ Determining the extent to which either impression is well founded will depend on acquiring a better understanding of the health and welfare of feral cats, both in managed and unmanaged situations.

“Modern American society recognizes the crucial role of data and information in effectively addressing societal problems. . . . Addressing pet overpopulation should be no different. Data are needed in order to define the nature and scope of the dog and cat demographic challenge. Data can help people understand the impact of ‘pet homelessness’ on companion animals; to identify some of the characteristics of both successful and failed human-animal relationships; and to develop sound, effective, and long-lasting solutions that will strengthen humans’ relationships with companion animals and enhance companion animals’ welfare.”

Clancy EA & Rowan AN (2003). Companion animal demographics in the United States: a historical perspective, The State of the Animals II, DJ Salem & AN Rowan (eds.), Washington, D.C.: Humane Society Press, 9.

- ◆ **ADOPTION POLICIES AND PROGRAMS:** The past decade has also seen a substantial increase in attempts to use adoption programs to reduce the frequency of population control euthanasias. Funders have invested tens of millions of dollars to assist shelters and rescue groups in their efforts to find new homes for shelter pets and the Advertising Council has recently undertaken a three-year national campaign to promote shelter adoptions.³⁹⁴

Previous pet acquisition and shelter adoption research can help inform these initiatives. Substantial gaps in the data remain, however. Statistics from the National Council’s 1996 Household Survey regarding the great frequency with which U.S.

households take non-sheltered stray and homeless animals into their homes raise the concern that increasing the “market share” which shelter adoptions make up of new pet acquisitions may reduce the number of stray and abandoned pets that people take into their homes. For this reason, shelter adoption studies should include data about the rate at which non-sheltered homeless pets find homes.

They should also include retention data to insure that any gains from increased shelter adoptions are not offset by more failed adoptive placements. To maximize the effectiveness of adoption as a tool to reduce population control euthanasia rates, failed adoptions must be studied with the same rigor and methodology as that employed in the National Council’s Regional Shelter Relinquishment Survey (Page 3). Epidemiologic research must be completed to identify the major risk factors for adoptive failures and subsequent research undertaken to measure the effectiveness of various strategies and interventions in reducing the rate of failed placements. The development and evaluation of standardized guidelines for adoption counseling would improve our understanding of the effect of counseling programs on retention rates.³⁹⁵

One study of offsite adoptions found that the retention rates of some placements outside shelters were similar to those of adoptions that had taken place in shelters (Page 64). It would be worthwhile to extend that research to offsite placements made at veterinary clinics. In 1992, a study of 75 cats and dogs placed through veterinary clinics in the San Francisco area found that after six months, 93% of the pets placed through veterinary clinics were still in their adoptive homes, compared to 80% of the pets placed by local shelters during the same period, and that veterinary clients had fewer unreasonable expectations about pets’ roles in their own and their children’s lives than people who adopted pets from shelters.³⁹⁶ It may be that the greater ability of veterinary clinics to provide post-adoption counseling and other assistance to its clients can result in a higher rate of successful placements than is possible for those made through shelters.

- ◆ **PET STERILIZATION PROGRAMS:** The past decade has also seen a substantial increase in the amount of public and private funding provided to pet sterilization programs. During that period, tens of millions of dollars have been spent on a diverse array of programs. Some charge participants a set fee or co-payment to participate, others provide a voucher that participants can use to offset part of the cost of sterilization, and others provide the sterilization at no cost. Some programs limit eligibility to pet owners with very limited

incomes, others restrict a program to people who reside in certain areas or zip codes, and others open a program to every local resident. Some sterilize only specific subsets of cats or dogs, such as cats and dogs in shelters or feral cats, while others are open to any owned cat or dog.

Statistics from more than a dozen pet sterilization programs operating in different parts of the United States have shown that in some cases local shelter intake rates dropped after a program began, while in others the intake rates remained the same or even increased. To maximize the impact of funding devoted to pet sterilization programs, additional research is needed to determine whether programs associated with sustained reductions in local shelter intake rates share common characteristics with respect to their design, volume, or other factors.

Research has shown that low pet sterilization rates are associated with increased public expense through higher shelter intake rates and a higher incidence of dog bite injuries (Pages 9-10 and 27-28). As a result, programs that increase local pet sterilization rates can have substantial economic benefits. Analyses that compare the cost of programs that increase local pet sterilization rates with the resulting savings would provide policymakers with the information they need to decide whether and to what extent public funding for these programs is fiscally justified.

Issues that merit investigation include whether offering large subsidies to indigent pet owners is more cost effective than offering smaller subsidies to a broader range of pet owners and if the increased benefit derived from sterilizing younger pets justifies providing increased financial incentives for their sterilization. Other issues worthy of investigation include whether programs that target eligibility by localities or zip codes are more cost effective than those that use income levels to determine eligibility and whether an increase in the rate at which household cats have been sterilized affects the frequency with which they migrate to free-roaming status.

- ◆ **FERAL CAT PROGRAMS:** The most significant gap in current knowledge about cat and dog populations in the United States concerns feral and free-roaming cats. There may be as many stray and feral cats in the country as there are cats living in households, and they may produce as many as 80% of all the kittens born each year.³⁹⁷ Debate about feral and free-roaming cats as a reservoir of zoonotic diseases and their impact on the environment and feline welfare is ongoing, often emotional, and fueled largely by a lack of sound scientific data on which to base credible conclusions.³⁹⁸

In recent years, attempts to control feral cat populations by trap/neuter/return programs have become an increasingly popular alternative to mass euthanasia,³⁹⁹ with mixed results. In some cases, trap/neuter/return programs have successfully reduced feral cat populations, while in others their success has been substantially limited by the abandonment of household cats or their migration to feral colonies.⁴⁰⁰ Relatively little research has been undertaken, however, to determine the origin of feral cats in most locations⁴⁰¹ or the effectiveness of attempts to manage feral populations.⁴⁰² Without a clear understanding of the origins and dynamics of feral populations, it will not be possible to design effective programs to manage them. Issues about feral cat management strategies will likely continue to be unresolved until basic data have been collected about the size of the feral population, its health and welfare, and the extent to which feral and free-roaming cats pose a risk to the health of owned cats or people.

- ◆ **RELINQUISHMENT OF PETS:** The surrender of pets to shelters is the most well-researched aspect of pet population dynamics in the United States. In the mid-1990s, Dr. Gary Patronek and colleagues conducted epidemiologic studies to identify the characteristics of pet owners and pets associated with increased rates of relinquishment to an Indiana shelter.^{403, 404} They identified modifiable factors associated with an increased risk of relinquishment, such as lack of sterilization or participation in post-acquisition dog obedience classes, owners' unrealistic care expectations, and problematic pet behaviors like inappropriate elimination, aggression toward people or other pets, and destructive behavior.

These studies were followed by the Regional Shelter Relinquishment Survey, in which data were collected about pets relinquished to 12 shelters in four parts of the United States and their owners; this information was then compared to data from a national survey of pet-owning households in the country (Page 3).

"Certainly there are irresponsible people who surrender, but data suggest that more often ignorance and unfortunate circumstances culminate in relinquishment. This is good news, because it is difficult to rehabilitate irresponsible people, but somewhat easier to educate well-meaning, but uneducated owners or those caught in unfortunate circumstances."

Scarlett J (2004), Pet Population Dynamics and Animal Shelter Issues. Shelter Medicine for Veterinarians and Staff, L. Miller and S. Zawistowski (eds.) Ames, Iowa: Blackwell Publishing, 21.

Now that the major modifiable risk factors for relinquishment have been identified, researchers need to effectively communicate their findings to policymakers who, in turn, need to develop policies and programs to reduce them. Subsequent research will then be needed to determine which programs are the most effective in reducing relinquishment rates and to compare various possible interventions to decide which are the most cost effective.

- ◆ **PUBLIC INFORMATION AND AWARENESS PROGRAMS:** Attempts to educate pet owners about pet overpopulation date back to the 1950s.⁴⁰⁵ Recently collected data can help inform and increase the effectiveness of these efforts.

Billions of dollars have been spent in the United States over the years to shelter and re-home animals that have become homeless; by 1996, however, shelters accounted for only 14.5% of the cats that entered American households and 11.5% of the dogs.⁴⁰⁶ People took twice as many abandoned and stray dogs and cats into their homes from streets and neighborhoods that year as they adopted from shelters.⁴⁰⁷ It would be worthwhile to undertake research about the factors people consider when deciding whether to acquire a cat or dog and from what source. These decisions are complex. In such cases, qualitative research such as structured interviews and focus groups may provide more insight than purely quantitative methods.⁴⁰⁸ Without this information, marketing campaigns may fail to address attitudes and mistaken beliefs that constrain shelter adoption rates. Once that information has been collected, subsequent market research should be undertaken to test the effectiveness of different messages and messengers on target audiences.

Using educational campaigns solely for downstream strategies like adoption programs would fail to harness the vast potential that social marketing campaigns have; they need to be applied upstream, too.⁴⁰⁹ A good example of the kind of research needed is a project The Humane Society of the United States undertook in 2007 to collect quantitative and qualitative information in Louisiana and Mississippi about why people sterilize—or fail to sterilize—their pets.⁴¹⁰ This type of research needs to be replicated in other regions of the country to find out if there is significant regional variation in attitudes and beliefs regarding pet sterilization. The results can then be used to shape regional and national public information and awareness campaigns.

Data from the National Council's 1996 Household Survey identified a significant knowledge deficit that deserves to be a primary focus of educational initiatives about

pet sterilization. More than half of all dog and cat owners either mistakenly believed that a cat or dog would benefit from having a litter before being spayed or did not know if she would or not.⁴¹¹ This lack of knowledge has likely contributed to the great frequency with which pet owners delay having a female pet sterilized until well after her first estrus and the large number of pre-sterilization litters that result (Pages 91-94). Research regarding the effectiveness of various strategies and programs to reduce the incidence of pre-sterilization litters (e.g., veterinary counseling programs, financial incentives for sterilizations that are timely, and public information and awareness campaigns) would likely be of great value.

- ◆ **LEGISLATIVE PROGRAMS:** Legislative initiatives to reduce shelter overpopulation usually attempt to increase the local pet sterilization rate. Limited empirical data exist about how to accomplish that, however, and legislative approaches have varied widely both with respect to the groups subject to the laws and the mechanisms employed.⁴¹² Some mandate pet sterilization or create disincentives for breeding, such as requiring the purchase of a license or permit to breed a cat or dog. Others create incentives to have pets sterilized by providing public funding for various pet sterilization subsidy programs. The lack of information about the demographics and dynamics of the pet population, however, makes it impossible to predict the effectiveness of any legislative approach with confidence.⁴¹³

To inform legislative policy, basic research needs to be completed regarding the effectiveness of past legislative attempts to increase pet sterilization rates. The effectiveness and enforceability of mandates and disincentives need to be studied as well as the costs of enforcement. Establishing excessive disincentives for maintaining intact pets may lead to their relinquishment or abandonment. To avoid this, substantial differential licensing surcharges should not be enacted unless adequately funded low-income pet sterilization subsidy programs exist to bring neutering within the reach of every pet owner in the jurisdiction. The revenue from disincentives is an ideal source of funding for these programs.

Incentive programs to increase pet sterilization rates need to be scrutinized, too. As with any expenditure of public funds, cost-benefit data must be collected and analyzed periodically to determine the level of funding, if any, that is justified.

- ◆ **REGIONAL VARIATION IN RATES OF SHELTER OVERPOPULATION:**
Rates of shelter overpopulation and population-control euthanasia vary wide-

ly in the United States from one region to another. This has led to the establishment of programs that transport pets from places with a high shelter euthanasia rate to those where it is lower. The shelter euthanasia rate is 10 times higher in some places than in others:

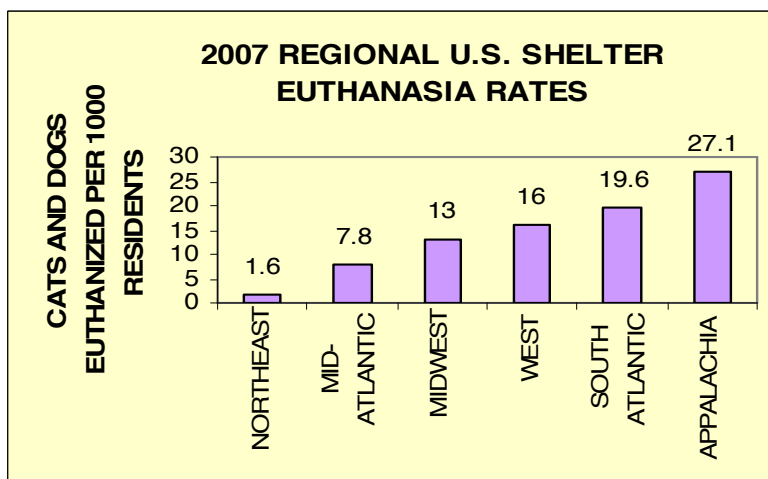


Figure 22.⁴¹⁴

There is even substantial variation in shelter intake and euthanasia rates within individual states. In 2007, intake rates in some counties in California were more than four times higher than those in others.⁴¹⁵

Research regarding regional variations in the demographics and disposition of shelter animals can help identify the factors that underlie them; to date, though, they have received only limited attention.⁴¹⁶ A better understanding of the process by which shelter intake and euthanasia rates have been reduced in some areas can help identify the programs that have contributed to the reductions and provide insights about the reasons for the success—or failure—of individual programs. Without such an understanding, it will be difficult to effectively allocate resources to the programs and policies that best address the root causes of overpopulation.

- ◆ **EFFECTIVE ALLOCATION OF RESOURCES:** Over the years, public and private shelters have provided most of the funding for overpopulation programs, but their ongoing responsibility for the animals in their care has limited the amount of resources that they could allocate to preventive programs. In recent years, however, private foundations have committed increasing

amounts of funding to overpopulation programs and are regularly faced with decisions about whether to fund downstream programs (e.g., offsite adoption programs or adoption transport programs) or upstream ones (e.g., pet sterilization programs or the construction of pet sterilization clinics).

If a sheltering system is at capacity and every additional intake results in an animal being euthanized, an expenditure that results in one less animal entering the system has an equivalent life-saving impact to one that leads to the successful adoption of a shelter animal. Research regarding the comparative cost-effectiveness of expenditures in various upstream and downstream programs would help funders allocate their resources in ways that maximize their impact. The impact of adoption programs is immediate while the full impact of increased pet sterilization rates on shelter intakes may not be felt for many years,⁴¹⁷ a factor that must be taken into account when comparisons are made regarding the cost effectiveness of different strategies.

“These results demonstrate that there are several cost-effective methods of reducing dog overpopulation. Spay/neuter campaigns are the most effective over long time horizons. Cost-effective numbers are shown here because they allow a common unit for the comparison of programs. It must be noted however that these cost-effective numbers are rough estimates at best, and are best interpreted as level-of-magnitude estimates of costs rather than precise forecasts, since public responsiveness and a number of other key variables are not known with certainty. Well-monitored pilot programs would be an ideal method for testing these costs.”

Frank J (2004). An interactive model of human and companion animal dynamics: the ecology and economics of dog overpopulation and the human costs of addressing the problem. *J. Human Ecology* **32** (1): 127.

CONCLUSION: Preliminary research has been completed regarding several issues that affect the dynamics, volume, and demographics of cats and dogs that enter shelters in the United States, but much work remains to be done. Given the historical lack of data in the field, the strategies currently employed are based on many untested assumptions:

- ◆ **Pet sterilization programs:** Future research may show that resources should be directed at decreasing the frequency of pre-sterilization litters in addition to increasing the overall pet sterilization rate;
- ◆ **Adoption programs:** Research may identify currently underutilized offsite locations—such as private veterinary clinics—that could substantially increase the volume of successful shelter adoptions;

- ◆ **Feral cat programs:** Research may identify preventive strategies—such as low-income cat sterilization subsidy programs or stricter enforcement of laws against pet abandonment—that reduce the migration of household cats to free-roaming status and increase the effectiveness of trap/neuter/return programs;
- ◆ **Public information and awareness programs:** Research may identify the components and content of the educational programs that can most effectively augment pet sterilization and shelter adoption initiatives.

The emergence of shelter medicine as a veterinary specialty has come at an opportune time. The contribution veterinarians can make extends far beyond using their medical skills and training to enhance and protect the health of shelter animals. Veterinarians have the specialized training and an evidence-based approach that can catalyze the eradication of shelter overpopulation. Research regarding the causes of pet homelessness and effective strategies to overcome it can lead to breakthroughs in both upstream and downstream strategies and to the more effective allocation of resources between the two.

The last decade has seen a substantial increase in funding for pet sterilization and adoption programs. There also has been a proliferation of legislative attempts to reduce shelter overpopulation. Progress, though, has been slow and halting, compared to the steady and sustained progress of the previous two decades:

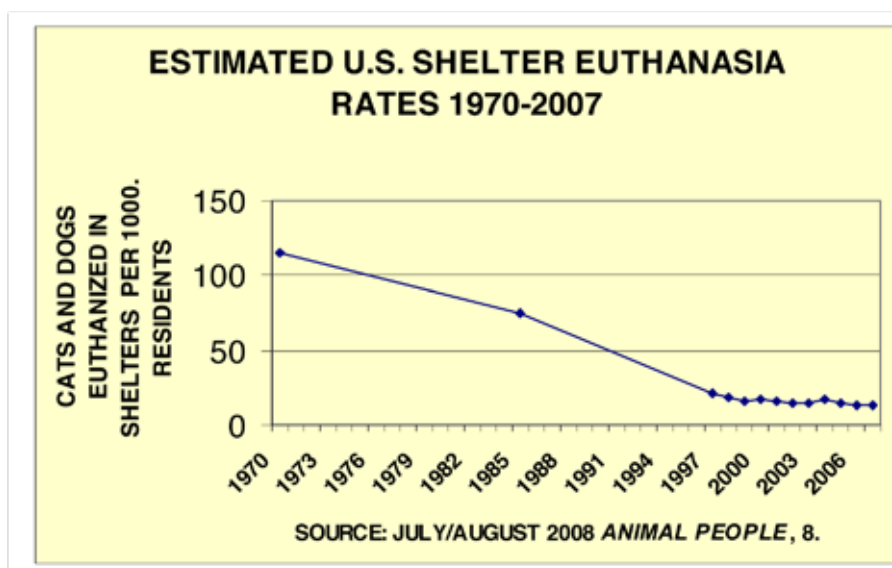


Figure 23.

A likely factor in the slowing of progress is that as intake rates decrease, the interventions necessary for further progress must be more accurately targeted in order to effectively address the remaining sources of overpopulation.

Without data-driven programs, future efforts to eradicate the use of population control euthanasia will continue to involve trial and error, with the delays and inefficiencies that entails. Data from jurisdictions that have made the greatest progress suggest that shelter euthanasia rates can be reduced from the current level of about 14 Pets Per Thousand People (PPTP)⁴¹⁷ to 3 PPTP or less. At the current rate of progress, it will take another two decades or more to fully eradicate shelter overpopulation in the United States. Accomplishing that more quickly will require an increased commitment to the development and implementation of evidence-based programs.

³⁸⁸ Scarlett JM (2008). The interface of epidemiology, pet population issues and public policy. *Prev. Vet. Med.* **86**:195.

³⁸⁹ DiGiacomo N, Arluke A, & Patronek G (1998). Surrendering pets to shelters: The relinquisher's perspective. *Anthrozoos* **11** (1): 50.

³⁹⁰ http://www.maddiesfund.org/Resource_Library/Alternatives_to_Relinquishment.html.

³⁹¹ http://www.maddiesfund.org/Resource_Library/New_Policy_Saves_All_Healthy_and_Treatable_Shelter_Pets.html.

³⁹² Levy JK & Crawford PC (2004). Humane strategies for controlling feral cat populations. *J. Am. Vet. Med. Assoc.* **225** (9): 1357.

³⁹³ *Ibid.*, 1359.

³⁹⁴ Baker J (2009). A big new voice for shelter animals. *Animal Sheltering*, May/June 2009: 6-8.

³⁹⁵ Scarlett J (2004). Pet Population Dynamics and Animal Shelter Issues. Shelter Medicine for Veterinarians and Staff, L. Miller and S. Zawistowski (eds.) Ames, Iowa: Blackwell Publishing, 20.

³⁹⁶ Kidd AH, Kidd RM, & George CC (1992). Veterinarians and successful pet adoptions. *Psychological Reports* **71** (2): 554.

³⁹⁷ Chu K, Anderson WM, & Rieser MY (2009). Population characteristics and neuter status of cats living in households in the United States. *J. Am. Vet. Med. Assoc.* **234** (8): 1030.

³⁹⁸ Levy and Crawford, Humane strategies for controlling feral cat populations, 1354.

³⁹⁹ Wallace JL & Levy JK (2006). Population characteristics of feral cats admitted to seven trap-neuter-return programs in the United States. *J. Fel. Med. & Surgery* **8**: 279.

- ⁴⁰⁰ Levy and Crawford, Humane strategies for controlling feral cat populations, 1358.
- ⁴⁰¹ Slater MR & Shain S (2005). Feral cats: an overview in *State of the Animals III*, D.J. Salem & A.N. Rowan (eds.). Washington, D.C.: Humane Society Press, 46.
- ⁴⁰² Lord LK, Wittum TE, & Scarlett JM (2007). Use of group-randomized trials in pet population research. *Prev Vet Med* **82** (3-4): 171.
- ⁴⁰³ Patronek GJ, Glickman LT, Beck AM, McCabe GP, & Ecker C (1996). Risk factors for relinquishment of dogs to an animal shelter. *J. Am. Vet. Med. Assoc.* **209** (3): 572-581.
- ⁴⁰⁴ Patronek GJ, Glickman LT, Beck AM, McCabe GP, & Ecker C (1996). Risk factors for relinquishment of cats to an animal shelter. *J. Am. Vet. Med. Assoc.* **209** (3): 582-588.
- ⁴⁰⁵ Moulton C, Wright P, & Rindy K (1991). The role of animal shelters in controlling pet overpopulation. *J. Am. Vet. Med. Assoc.* **198** (7): 1173.
- ⁴⁰⁶ New, Jr. JC, Kelch WJ, Hutchinson JM, Salman MD, King M, Scarlett JM, & Kass PH (2004). Birth and death rate estimates of cats and dogs in U.S. households and related factors. *J. Appl. Animal Welfare Sci.* **7** (4): 238.
- ⁴⁰⁷ Ibid.
- ⁴⁰⁸ Scarlett, the interface of epidemiology, pet population issues and public policy, 194.
- ⁴⁰⁹ Andreasen AR (2006). *Social Marketing in the 21st Century*. Thousand Oaks, California: Sage Publications, Inc., 7.
- ⁴¹⁰ Cammisa H (2009). Messaging spay/neuter: lessons from the Gulf Coast spay/neuter campaign. http://hsus.org/web-files/PDF/messaging-spay-neuter-report_final.pdf.
- ⁴¹¹ New Jr. JC, Salman MD, King M, Scarlett JM, Kass PH, & Hutchinson JM (2000). Characteristics of shelter-relinquished animals and their owners compared with animals and their owners in U.S. pet-owning households. *J. Appl. Animal Welfare Sci.* **3** (3): 193.
- ⁴¹² Chu et al., Population characteristics and neuter status of cats living in households, 1023. Ibid.
- ⁴¹³ Clifton M (2008). Gains in most regions against cat and dog surplus, but no sudden miracles. *Animal People* 2008: **July/Aug**: 8.
- ⁴¹⁴ California Department of Health Services, Annual Reports of Local Rabies Control Activities, 2007.
- ⁴¹⁵ Wenstrup J & Dowidchuk A (1999). Pet overpopulation: data and measurement issues in shelters. *J. Appl. Animal Welfare Sci.* **2** (4): 310.
- ⁴¹⁶ Frank J (2004). An interactive model of human and companion animal dynamics: The ecology and economics of dog overpopulation and the human costs of addressing the problem. *J. Human Ecology* **32** (1): 123-125.
- ⁴¹⁷ Clifton M (2008). U.S. shelters killed 2.3 million cats and 1.9 million dogs last year. *Animal People* 2008: **July/Aug**: 8.

Appendix

A. Research Articles.

This section of the appendix contains selected abstracts and summaries of research articles that may be useful to those who design and implement programs to reduce shelter overpopulation. It is organized according to each article's primary topic to facilitate access for those who are especially interested in a particular issue. Comments regarding possible uses of the research findings for program design and suggestions about future research that may prove to be of value are included as well as—when available—sources from which a copy of the article or survey can be obtained.

■ DYNAMICS OF CAT AND DOG POPULATIONS

1. Nassar R, Mosier JE, & Williams LW (1984). Study of the feline and canine populations in the Greater Las Vegas area. *Am. J. Vet. Research* **54** (2): 282-287.

Summary: *Analysis of household dogs and cats based on age-distribution data and on age-specific birth and survival rates, as well as on pet source, indicated that the dog and cat populations are stable and not increasing in size (lambda congruent to 1). Roaming dogs and cats euthanatized at the pound represented about 5.7% and 8.1% of the estimated dog and cat populations, respectively. The death at the pound seems to be effective in checking pet population growth.*

Among pets acquired, 84% were less than 1 year of age for dogs as compared with 88% for cats. Breeders and pet shops supplied about 7% of cats and 17% of dogs. About 10% of cats and 10% of dogs were acquired at the pound, while 6.4% of dogs and 14% of cats were acquired as stray. About 45% of dogs and 41% of cats were acquired from pet owners. Some dogs (12.46%) and cats (12%) were imported from outside the Las Vegas area. Of dogs and cats below 2 months of age, 33% and 19.5%, respectively, came from breeders or pet shops or were imported from outside the area.

Seventeen percent of unspayed female dogs and 16% of unspayed female cats reproduced. The percentages of spayed females were 77 for dogs and 86 for cats. Forty-five percent of the dogs and 48% of the cats were males. Among dogs at the shelter, 2% were neutered and 26% spayed. At the pound, 24% of dogs were small breeds, 24% medium size breeds, and 52% large breeds. In the population, on the other hand, 35% were small breeds, 30% were medium sized breeds, and 35% were large breeds. These figures indicate that the majority of dogs that roam may be large breeds.

Forty-six percent of households had dogs, while 22% had cats. For households with dogs, there was an average of 1.49 dogs/household. For households with cats, the average was 1.61 cats. The ratio of people to pets was 3.92:1 for dogs and 7.74:1 for cats. We estimate that the increases in dogs and cats in 1982 as a result of new pet ownership were 3.6% and 1.8% respectively. These should be considered as the upper limits. The deaths at the pound are likely to compensate for this increase.

The average age at death was 7.02 years for cats and 9.57 years for dogs. The average age in the dog population was 5.32 years. The average age in the cat population was 4.86 years. The average age (as estimated by pound personnel) for a pet entering the pound was 1.68 years for dogs and 1.16 years for cats. The average age (as given by owner claiming the pet) was 2.53 years for dogs and 1.66 years for cats.

Dogs acquired from breeders and pet shops were represented with considerably less frequency in the pound (significantly less than their representation in the population). This may imply that they did not roam as much as dogs from other sources. Dogs born at home or acquired from the pound were represented at the pound at a much higher frequency than their representation in the population, implying that these dogs were allowed to roam more often than others. Approximately 15% of the dog and cat population were handled at the pound per year. There is evidence that a majority of roaming dogs and cats are owned animals.

Comment: Though limited to the study of cat and dog populations in a single community, this comprehensive research first explored many significant issues that were to become the subjects of later research. One such topic was the age distribution of cat and dog acquisitions. In this community, 84% of dogs acquired from all sources were less than a year old when acquired, as were 88% of all cats. Pets entering the local shelter were frequently older than this. The average age of dogs entering the shelter was 1.68 years; for cats it was 1.16 years. People appeared to adopt dogs and cats from the shelter when their age was in the same range as that of the pets that were acquired from other sources. Eighty percent of dogs that were adopted from the shelter were less than a year old, as were 90% of adopted cats. The shelter ac-

counted for only 10.35% of all cat acquisitions in the area and 9.67% of dog acquisitions, perhaps because many pets in the shelter were older than the public's apparent preference for juvenile animals. These age-based acquisition data were consistent with those found in a subsequent study of cat and dog populations in St. Joseph County, Indiana (**Appendix A2**) and suggest that to maximize their impact, shelter adoption programs may need to incorporate a public education component regarding the benefits of adopting adolescent and adult pets.

The reproductivity of cats and dogs of different age ranges was another significant issue examined in this study. In the area studied, the litter production rate of female cats in their reproductive years was strongly skewed toward younger cohorts. The most prolific age group of female cats was those between six months of age and one year old. Cats between the ages of two and three were only half as prolific. Some of this difference is likely due to the frequency with which owners delayed sterilizing female cats. Fifty-two percent of cats between the age of weaning and one year old had been sterilized, while 94% of those between two and three years old had been sterilized. The same trend held true for dogs. Dogs between the ages of one and two years were the most prolific and almost twice as prolific as those between three and four years old.

These data make clear that increasing the timeliness of sterilizations and reducing the frequency of pre-sterilization litters are critical to effectively managing pet populations through sterilization. More than 85% of female cats and 79.22% of female dogs in the area had been sterilized. Based on the local age-dependent birth and death rates, the authors of this study determined that the overall sterilization rate should have stabilized dog and cat populations in the area, but it had not. Population control euthanasia was needed to maintain a relatively stable pet population. This highlights the need for pet sterilization programs to take effective measures to reduce the frequency of pre-sterilization litters.

The source of pet acquisitions was another significant issue examined in this study. The acquisition of strays made up 14.5% of all cat acquisitions, even outstripping the rate at which cats were adopted from the shelter (10.35% of all acquisitions). Later research found that more stray and homeless cats were taken into homes than those adopted from shelters in an Indiana county (**Appendix A2**) and nationally (**Appendix A4**). These data raise a concern that the beneficial impact of shelter adoption programs in reducing overall feline homelessness will be offset by the extent to which increased shelter adoptions result in fewer non-sheltered homeless

cats acquiring homes. To avoid that, adoption programs may need to be augmented with effective pet sterilization subsidy programs to reduce the frequency with which intact cats roam away from home and public information and awareness campaigns about the benefits of keeping cats indoors.

The breakdown of sterilization rates by species and gender was a fourth topic examined in this study. While cats of both genders were sterilized at about the same rate, 77% of female dogs, but only 26% of male dogs, were sterilized in this community. This gender sterilization disparity was consistent with studies of dog sterilization rates in an Indiana county (**Appendix A2**) and four towns in Massachusetts (**Appendix A12**). Because sexually intact dogs tend to be relinquished by their owners at twice the rate of their sterilized counterparts (Page 28), pet sterilization education programs may need to include material that specifically addresses the benefits of sterilizing male dogs.

2. Patronek GJ, Beck AM, & Glickman LT (1997). Dynamics of cat and dog populations in a community. *J. Am. Vet. Med. Assoc.* 210 (5): 637-642.

Abstract: *OBJECTIVE—To describe dynamics of the pet dog and cat populations in a single community in terms of reproductive patterns and turnover.*

DESIGN—Cross-sectional, random-digit dial telephone survey. SAMPLE POPULATION—Information gathered from 1,272 households in St. Joseph County, Ind. that

owned a dog or cat between Dec 1, 1993 and Nov 30, 1994 was compared with data on 9,571 dogs and cats received by the Humane Society of St. Joseph County during the same period. RESULTS—Prevalence of pet ownership was lower than expected, compared with consumer panel surveys. Eight hundred forty-three of 1,335 (63.1%) dogs

were neutered, compared with 816 of 1,023 (79.8%) cats. Cost was cited as a reason that 35 of 441 (7.9%) dogs and 34 of 132 (25.8%) cats were not neutered. Only 33 of

968 (3.4%) dog-owning households reported that their dog had had a litter during the past year, whereas 52 of 662 (7.9%) cat-owning households reported that their cat had

had a litter of kittens. Most cat litters were planned. Annual turnover in owned pets was 191 of 1,354 (14.1%) dogs and 184 of 1,056 (18.4%) cats. Pet owners underreported

relinquishing pets to a shelter in the telephone survey. CLINICAL IMPLICATIONS—A combination of animal shelter and human population-based data are needed to describe

pet population dynamics in a community. Information about species-specific reproductive patterns is essential in designing population control programs.

Comment: This was the first published study to consider the possible association between household income levels and pet sterilization rates. Households with annual incomes of less than \$20,000 were more likely to have an intact dog at least 6 months old (34/27.9%) but that difference was not statistically significant. Data from a more recent national survey showed that households with annual incomes of less than \$12,500 a year were significantly more likely to have an intact dog than households with higher incomes (data collected in 2008 for 2009/2010 American Pet Products Association [APPA] National Pet Owners Survey—Figure 5, Page 12).

In the St. Joseph County survey, low-income households were also more likely to have an intact adult cat than other all households (23.1/10.1%), a difference that was highly statistically significant. Subsequent national research found that household income level was strongly predictive of cat sterilization rates (**Appendix A16**). Data collected for the 2009/2010 APPA National Pet Owners Survey also showed that people living in low-income households were significantly more likely to have an intact cat than those in other households (Figure 5, Page 12). These data suggest that pet sterilization programs which include subsidies to make neutering affordable for low-income owners will be more effective in increasing the pet sterilization rate than those that do not.

A second issue examined in this study was the reason owners of intact pets gave for not having had an animal sterilized. In the county studied, cat owners cited cost as a reason much more frequently than dog owners (25.8/7.9%). This pattern was consistent with that of a 1991 random telephone survey of Massachusetts pet-owning households, in which 22% of owners of intact cats, but not a single dog owner, cited cost as a reason for not having had the pet sterilized [Dorr Research Corporation (1991) Massachusetts Public Opinion Study on Spaying and Neutering of Pets, Boston, MA: Massachusetts Society for the Prevention of Cruelty to Animals, 8]. In a subsequent national survey, cost was the most frequent reason given by owners of a cat that had an unplanned litter for not having had the cat sterilized (**Appendix A4**). These data support the use by pet sterilization programs of a two-tiered co-payment structure in which the cost paid by cat owners to have their pet sterilized is less than that paid by dog owners.

As in the Las Vegas study (**Appendix A1**), age distribution data showed that pet owners in this county frequently delayed having a female dog sterilized until the animal was well into her reproductive years. Sixty-three and nine-tenth percent of the female dogs between six months and three years old had been sterilized; the

sterilization rate for female dogs between the ages of three and seven years old was 73.8%; for those over than seven years old, it was 86.4%.

Sterilization of a female cat well after first estrus was common, too. The sterilization rate for female cats between six months and three years old was 76.5%; for those between three and seven years old, it was 90.7%; and 96.2% of those older than seven years old had been sterilized. Recent data from a high-volume pet sterilization program in Tennessee showed a similar pattern, in which the sterilization of both female dogs and cats was commonly delayed beyond first estrus (Figure 20, Page 93). These age-specific sterilization data suggest that increasing the number of sterilizations that are performed before an animal's first estrus can be of significant value in the management of cat and dog populations through sterilization.

As with the Las Vegas study (**Appendix A1**) and a study of dog and cat populations in four Massachusetts towns (**Appendix A12**), there was a gender disparity in the sterilization rate of dogs, but not cats. Slightly over half (52.9%) of male dogs had been sterilized compared to 72.7% of females.

Consistent with the Las Vegas data (**Appendix A1**), this survey found that 84% of all dogs and cats had been acquired when less than a year old.

Another significant issue examined in this study was the extent to which the breeding of owned cats and dogs was intentional. Almost nine of ten (88.9%) feline litters were unplanned compared to less than two-fifths of canine litters (38.5%). A subsequent national survey found similar results (**Appendix A4**). This suggests that programs to reduce the rate of unplanned or accidental litters can have significant impact in reducing feline reproductive rates.

Source: A copy of this article can be purchased from the cat.inist website at <http://cat.inist.fr/?aModele=afficheN&cpsidt=10739381>.

3. Wenstrup J & Dowidchuk A (1999). Pet overpopulation: Data and measurement issues in shelters. *J. Appl. Animal Welfare Sci.* **2** (4): 303-319.

Abstract: *Data collection and analysis within animal shelters are critical to developing effective programs that reduce the number of dogs and cats euthanized each year. However, current data collection efforts are insufficient to identify the magnitude, dynamics,*

or root causes of euthanasia in animal shelters across the United States. The purpose of this study was to examine potential solutions to the underlying root causes of pet overpopulation, with 2 elements. The first, more explicit goal was to establish a baseline of shelter data, policies, and viewpoints through a detailed survey of 186 shelters, 12 site visits, and numerous interviews. The findings suggest large variation in local issues faced by shelters, as well as a nearly universal focus on sterilization as a solution. The greater objective, however, was to use this information as an impetus to improve the process by which shelters amalgamate information and effectively use it to target the most pressing needs within their communities. We believe the essential step is to provide shelters with an analytical tool that would yield informational benefits exceeding the cost of data collection. Such an improvement would have a positive spillover effect on researchers, donors, and others attempting to collect standardized, geographically scalable data. This article presents an overview of the survey findings, as well as a prototype of a tool to help improve data amalgamation and analysis efforts within shelters.

Comment: This 1998 study was based on survey data provided by 186 public and private shelters in the United States. The quantitative data were supplemented by personal interviews and site visits to 12 shelters in five states.

A great deal of variation was found in the demographics of the animals that entered shelters in different localities. This suggests that shelter data from national surveys and from shelters located in other jurisdictions may be of limited value in the design of programs for a particular locality.

Data were collected about sheltering expenses and shelter population levels from which a unit cost per animal handled (\$176) was derived. Such data are needed to better understand the economics of animal sheltering operations. More complete data about animal control expenditures could be of significant value, especially if they were broken down between fixed costs (i.e., costs that do not vary with the volume of animals handled) and variable costs. This could provide a sound basis for cost-benefit analyses to determine the appropriate level of funding for various animal sheltering policies and programs.

Data were also collected regarding the period of time before an animal exited the surveyed shelters through adoption, redemption, or euthanasia (an average of 9.5 days). Collecting similar data in future studies could help determine whether increased holding periods affect adoption rates or the incidence of disease and medical euthanasia rates in a shelter.

Source: A copy of this article can be purchased from the informaworld website at <http://www.informaworld.com/smpp/ftinterface?content=a783708082&rt=0&format=pdf>

4. New, Jr. JC, Kelch WJ, Hutchinson JM, Salman MD, King M, Scarlett JM, & Kass PH (2004). Birth and death rate estimates of cats and dogs in U.S. households and related factors. *J. Appl. Animal Welfare Sci.* 7 (4): 229-241.

Abstract: *Studies report variable factors associated with dog and cat surpluses in the United States. Estimates of cat and dog birth and death rates help understand the problem. This study collected data through a commercial survey company, distributing questionnaires to 7,399 cat- and dog-owning households (HHs) in 1996. The study used an unequal probability sampling plan and reported estimates of means and variances as weighted averages. The study used estimates of HHs and companion animals for national projections. More than 9 million owned cats and dogs died during 1996-yielding crude death rates of 8.3 cat deaths/100 cats in HHs and 7.9 dog deaths/100 dogs in HHs. The study reported twice as many kitten as puppy litters, with an average litter size of 5.73 and 7.57, respectively. The study reported data on planned versus unplanned litters, reasons caregivers did not spay females, disposition of litters, and sources of animals added to HHs. These first national estimates indicate the magnitude of, and reasons for, animals leaving HHs. The crude birth rate was estimated to be 11.2 kittens/100 cats in HHs and 11.4 puppies/100 dogs in HHs.*

Comment: Many findings of this national survey were consistent with those of several local studies. Data about the frequency with which stray and abandoned cats acquired homes were consistent with those from the Las Vegas study (**Appendix A1**) and the St. Joseph County study (**Appendix A2**). In 1996, stray cats were taken into U.S. households about two and a half times more often than cats were adopted from shelters (2.07/.82 million).

Cost was the reason most frequent reason given for not having had a pet sterilized by owners of female cats that had given birth to an unplanned litter during the survey period; it was much less frequently given by dog owners whose pets had an unplanned litter (.49 million cat-owning households/.17 million dog-owning households). Cat owners also more frequently cited cost as a reason for not having had a pet sterilized than dog owners in a 2007 telephone survey of pet-owning households in Louisiana

and Mississippi [Cammisa H (2009). Messaging spay/neuter: lessons from the Gulf Coast spay/neuter campaign. http://hsus.org/web-files/PDF/messaging-spay-neuter-report-_final.pdf]. These findings are consistent with those first reported in the St. Joseph County study (**Appendix A2**).

This survey included information from owners whose pets had litters about whether the litters were planned or unplanned. As with the St. Joseph County, Indiana survey (**Appendix A2**), more than four-fifths of all litters of kittens were unplanned (81%) compared to less than half of all litters of puppies (47.4%).

Source: A copy of this article can be obtained at no cost from the National Council on Pet Population Study and Policy website at http://www.petpopulation.org/BirthandDeathRateEstimatesJAAWS7_4.pdf.

5. Di Nardo A, Candeloro L, Budke CM, & Slater MR (2007). Modeling the effect of sterilization rate on owned dog population size in central Italy. *Prev. Vet Med.* **82**: 308-313.

Abstract: *A spreadsheet population dynamics model was constructed to evaluate the impact of female dog sterilization on the domestic dog population for the province of Teramo, Italy. Baseline owned dog population structure as well as the annual number of births, adoptions, abandonments, and purchases were estimated based on regional managed kennel data in addition to a telephone questionnaire administered to members of the local population. Age- and gender-dependent death rates were based on domestic dog life tables. The model predicts that at the current female dog sterilization rate of 30%, the owned dog population will most probably continue to increase. After 20 years, a mean annual increase of 2.6% (median: 2.5%, 95% CI: -3.2% to 8.8%) is projected assuming that the average age at sterilization is 3 years. A sterilization rate of at least 55% is estimated to be needed to halt population growth if the current age structure for female dog sterilization is maintained. However, if the province of Teramo were to focus on sterilizing female dogs less than 1 year of age, the required sterilization rate to arrest population growth could be reduced to as low as 26%.*

Comment: The authors of this study constructed a statistical model to evaluate the impact of different female dog sterilization rates and average ages of sterilization on the domestic dog population in an Italian province. According to the model, if the current female sterilization rate (30%) and average age of sterilization (3 years)

were maintained, the annual mean domestic dog population in the province would increase by 2.6% after 20 years. The sterilization rate would have to increase to 55% to halt population growth if the current age structure for the sterilization of female dogs was maintained. If the average age at which female dogs were sterilized was reduced to less than one year old, however, the sterilization rate needed to arrest population growth would be reduced to as low as 26%. This model demonstrates the enormous impact that pre-sterilization litters can have on the reproductive rate of domestic dogs.

Source: A copy of this article can be purchased at the website of Science Direct: <http://www.sciencedirect.com/science>

■ RESOURCE ALLOCATION

6. Frank J (2004). An interactive model of human and companion animal dynamics: The ecology and economics of dog overpopulation and the human costs of addressing the problem. *Human Ecology* **32** (1): 107-130.

Abstract: *Companion animal overpopulation is a problem of human creation with significant human costs that can only be addressed through human action. A model was constructed to understand the dynamics of canine overpopulation and the effectiveness of various policy options for reducing euthanasia. The model includes economic and ecological factors in human and dog populations. According to the model, a “no-kill” society is an achievable goal at an acceptable human cost. Spay/neuter programs were generally found to be the most effective, with increasing adoptions also being an effective option. However, spay/neuter policies need to be evaluated over a very long time horizon since full impact may not be achieved for 30 years or more. Spay/neuter efforts can have a large impact even if they only effect (sic) a small portion of the human population. Adoption and spay/neuter programs were found to work well in combination, and to continue being effective as society approaches “no-kill” dynamics.*

Comment: In this study, various policy options to reduce canine shelter overpopulation were analyzed to determine their relative cost efficiency and compatibility with other strategies. Data from a survey of the human and dog populations in the Capital Region of New York State were used to construct a mathematical model. Many policy options were studied: increasing shelter capacity, providing financial incentives to

adopt dogs from shelters, imposing taxes on the acquisition of dogs from sources other than a shelter, and establishing low-cost spay/neuter programs, educational programs promoting pet sterilization, educational programs promoting the adoption of dogs from shelters, and educational programs to reduce pet abandonment rates.

Low-cost pet sterilization programs and educational programs promoting pet sterilization were found to be the most effective methods of addressing canine shelter overpopulation, especially when long-term impacts were considered.

Adoption programs were found to be less cost efficient than pet sterilization programs, but still quite effective, especially if they resulted in switching dog acquisitions from other sources to shelters instead of increasing the total number of dog owners.

Programs to reduce dog abandonment rates were found to be less efficient in reducing shelter euthanasia rates than either pet sterilization or adoption programs.

Source: A copy of this article can be purchased from the Springer Science & Business Media website at <http://www.springerlink.com/content/wr3604327413804r>.

■ RELINQUISHMENT OF PETS TO SHELTERS

7. Patronek GJ, Glickman LT, Beck AM, McCabe GP, & Ecker C (1996). Risk factors for relinquishment of dogs to an animal shelter. *J. Am. Vet. Med. Assoc.* **209** (3): 572-581.

Abstract: *OBJECTIVE*—To identify canine and household characteristics associated with relinquishment of a pet dog to an animal shelter. *DESIGN*—Case-control study. *SAMPLE POPULATION*—Households that relinquished dogs for adoption (case households) and a random sample of current dog-owning households in the same community (control households). *RESULTS*—Potentially modifiable factors that explained the highest proportion of relinquishment were owners not participating in dog obedience classes after acquisition, lack of veterinary care, owning a sexually intact dog, inappropriate care expectations, and dogs having daily or weekly inappropriate elimination. Dogs obtained from shelters, kept in crates, or acquired at > or = 6 months of age were at increased risk of relinquishment. Greater purchase price was associated with decreased

risk of relinquishment, but relinquishment was not associated with the degree of planning to acquire the dog. Dogs with behavioral problems and little veterinary care were at greater risk of relinquishment than were dogs with regular veterinary care, and behavioral problems were associated with inappropriate care expectations. CLINICAL IMPLICATIONS—Risk factors identified in this study can be modified by dog owners and veterinarians to decrease the estimated 2 million dogs euthanatized annually in animal shelters. Veterinarians should educate owners about typical dog behavior, routine care requirements and training, and the importance of regular veterinary visits; should incorporate wellness concepts in their practice; and should focus on preventive medicine and behavioral consultation.

Comment: This study examined factors that were associated with an increased risk of relinquishment of dogs to an Indiana shelter and first explored many issues that became subjects of the Regional Shelter Relinquishment Survey undertaken by the National Council on Pet Population Study and Policy. **(Appendix A9).** Sexually intact dogs were three times more likely to be relinquished to the shelter studied, perhaps because they were also significantly more likely to engage in problematic behaviors, such as inappropriate elimination or unwanted chewing. Nearly one-third of all relinquishments to the shelter were attributed to a dog's intact status. This suggests that the impact of pet sterilization programs in reducing shelter overpopulation extends beyond managing the size of the pet population to reducing relinquishment rates. It also suggests that by adopting a pre-release sterilization policy instead of placing intact dogs with a neutering deposit, a shelter will increase the rate at which dogs adopted from the shelter will be successfully retained in an adoptive home.

It was also found that participation in a dog training class after acquisition significantly reduced the risk that a dog would subsequently be relinquished. Public information and awareness programs that promote the benefits of training programs and subsidized classes for low-income dog owners would likely be of significant value if they increase the rate at which new dog owners participate in training classes. In addition, by offering dog training classes to adopters and offering a subsidy to those unable to pay the full cost, shelters would likely benefit by increasing participation in training classes and subsequent adoptive retention rates.

Another modifiable risk factor associated with an increased risk of relinquishment was an owner's expectation that the care of a dog would be less work than it turned out to be. Nearly one-third of all relinquishments were attributed to an owner's underestimate of the amount of work that would be required to care for the dog. In

addition, owners who adopted dogs from shelters were significantly more likely to report that the dog required more care than expected. The authors of the study suggested that subsequent research would be helpful to evaluate the efficacy of various pre-adoption counseling programs.

Source: A copy of this article can be purchased from the cat.inist website at <http://cat.inist.fr/?aModele=afficheN&cpsidt=10977491>

8. Patronek GJ, Glickman LT, Beck AM, McCabe GP, & Ecker C (1996). Risk factors for relinquishment of cats to an animal shelter. *J. Am. Vet. Med. Assoc.* **209** (3): 582-588.

Abstract: *OBJECTIVE*—To identify feline and household characteristics associated with relinquishment of a pet cat to an animal shelter. *DESIGN*—Case-control study. *SAMPLE POPULATION*—Households that relinquished cats for adoption (case households) and a random sample of current cat-owning households in the same community (control households). *RESULTS*—Potentially modifiable risk factors with the highest population attributable risk for relinquishment were owners having specific expectations about the cat's role in the household, allowing the cat outdoors, owning a sexually intact cat, never having read a book about cat behavior, cats having daily or weekly inappropriate elimination, and inappropriate care expectations. Frequency of inappropriate elimination and aggression toward people were not associated with declaw status, but these behaviors were more common among sexually intact cats, compared with sterilized cats. Owners of cats in case households were more likely than owners in control households to cite cost of sterilization as a reason a cat was sexually intact. Cats found as strays and cats acquired with minimal planning were at decreased risk of relinquishment. *CLINICAL IMPLICATIONS*—The identified risk factors can be modified by cat owners and veterinarians to decrease the estimated 4 million cats euthanatized annually in animal shelters. Owner education programs are needed as well as increased awareness on the part of cat owners and veterinarians of the importance of resolving feline inappropriate elimination problems.

Comment: This study was the companion to the authors' research regarding risk factors for the relinquishment of dogs to an Indiana shelter (**Appendix A7**). Among the modifiable risk factors that were associated with an increased risk of feline relinquishment was being sexually intact. Unsterilized cats were four times more likely to be relinquished, perhaps because such problematic behaviors as inappropriate elimination and aggression toward people were also associated with being sexually

intact. Nearly one-third of all feline relinquishments to the shelter were attributed to a cat's intact status. Programs that increase the local sterilization rates of owned cats may not only help better manage the size of the cat population, they also may help reduce the rate at which owned cats are relinquished to local shelters. In addition, shelters that adopt a pre-release sterilization policy in the place of a neutering deposit may increase the retention rate of adopted cats.

Having unrealistic expectations about a cat's role in the family or the amount of work required to care for the animal was also associated with an increased risk of relinquishment. A shelter may be able to increase the rate at which cats are successfully retained in their adoptive homes by insuring that prospective adopters are well informed about these matters prior to adoption. Not having owned another cat as an adult was also associated with a heightened relinquishment risk, so adoption counselors may want to take special care that this group of prospective adopters receive thorough pre-adoption counseling.

Source: A copy of this article can be purchased from the cat.inist website at <http://cat.inist.fr/?aModele=afficheN&cpsidt=10977492>

9. New Jr. JC, Salman MD, King M, Scarlett JM, Kass PH, & Hutchinson JM (2000). Characteristics of shelter-relinquished animals and their owners compared with animals and their owners in U.S. pet-owning households. *J. Appl. Animal Welfare Sci.* **3** (3): 179-201.

Abstract: *Animal shelters in the United States annually receive millions of relinquished dogs and cats, and risk factors for relinquishment are not fully understood. Investigators sponsored by the National Council on Pet Population Study and Policy interviewed people who relinquished dogs and cats at 12 shelters in four regions. We collected similar data from a sample of U.S. households with companion animal. Data collected included nonhuman animal characteristics such as age, sex, and frequency of selected behaviors. We also obtained data on keepers' (owners') age, sex, and level of education as well as their general knowledge of pet care and behavior. We found that relinquishment was associated with physical and behavioral characteristics of the animals and owner characteristics and knowledge. Relinquished animals were more likely to be intact, younger, and mixed bred. People relinquishing animals were significantly more likely to be men and younger than 35 years. Duration of ownership was significantly shorter for relinquished animals..*

Comment: This was the first study to report the widespread nature of the knowledge deficit among pet owners about whether a female pet would benefit from having a litter before being sterilized. Half of all owners in this national mail survey of pet-owning households (51.2% of the dog owners and 49.3% of cat owners) either mistakenly believed that a female animal would benefit from having a litter or did not know whether she would benefit or not. This knowledge deficit may have a significant practical impact: In a 2007 national survey, 40.7% of those who had an intact cat in their household cited their belief that a cat would benefit from having a litter before being sterilized as the reason they had not had the cat sterilized, the most common reason given (**Appendix A16**). Remediating this knowledge deficit through public information and awareness campaigns would likely be of great benefit in the effective management of dog and cat populations and the reduction of shelter relinquishment rates.

Consistent with findings of earlier studies that intact cats and dogs were more likely to be relinquished to an Indiana shelter (**Appendix A7 and A8**), intact status was associated with an increased risk of relinquishment to the 12 shelters included in this study. Intact dogs were found to have twice the risk of being relinquished to these shelters, and intact cats had more than three times the risk. In addition to other benefits, programs that increase local pet sterilization rates may also help reduce the frequency with which pets are relinquished to local shelters.

This study extended the findings of earlier local relinquishment studies (**Appendix A7 and A8**) in other respects, too. As in the Indiana studies, several factors were associated with an increased risk of canine and feline relinquishment to the 12 shelters studied (e.g., increased frequency of inappropriate elimination and an owner's unrealistic expectations about the amount of work that would be needed to care for the pet). To derive the full benefit from this research, it will be necessary to design interventions to reduce these risks and evaluate the effectiveness of each.

Source: A copy of this article can be obtained at no cost from the website of the National Council on Pet Population Study and Policy: <http://www.petpopulation.org/characteristicsofshelter.pdf>.

■ FERAL CAT MANAGEMENT PROGRAMS

10. Natoli E, Maraliano L, Cariola G, Faini A, Bonanni R, Cafazzo S, & Fantini C (2006). Management of feral domestic cats in the urban environment of Rome (Italy) *Prev Vet Med* **77** (3-4): 180-185.

Abstract: *In Italy, which is rabies-free, the national Law No. 281 [Legge Nazionale 14 agosto 1991. No. 281: Legge Quadro in materia di animali di affezione e prevenzione del randagismo. Gazz. Uff. Rep. Ital. no 203 del 30 agosto 1991: p. 3] on the management of pets and on the control of feral cats has introduced the no-kill policy for this species. Thus, “trap-neuter-release” (TNR) programs have been carried out for >10 years. In this paper we present data on registered colonies and censused cats in Rome from 1991 to 2000; the results of the neutering campaign from 1991 to 2000; and a survey, on 103 cat colonies, on the effects of demographic control of urban feral-cat colonies in the city of Rome, carried out by the local Veterinary Public Services (VPS) in collaboration with the associations of cat care-takers. In 10 years almost 8000 were neutered and reintroduced in their original colony. The spay/neuter campaigns brought about a general decrease in cat number but the percentage of cat immigration (due to abandonment and spontaneous arrival) is around 21%. This suggests that all these efforts without an effective education of people to control the reproduction of house cats (as a prevention for abandonment) are a waste of money, time and energy.*

Comment: This was the first published study about the impact of long-term Trap/Neuter/Release (TNR) programs on a large population of urban feral cats. While colonies that had been managed through TNR programs for two years or less showed a 13% increase in the total population, those that had been managed for 3, 4, 5, or 6 years showed decreases of 16, 29, 28, and 32% respectively. These data suggest that TNR programs can produce a significant decrease in urban feral cat populations, but only if sustained for several years.

The impact of TNR programs on the size of feral cat populations in the 103 colonies studied was greatly affected by the arrival of pet cats that had migrated from households or had been abandoned. Between 16% and 21% of each colony's population was made up of pets that had been abandoned by owners or migrated from households during the two- to six-year period after a colony first began to be studied. The authors concluded that controlling the reproduction of owned pet cats is crucial to achieve control of urban feral cat populations. They suggested that to effectively manage feral populations, TNR programs need to be combined with public information and

awareness campaigns to reduce the abandonment of owned cats and subsidized sterilization programs for household cats.

Source: A copy of this article can be purchased at the website of Science Direct : <http://www.sciencedirect.com/science>

11. Wallace JL & Levy JK (2006). Population characteristics of feral cats admitted to seven trap-neuter- return programs in the United States. *J. Fel. Med. & Surgery* 8: 279-284.

Abstract: *Internationally, large populations of feral cats constitute an important and controversial issue due to their impact on cat overpopulation, animal welfare, public health, and the environment, and to disagreement about what are the best methods for their control. Trap-neuter-return (TNR) programs are an increasingly popular alternative to mass euthanasia. The objective of this study was to determine the population characteristics of feral cats admitted to large-scale TNR programs from geographically diverse locations in the United States. Data from 103,643 feral cats admitted to TNR programs from 1993 to 2004 were evaluated. All groups reported more intact females (53.4%) than intact males (44.3%); only 2.3% of the cats were found to be previously sterilized. Overall, 15.9% of female cats were pregnant at the time of surgery. Pregnancy was highly seasonal and peaked between March and April for all of the groups. The average prenatal litter size was 4.1 ± 0.1 fetuses per litter. Cryptorchidism was observed in 1.3% of male cats admitted for sterilization. A total of 0.4% of cats was euthanased because of the presence of debilitating conditions, and 0.4% died during the TNR clinics. Remarkably similar populations of cats with comparable seasonal variability were seen at each program, despite their wide geographical distribution. These results suggest that it is feasible to safely sterilize large numbers of feral cats and that the experiences of existing programs are a consistent source of information upon which to model new TNR programs*

Comment: This study of 103,643 unowned free-roaming cats in the southern, southwestern, and northwestern United States found that only 2.3% had previously been sterilized. This suggests that sterilized pet cats do not commonly migrate from households to become free-roaming. As a result, programs that increase the sterilization rate of owned cats may reduce the rate they migrate to free-roaming status and increase the capacity of TNR programs to effectively manage feral populations.

Even though the cats studied were homeless and had variable access to food and shelter, only .4% were euthanized for debilitating conditions, such as neoplasia, chronic health conditions, trauma and infectious diseases. These data suggest that there is no animal welfare justification for the widespread trapping and euthanization of feral and free-roaming cats.

Source: A copy of this article can be purchased at the website of Science Direct: <http://www.sciencedirect.com>

■ PET STERILIZATION PROGRAMS

12. Manning MM & Rowan AN (1992). Companion animal demographics and sterilization status: Results from a survey in four Massachusetts towns. *Anthrozoos* 5 (3): 192-201.

Abstract: *A survey was conducted in four Massachusetts communities to determine levels of pet ownership and the sterilization status of those pets, to analyze the impact of sterilization on pet overpopulation, to identify major reasons owners do or do not sterilize their animal, and to assess the impact of cost on an owner's decision to sterilize, among other factors. The survey was conducted by telephone using randomly generated telephone numbers. Interviews were conducted with 343 households of which 42% owned pets and 58% owned no pets. The percentages of households owning dogs (22%) and cats (21%) were lower than those reported in national surveys, as were the numbers of dogs (1.17) and cats (1.66) per owning household. Information was collected on 209 animals of which 42% were dogs and 52% were cats. Of the animals in the survey, 18.6% were intact and 81.3% were sterilized. Female dogs were sterilized at a significantly higher rate (87.8%) than were male dogs (45%). There was no difference in the sterilization rates for male and female cats. The rate of lifetime litter production by intact (0.4 litters per female) and sterilized females (0.31 litters per female) did not differ significantly. Owners obtaining their animals from pet stores and breeders were more likely to own intact animals than owners obtaining their pets from any other source. The most frequently cited reason for having a pet sterilized was to decrease the number of unwanted offspring. Owners of male animals were more likely to have their animals sterilized for behavior problems than owners of female animals. The major reasons for not sterilizing animals were: unnecessary because the animal was confined*

(31.6%), wanted to breed the animal (23.6%), animal was too young (18.4%), and it was inconvenient (10.5%). Less than 6 percent of owners cited cost as a factor in the decision to sterilize. A relationship also exists between owners' religious affiliation and ethnic background and sterilization status of their pets.

Comment: This is the first published study to point out the high rate at which sterilized female cats and dogs had one or more litters before having been sterilized. The rate of lifetime litter production of the intact cats and dogs included in this study (.4 litters per female) was not significantly different from that of those that had been sterilized (.31 litters).

The authors' estimate that 20% of sterilized female cats and dogs had at least one litter before having been sterilized [derived from a survey of Massachusetts pet-owning households sponsored by the Massachusetts Society for the Prevention of Cruelty to Animals—Dorr Research Corporation (1991): Massachusetts Public Opinion Study on Spaying and Neutering of Pets] was similar to the percentage of female cats and dogs that had one or more litters before being sterilized through a Tennessee pet sterilization program (24.7 % of female cats and 22.3% of female dogs; Figure 21, Page 94) and the finding of a 2007 national telephone survey of cat-owning households that 18.3% of sterilized female cats that had at least one litter before having been sterilized [Chu K, Anderson WM, & Rieser MY (2009). Population characteristics and neuter status of cats living in households in the United States. *J. Am. Vet. Med. Assoc.* **234** (8): 1025; **Appendix A16**].

In the four towns studied, female cats and dogs that remained intact had given birth to only 13% of all litters while those that were ultimately sterilized accounted for the remaining 87%. The high volume of pre-sterilization litters points to the need for pet sterilization education programs to emphasize the importance of timeliness in maximizing the benefits of pet sterilization. In addition, because timely sterilizations more effectively manage pet population levels than those that have been delayed, sterilization programs should consider offering discounts or other financial incentives for the sterilizations that are performed before an animal's first estrus.

This study found that female dogs in the four towns surveyed were sterilized at a much higher rate than males (87.8/45%) which was consistent with the findings of surveys in Las Vegas (**Appendix A1**) and Indiana (**Appendix A2**). The second most common reason given by pet owners surveyed in this study for having male pets sterilized was to address behavior problems, suggesting that education programs may

want to include information about the behavioral benefits that are associated with pet sterilization in an attempt to increase the sterilization rate of male dogs.

Source: A copy of this article can be purchased from the IngentaConnect website: <http://www.ingentaconnect.com/content/berg /anthroz/1992/00000005/00000003/art00006>

- 13.** Alexander SA & Shane SM (1994). Characteristics of animals adopted from an animal control shelter whose owners complied with a spaying/neutering program. *J. Am. Vet. Med. Assoc.* 205 (3): 472-476.

Summary: *A study of 137 cats and 567 dogs received by and subsequently adopted from an animal control center was performed to determine characteristics of animals whose new owners subsequently complied with a prepaid spaying/neutering program. Four times as many dogs as cats were adopted. Females were adopted more frequently than males. Owners who adopted female cats were most likely to comply with the prepaid spaying/neutering program, followed, in order, by owners of male cats, owners of female dogs, and owners of male dogs. Most animals returned to the shelter were < 4 months old. Dogs suspected to be of mixed breeding that were > 4 months old were most likely to be adopted. Owners who adopted a female dog suspected to be of mixed breeding were more likely to have the dog spayed than were owners who adopted a female dog that appeared purebred.*

Comment: This study included data about the rate at which adopters from a Louisiana animal control shelter had intact pets sterilized after paying a \$25 neutering deposit that entitled them to have the adopted cat or dog sterilized at a participating veterinary clinic at no additional cost. Only 53.8% of those who adopted an intact cat and 38.3% of those who adopted an intact dog had the pet sterilized. These data suggest that pre-release sterilization programs can be of substantial value to manage pet populations and to increase the rate at which shelter pets are successfully retained in their adoptive homes.

Source: A copy of this article can be purchased from the cat.inist website at <http://cat.inist.fr/?aModele=afficheN&cpsidt=11243282>.

14. Mahlow JC (1999). Estimation of the proportions of dogs and cats that are surgically sterilized. *J. Am. Vet. Med. Assoc.* 215 (5): 640-643.

Abstract: *OBJECTIVE: To determine an estimate of the proportions of dogs and cats in Texas that are surgically sterilized and whether those proportions differed according to species and sex of the animal, level of responsibility of the owner, or geographic location. DESIGN: Cross-sectional study. ANIMALS: 43,831 dogs and cats > or = 6 months old. PROCEDURE: Information on sterilization rates was provided by 14 licensing agencies and 16 animal shelters in diverse regions of Texas. Univariate and multivariate analyses were used to compare sterilization rates among subpopulations of animals (dogs vs cats, males vs females, sheltered vs licensed, rural vs urban location). RESULTS: Overall, 12,893 (29.4%) of the animals (26.9% of dogs and 32.6% of cats) were sterilized. Proportions of animals sterilized were significantly different among subpopulations. CONCLUSIONS AND CLINICAL RELEVANCE: Although the cause of pet overpopulation is multifaceted, failure of owners to spay and castrate their animals is a major contributing factor. Significant differences in sterilization rates among subpopulations of dogs and cats suggest that organizations encouraging spaying and castration should use motivational techniques specific for the pet owners they are targeting.*

Comment: In this comprehensive survey of sterilization rates of canine and feline subpopulations in Texas, it was found that less than one-fifth of all dogs (17.7%) and cats (19.7%) admitted to surveyed shelters had been sterilized. This percentage was very similar to that of adult dogs (19.6%) and cats (20.2%) admitted to Michigan shelters in 2003 [Bartlett PC, Bartlett A, Walshaw S, & Halstead S (2005). Rates of euthanasia and adoption for dogs and cats in Michigan animal shelters, *J. Appl. Animal Welfare Sci.* 8 (2): 100]. Licensed dogs and cats in the surveyed jurisdictions were 4.4 times more likely to have been sterilized than those that entered shelters, suggesting that sterilization may have a strong protective effect.

There was significant local variation in sterilization rates within the state. Dogs and cats licensed in rural counties were significantly less likely to have been sterilized than those licensed in urban counties. This variation in sterilization rates highlights the value of using local data about dog and cat demographics and population dynamics when designing programs to reduce shelter overpopulation.

The variation in sterilization rates among subpopulations of dogs and cats may also be important in the design of strategies to increase pet sterilization rates. The author suggests that different motivational techniques, incentives, and disincentives may be

needed to influence dog owners than cat owners, for the owners of male and female pets, for those who live in urban and rural areas, and for responsible and irresponsible owners.

15. Frank J & Carlisle-Frank PL (2007). Analysis of programs to reduce overpopulation of companion animals: Do adoption and low-cost spay/neuter programs merely cause substitution of sources? *Ecological Economics* 62: 740-746.

Abstract: *Overpopulation of companion animal results in millions of deaths each year at shelters and spending in the billions of dollars. Major efforts are underway to reduce this problem, with one of the largest efforts being spearheaded by Maddie's Fund. Maddie's Fund programs focus on encouraging spay/neuter and adoptions through economic incentives and marketing. However, aggressive spay/neuter and adoption programs present economic questions regarding how much they simply lead to substitution of sources for these good and services rather than increasing total community adoption and spay/neuter levels. In addition, spay/neuter also presents an ecological question as to how effective it is at reducing population sizes and therefore shelter intake. Analysis of Maddie's Fund program results show that low-cost spay/neuter programs are effective at raising total community spay/neuter levels (i.e. they do not merely cause substitution in source of spay/neuter procedures). Similar results were found for adoptions, with animal control adoptions not being reduced by new adoption programs initiated by other organizations. However, no clear results were found demonstrating the impacts of total spay/neuter procedures on shelter intake.*

Comment: This study of five separate low-cost pet sterilization programs found that the establishment of a subsidized program not only was not associated with a reduction in the number of unsubsidized sterilizations performed, but there was also an increase in the number of sterilizations performed by local veterinary clinics in the community at full price. The authors suggested that the publicity and social marketing campaigns used to promote the subsidy programs may have induced owners to have their pets sterilized even in the absence of a financial incentive. These findings suggest that economic incentives can increase a community's overall pet sterilization rate—especially if they are provided to financially needy pet owners—and that the effectiveness of subsidy programs can be augmented through social marketing campaigns that promote pet sterilization.

Source: A copy of this article can be purchased at the website of Science Direct: <http://www.sciencedirect.com/science>

- 16.** Chu K, Anderson WM, & Rieser MY (2009). Population characteristics and neuter status of cats living in households in the United States. *J. Am. Vet. Med. Assoc.* **234** (8): 1023-1030.

Abstract: *OBJECTIVE: To gather data on cats living in US households, document their neuter status, and identify demographic characteristics associated with neuter status. DESIGN: Cross-sectional, random-digit-dial telephone survey. SAMPLE POPULATION: 1,205 adults in the continental United States contacted between April 24, 2007, and May 14, 2007. PROCEDURES: Information was gathered by means of computer-assisted telephone interviews. Multivariate logit analysis was used to identify demographic characteristics significantly associated with neuter status. RESULTS: 383 of 1,205 (31.8%) respondents reported having at least 1 cat at the time of the survey, yielding an estimated population of 82.4 million cats living in 36.8 million US households. Overall, 680 of 850 (80.0%) cats were reportedly neutered. Of the 371 neutered female cats, 303 (81.7%) had reportedly been neutered before having any litters. Proportion of cats that were neutered differed significantly across annual family income groups, with 96.2% (231/240) of cats in households with annual family incomes \geq \$75,000 being neutered, 90.7% (231/254) of cats in households with annual family incomes between \$35,000 and \$74,999 being neutered, and only 51.4% (123/239) of cats in households with annual family incomes $<$ \$35,000 being neutered. CONCLUSIONS AND CLINICAL RELEVANCE: Findings suggested that a high percentage (80.0%) of cats living in households in the United States were neutered and that annual family income was the strongest predictor of whether cats in the household were neutered. The present study did not attempt to address stray and feral cats, which represent a substantial but unknown percentage of the total US cat population.*

Comment: This national survey found that annual household income was a better predictor of cat sterilization status than any other demographic factor examined. Only 51.4% of the cats living in households with annual incomes of less than \$35,000 had been sterilized, compared to 90.7% of those living in households with incomes between \$35,000 and \$74,999 a year and 96.2% of those living in households with incomes of at least \$75,000 a year. Cats living in the low-income households were 26 times more likely to be intact than those living in the upper-income households and 9 times more likely to be intact than those from the middle-income households.

This relationship between income level and the household cat sterilization rate was consistent with that found in a contemporaneous national survey completed for the American Pet Products Association (Figure 5, Page 12) and is strong evidence that attempts to significantly increase the U.S. household cat sterilization rate beyond its current level will depend on increasing the rate at which cats living in low-income households are sterilized.

Almost one-fifth (18.3%) of all the sterilized female cats included in the survey had at least one litter before having been sterilized. This rate was similar to that reported in an earlier Massachusetts survey (**Appendix A12**) and data from a Tennessee pet sterilization program (Figure 21, Page 94) and suggests that the high incidence of pre-sterilization litters may be a national phenomenon.

More than two-fifths (40.7%) of those who maintained at least one intact cat reported that they had not had the cat sterilized because they believed that a female cat would be better off by having a litter before being sterilized. This was the most common reason given for not having had a cat sterilized, more commonly cited than cost (38.8%) or an intention to breed the cat (20%). Public education campaigns to correct this mistaken belief would appear to have great potential as a strategy to reduce the incidence of pre-sterilization litters and more effectively manage household cat populations in the United States.

Source: A copy of this article can be purchased at the website of the American Veterinary Medical Association: <http://avmajournal.avma.org/doi/abs/10.2460/javma.234.8.1023>

B. RESOURCES

This section of the appendix includes selected reference materials that discuss how shelter statistics and other data can be used to develop effective evidence-based programs against shelter overpopulation.

1. St. Arnaud A (2003). "Community Assessment and Planning for the Humane Movement."

Summary: This handbook outlines a practical, ten-step process in which local shelter statistics can be gathered, analyzed, and used to develop data-driven overpopulation programs.

Source: A copy of this handbook can be obtained at no cost from the website of the Best Friends' Animal Society:
<http://www.bestfriends.org/nomorehomelesspets/pdf/Assessment.pdf>

2. Troughton B & Ginsberg C (2003). Making Plans to Make a Difference. New York, N.Y.: American Society for the Prevention of Cruelty to Animals (ASPCA).

Summary: This manual provides a broad overview of the planning and assessment process that can be followed to develop evidence-based overpopulation programs in a community. It describes 12 planning tools a shelter can use to assess its current situation, develop goals and create a step-by-step plan to achieve them. Each chapter contains examples of how a shelter has successfully used these tools to advance its mission.

Source: A copy of this manual can be purchased from the ASPCA Online Store:
<http://www.aspcasonlinestore.com/index.php?productid=1967>

During the past 15 years, much valuable research has been completed about the sources of shelter overpopulation in the United States. At the same time, scores of new programs have been established. Experience has shown that the most effective programs have used research findings and other data to design their programs. The information in this book:

- ✧ Identifies the core principles which underlie the most effective programs;
- ✧ Provides examples of programs that animal control agencies, humane organizations, veterinary practitioners, and advocacy groups can use to reduce overpopulation in their communities;
- ✧ Discusses the most important research studies and the implications of their findings for the design of programs;
- ✧ Includes recommendations about how veterinarians working in shelters and spay/neuter programs can play a vital role by providing a link between research and program design; and
- ✧ Provides suggestions about future research that can be used to increase the effectiveness of shelter adoption programs, feral cat management programs, pet sterilization programs and pet retention programs.



Peter Marsh was a founder of Solutions to Overpopulation of Pets, the group that spearheaded the establishment of publicly-funded pet sterilization programs in New Hampshire. During the first six years after the programs were established, shelter euthanasia rates dropped by 75% and have been maintained at that level since that time. For the past 15 years, he has helped animal care and control agencies, humane organizations, and advocacy groups establish effective shelter overpopulation programs in their communities