

# Rates of Euthanasia and Adoption for Dogs and Cats in Michigan Animal Shelters

Paul C. Bartlett

*College of Veterinary Medicine  
Michigan State University*

Andrew Bartlett

*Michigan State University*

Sally Walshaw

*Atlantic Veterinary College  
University of Prince Edward Island*

Stephen Halstead

*State Veterinarian  
Michigan Department of Agriculture  
Lansing, Michigan*

Estimates of canine and feline euthanasia at U.S. animal shelters—largely based on voluntary surveys with low response rates—make it difficult to estimate the population from which the euthanized animals derive. Estimates of euthanasia rates (animals euthanized per unit of population) have varied widely and been available only sporadically. This study used requirements of Michigan state law (Pet Shops, Dog Pounds, and Animal Shelters Act, 1969) for animal shelters to collect admission and discharge data for all 176 Michigan-licensed animal shelters. In 2003, Michigan shelters discharged 140,653 dogs: Of these, 56,972 (40%) were euthanized; 40,005 (28%) were adopted. This annual euthanasia rate is 2.6% of the estimated 2003 Michigan dog population. Michigan shelters discharged 134,405 cats in 2003: 76,321 (57%) by eutha-

nesia and (24%) by adoption. The estimated ratio of euthanized cats to cats who had owners was 3.1%. Small shelters and privately owned shelters were associated with higher adoption rates. Comparison with historical information from the past 10 to 20 years suggests the number of companion animals being euthanized in shelters has decreased and that progress has been made in reducing the companion animal overpopulation problem.

The welfare of canines and felines reflects an ethical dualism in which lavish attention often is given to the individual animal companion, yet the population of dogs and cats often is treated with remarkable disregard. We often give costly and superfluous attention for the individual trees, yet show general disregard for the forest (Ott, 1990).

Widely differing estimates of the number of animals being euthanized have confused the extent of our nation's companion animal overpopulation problem. The number of dogs and cats euthanized annually in the United States has been estimated at 8 million (White & Shawhan, 1996), 8 to 10 million (Rowan & Wilson, 1985), 7.3 to 11.3 million (American Humane Association, 1988), 7 to 15 million (Machie, 1992), 16 million (Thorton, 1991), and 13 to 17 million (Carter, 1990).

Recent studies indicate that these earlier estimates may have been too high or perhaps that euthanasia rates have been decreasing over the past 10 to 20 years. Arkow (1994) estimated national shelter euthanasia of 5.7 million dogs and cats per year, which was an annual rate of 5.43% of the estimated population of owned dogs and cats who live with their owners. Patronek and Rowan (1995) and Patronek, Glickman, Beck, McCabe, and Ecker (1996) estimated that 2.4 million dogs were euthanized per year.

Earlier survey methods have been described as being "very informal" (Arkow, 1994). All of these estimates of euthanized companion animals come from a sample of volunteering animal shelters. Nonresponding shelters may have very different disposition patterns compared with responding shelters. One of the largest surveys had a response rate of about 20%, which would magnify considerably the effects of any selection bias (National Council on Pet Population Study and Policy, 2004). However, voluntary shelter surveys heretofore have been our only source of data.

Comprehensive surveys from a large geographical area are required to accurately compute euthanasia rates per unit of population. Several shelters (private, municipal, and humane societies) may draw animals from the same geographical area, thereby making it impossible to estimate the true unit population (denominator) when numerator data are available from only a sample of the shelters. High survey response rates to shelter surveys typically are achieved only by government mandate of the type required of shelters in Michigan. This article presents the results of the 2003 Michigan animal shelter survey, for which reliable data were available from all licensed animal shelters.

## METHOD

In 2000, Michigan amended state law (Pet Shops, Dog Pounds, and Animal Shelters Act, 1969) to mandate that all animal shelters report data annually regarding the disposition of all their dogs, cats, and ferrets. In the summer of 2004, numerous mailings, phone calls, emails, and personal contacts were employed to obtain a complete listing of animals processed in 2003. Data were collected regarding numbers of dogs, cats, and ferrets who were received or admitted, returned to owner, adopted, sold (including research), transferred (law enforcement or service), euthanized, or other (died, stolen, escaped, otherwise disappeared.) Data were broken down by age (younger or older than 6 months of age) and as altered or not altered.

Nine shelters could not supply data, so their data from the most recent year were used as an estimate of 2003 activity. Employees of neighboring municipal shelters estimated summary data of eight small shelters for which data were still unavailable. The estimators knew that these small shelters were still functioning and were familiar with their operations. In these eight instances, the total number of dogs and cats who were received or admitted was used to estimate the missing variables based on state averages. The final database contained data for all 176 shelters known to be operating in Michigan in 2003.

Extrapolation of Michigan data to the national level certainly is speculative; however, it may be useful to obtain an estimate of national shelter euthanasia numbers. Michigan (human population = 10,079,985) contains about 3.5% of the U.S. human population of 290,809,777 people ("History, Arts, and Libraries," 2004). The nonferal dog population of Michigan is estimated at 2,181,000, and the nonferal cat population is estimated at 2,473,000 (American Veterinary Medical Association [AVMA], 2002).

The percentages of discharged animals that were euthanized (DOG-E% and CAT-E%) for each shelter were used as dependent variables in analysis of variance (ANOVA) models with independent variables regarding type of shelter (private vs. governmental); urban versus rural location (human population > 200,000 vs. < 200,000); and shelter size (number of animals received; Ott, 1990; SAS, 1985). Each independent variable was analyzed separately and in a multiple ANOVA with inclusion criteria of  $p < .05$ .

## RESULTS

The summary results are shown in Table 1, indicating that 140,653 dogs were discharged from Michigan shelters in 2003. Of these discharged dogs, 56,972 (40%) were euthanized and 40,005 (28%) were adopted. This is an annual euthanasia rate of 2.6% of the estimated 2003 Michigan dog population. Michigan

shelters discharged 134,405 cats, of which 76,321 (57%) were euthanized and 32,251 (24%) were discharged by adoption. The estimated ratio of euthanized cats to owned cats was 3.1%

Altered dogs and cats had rates of euthanasia that were much lower than those of nonaltered dogs and cats. Shelters in urban and rural counties did not differ in DOG-E% or CAT-E%. Privately owned shelters euthanized 20% of their dogs and 29% of their cats, whereas governmental shelters euthanized 30% of their dogs and 50% of their cats. Larger shelters had significantly higher euthanasia rates for dogs and cats, even after adjustment for private versus governmental ownership. The final multivariable model for the percentage of dogs euthanized contained type, size, size<sup>2</sup>, and size × type. The  $R^2$  was .25, with the residuals distributed normally at  $W = .91$ . The final multivariable model for CAT-E% (Table 2) contained type, size, and size<sup>2</sup> and had an  $R^2$  of .24, with normally distributed residuals ( $W = .96$ ).

TABLE 1  
Summary of Results of Dogs Discharged From Michigan Shelters in 2003

	<i>Younger Than 6 Months</i>		<i>6 Months or Older</i>		<i>Total</i>
	<i>Not Altered</i>	<i>Altered</i>	<i>Not Altered</i>	<i>Altered</i>	
<b>Dogs</b>					
Received/admitted	27,020	667	74,609	18,105	126,676
Returned to owner	1,388	163	20,942	5,530	28,775
Adopted	11,458	3,080	13,366	10,531	40,005
Sold (including research)	531	49	1,797	312	2,726
Transferred (law enforcement service)	927	25	2,545	614	4,508
Euthanized	10,477	63	37,868	6,304	56,972
Other (died, stolen, escaped, otherwise disappeared)	423	8	3,972	3,151	7,667
Total discharged	25,204	3,388	80,491	26,442	140,653
<b>Cats</b>					
Received/admitted	47,974	1,770	52,071	13,776	116,812
Returned to owner	542	1,375	1,548	2,361	5,826
Adopted	12,202	4,168	7,353	8,529	32,251
Sold (including research)	607	39	3,430	76	4,153
Transferred (law enforcement service)	1,362	95	2,156	3,658	7,271
Euthanized	29,058	232	40,068	6,963	76,321
Other (died, stolen, escaped, otherwise disappeared)	1,718	2,881	3,729	256	8,584
Total discharged	45,489	8,790	58,284	21,843	134,405

TABLE 2  
Euthanasia Rate by Species, Age, and Neutering

	<i>Altered (%)</i>	<i>Not Altered (%)</i>
Dogs	23.84	47.05
Pups	1.86	41.57
Cats	31.88	68.75
Kittens	2.64	63.88

## DISCUSSION

Complete regional compilation of shelter statistics is rare in the United States. Recently, the Virginia Department of Agriculture and Consumer Services (VDACS, 2004) undertook a special project to compile shelter statistics based on the Michigan model. Dogs euthanized in Virginia in 2000 to 2002, expressed as a percentage of the estimated dog population of 1,555,000, were 65,314 (4.2%); 59,396 (3.8%); and 60,625 (3.9%), respectively (AVMA, 2002). These rates are somewhat higher than the 2.6% reported for Michigan in 2003, and may be due to real differences between the states or to differences in completeness of reporting. Numbers and rates per 1,785,000 owned cats in Virginia for 2001 to 2002 were 67,663 (3.8%); 61,156 (3.4%); and 73,175 (4.1%), respectively. These rates were slightly higher than the 3.1% that we report for Michigan.

Much of Michigan borders the Great Lakes, so there is minimal ingress and egress of stray animals across state boundaries. However, any movement of stray animals into Michigan is likely to be counterbalanced by movement of strays out of Michigan.

The number of animals received or admitted (Table 1) is lower for both dogs and cats than is the combination of the six discharge categories. Discharges could be greater than admissions because of shelters receiving pregnant animals or because of euthanasia of animals who never were perceived by administrators to have been received or admitted. Because of the possible confusion on how to count animals admitted to the shelter, our analysis looked at euthanasia as a percentage of all the possible means by which animals could be discharged from the shelter.

### Underestimation

Some caution is necessary in using these statistics to evaluate the success of our statewide animal control effort. In some localities, low rates of animal shelter

admission and euthanasia may indicate an inactive animal control effort rather than a decreasing animal control problem. Our statistics reflect only dogs and cats euthanized in animal shelters. Not included are the many stray and owned animals who died of disease or trauma outside animal shelters. Also, a small number of nonlicensed shelters may exist within Michigan in violation of the state statute, but these are expected to be small, private rehabilitation efforts that are unlikely to euthanize large numbers of animals. Private veterinary clinics commonly euthanize old and sick pets, but most veterinarians transfer healthy animals to a shelter where adoption is possible; therefore, it would be unlikely that veterinarians are euthanizing large numbers of homeless animals.

### Overestimation

Many of the dogs and cats euthanized at shelters are old, sick, or vicious animals who would be public health hazards if returned to the community. Some may have behaviors that make them unacceptable pets. Such nonadoptable animals are estimated at approximately 20% of admissions (“Grant Aimed at Ending,” 2004; Scarlett, Salman, New, & Kass, 1999). These animals are included in the euthanasia statistics but are not reflective of the pet overpopulation problem. If we subtract 20% of all admissions from 56,972, we estimate that 31,636 *adoptable* dogs were euthanized in Michigan in 2003.

The pet ownership rates consider only animals with owners and do not include feral and stray animals. Therefore, the calculated rates of euthanasia and adoption may be elevated erroneously because of underestimating the true population. Unless feral and stray populations can be estimated, denominators necessarily will reflect only animals with owners. The percentage of stray dogs is estimated to be very small, but the feral cat population might be as large as the population of cats with definite owners (Patronek & Rowan, 1995). Therefore, it may be more appropriate to refer to the ratio of cat euthanasia per unit population of cats with owners.

### Extrapolation to National

The Michigan shelter database is unique in that it is comprehensive and complete for a large geographic area. If other states were similar to Michigan in dog and cat ownership and handling patterns, extrapolation of our results to the national level would suggest that approximately 1.6 million dogs and 2.2 million cats were euthanized in shelters nationally in 2003. This estimate includes the euthanasia of pets who were too sick or vicious to be adoptable, which has been estimated to comprise 20% of admissions.

## CONCLUSIONS

The Michigan 2003 estimates of pet euthanasia are lower than are earlier estimates but very similar to more recent estimates (Arkow, 1994; Patronek & Rowan, 1995; Patronek et al., 1996; VDACS, 2004). Our data suggest that progress is being made in reducing the pet overpopulation problem, but it also is possible that earlier estimates of pet overpopulation were overstated. Ideally, no healthy, adoptable animal should be euthanized; most shelters strive to attain this goal. It is unrealistic to strive for a situation in which no animals are euthanized because euthanasia always will be necessary for old and dying pets who are suffering. Therefore a *no kill shelter* is defined as one in which no adoptable animals are euthanized (AVMA, 2002). We need reliable shelter accounting to monitor the disposition of adoptable dogs and cats as a means of evaluating our progress in combating the pet overpopulation problem.

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