

What Happens to Shelter Dogs? Part 2. Comparing Three Melbourne Welfare Shelters for Nonhuman Animals

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Although the characteristics of dogs admitted to animal welfare shelters have been described previously, few studies have compared the statistics of different welfare shelters. The existing studies compare shelters that differ operationally and philosophically on factors such as whether they perform euthanasia or whether the shelter receives both impounded and relinquished animals. This study aims to determine whether differences in admission and outcome data exist between shelters when these issues are constant. The study sampled 3 metropolitan Australian shelters over a 12-month period. All shelters sampled serve both as municipal pounds and welfare shelters, perform euthanasia as required, and operate within the relatively small, culturally homogeneous environment of Melbourne. The study observed significant differences between shelters regarding the admission characteristics of the dogs, length of stay, and outcomes. The identification of these differences may enable us to establish “best-practice” procedures capable of implementation elsewhere. The differences identified in the reasons given for relinquishment between locations also may have policy and educational implications for animal control agencies.

In today’s western society, dogs who are companion animals (pets) provide humans with companionship in at least 40% of Australian, 38% of American, and 34% of British homes (BIS Shrapnel Global Marketing Intelligence and Forecasting, 1999, pp. 9–15). Unfortunately, problems of dog overpopulation, straying, and canine behavior problems accompany such widespread dog guardianship (ownership). In many countries, there is a vocal antidog lobby. Straying

dogs are a major community concern generating widespread negative media coverage, especially when associated with aggression to humans and other animals. Also, because stray dogs are likely to be sexually intact (Marston, Bennett, & Coleman, 2004; Patronek, Glickman, Beck, McCabe, & Ecker, 1996; Shore & Girrens, 2001), they contribute to the continuing long-term problem of an over-supply of pet dogs in many communities (Olson, Moulton, Nett, & Salman, 1991).

Pet overpopulation is being tackled by community education and incentive programs that focus on reduced cost desexing, reduced registration fees for desexed animals, and the automatic desexing of all shelter stock (Olson et al., 1991). These measures almost halved (40%) canine shelter admissions in the United States in 10 years (Luke, 1996) and have markedly reduced the number of puppy admissions.

The typical shelter dog now is more than 2 years of age (DiGiacomo, Arluke, & Patronek, 1998; Patronek et al., 1996), sexually intact, and male (Marston et al., 2004; Patronek et al., 1996; Salman et al., 1998; Shore & Girrens, 2001). We must take care when talking about the “typical” shelter dog, however, because the dog may not be “universally typical.”

An American study compared dogs admitted to two shelters: one run by an animal control agency dealing with strays picked up by animal control officers and one by a Humane Society that deals with private citizens (Shore & Girrens, 2001). This study found that dogs admitted to the Humane Society primarily were surrendered and were comprised of greater proportions of puppies and senior dogs (aged 8 years or more) than those admitted to the animal control agency. The animal control agency admitted a greater proportion of male and adult dogs.

Similarly, differences exist between shelter admissions in the United States and Australia. In Australia, there are fewer rehomed dogs returned and a higher percentage of stray admissions observed (Marston et al., 2004). In contrast, a greater proportion of American dog owners relinquish their pets to shelters specifically for euthanasia (Patronek, Glickman, & Moyer, 1995) than do their Australian counterparts: In America, shelters provide “alternatives to animal hospitals for euthanasia for humane reasons” (Kass, New, Scarlett, & Salman, 2001, p. 247).

It is currently unknown whether significant differences exist in canine admissions between shelters operating in a similar manner but located in different areas within a single city. If so, it could be important to characterize these differences so that government policy can be informed by factors affecting shelter demographics. If significant differences exist between areas, types of shelters, or geographic locations, it would be unwise to base decisions on overall statistics. Environmental issues—availability of land, the provision of dog-friendly open spaces or parks, and the accessibility of walking tracks—might influence the breed or size of dogs in a community. This may be reflected in the statistics of the shelter servicing the area.

Such factors also might influence the reasons given for relinquishment or the type of dog found straying. A barking or particularly active dog might not consti-

tute a perceived problem on a large property but would in an area of high density housing. This may be reflected in the reasons given by owners for shelter admissions and may influence outcome data. Larger or more active dogs may be rehomed more easily in an area of larger properties—those in rural fringe areas—although older or less active dogs may be rehomed more easily in city areas.

Melbourne is the capital of Victoria (Australia), with a population of 3.16 million people (Australian Bureau of Statistics, 2001) and an estimated 920,000 dogs (BIS Shrapnel Global Marketing Intelligence and Forecasting, 1999). There are 18 animal shelters of varying sizes located throughout Melbourne (C. Pawsey, personal communication, January 20, 2003). These either operate as “no-kill shelters” or perform euthanasia “as required.” Shelters functioning as municipal pounds almost exclusively fall into the second category. This article focuses on three such shelters.

The basic procedures and legal requirements pertaining to these shelters are the same and have been detailed previously (Marston et al., 2004). Although the overall findings have been published, this article concentrates on comparisons between the three shelters, located in central city, suburban, and rural fringe areas of the city. We collected descriptive data relating to the characteristics of dogs admitted, patterns of admission, sale, reclamation and euthanasia, duration of stay, reasons for relinquishment, euthanasia, postadoptive return, and the outcomes for different types of admissions.

MATERIALS AND METHOD

The method is described extensively in a previous article (Marston et al., 2004). Briefly, we gathered archival data relating to a full year of canine admissions from three animal welfare shelters in metropolitan Melbourne. Data for the same 12-month period were not available from all three shelters; data were gathered from June 2001 to May 2002 for two of the shelters and from November 2001 to October 2002 for the third. These shelters provided a convenience sample for comparison of data. The city shelter was located approximately 4km from the general post office (GPO), the suburban shelter was approximately 10 km from the GPO, and the rural shelter was approximately 35km from the GPO.

The three shelters admitted all dogs presented to them. All three received dogs from animal control officers (officials authorized to impound straying animals or seize aggressive and dangerous animals). However, animal welfare inspectors were based only at the suburban shelter. Unlike the other two shelters, the suburban shelter admitted animals seized on humane grounds. Relinquishments occurred when owners voluntarily surrendered their pet dogs to the shelter and signed over ownership. Abandonment was a type of relinquishment whereby owners removed dogs voluntarily from their care by (a) tying the dog up at the shelter gates or in a public place, often with notes attached or (b) leaving a dog confined to

the garden of a vacant house, when the owner relocated and the animal welfare inspectors subsequently rescued the dog.

All data were analyzed using SPSS Windows Version 11.5, with alpha level set at .05.

RESULTS

Characteristics of Dogs Admitted

A total of 20,729 admissions were recorded for the 3 shelters. Descriptive data for these admissions are presented in Table 1. As can be seen from Table 1, the city shelter admitted more than half the total number of dogs in this sample. Although the majority of all admissions were stray, a significantly greater proportion of strays was admitted to the city shelter than to the other shelters, $\chi^2(4, N = 20,729) = 1,574.93, p < .0001$. The suburban shelter received significantly more relinquishments than the other shelters, $\chi^2(2, N = 20,729) = 287.3, p < .0001$.

TABLE 1
Breakdown of Admission Data for 1 Year From the Three Shelters

Variable	Rural ^a		Suburban ^b		City ^c		Total ^d	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Admission type								
Stray admissions	2,226	80.9	5,102	71.4	10,042	92.7	17,370	83.8
Relinquished/surrendered	508	18.5	1,825	25.5	790	7.3	3,123	15.1
Other	17	0.6	219	3.1	0	0.0	236	1.1
Age								
Adult dogs	2,520	91.6	6,166	86.3	9,920	91.6	18,606	89.7
Pups(< 6 months)	231	8.4	980	13.7	912	8.4	2,123	10.2
Size								
Small dogs	1,028	37.5	2,897	40.5	4,767	44.0	8,692	41.9
Medium-sized dogs	792	28.9	2,489	34.8	2,712	25.0	5,993	28.9
Large dogs	923	33.6	1,760	24.6	3,353	31.0	6,036	29.1
Total for shelter	2,743 ^e		7,146		10,832		20,721	
Gender								
Female	1,217	44.2	3,118	43.6	4,548	42.0	8,883	42.9
Male	1,534	55.8	4,028	56.4	6,284	58.0	11,846	57.1
Sexual status								
Sexually entire dogs	1,700	61.8	5,295	74.1	9,005	83.1	16,000	77.2
Desexed dogs	1,051	38.2	1,851	25.9	1,827	16.9	4,729	22.8

^a*n* = 2,751. ^b*n* = 7,146. ^c*n* = 10,832. ^d*N* = 20,729. ^eEight records were missing size data from the rural shelter.

Other admissions included transfers between shelters (that occurred only at the rural shelter), welfare cases (dogs are taken into care when their owners may be in a refuge or temporarily hospitalized), and 120 humane seizures made by the animal welfare inspectors at the suburban shelter. The majority of admissions at all shelters were adult dogs, although the suburban shelter admitted significantly more puppies, $\chi^2(2, N = 20,729) = 143.03, p < .0001$. The shelters differed in size of dogs admitted; proportionately, more small dogs were admitted to the city shelter, a greater proportion of medium sized dogs were admitted to the suburban shelter, and a greater proportion of larger dogs were admitted to the rural fringe shelter, $\chi^2(4, N = 20,721) = 251.56, p < .0001$. Although male dogs were overrepresented at all shelters, compared to the national estimate of 50% (McHarg, Baldock, Headey, & Robinson, 1995), the proportion of female to male dogs differed significantly between shelters, $\chi^2(2, N = 20,729) = 7.25, p < .05$. The proportion of male dogs decreased directly with the distance from the city center (Nota Bene [NB] females were coded as 1 and males as 2 for analysis; Spearman's $\rho = -0.19, p < .01$, two-tailed).

There was a highly significant difference observed in the proportion of entire dogs admitted to the shelters, $\chi^2(2, N = 20,729) = 626.33, p < .0001$, varying from 83% of admissions at the city shelter to 61% at the rural shelter. However, even the lowest percentage of entire dogs, 61%, significantly exceeds the estimated percentage of entire dogs in the Australian community, 39% (McHarg et al., 1995), $\chi^2(1, N = 20,729) = 129.36, p < .0001$. There was a significant correlation between gender and size of dog (Spearman's $\rho = -0.21, p \leq .01$, two-tailed) with male dogs tending to be smaller. There was no correlation observed between size and desexed status (Spearman's $\rho = 0.11, p = .11$, two-tailed, *ns*).

Given the significant differences across gender and desexed status described in Table 1, these were compared more rigorously across the shelters. Table 2 presents descriptive data for gender and desexed status of dogs admitted at each location. As can be seen from Table 2, stray admissions—particularly at the city shelter—were far more likely to be entire than relinquished animals. The vast majority of dogs relinquished at the city shelter, of both genders, were sexually entire; relinquished animals at the other two shelters' showed a more even division between entire and desexed animals. There was a significant correlation observed between gender and desexed status, with bitches more likely than males to be desexed (Spearman's $\rho = -0.40, p < .01$, two-tailed). This difference became more pronounced when the relationship was controlled by shelter ($r_{gender, neuterstatus, shelter}(20,726) = -.37, p < .0001$).

Outcomes

Table 3 presents descriptive data for the outcomes of the shelter admissions. As can be seen from Table 3, approximately one third (31.5%) of all admissions

TABLE 2
Comparison of Location, Admission Type, and Gender Status

<i>Location</i>	<i>Admission Type</i>	<i>Gender Status</i>								<i>Total</i>	
		<i>Entire Females</i>		<i>Desexed Females</i>		<i>Entire Males</i>		<i>Desexed Males</i>			
		<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Rural	Stray	629	28.26	362	16.26	817	36.70	418	18.78	2,226	100
	Relinquished	108	21.26	110	21.65	137	26.97	153	30.12	508	100
	Other	5	29.41	3	17.65	5	29.41	4	23.53	17	100
	Total	742	26.97	475	17.27	959	34.86	575	20.90	2,751	100
Suburban	Stray	1,759	34.48	426	8.35	2,402	47.08	515	10.09	5,102	100
	Relinquished	430	23.56	406	22.25	532	29.15	457	25.04	1,825	100
	Other	73	33.33	24	10.96	99	45.21	23	10.50	219	100
	Total	2,262	31.65	856	11.98	3,033	42.44	995	13.92	7,146	100
City	Stray	3,410	33.96	783	7.80	4,961	49.40	88	84.84	10,042	100
	Relinquished	273	34.56	82	10.38	361	45.70	74	9.37	790	100
	Other	0	0.00	0	0.00	0	0.00	0	0.00	0	0
	Total	3,683	34.00	865	7.99	5,322	49.13	962	8.88	10,832	100

TABLE 3
Outcomes by Admission Type, Gender, and Desexed Status

Variable	Rural		Suburban		City		Total	
	n	%	n	%	n	%	n	%
Overall								
Euthanized	609	22.14	1,693	23.69	4,237	39.12	6,539	31.55
Reclaimed	1,475	53.62	2,909	40.71	5,187	47.89	9,571	46.17
Sold	693	23.23	2,447	34.24	1,319	12.18	4,405	21.25
Other	28	1.02	97	1.36	89	0.82	214	1.03
Total for shelter	2,751	100.00	7,146	100.00	10,832	100.00	20,729	100.00
Stray admissions								
Euthanized	386	17.20	897	16.83	3,651	36.36	4,934	28.01
Reclaimed	1,460	65.06	2,813	52.78	5,175	51.53	9,448	53.63
Sold	384	17.11	1,550	29.08	1,128	11.23	3,062	17.38
Other	14	0.63	70	1.31	88	0.88	172	0.98
Total for shelter	2,244	100.00	5,330	100.00	10,042	100.00	17,616	100.00
Legal seizures ^a								
Euthanized	26	56.52	21	30.00	45	48.91	92	44.23
Reclaimed	16	34.78	32	45.71	36	39.13	84	40.38
Sold	2	4.35	16	22.86	2	2.17	20	9.62
Other	2	4.35	1	1.43	9	9.78	12	5.77
Total for shelter	46	100.00	70	100.00	92	100.00	208	100.00
Relinquishments								
Euthanized	223	43.98	796	43.83	586	74.18	1,605	54.56
Reclaimed	15	2.96	96	5.29	12	1.52	123	3.95
Sold	255	50.30	897	49.39	191	24.18	1,343	43.14
Other	14	2.76	27	1.49	1	0.13	42	1.35
Total for shelter	507	100.00	1,816	100.00	790	100.00	3,113	100.00
Male dogs								
Euthanized	377	24.58	990	24.58	2,506	39.88	3,873	32.69
Reclaimed	790	51.50	1,654	41.06	3,002	47.77	5,446	45.97
Sold	353	23.01	1,322	32.82	723	11.51	2,398	20.24
Other	14	0.91	62	1.54	53	0.84	129	1.10
Total for shelter	1,531	100.00	4,028	100.00	6,284	100.00	11,846	100.00
Female dogs								
Euthanized	232	19.06	703	22.55	1,731	38.06	2,666	30.01
Reclaimed	685	56.29	1,255	40.25	2,185	48.04	4,125	46.44
Sold	286	23.50	1,125	36.08	596	13.10	2,007	22.59
Other	14	1.15	35	1.12	36	0.80	85	0.96
Total for shelter	1,217	100.00	3,118	100.00	4,548	100.00	8,883	100.00
Desexed animals								
Euthanized	217	20.65	509	27.50	352	19.27	1,078	22.80
Reclaimed	602	57.28	753	40.70	959	52.49	2,314	48.93
Sold	218	20.74	574	31.01	507	27.75	1,299	27.47
Other	14	1.33	15	0.81	9	0.49	38	0.80
Total for shelter	1,051	100.00	1,851	100.00	1,827	100.00	4,729	100.00

(continued)

TABLE 3 Continued

Variable	Rural		Suburban		City		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Entire animals								
Euthanized	392	23.06	1,184	22.36	3,885	43.14	5,461	34.13
Reclaimed	873	51.35	2,156	40.72	4,228	46.95	7,257	45.36
Sold	421	24.77	1,873	35.37	812	9.01	3,106	19.41
Other	14	0.82	82	1.55	80	0.90	176	1.10
Total for shelter	1,700	100.00	5,295	100.00	9,005	100.00	16,000	100.00

^aLegal seizures can be admitted as either strays or relinquishments and are included in those categories, but have been identified separately for information purposes.

were euthanized, half were reclaimed by their owner, and one fifth were rehomed. The suburban shelter rehomed the greatest proportion of animals, although the city shelter euthanized the greatest proportion of dogs. Other outcomes refers to a very small percentage of dogs who were transferred to organizations such as breed rescues, service organizations, or dogs admitted on welfare grounds and reunited with their owners. A highly significant difference was observed in the proportion of stray dogs reclaimed, with a greater proportion of stray dogs reclaimed from the rural shelter (65.06%), $\chi^2(6, N = 17,616) = 1,293.23, p < .0001$. Somewhat surprising, owners reclaimed a number of dogs who had been relinquished. This occurred particularly at the suburban shelter, $\chi^2(6, N = 3,123) = 233.62, p < .0001$. Legally seized dogs are those admitted by animal control officers because of extreme aggressive predatory behavior, often involving dog attack. These animals could be admitted as strays or relinquishments, depending on whether their owners signed them over to the local authority before admission. Significantly, more of these dogs were sold at the suburban shelter, $\chi^2(6, N = 208) = 30.52, p < .0001$.

Analyzing the outcome data for all admissions by gender indicates that male dogs were more likely than females to be euthanized at all shelters, $\chi^2(6, N = 11,846) = 816.02, p < .0001$. At the city shelter, bitches were euthanized almost twice as frequently as at the other shelters, $\chi^2(6, N = 8,883) = 693.72, p < .0001$, although males were euthanized at about 1.5 times the frequency of other shelters, $\chi^2(6, N = 11,846) = 816.02, p < .0001$. Analyzing outcome data by the desexed status of the dog reveals that desexed animals were more likely to be sold at the suburban shelter and more likely to be reclaimed from the city and rural shelters than were entire dogs, $\chi^2(6, N = 4,729) = 107.19, p < .0001$. In contrast, entire animals were more likely to be reclaimed from the rural shelter and euthanized at the city shelter than were desexed admissions, $\chi^2(6, N = 16,000) = 1,769.62, p < .0001$.

Length of Time Spent in Shelter

Figure 1 presents data relating to the time dogs remained in the shelter environment. Almost half of all dogs admitted to a shelter spent 2 or fewer days there ($Mdn = 3$, $M = 5.68$ days). Contributing to the overall figures presented in Figure 1 are reclaimed, sold, and euthanized dogs. Analysis of this data, using a Kruskal–Wallis test, indicated that significant differences exist in the length of stay between shelters, $\chi^2(2, N = 20,723) = 977.89$, $p < .0001$. Post hoc Mann–Whitney U tests showed that the suburban shelter retained dogs for longer ($Mdn = 6$ days, $M = 7.07$, $SD = 7.35$) than did either the city shelter ($Mdn = 2$ days, $M = 4.55$ days, $SD = 6.68$, $N = 17,972$, $Z = -31.60$, $p < .0001$) or the rural shelter ($Mdn = 2$ days, $M = 6.52$ days, $SD = 9.26$, $N = 9,897$, $Z = -9.94$, $p < .0001$). The city shelter retained dogs for less time than did the rural shelter ($N = 13,577$, $Z = -10.07$, $p < .0001$). Controlling for shelter there is a direct significant correlation between size of a dog and length of time required to rehome the dog ($r_{size,time\ to\ rehome\ shelter}(4,400) = 0.047$, NB 5 dogs from rural shelter in this category were missing size data, $p = .002$).

As shown in Figure 1, a second peak, which occurs between 8 and 10 days at all shelters, exists in length of stay. This is due to completion of the mandatory 8-day holding period for strays, after which dogs are euthanized or put up for sale. The city shelter retains dogs for a short period, either reuniting them with their owner within 2 days or selling the dogs on the eighth day—or as soon as they become available. Because weekends delay the assessment of some dogs, a smaller peak follows at 10 days. To analyze the outcome data for stray dogs more fully, Figure 2 presents the percentage of stray dogs reclaimed over time at each of the shelters. As shown in Figure 2, the vast majority of dogs were reclaimed in less than 3 days. Analysis of the data represented in Figure 2 using a Kruskal–Wallis test indicated significant differences in the length of time taken to reclaim dogs from the differ-

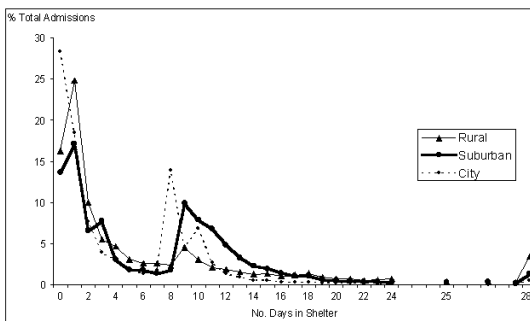


FIGURE 1 Percentage of admissions by length of stay by location.

ent shelters, $\chi^2(2, N = 9,751) = 223.41, p < .0001$. Post hoc Mann–Whitney *U* tests showed that dogs were reclaimed more quickly from the city ($M = 1.94$ days) than from both the rural fringe shelter ($M = 2.24, N = 6,662, Z = -9.12, p < .0001$), and the suburban shelter ($M = 2.69$ days, $N = 8,096, Z = -13.91, p < .0001$); however, no differences were seen between the suburban and rural fringe shelter.

Figure 3 presents the percentage of dogs sold across time by each of the shelters. It is worth noting that although stray dogs legally cannot be sold until the 8-day cooling off period has lapsed, relinquished dogs can be sold as soon as they are assessed as suitable for rehoming. Analysis of the data represented in Figure 3 using a Kruskal–Wallis test indicated that significant differences exist between shelters regarding the time taken to rehome dogs, $\chi^2(2, N = 4,401) = 199.97, p < .0001$. Post hoc Mann–Whitney *U* tests revealed that the city shelter rehomes dogs more quickly than do either the suburban shelter, $N = 3,764, Z = -12.78, p < .0001$, or the rural fringe shelter, $N = 1,956, Z = -10.59, p < .0001$, but the suburban shelter rehomes dogs more quickly than does the rural fringe shelter, $N = 3,082, Z = -4.40, p < .0001$. The rural fringe shelter sold significantly more dogs than did either of the other shelters after 15 days had lapsed, $\chi^2(10, N = 4,386) = 490.03, p < .0001$.

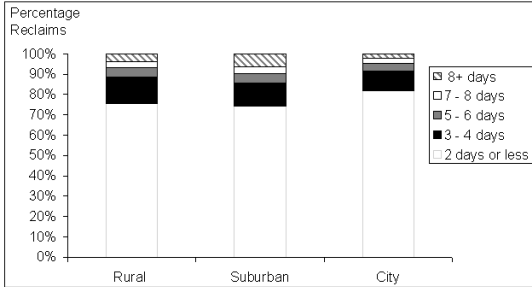


FIGURE 2 Percentage owner reclamations by time by location.

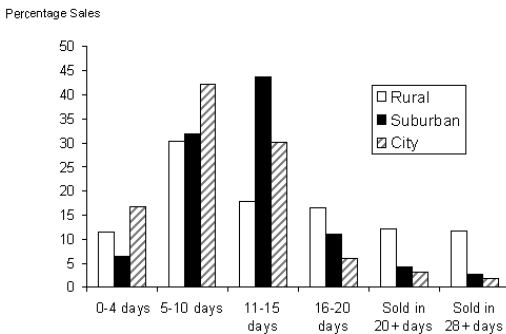


FIGURE 3 Percentage of dogs sold by time by location. Note that “stray” dogs cannot be sold until the 8-day holding period has expired.

TABLE 4
Relinquishments at Each Location by Reason for Relinquishment

Variable	Rural		Suburban		City		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Reason not recorded	78	15.35	847	46.41	145	18.35	1,070	34.26
Owner factors	207	40.75	475	26.03	315	39.87	997	31.92
Dog behavior	112	22.05	142	7.78	84	10.63	338	10.82
Issues with other pet	32	6.30	23	1.26	21	2.66	76	2.43
Unwanted pup	32	6.30	89	4.88	81	10.25	202	6.47
Relinquished for euthanasia	9	1.77	165	9.04	71	8.99	245	7.85
Unchangeable dog factors	17	3.35	40	2.19	7	0.89	64	2.05
Aggression	11	2.17	32	1.75	57	7.22	100	3.20
Other	0	0.00	4	0.22	2	0.25	6	0.19
Relinquished then reclaimed	10	1.97	8	0.44	7	0.89	25	0.80
Total	508	100.00	1,825	100.00	790	100.00	3,123	100.00

Reasons for Relinquishment

Declared owners relinquished only 15.1% of the total sample (3,123 dogs). Reasons for relinquishment were recorded when available and are summarized in Table 4. As can be seen from Table 4, almost half the suburban shelter relinquishers did not provide a reason for relinquishing their dog. This is a much higher rate than was observed at the other two shelters in this study. Significant differences were observed in the reasons given for relinquishment at the different locations, $\chi^2(18, N = 3,123) = 483.40, p < .0001$. At the city shelter, a relatively high proportion of dogs (7.22%) were relinquished for aggression. Although this finding may have been affected by the low numbers of people giving a relinquishment reason, proportionately fewer dogs were relinquished at the suburban shelter for owner-related reasons such as moving, life changes, and health. More dogs were relinquished at the rural fringe shelter because of canine behavior issues or issues with an existing pet. A very low percentage was relinquished for owner-requested euthanasia. Although puppies made up a large proportion of city shelter relinquishments, fewer pups were relinquished there (81) than at the suburban shelter (89) because of the low, overall relinquishment rate at this location.

Table 4 also shows that almost one third of the reasons given for relinquishment can be characterized as owner-related factors and approximately 11% were canine behavioral reasons. These were subdivided into separate categories and are presented in Table 5. Table 5 shows that the proportions of owner-related reasons differed significantly between organizations, $\chi^2(24, N = 1,132) = 76.55, p < .0001$. At all shelters, the most common owner-related reasons for relin-

TABLE 5
Owner and Dog Behavioral Reasons for Relinquishment by Location

Variable	Rural		Suburban		City		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Owner-related reasons								
Accommodation/moving	105	41.7	208	39.5	120	33.9	433	38.3
Owner health/personal reasons	58	23.0	91	17.3	57	16.1	206	18.2
Too much work/effort/ time	33	13.1	94	17.9	57	16.1	184	16.3
Abandoned	10	4.0	36	6.8	40	11.3	86	7.6
Owner commitment	10	4.0	19	3.6	28	7.9	57	5.0
Financial	11	4.4	28	5.3	16	4.5	55	4.9
Did not choose dog	11	4.4	14	2.7	12	3.4	37	3.3
Welfare issues	0	0.0	3	0.6	15	4.2	18	1.6
Mismatch	4	1.6	10	1.9	2	0.6	16	1.4
Issues with children	5	2.0	8	1.5	1	0.3	14	1.2
Wrong decision	0	0.0	8	1.5	4	1.1	12	1.1
Not fitting in with family	2	0.8	7	1.3	2	0.6	11	1.0
Unrealistic expectations	3	1.2	0	0.0	0	0.0	3	0.3
Total	252	100.0	526	100.0	354	100.0	1,132	100.0
Dog behavioral reasons								
Escapes	48	35.0	25	17.2	25	29.1	98	26.6
Hyperactive/too boisterous	16	11.7	48	33.1	10	11.6	74	20.1
Other (mouthing, housetraining, dog too demanding)	17	12.4	17	11.7	8	9.3	42	11.4
Barking	15	10.9	11	7.6	12	14.0	38	10.3
Predatory behavior	16	11.7	8	5.5	8	9.3	32	8.7
Uncontrollable	6	4.4	16	11.0	7	8.1	29	7.9
Destructive	4	2.9	9	6.2	12	14.0	25	6.8
Digs	9	6.6	10	6.9	2	2.3	21	5.7
Separation anxiety	6	4.4	1	0.7	2	2.3	9	2.4
Total	137	100.0	145	100.0	86	100.0	368	100.0

Note. Although 338 dogs were relinquished for behavioral reasons, a further 30 were admitted as strays and subsequently relinquished rather than being reclaimed. These dogs were relinquished primarily for escaping.

quishment were accommodation based, followed by personal reasons, and the dogs requiring too much effort/work/time. To a greater extent, owner health and personal reasons contributed to reasons for relinquishment at the rural fringe shelter. Cases of canine abandonment and human welfare issues such as homelessness contributed to a greater proportion of relinquishments at the city shelter. Four percent of owner-related reasons given for relinquishment at the rural shelter (and approximately 3% overall) involved a dog who had been obtained either

as an unwanted gift or who was left behind in a house after the original owner had moved.

The three most commonly reported behavioral problems in all shelters were escaping, boisterousness/hyperactivity, and barking. However, the relative proportions of these differed significantly between shelters, $\chi^2(16, N = 368) = 54.26, p < .0001$. The most common reason for relinquishment at both the city and rural shelters was escaping.

Hyperactivity/boisterousness was most common at the suburban shelter, although barking was not such a prominent issue. Destructiveness featured prominently among relinquishment reasons in the city, although separation related issues and housetraining seemed to be more of a problem at the rural shelter. Digging was not a prominent reason for relinquishment in the city. No significant differences were observed between the shelters in the ratio of dogs relinquished for aggression.

Reasons for Euthanasia

Table 6 presents data relating to the characteristics of euthanized dogs. As Table 6 shows, a highly significant difference was found among the shelters between admission type and subsequent euthanasia. Although stray dogs make up the

TABLE 6
Characteristics of Euthanized Dogs by Location

Variable	Rural		Suburban		City		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Admission type								
Stray	383	62.89	855	50.50	3,651	86.17	4,889	74.77
Relinquished	223	36.62	797	47.08	586	13.83	1,606	24.56
Other	3	0.49	41	2.42	0	0.00	44	0.67
Total	609	100.00	1,693	100.00	4,237	100.00	6,539	100.00
Gender								
Female	232	38.10	703	41.52	1,731	40.85	2,666	40.77
Male	377	61.90	990	58.48	2,506	59.15	3,873	59.23
Total	609	100.00	1,693	100.00	4,237	100.00	6,539	100.00
Size								
Small	195	31.73	584	34.49	1,907	45.01	2,686	41.06
Medium	209	34.22	580	34.26	1,063	25.09	1,852	28.31
Large	205	34.05	529	31.25	1,267	29.90	2,001	30.63
Total	609	100.00	1,693	100.00	4,237	100.00	6,539	100.00
Desexed status								
Entire	392	64.37	1,184	69.94	3,885	91.69	5,461	83.51
Desexed	217	35.63	509	30.06	352	8.31	1,078	16.49
Total	609	100.00	1,693	100.00	4,237	100.00	6,539	100.00

majority of euthanized animals at all shelters, city shelter euthanized a significantly larger proportion of them (86.2%), $\chi^2(2, N = 6,539) = 908.37, p < .0001$. There were no significant differences observed in gender differences across shelters, $\chi^2(2, N = 6,539) = 2.22, p = .33, ns$, but a significantly larger proportion of small dogs (45%) were euthanized at the city shelter $\chi^2(4, N = 6,532) = 93.17, p < .0001$. Sexually entire animals formed approximately 66% of animals euthanized at the rural and suburban shelters but a highly significant 91.7% of those euthanized at the city, $\chi^2(2, N = 6,539) = 594.72, p < .0001$.

Reasons for Postadoptive Return

Of the 4,405 dogs adopted from the shelters participating in this study, only 7.26% (320 dogs) were returned during the time data were collected. Table 7 presents data relating to the reasons. As Table 7 shows, canine behavior problems and owner-related factors comprised 60%, $\chi^2(12, N = 320) = 28.66, p < .01$, of reasons given for returns at the suburban shelter. Problems with existing pets and escaping were cited less frequently at this shelter than at the other two shelters. Analyzing outcome for dogs who were rehomed and subsequently returned indicates that returned dogs from the suburban shelter were more likely to be resold when compared to the number of dogs resold at the other shelters, $\chi^2(4, N = 320) = 31.81, p < .0001$; approximately 59% of dogs returned to the city shelter were euthanized.

TABLE 7
Reasons Dogs Were Returned Postadoption and Outcome by Location

Variable	Rural		Suburban		City		Total	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Reason given								
Owner factors: Moving, inappropriate selection, and so forth	7	12.5	55	33.5	22	22.0	84	26.3
Behavior	10	17.9	43	26.2	18	18.0	71	22.2
Dog factors: Health, size	12	21.4	37	22.6	22	22.0	71	22.2
Did not get on with established pet	11	19.6	13	7.9	17	17.0	41	12.8
Escapes	8	14.3	10	6.1	10	10.0	28	8.8
Reason not recorded	6	10.7	5	3.0	9	9.0	20	6.3
Psychological reasons	2	3.6	1	0.6	2	2.0	5	1.6
Outcomes for returned dogs								
Resold	31	55.4	115	70.0	38	38.0	184	57.5
Euthanized	22	39.3	40	24.4	59	59.0	121	37.8
Unknown	3	5.4	9	5.5	3	3.0	15	4.7

Note. $N = 320$.

DISCUSSION

This study aimed to compare admission data gathered over 1 year from three operationally similar shelters located in different parts of Melbourne. Data examined included the following:

1. Characteristics of dogs admitted
2. Patterns of admission
3. Sale
4. Reclamation and euthanasia
5. Duration of stay
6. Reasons for relinquishment—euthanasia and postadoptive return

The main findings of note are discussed in more detail in the following.

General Admission Data

Several findings from the general admission data are of particular note. National figures indicate that only 39% of Australian dogs are entire (McHarg et al., 1995); yet, the lowest percentage of entire dogs admitted in this study (61% at the rural shelter) substantially exceeds this figure. The implications of this overall finding have been discussed previously (Marston et al., 2004). Somewhat unexpected, however, is the finding that the proportion of desexed dogs admitted seems to vary directly with the distance from the city center. Significantly fewer entire dogs were admitted to the rural fringe shelter (60%) than were admitted to the suburban (74%) and city (83%) shelters.

This contradicts a commonly held perception in Australia that rural people tend to own entire animals. No reason for this finding has been established. Perhaps rural owners own more entire dogs but behave more responsibly with them. Alternatively, the country may have received the pet desexing message more favorably than the city. Our data indicate that bitches are more likely to be desexed than are male dogs and this systematically may have affected the results at the rural shelter where more bitches were admitted. Another possibility is that people may perceive the behavior of entire small dogs somewhat differently from how they perceive the behavior of entire, larger dogs. This, in turn, systematically may have affected the findings at the rural shelter where larger dogs were more common. Further study is needed to clarify this issue.

Second, the size of dog admitted to each shelter seems to relate directly to the distance of that shelter from the city center. The city shelter admitted a greater proportion of small dogs; the suburban, medium-size dogs; and the rural fringe shelter, large dogs.

The most logical explanation for this finding would relate to the relative cost of land in these areas. Perhaps dog owners select their dogs based on the amount of housing space available or, conversely, choose where to live based on the perceived needs of their canine companions. When absent from home, suburban-dwelling Australian dog owners do tend to leave their dogs in the backyard, (Kobelt, Hemsworth, Barnett, & Coleman, 2003). Therefore, it seems likely that size and availability of a backyard might affect the selection of a dog. Perhaps city dwellers—living in townhouses and apartments—might prefer smaller dogs, although those on rural properties might prefer larger dogs.

Arguing against this explanation is the observation that the catchment area of the city shelter actually covers 15 widespread and culturally divergent municipalities—beachside, city, rural, and suburban areas. Therefore, the geographic location of the shelter seems unlikely to be the major determining factor influencing the size of dog admitted. Perhaps socioeconomic or cultural factors of the catchment areas are involved but only further investigation can clarify this.

Outcomes

Although all shelters routinely attempt to identify all dogs admitted using identical procedures—a scan for microchips, collar tags, and tattoos—significantly, the rural shelter was more successful than the other shelters in reuniting stray dogs with their owners. Superficially, this shelter does not appear to use significantly different or better procedures and does not have a Website of found dogs; therefore, establishing how this is achieved requires an in-depth comparison of the procedures. However, garnering such information greatly could benefit other animal welfare organizations. The suburban shelter was the most successful at rehoming dogs, selling one third of admissions. This may be a direct result of a greater public profile for this organization; it also may be related to the types of admissions there. This shelter processes a higher proportion of relinquished dogs, puppies, and more small/medium dogs; all of whom may be more adoptable than stray, large, and old dogs. Again, further investigation is required.

The city shelter euthanized the greatest percentage of admissions. This probably reflects the greater proportion of strays admitted there or the strong pressure on limited resources in the city center.

Seized dogs comprised approximately 1% of the total admissions. The significant differences observed in outcome for seized animals at the suburban and rural shelters probably are linked to the nature of seizures that occur at each organization. Both shelters seize dogs for reasons of rush/attack. At the rural shelter, however, this often involves livestock predation, making far less likely the return home or sale to the public of these dogs.

Length of Stay

The three shelters varied significantly in their average length of stay. Typically, dogs were reclaimed from the city shelter within 2 days; after the 8-day “holding period,” strays either were euthanized or sold very quickly. This simply may be a result of the large number of admissions to this shelter resulting in pressure on limited kenneling space or it may reflect differences in assessment protocols that determine which dogs are euthanized and which are made available for sale. Sales peaked between 8 to 10 days at all three shelters. At this time, the mandatory holding period for stray dogs completed, the dogs are assessed and made available for sale to the public.

Dogs at the rural shelter took longer on average to sell: Perhaps this is because this shelter, being further from the main population areas, is less accessible to many potential adopters. It also may reflect the desexing policy at this shelter, where entire animals are desexed only after adoption—thus adding a day or so to the stay for surgery and recovery. The time taken to rehome a dog correlates directly with size; therefore, the greater proportion of large dogs admitted to this shelter would result in an increased overall length of stay.

Reasons for Relinquishment

Nearly half of all relinquishers at the suburban shelter gave no reason for the relinquishment. This may indicate scope for procedural improvements, whereby the staff more actively could pursue relinquishment details. However, the same shelter received the greatest proportion (and number) of relinquishments. It may be that not having to give a reason actually makes this shelter more attractive to relinquishers, thereby ensuring that dogs are relinquished rather than being permitted to stray or being disposed of in some other way. This apparent “ease of relinquishment” needs to be balanced against the numbers of owners who initially relinquished their dogs and subsequently returned to reclaim their animals. In fact, a surprisingly high percentage (5.29%), of relinquishments was reclaimed from this shelter. Many shelters have a postrelinquishment cooling-off period, varying from several days at the rural shelter to immediate processing at the city shelter. Although the implementation of a mandatory cooling-off period would involve longer shelter stays for relinquished animals and potentially have a negative impact on canine welfare, it would seem that these “reclaimed relinquishments” indicate that owners had not given enough consideration to their actions. Also unknown is how successful are such “reunions.” This area too bears further investigation.

Considering the large number of admissions to the city shelter, there were very few explicitly relinquished dogs (7.29%). However, this shelter accepted quite a

large number of explicitly abandoned dogs. Abandonments comprised more than one tenth of relinquishments at the city shelter. The dogs involved often had been left tied up at various venues, sometimes with notes attached to them requesting that the dog be cared for and extolling the animal's virtues. Often such dogs were left with bags of food, toys, or bedding. It is difficult to understand the desperation of these obviously caring owners and distressing to think that they feel they have no other recourse available. Both human and animal welfare issues may need further exploration in this area.

One of the owner-related reasons given for relinquishment included a small number of dogs (approximately 3% overall) relinquished by people who had received the dog as an unwanted gift or who had "inherited" the dog from another person. Although it has been established that dogs acquired at low cost are at increased risk of relinquishment (Patronek et al., 1996; Salman et al., 1998), Patronek et al. also specified that dogs received as gifts actually—compared to a control group—were at reduced risk of relinquishment. Perhaps an important feature in determining the fate of "gift" dogs is whether the recipient wants them. Additional research is required to investigate this issue in the wider Australian community.

Perhaps because more dogs are confined within a house or apartment and therefore have less opportunity to engage in these behaviors, barking and digging were cited less frequently as reasons for relinquishment in the city; destructiveness, however, was more common. These findings concur with others from Western Australia (Adams & Clark, 1989). Escaping was cited more commonly as a reason for relinquishment in the rural and city shelters than in the suburbs; this might be related to the type of fencing used in these areas. Suburban areas tend to have tall, solid fences (between 5 ft. 6 in. and 6 ft.); whereas rural areas tend to have a greater proportion of low, wire, farm style fencing. Understanding why escaping is prevalent among the reasons for relinquishment in the city shelter is more difficult, given the very large catchment area involved. This issue warrants further investigation, capturing information about the areas from which the dogs were admitted.

Hyperactivity and boisterousness were cited more commonly as reasons for relinquishment in the suburban shelter—almost three times more frequently than in the other shelters. This agrees with the findings from a recent study of responsible owners (who own dogs registered with their local council) in suburban Melbourne, in which 63% of owners reported overexcitement as the major behavior problem experienced (Kobelt et al., 2003).

The same study (Kobelt et al., 2003) also found negative correlations between reported hyperactivity and both the amount of exercise a dog received and the amount of time the owner spent with the dog. Perhaps suburban Australian owners believe their dogs obtain sufficient exercise and interaction confined in the yard. It would be very interesting to establish whether differences exist, between geographical areas, regarding patterns of exercise and how owners spend time with

their dogs. Although breed was not captured within this study, it may be that some Australian residents, believing that size and activity level are related, are selecting dogs inappropriately—resulting in people in suburban environments selecting highly active, but relatively small, working dogs such as kelpies, border collies, and cattle dogs. The actual activity needs of such working dogs might then exceed the owner’s ability to occupy the animal, resulting in complaints of hyperactivity. Further research could establish the frequency of working dog breeds among relinquished dogs. In addition, if people are selecting dogs purely for size, then appropriate educational programs could target this issue.

Reasons for Postadoptive Returns

Probably for the same reasons governing relinquishment, escaping formed a lower percentage of reasons for return of dogs to the suburban shelter. Canine behavior and owner-related factors were cited significantly more often when returning dogs to the suburban shelter, whereas owner-related factors were under-represented in returns to the rural fringe shelter. The suburban shelter had a return rate—for problems with existing pets—half that of the other shelters. This may result from some subtle differences in the preadoption selection and counseling procedures followed by the shelters. Perhaps the rural shelter screens more effectively for owner-related factors and the suburban shelter, for pet-related issues. However, these differences are not immediately obvious and will require in-depth investigation of existing procedures.

IMPLICATIONS

The results indicate that the sampled shelters have differing strengths. The suburban shelter is the preferred venue for relinquishment and adoption and successfully addresses the problems experienced when integrating an adopted dog with existing pets. The rural fringe shelter has the greatest success in reuniting stray dogs with their owners and appears to filter effectively for the owner-related factors that contribute to postadoptive returns. The city shelter has the fastest reclamations of stray dogs. Further analysis of the procedures used at each venue would enable the formulation of best practice and benefit all organizations.

Unfortunately, each of the shelters sampled serves as a pound for multiple municipalities, which means they admit dogs from different geographical and socioeconomic areas. This makes it very difficult to generate hypotheses relating to demographic information, as it is likely that some of the observed differences may reflect demographic differences within the various catchment areas. Further studies, analyzing dog admission data by municipal area, might provide insight into the socioeconomic or cultural factors related to shelter dog admissions. Certainly, the

high number of explicitly abandoned dogs received at the city shelter seems indicative of underlying human welfare issues.

The relationship between relinquishment reason and location may enable the formulation of strategic educational interventions aimed at preventing common behavior problems from becoming sufficiently severe to warrant relinquishment. Local papers or rates notices might target suburban owners with strategies to combat hyperactivity and boisterousness, although city dwellers could receive information on how to quiet barking dogs. The most common owner-related reasons for canine relinquishment across all shelters sampled in this study were accommodation based, agreeing with the findings from other studies (New et al., 1999; Salman et al., 1998; Shore, Petersen, & Douglas, 2003). It seems likely that easy identification and access to pet-friendly rental accommodation could reduce this substantially (Peterson, 2002).

It must be emphasized that the findings from this study, with an effective sample size of one shelter per group, cannot be generalized to other city, suburban, and rural located shelters. To increase the group size significantly would require a larger number of shelters than exist in Melbourne. However, findings indicate that significant differences exist between shelters that operate very similarly. The shelters in this study all function as council pounds for multiple municipalities, are located within a relatively small geographical area, accept all dogs presented, conduct euthanasia as required, and assess dogs similarly. However, they differ in their physical size, number of councils serviced (and therefore number of strays admitted), location, and the demographics of their clientele. Future work could focus profitably on these areas. This study highlights that existing research must be applied cautiously to other shelters and baseline data obtained for each shelter before commencing research. This study also has provided some indications for further research to determine the key human and environmental factors involved in shelter dog admissions and outcomes.

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