



CAT ADMISSIONS TO MELBOURNE SHELTERS

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GLOSSARY

For the purposes of clarification within this report, key terms are defined as follows:

Owned cat: is a cat for whom an identified person has claimed ownership. Such cats may or may not be registered, desexed or carry a permanent form of identification.

Semi-owned cat: a cat for whom an identified person has provided some aspect of care, such as food, veterinary care or de-sexing, but for whom the person does not claim ownership.

Stray cat: a cat that lives in proximity to humans and utilises resources associated with human environments, but who is not intentionally supported by any identified person.

Feral cat: a cat that has little dependence on humans, finding shelter, food and mates without human assistance.

Colony – A colony admission is defined as any admission, from a single location, consisting of three or more cats aged six months and over.

EXECUTIVE SUMMARY

The principle aim in this project was to describe the characteristics of cats admitted to three shelters in Victoria, Australia. Admission data were collected for 13 months. In addition to the data that is routinely collected, shelters also recorded information describing the physical condition, sociability and number of cats admitted per admission. This resulted in a total of 25,810 admissions being captured. The main findings were as follows:

Admissions

- The majority (78.51%) of cats were admitted as stray cats by Animal Management Officers (AMO's) or the public. By contrast, owner surrenders accounted for only 21 percent of total admissions.
- Nearly three-quarters (73.33%) of admissions to the participating shelters involved multiple animals, either colonies of cats, mothers with kittens or multiple kittens admitted without their mother. 'Kitten only' admissions formed 23.4% of all admissions with virtually all being presented by the public (63.8% as strays and 32.6% surrendered by owners).
- The majority (63.43%) of cat colonies were admitted by AMOs. Nearly two-fifths (38.7%) of the cats admitted to shelters were trapped before admission, mostly (72.8 %) by AMOs. Colonies of cats formed the majority (63.1%) of trapped cats and were trapped significantly more often than other admission types, such as single cats, kittens etc.
- Only 3.9% of all cats admitted were identified in any way, including microchips, flea-collars and registration tags. Only 2.8% of the total sample was microchipped.
- The reasons provided by owners who relinquished a cat were primarily owner-centric, with two reasons predominating: 'too many cats' (36.4% of all relinquishments) and a 'new child in the family' (21.8% of relinquishments). Almost all (95.4%) of the cats relinquished for the reason 'Too Many Cats' were kittens.
- While most (52%) stray cats were admitted to a shelter within a month of having been observed by the person who presented them, colonies of cats and mothers with kittens were tolerated as strays for longer periods.
- Kittens comprised 52.76% of all shelter admissions during the study period. With the exception of kittens, the admission rate of cats did not vary substantially throughout the year. However, over half of all admissions occurred between December and April, with a substantial increase in the number of kittens presented during these months, with two peaks observed in the distribution of kitten admissions.

Physical characteristics of cats admitted

- Although approximately equal numbers of male and female cats (39.67% and 43.31% respectively) were presented overall, a higher proportion of female cats were admitted in all age groups other than kittens.
- Only 2.81% of all the cats admitted to shelters were obviously desexed. A larger percentage of owner relinquished cats (7.6%) were desexed compared to strays (1.5%), but this remained much lower than the 90% desexing rate previously reported for registered cats (McMurray, 2004). Very few cats (98) wore registration tags (0.04% of the sample) and 67 of these were relinquished by owners.
- The owners in this study, who relinquished cats, displayed similar behaviour to the semi-owners as described in other studies (Toukhsati, Coleman, & Bennett, 2005). For example, only 1.2% of relinquished cats were registered and only 7.6% were desexed i.e. although these owners claimed ownership of these cats, this did not extend to desexing and registering them. Cat semi-owners have previously been identified as providing some elements of responsible ownership, such as food, but not all of them. One important difference between the relinquishing owners in this study and the semi-owners identified previously is that the relinquishing owners in this study claimed ownership of the animal. It seems likely that there is a continuum of cat care in the community, ranging from non-ownership, through semi-ownership, through a more casual type of ownership (where ownership is acknowledged but the cat may be sexually entire and unregistered) to fully responsible ownership, where all these conditions occur.
- Almost half (47.8%) of Queens admitted with kittens were juvenile.
- The majority (72.8%) of cats admitted to shelters received an optimal body condition score, 22% received sub-optimal body scores and only 2.6% of cats were rated as over-weight or obese. Almost one-third (31.07 %) of cats with poor body condition was admitted by AMOs and these animals were more likely to be members of colonies.
- Cat flu was recorded in 32.17% of the total sample and occurred in 77% of the colony cats. Flea burden was recorded more frequently in colony and single cat admissions while Ringworm, Squamous cell carcinoma and Feline Aids occurred infrequently.
- One-fifth (20.5%) of all colony admissions were admitted with visible injuries. This represented 58.7% of all cats admitted with injuries. Over half (54.6%) of the injuries were old (scars possibly resulting from fights which had healed), 34.1% had new injuries, which may be new 'battle scars' or the result of trauma, such as would result from being hit by a car, and 11.2% had both old and new injuries.

Sociability of cats admitted to the shelters

- Only 9.7% of Queens admitted with kittens were assessed as wild or feral. The majority (65.5%) of Queens admitted with kittens were actively sociable, yet only 20% of these were owner-surrendered animals.
- The majority of public (68.58%) and AMO (72.18%) admitted strays were tolerant of, or actively sociable with, humans.
- The majority (75.12%) of owner-surrendered animals were highly tolerant of being handled and actively sought human interaction.
- Colonies of cats were less social than other groups, with 26.1% classed as actively anti-social. They also displayed poorer welfare with 45.6% of them having sub-optimal body condition, 20.5% displaying injuries and 77.4% showing Cat flu i.e. colonies had a higher frequency of injury and Cat flu than other admission types.

Outcomes

- Outcome was directly determined by the sociability of the cat with people. Almost half (47.7%) of the euthanased cats, were euthanased because they were wild/feral. By contrast only 13.6% of highly sociable cats were euthanased. Other factors such as injuries, disease, body condition, age and the method of admission affected the outcome to a lesser extent.
- Overall, 63% of cats admitted to shelters were euthanased, 28% were sold, four percent fostered and less than four percent reclaimed. Bearing in mind the high level of stray admission, the reclaim rate is very low (3.87%). Owner-surrendered animals were less likely to be euthanased than other groups with 48% sold and 7.62% fostered. The highest rate of euthanasia (78.4%) occurred amongst cats admitted as public strays.
- Older cats were more likely to be reclaimed by their owners than younger ones. The euthanasia rate for senior cats (78.96%) was the highest of all the age groups, while kittens and juveniles were more likely to be fostered. Although a greater proportion (31.72%) of kittens was sold than any other group, approximately 60% of kittens were euthanased. Whilst many kittens were euthanased because they were too young to be fostered or feral, 38.8% of kittens euthanased were sociable.
- Only 3% of admissions were euthanased due to a lack of space at the shelter and 0.4% due to a lack of buyer interest. However, almost one-fifth of euthanasia's were performed for unspecified reasons.
- Increased sociability and the ability to determine the desexed status of a cat reduced the likelihood of euthanasia occurring. In contrast, the presence of injuries, disease and poor body condition were predictive of euthanasia. Sociability was the strongest predictor of outcome. Whether a cat was trapped or not did not contribute significantly to the ability of the model to predict an outcome of euthanasia.

Microchip data

- Over a quarter (26.5%) of cats found to be microchipped upon admission were admitted within four months of chip implantation with 88% of them being readmitted to the shelter that had implanted them.

Implications

- The preponderance of stray admissions indicates that strategies targeted at reducing the number of stray cats are likely to have the greatest impact on shelter admissions.
- The high number of ‘kitten only’ admissions is particularly concerning, potentially indicating that many fertile queens remain in the community.
- ‘Kitten only’ admissions were presented almost exclusively by members of the public. This suggests that these kittens were produced from either semi-owned or owned queens. Whichever of these situations apply, the person admitting the kittens is a possible point of access to the fertile queen, to enable desexing to prevent further unwanted kittens being born. The two peaks observed in the kitten admissions are consistent with queens having had two litters during ‘kitten season’.
- Kittens comprised 52.76% of all shelter admissions during the study period. Therefore, in order to significantly reduce cat admissions to shelters, the number of kittens being born each year must be reduced.
- Almost half (47.8%) of the Queens admitted with kittens were juvenile, indicating that many cats were not desexed before puberty and reproduced at their first heat. However, as 89.8% of these juvenile queens were admitted as strays, the mandatory desexing of cats will possibly have a limited effect on this group, affecting only those owned queens who have an unwanted litter before desexing. Trap Neuter and Release programs may possibly reduce admissions via this avenue, however there are welfare concerns associated with such programs as well as uncertainty about their effectiveness.
- The reduced proportion of male cats in older samples may indicate that adult female cats are more likely to stray or more likely to be amenable to capture. Alternatively, fewer males may survive until adulthood.
- The sociable nature of the majority of Queens and kittens admitted suggests that most were socialised with humans to some degree, either by migrating from the owned to the stray population or via some kind of semi-ownership.
- Owner-surrendered animals were less likely to be euthanased than other groups, probably because this group is generally more sociable.

INTRODUCTION

The evolution of domestic cats commenced in the Mediterranean area about 8-10 million years ago, with the divergence of six species of small cats from other Felids (Serpell, 2000). Prior to 14,000 years before Christ (BC) humans interacted with animals as either predator or prey, however at this time, archeological evidence indicates that the first domestication event took place, with the domestication of the dog (*Canis lupus familiaris*) (Boessneck, 1985; Clutton-Brock, 1999). Archeological evidence relating to the domestication of cats (*Felis catus*) has been identified from about 6000 years ago (Serpell, 2000), when cats were used to protect stored food from rodents. The discovery of human and feline remains buried together in ancient Egypt, some 4,000 years ago, testifies that mankind's relationship with the cat had altered significantly by this time. In ancient Egypt the relationship had changed to such an extent that cats were worshipped by the cult of Bastet. By 1450 years ago, cats were commonly depicted in paintings of domestic scenes, often shown playing with family members or being petted. This indicates that cats had been fully integrated into human households. Over approximately four and a half millennia, the role of cats had changed from that of functional employee to valued companion (Archer, 1997; Serpell, 1999).

Cats were introduced to mainland Australia between 1824 and 1886 (Abbott, 2002). They accompanied European settlers on boats and spread inland from coastal towns as the settlers began settling the continent (Abbott, 2002). Cats are highly efficient predators and so the domestic cat is regarded, by many, as a distinct threat to indigenous birds and wildlife (Fougere, 2000). This concern is increasingly leading to calls for cat curfews and containment (Baker, 2001; Melissa Fyfe, 2004). These have already been introduced in the Australian Capital Territory (Anon, 2004).

In common with other domesticated animals, cats that are socialised with and handled by humans at an early age are tolerant of, and responsive to, human interaction (Freedman, King, & Elliot, 1961), relating to humans as members of their social group (Webb, 1995). As with other species of companion animals, at the present time cats are primarily kept for companionship (Serpell, 2000) and confer a variety of benefits upon their owners. These include emotional (Zasloff & Kidd, 1994) and social support (Raina, Waltner-Toews, Bonnett, Woodward, & Abernathy, 1999), improved psychological well-being, buffering from psychological trauma (Garrity, Stallones, Marx, & Johnson, 1989; Baun, Oetting, & Bergstrom, 2001) and reduced reported levels of depression (Mugford & M'Comisky, 1975). Pet owners enjoy greater general and cardiac health (Kidd & Feldman, 1981; Enders-Slegers, 2000) and enjoy better survival rates after a heart attack than non pet-owners (Cain, 1983). A prospective study evaluating the effects of pet acquisition (either a dog or cat) determined that acquiring a pet resulted in a significant reduction in minor health problems and increased psychological well-being, with some effects being relatively long lasting (Serpell, 1990).

Cats are far more popular pets in the United Kingdom (UK) (Combelles, 2004) than they are in Australia. In 2002 there were an estimated 7.5 million pet cats in the UK, making them more popular pets than dogs (6.1 million) (Anon, 2002). Currently there is an estimated British cat population of approximately 8 million (Combelles, 2004), with 18% of households owning at least one cat. Nearly 40% of British people prefer a cat as a pet, compared to only 7% who prefer a dog (Combelles, 2004). This finding contrasts with a report from the 1950's, when C.A. Reed

wrote '... the British today are almost stereotyped as a nation of "dog-lovers" (cited in Combelles, 2004). A recent Cat Protection League survey (Anon, 2002) indicated that nearly a quarter of all respondents kept cats because they were low maintenance, and 27% said they liked not having to exercise them. These factors are thought to have contributed to a preference for cats, coinciding with increased urbanisation and changes in lifestyle that have resulted in people becoming busier and having less time for pet care. Over half (57%) of all respondents liked cats because they were affectionate, 49% liked them for their independence and 46% preferred them because they were clean. Cats were most popular with the 35-44 years age group, with nearly a third of this group owning at least one cat, while older people preferred dogs.

Whilst many of the social changes observed in the UK appear to also characterise Australia (Toukhsati, Coleman, & Bennett, 2005), at least to some extent, there has not been a similar increase in the popularity of cats in Australia, in fact quite the opposite. Estimates of Australia's cat population, based upon telephone surveys conducted by professional market research companies, consistently indicate that the number of pet cats and their owners has declined in Australia over the last decade. For example, an AC Nielsen survey estimated that Australia's household cat population increased steadily between 1979 (2.23 million) and 1988 (3.24 million) and then declined to 2.86 million in 1994 (Baldock, Alexander, & More, 2003). A comparable report, collated by Reark Research Pty Ltd, estimated that, in 1994, the total number of cats living in Australian households was 1,397,000 (Reark Research Pty Ltd, 1994). Although this is approximately one million cats less than the AC Nielsen survey indicated, both reports agree that the pet cat population is decreasing. The Reark report estimated that there had been a decrease in this population of 10% during the year 1993-1994. Yet another report indicated that the pet cat population in Australia was 2.60 million in 1999, but had decreased to 2.47 million in 2002 (BIS Shrapnel Global Marketing Intelligence and Forecasting, 2003). The number of homes owning at least one cat has also fallen, although to a lesser degree, from just over 25 percent of metropolitan households in 1994 to 23 percent of households in 2002. These findings imply that many households, whilst still keeping cats, keep fewer of them. Interestingly, Toukhsati et al. (2005) identified that 33% of households in Victoria, Australia, owned at least one cat. Perhaps the level of cat ownership varies significantly throughout Australia.

Consistent with this, evidence presented by Australian veterinary epidemiologists suggests that pet cat numbers are declining at a rate of 1.5% per annum (Baldock et al., 2003). This is potentially of some significance, since Baldock et al. (2003) claim that the pet cat population has declined to such an extent that it is now unsustainable, primarily because of the high level of desexing of pet cats in Australia. The Reark Report (1994) identified that 88% of all metropolitan pet cats are desexed, with this percentage rising to 94% of the adult cat population (over one year of age). The level of desexing reported by Reark (1994) and Baldock et al. (2003) has been confirmed by other studies (McHarg, Baldock, Headey, & Robinson, 1995; Toukhsati et al., 2005) which also report that over 90% of owned female cats and 89% of owned male cats are desexed.

Baldock et al. (2003) argue that the high level of desexing has resulted in intact female cats being unable to make contact with sufficient numbers of intact males to reproduce, and claim that this limits the number of kittens available for adoption. Arguing against this assertion is a recent survey in Australia (Kendall & Ley, 2006), which indicated that only 2% of cat owners had

experienced any difficulty locating a kitten to purchase, whether from a breeder, pet shop or welfare society. Half of those experiencing difficulty had required a specific breed of kitten and the other half were attempting to adopt outside kitten season. This survey, therefore, does not support the contention that insufficient quantities of kittens are available for adoption.

Animal welfare shelters in Melbourne also report no decrease in cat or kitten admissions (Webb, 2006), comparable to the reduced ownership statistics identified above. Euthanasia remains the most commonly used strategy to control cat overpopulation (Griffin, 2001; Rochlitz, 2000) and, currently, the Cat Protection Society reportedly (Webb, 2006) euthanase thousands of kittens each year, due to insufficient numbers of potential adopters. A possible explanation for this situation maybe that, although most pet cat owners desex their animals, only 70% of both sexes are desexed by six months of age (Toukhsati et al., 2005). Considering that many queens can enter oestrus from four months of age, this means that many female cats are not being desexed until after they can produce at least one litter of kittens. Urban-living toms can reproduce from approximately 10 months of age, which is much earlier than rural-living toms, who delay reproduction until three years of age (Say, Pontier, & Natoli, 1999). Therefore, desexing owned male cats at one year of age is also likely to contribute to the over-population of cats.

The question of whether there is a cat over-population problem in Australia is somewhat contentious at present. At a recent conference (National Summit to End Pet Overpopulation; Gold Coast, Australia, June 15-17th 2006) there was a dichotomy of opinion between veterinarians in private practice, who see the pet cat population decreasing, and animal welfare professionals, who see no corresponding reduction in the numbers of cats presented at shelters each year. The most parsimonious explanation for this difference may be that both views are correct, at least to some extent, and that the excess cats and kittens admitted to shelters are coming from a source other than the pet cat population.

Cats enter welfare shelters via a number of pathways. They can be admitted as strays by Animal Management Officers (AMOs), or members of the public, surrendered by their owners, admitted by qualified welfare inspectors on humane grounds and sheltered temporarily for owner-support reasons, such as when a cats' owner is temporarily unable to care for him or her. Factors that increase the risk of a pet cat being relinquished in the United States of America (USA) have been identified (Patronek, Glickman, Beck, McCabe, & Ecker, 1996) and include owner-related issues and cat-related factors. Owner-related issues include having specific expectations about the cat's role in the household, inappropriate care expectations, allowing the cat outdoors, and never having read a book about cat behavior. Cat-related factors include the cat being sexually intact, or having daily or weekly inappropriate elimination. Whether these same factors are associated with the risk of relinquishment in Australia is unknown, however differences have been identified in the reasons that Americans and Australians relinquish dogs (Marston, Bennett, & Coleman, 2004), so it is possible that such differences may also exist in relation to cats. Additional research is required to clarify this issue, and also to clarify the percentage of cats in welfare shelters that come directly from the pet population.

Jarman and van der Lee (1993) defined three categories of cats, although they acknowledged that the boundaries between these sub-populations are flexible and that individual cats can migrate between sub-groups depending upon circumstances. The categories defined by these authors are:

- Domestic cats: cats that are almost totally dependent upon humans intentionally providing food and shelter for them. Although domestic cats can hunt for themselves and find their own mates, removal of humans and the resources they provide would result in profound changes in the cat's way of life. Their population ecology is intentionally and directly controlled by humans.
- Stray cats: cats that are less dependent upon humans, but use food and shelter provided intentionally or unintentionally by humans. Their survival is indirectly controlled by humans and, despite some hunting, their lives would be severely impacted should humans be removed the environment.
- Feral cats: cats that have little dependence on humans and find shelter, food and mates without human assistance. Their ecology would remain unchanged with the removal of humans.

Consistent with the proposition that sub-populations of cats, other than those kept domestically as pets, may be contributing to the large number of animals admitted to shelters, it has been estimated that, in 2002 in the state of Victoria alone, there were an estimated 500,000 domestic cats, 300,000 stray cats and 200,000 feral cats (Department of Sustainability and Environment, 2003). Moreover, a 2005 study conducted in Victoria, Australia (Toukhsati et al., 2005) revealed that a sizable proportion of the Victorian residents (22% of respondents) were involved in semi-ownership (also known as communal-ownership) practices involving cats. Semi-ownership is described as the provision of some degree of care for cats not owned by the individual providing the care; namely feeding. It is not known to what extent semi-ownership practices are directed towards cats that are 'fully-owned' by other humans and to what extent they are directed towards cats that Jarman and van der Lee (1993) would describe as 'strays', however previous research in Australia (Webb, 1995) indicates that 33% of colony cats are intentionally fed by humans. It seems likely that semi-owned cats, supported by humans who take responsibility for feeding but not for desexing, may contribute substantially to the perceived cat over-population problem in Victoria.

If pet cats are not responsible for maintaining the levels of cat admissions to shelters but, instead, these are originating from the feral, stray and semi-owned cat populations, then this has significant implications for those seeking to design and implement cat population control strategies. According to available statistics, over 90% of pet cats *are* desexed (Baldock et al., 2003). Superficially then, it would seem that further strategies promoting desexing to pet owners would have limited success in reducing cat numbers overall. However, it has also been reported that only 70% of female cats that *will be* desexed are *actually* desexed by six months of age (Toukhsati et al., 2005). This study also identified that 13% of female cats had a litter prior to desexing and five percent of male cats were known to have sired at least one litter. If so, then shelters might expect to see unwanted kittens being owner-surrendered without their 'pet' mothers. This may indicate that there is scope to promote Early Age Desexing (EAD) more widely to cat owners, preventing even one litter of unplanned kittens being born to each female. Little research has examined why cat owners do not desex their cat before pregnancy becomes possible, but a survey of households which had unplanned litters of kittens, cited reasons such as the cost of desexing, considering the animal wild, the queen being already pregnant when adopted as a stray and a desire to have kittens as reasons for not doing so (New et al., 2004).

Promoting EAD amongst cat owners is unlikely to have a significant impact on the contribution to cat over-population of feral cats, who are highly likely to be sexually entire and able to reproduce freely. It is also unlikely to impact upon the stray population, although it might be effective with that portion of the stray population that is actively and intentionally maintained by human involvement i.e. the semi-owned cats. These cats have a human caring for them, at least to some degree, so it might be possible to reduce cat over-population by convincing these semi-owners to take more responsibility for the cat, particularly with relation to having it desexed. Research is required to know exactly what arguments, or incentives, might encourage such people to desex the cats that they do not regard as theirs but feed. If these cats are responsible for maintaining the high number of cat admissions to welfare shelters, this may be an important strategy to investigate.

In summary, then, the most effective strategy for controlling cat over-population, should it exist, will almost certainly depend upon which sub-population of cats is producing the bulk of animals contributing to the problem. Determining this is a logical first step towards finding a suitable solution. Although it is not possible to directly assess whether many animals admitted to shelters are feral, stray, semi-owned or pets, there are indirect ways of classifying cat admissions into the various categories.

Measures of physical health, such as body condition and the presence of injury, disease and/or parasites are likely to differ between the various sub-populations of cats. 'Wild-living' stray and feral cats face considerable welfare challenges with competition for mates, food and territory often resulting in fights and serious injuries (Dards, 1983), which do not receive veterinary attention. Human garbage and rubbish tips form a major food source for many cat colonies (Webb, 1995), resulting in the cats being exposed to unhygienic conditions, various diseases and pathogens. Cats who receive food from humans, either as an owned or semi-owned stray cat, are likely to be in better physical condition than strays and feral cats that are unsupported directly by humans. Therefore, indicators of physical health and well-being should provide some indication regarding whether a cat was wild-living or being fed by humans prior to shelter admission.

Whilst genetic factors, particularly from the sire, can influence a kitten's sociability (Reisner, Houpt, Erb, & Quimby, 1994), interaction with humans, at a young age, is necessary to socialise cats to human presence (Collard, 1967). Therefore, the level of tolerance and sociability shown by a cat to humans may also provide an indication of which category the cat falls in to. Pet cats are generally well socialized and feral cats are rarely socialized at all. Lying between these two extremes are the stray and semi-owned cats, dependent upon humans for food but less often experiencing the type of intimate contact with humans that is typical of fully owned cats. It could logically be suggested that cats in this group will be friendlier towards humans than feral cats, yet less tolerant of physical handling than owned animals.

The aim in this study was to characterize the cats admitted to three welfare shelters in Victoria over a 13 month period, quantifying numbers and physical characteristics of cats admitted and what happens to the cats following admission. A second aim was to determine the proportion of cats coming from stray, feral, privately or communally owned cat populations. A third aim was

to begin to determine the success of rehoming, using data from a major Victorian microchip database.

METHOD

From May 2005 to June 2006 the feline admission data from three Melbourne shelters was collected and analysed. Two shelters admit a variety of species, primarily dogs and cats, but the third facility specialises exclusively in protecting and rehoming cats. To ensure that all cats had equivalent time to settle and so increase the probability that they would display their normal behaviour at evaluation, all cats were held in a quiet location with minimal human presence for 24 hours before evaluation.

All shelters typically collect a range of information about admitted cats. This includes the date of admission, who admitted the cat, any identification present i.e. microchip, collar, registration tags etc, descriptive data such as breed, colour, length of coat, sex, desexed status, outcome and estimated age. The participating shelters utilize four age categories; kitten (< six months), juvenile (6-18 months), adult (1.5 -10 years) and senior (10 years+). Staff also identify whether admissions are single cats, a mother and kittens, a male cat and kittens, kittens only, multiple cats, or a colony of cats (which is defined as three or more cats admitted from a single location, with at least three aged over six months of age).

In addition to this information, participating shelters were asked to gather data relating to the physical condition of the cat. This included body condition, scored using the Waltham 5-point cat body condition chart. A score of three on this scale represents optimal condition, whereas a score of one represents emaciation and five indicates obesity. Shelter staff also recorded whether any injuries were present and whether these injuries were old or recent, whether the coat condition was good or poor, the percentage of matting present and also obvious signs of illness or disease.

After the 24-hour holding period, cats were assessed using a sociability scale devised after extensive discussion with a number of cat experts, such as veterinarians specialising in feline medicine, shelter cattery managers and cat owners. This scale was devised to measure behavioural characteristics that might discriminate between the various sub-populations of cats and is included as Appendix A of this report. A reliability study of the scale was conducted and it was found to have a good internal consistency, with a Cronbach alpha coefficient of 0.71.

If applicable, shelter staff also noted the reasons for euthanasia or relinquishment of each cat.

At the completion of the data collection period, all records were compiled in an electronic spreadsheet and transferred to a statistical package (SPSS for Windows, version 14) for analysis with significance levels set at 0.05.

RESULTS

Section 1: Admission data

1.1 Source of admission

A total of 25,810 cats were admitted to the participating shelters during the study period. The majority (62.8%) of cats were admitted to the specialist cat facility, with 23.9% and 13.3 % being admitted to the other facilities. As expected the cats came from various sources, as shown in Figure 1. The majority of cats were admitted as strays by either AMO's or by members of the public. Cats admitted by a person who claimed ownership accounted for one fifth of total admissions. The balance were admitted by Inspectors (individuals duly appointed and authorized to prosecute under the Protection of Cruelty to Animals Act) and for owner-support reasons e.g. when an owner is hospitalized and cannot afford to make boarding arrangements for his or her cats.

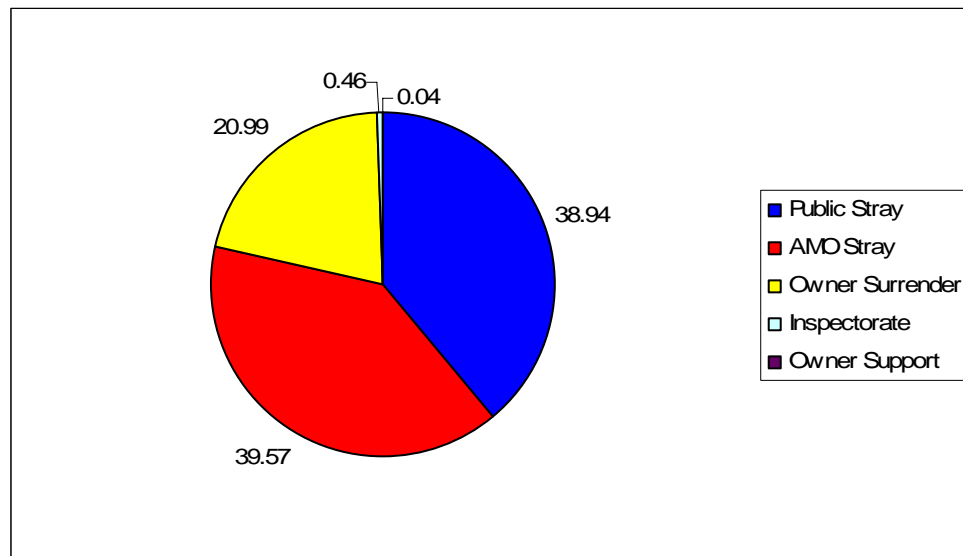


Figure 1. Source of Admissions

1.2 Type of admission

Data relating to the type of cats admitted per admission are presented in Table 1. As can be seen approximately one quarter of admissions (26.67%) involved a single cat. Nearly three-quarters (73.33%) of admissions to the shelters involved multiple animals; with colonies (26.16%), groups of kittens admitted without their mother (23.44%), groups of cats not identified as a colony (13.16%) and mother and kitten groups (10.55%) being well represented. The mother and kitten groups comprised 604 queens (289 juveniles and 315 adults) and 2050 kittens (69 of the adult or juvenile cats identified were not coded as female in the dataset).

Table 1
Admission Type

| | n | % |
|---------------|-------|-------|
| Single Cat | 6883 | 26.67 |
| Colony | 6751 | 26.16 |
| Kittens Only | 6051 | 23.44 |
| Multiple Cats | 3397 | 13.16 |
| Mother & Kits | 2723 | 10.55 |
| Male & Kits | 5 | 0.02 |
| Total | 25810 | 100 |

1.3 Source of admission by type of admission

Table 2 presents data illustrating how admission type varied with the source of admission. As can be seen, the number and type of cats presented differed significantly between admission sources ($\chi^2=10620.80$, $df=20$, $p < .0001$). Cat colonies were primarily presented by AMOs; whereas 'kitten only' admissions were presented almost exclusively by members of the public, either as strays or by persons who claimed ownership. It is quite likely that a percentage of public stray admissions were actually implicit owner-surrenders, so this high figure is consistent with the possibility that many pet cats may have at least one litter prior to being desexed. Mother and kitten groups were admitted primarily as strays. Although not shown in the table, further analysis revealed that 38.7% of the cats admitted ($n=9887$) were trapped before admission. The majority of these (72.8%; $n=7197$; $\chi^2=8402.83$, $df=4$, $p < .0001$) were trapped by AMOs and, in fact, trapped cats formed the clear majority (70.5%) of AMO admissions. Colonies of cats were significantly over-represented amongst trapped cats (63.1%; $n= 6237$; ($\chi^2=11851.45$, $df=4$, $p < .0001$).

Table 2
Admission Source by Admission Type

| | | Admission Source | | | | | Total |
|------------------|---|------------------|-----------|-----------------|--------------|---------------|--------|
| | | Public Stray | AMO Stray | Owner Surrender | Inspectorate | Owner Support | |
| Colony | % | 31.80 | 63.43 | 4.15 | 0.62 | 0.00 | 100.00 |
| | n | 2147 | 4282 | 280 | 42 | 0 | 6751 |
| Kittens Only | % | 63.79 | 3.87 | 32.26 | 0.08 | 0.00 | 100.00 |
| | n | 3860 | 234 | 1952 | 5 | 0 | 6051 |
| Male & Kittens | % | 20.00 | 0.00 | 20.00 | 0.00 | 60.00 | 100.00 |
| | n | 1 | 0 | 1 | 0 | 3 | 5 |
| Mother & Kittens | % | 36.43 | 43.55 | 19.79 | 0.22 | 0.00 | 100.00 |
| | n | 992 | 1186 | 539 | 6 | 0 | 2723 |
| Multiple Cats | % | 32.44 | 33.68 | 33.35 | 0.44 | 0.09 | 100.00 |
| | n | 1102 | 1144 | 1133 | 15 | 3 | 3397 |
| Single Cat | % | 28.32 | 48.93 | 21.97 | 0.73 | 0.06 | 100.00 |
| | n | 1949 | 3368 | 1512 | 50 | 4 | 6883 |
| Total | % | 38.94 | 39.57 | 20.99 | 0.46 | 0.04 | 100.00 |
| | n | 10051 | 10214 | 5417 | 118 | 10 | 25810 |

1.4 Identification of admitted cats

Of the entire sample only 1002 cats (3.9%) were identifiable; 722 (2.8%) had been microchipped, 98 (0.4%) were wearing registration tags, 354 (1.4%) were wearing a flea collar and 109 (0.4%) were wearing some other sort of collar, some of which had owner tags on them. Interestingly, cats that carried identification of some sort often presented with multiple forms, with 112 cats carrying two forms of identification, 35 cats carrying three, and 4 cats carrying four. One hundred and twenty-one microchipped cats wore a flea collar, 58 microchipped cats wore registration tags and 31 microchipped cats wore some other sort of collar. Only 1.2% of cats surrendered by their owners wore registration tags.

1.5 Reasons for owner surrender

Over 5000 cats in the sample were surrendered by someone who claimed ownership. An analysis of the reasons owners gave for surrender is presented in Table 3. As can be seen, the majority of reasons cited for relinquishing an owned cat are owner-centric. By contrast, cat-centric reasons like behaviour and cat health were cited relatively infrequently. Two reasons were given for the majority of relinquishments i.e. having ‘too many cats’ and that there was ‘a new child in the family’. Closer analysis of the reason ‘Too Many Cats’ revealed that 1879 of the 1970 (or 95.4%) cats relinquished for this reason were kittens. Notably, 26% of all kitten admissions were relinquished by owners and these formed 65% of cat relinquishments. In Victoria, Australia, many councils require owners to obtain a permit if they wish to own more than two cats. Therefore, the reason ‘too many cats’ may indicate a situation in which an existing multi-cat household acquires an extra cat or breeds kittens, which cannot then be kept.

Table 3
Reasons for Surrender (n=5,417)

| Reason | n | Percent |
|------------------------------|------|---------|
| Too Many Cats | 1970 | 36.37 |
| New Child | 1182 | 21.82 |
| Unable to care for | 423 | 7.81 |
| Cannot get Council Permit | 313 | 5.78 |
| Moving/Accommodation Issues | 276 | 5.10 |
| Owner Health | 248 | 4.58 |
| Relationship Breakdown | 196 | 3.62 |
| Incompatible with other pets | 189 | 3.49 |
| Feline Health Issues | 169 | 3.12 |
| Other | 139 | 2.57 |
| Feline Behaviour Issue | 113 | 2.09 |
| Unspecified | 107 | 1.98 |
| Financial Reasons | 92 | 1.70 |
| Total | 5417 | 100.00 |

1.6 Length of time spent as strays

Members of the public or council officers who presented cats identified as strays often indicated that they had observed the cat ‘straying’ in their area for some time before they captured it. Figure 2 presents the estimated number of days that stray cats were observed before admission. Of the 20,625 stray admissions, 2,036 were missing data, leaving 18,229 to be analysed.

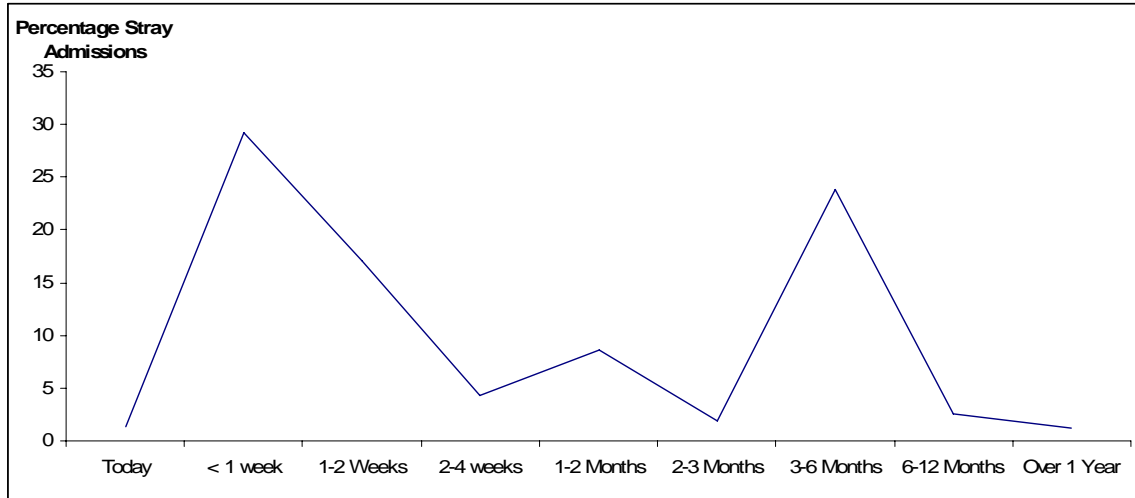


Figure 2: Number of Days that ‘Stray Cats’ were observed Straying before Admission.

As can be seen from Figure 2, many stray cats were admitted to shelters quite soon after they were noticed straying, although very few were admitted on the day that they were noticed straying. Figure 2 reveals a secondary peak of cats that have been observed straying for three to six months prior to capture. A breakdown of this data by the type of admission is presented in Figure 3.

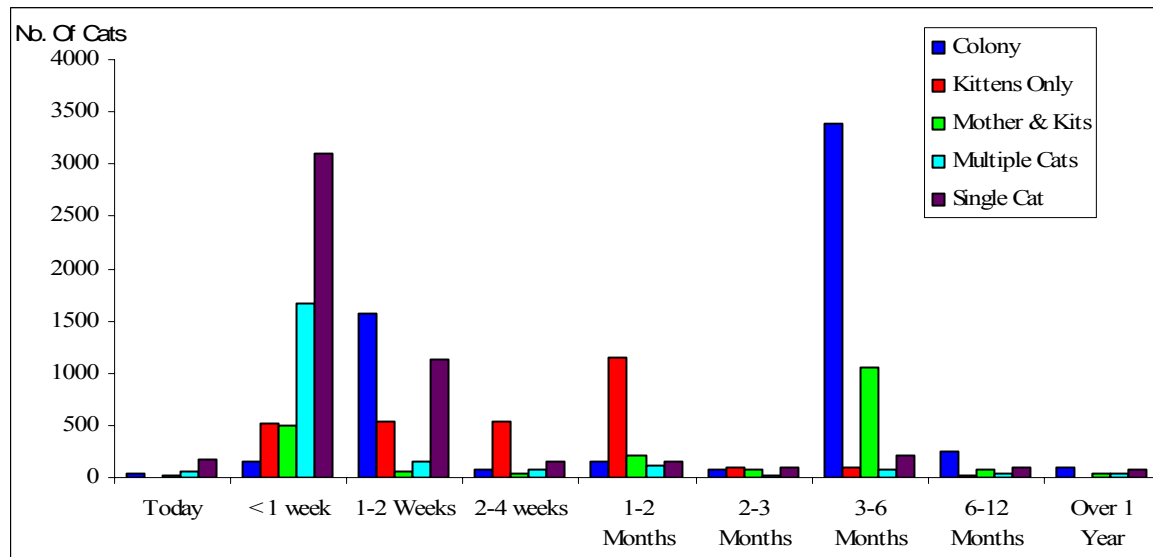


Figure 3: Admission Type by Length of Time Straying

As can be seen from Figure 3, the primary peak identified in Figure 2 consists primarily of single and multiple adult stray cats, presented at the shelter within 1-2 weeks of being observed. The second peak identified in Figure 2, however, consists primarily of colonies and mothers with kittens, observed straying for 3-6 months before being presented at the shelter. The majority of 'kitten only' admissions, admitted as strays rather than owner surrenders, had been noticed as strays for less than two months.

1.7 Seasonal Trends

Admission numbers varied from 838 animals admitted in September 2005 to a maximum of 3273 in December 2005, with an average of 1985 overall. Removal of kitten admissions halved the monthly average to 939 admissions. Admissions of senior, adult, juvenile cats and kittens were plotted by month over the duration of the study period, against the average overall admissions and the average admissions excluding kittens. These data are presented in Figure 4.

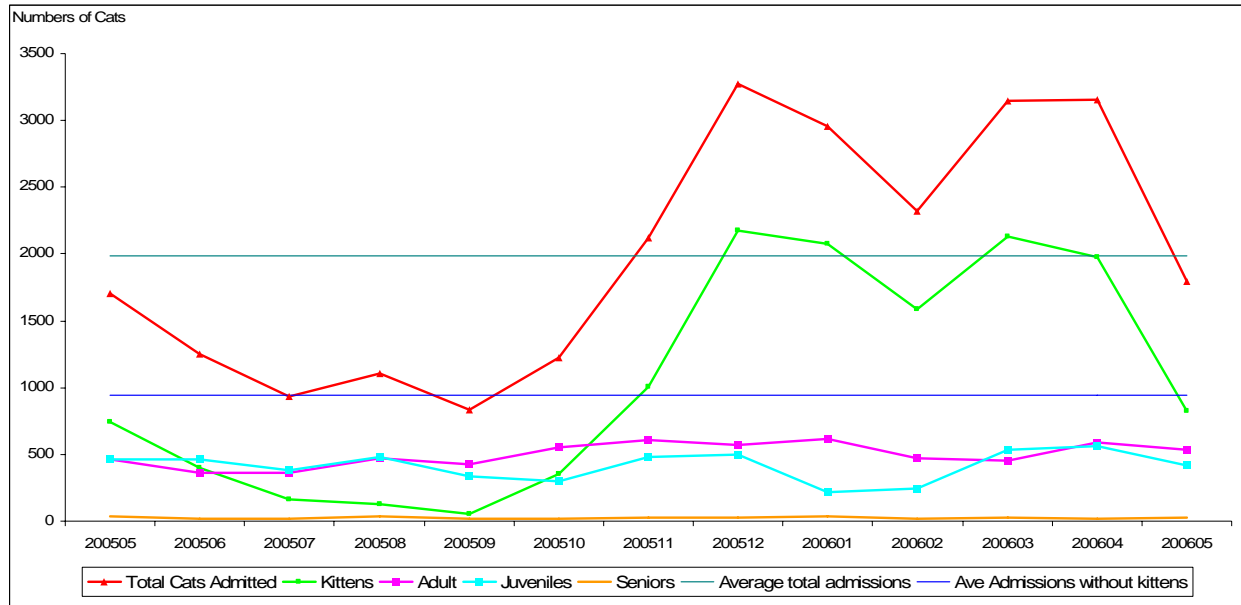


Figure 4. Monthly Admissions by Age Group (showing the Monthly Average with and without Kitten Admissions)

As can be seen from Figure 4 there is a clearly defined 'kitten season' apparent in the data which occurs at the warmest time of the year, starting in December and continuing through until April of the following year. The admission rates of cats in the other age groups vary relatively little throughout the year. It is particularly interesting to note the distribution of the kitten admissions, with a second peak following the first after a pause of approximately two months.

Section 2: Physical characteristics of the cats admitted

2.1 Age and sex of admitted cats

A breakdown of the age, sex and desexed status of the cats admitted is presented in Table 4.

Table 4
Age, Gender and Desexed Status of Cats Admitted (n=25,810)

| Characteristic | n | % of Entire Sample | % of This Age Group |
|---------------------------------|-------|--------------------|---------------------|
| Age | | | |
| Kitten (<6 months) | 13618 | 52.76 | |
| Female | 5289 | | 38.84 |
| Male | 5611 | | 41.20 |
| Unidentified | 2718 | | 19.96 |
| Juvenile (6-18 months) | 5390 | 20.88 | |
| Female | 2854 | | 52.95 |
| Male | 2234 | | 41.45 |
| Unidentified | 302 | | 5.60 |
| Adult (1.5 - 10 years) | 6474 | 25.08 | |
| Female | 2892 | | 44.67 |
| Male | 2293 | | 35.42 |
| Unidentified | 1289 | | 19.91 |
| Senior (10+ Years) | 328 | 1.27 | |
| Female | 144 | | 43.90 |
| Male | 101 | | 30.79 |
| Unidentified | 83 | | 25.30 |
| Summary Gender Breakdown | | | |
| Female | 11178 | 43.31 | |
| Male | 10240 | 39.67 | |
| Unknown | 4392 | 17.02 | |
| Total | 25810 | 100.00 | |
| Summary Desexed Status | | | |
| Not Desexed | 17651 | 68.39 | |
| Unknown | 7433 | 28.80 | |
| Desexed | 726 | 2.81 | |
| Total | 25810 | 100.00 | |

As can be seen in Table 4, over half of all admissions were kittens, with relatively few senior cats admitted. There was an approximately equal percentage of male and female cats overall, but there were significantly more females admitted in all age groups except kittens ($\chi^2=456.69$, $df=6$, $p < .0001$). A breakdown of the types of admissions by sex and age is presented in Figure 5.

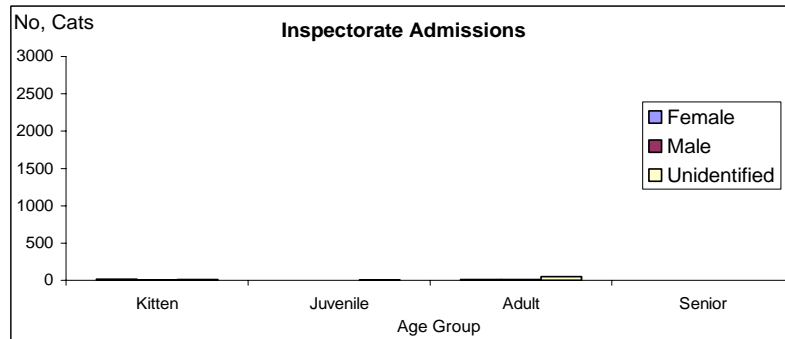
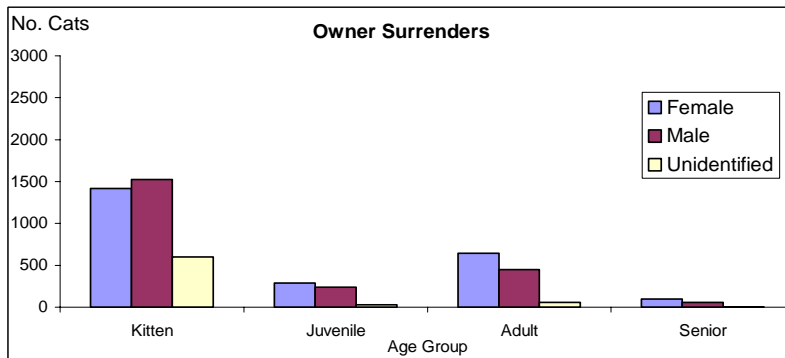
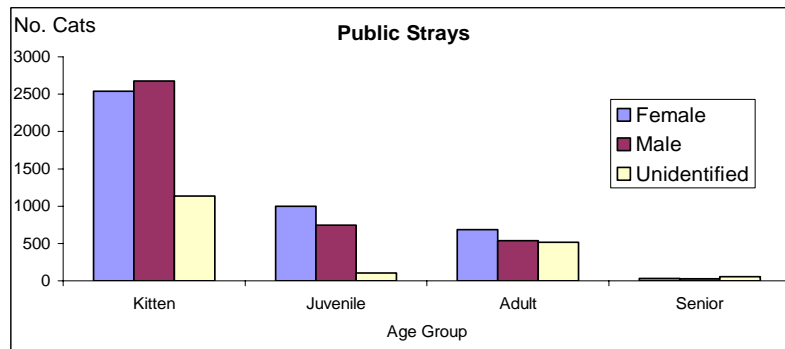
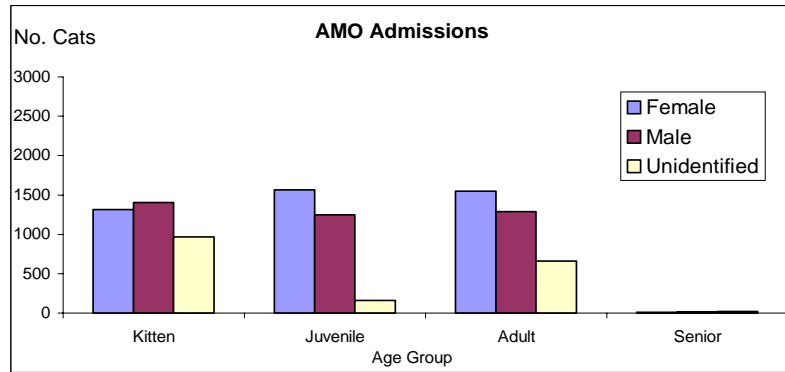


Figure 5. Age and Gender by Admission Source (Please note that ‘Owner Support’ Admissions were not charted, as they were so infrequent)

As can be seen in Figure 5, AMO admissions contained the greatest percentage of females of breeding age i.e. juvenile and adults ($\chi^2=545.70, df=6, p < .0001$). The majority of juvenile females (89.8% or 2563 out of 2854 animals) were admitted as strays. Colony admissions consisted of greater numbers of females and kittens than males. Public strays comprised a significantly greater proportion of kittens of both sexes than other admission sources ($\chi^2=481.00, df=6, p < .0001$). Owner-surrendered cats comprised a significantly lower percentage of juvenile cats of both sexes compared to other admission sources ($\chi^2=206.99, df=6, p < .0001$). Inspectorate admissions, although relatively infrequent overall (n=118), were comprised primarily of adult cats (n=73). The gender of over half of inspectorate admitted cats (n=69) could not be identified as being male or female ($\chi^2=15.93, df=6, p < .01$).

2.2 Sexual status of admitted cats

Although desexed male cats are easy to distinguish from entire males, it is difficult to know whether an adult female cat has been desexed unless she possesses an ear tattoo to indicate desexing. Nonetheless, on the basis of available information (Table 4), it was evident that few of the cats in the sample were desexed. Only a very small percentage (3.3%) either possessed an ear tattoo, indicating desexing, or were castrated males. The frequency of desexed males and females was similar (3.5% as compared to 3.3%). Data relating to the desexed status of the cats admitted and the source of admission is presented in Figure 6.

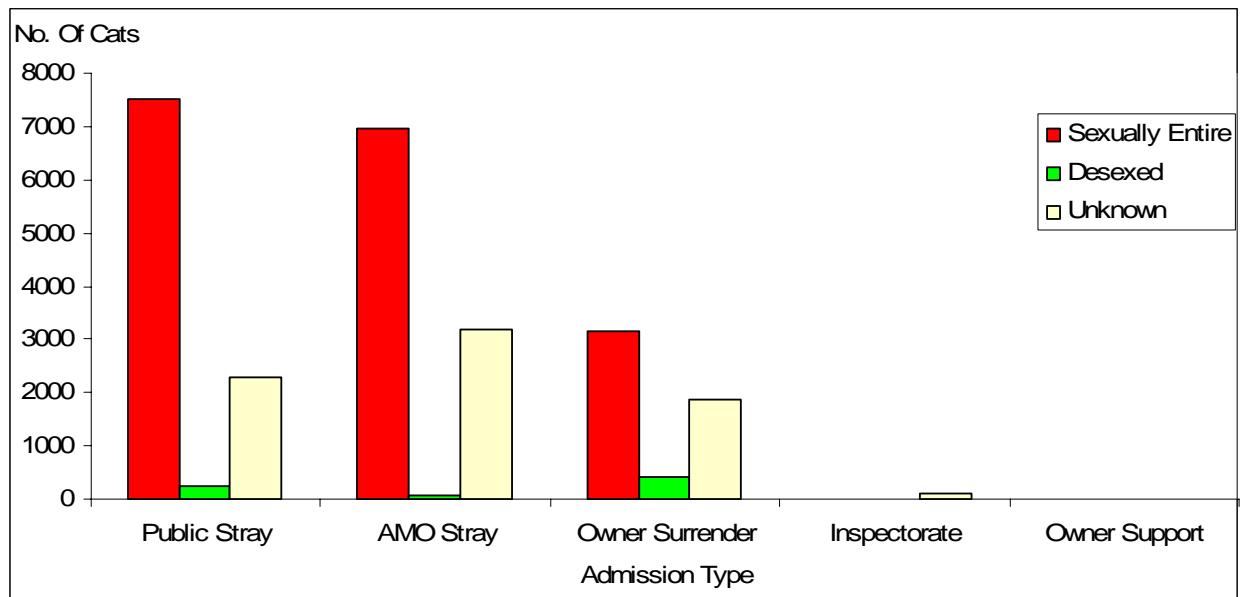


Figure 6. Admission Source by Sexual Status

As can be seen from Figure 6, the percentage of desexed cats varied in a significant manner between admission types ($\chi^2=1186.40, df=8, p < .0001$). More strays presented by members of the public (2.4%) were desexed compared to strays presented by AMOs (0.7%). Owner-surrendered animals were more likely to be desexed than those in other categories. There were a surprisingly high number of owner-surrendered cats where the desexed status of the cat was unreported.

2.3 Physical condition of admitted cats

The majority (72.8%) of cats admitted to shelters received an optimal body condition score of 3 (due to missing data this statistic is based on 25,158 cats). Very few cats were overweight; only 2.4% received a score of 4 and 0.2% a score of 5. In contrast, many more cats were admitted with sub-optimal body scores; 21.8% receiving a score of 2 and 0.2% a score of 1. Body scores are tabulated against the source of admission in Figure 7.

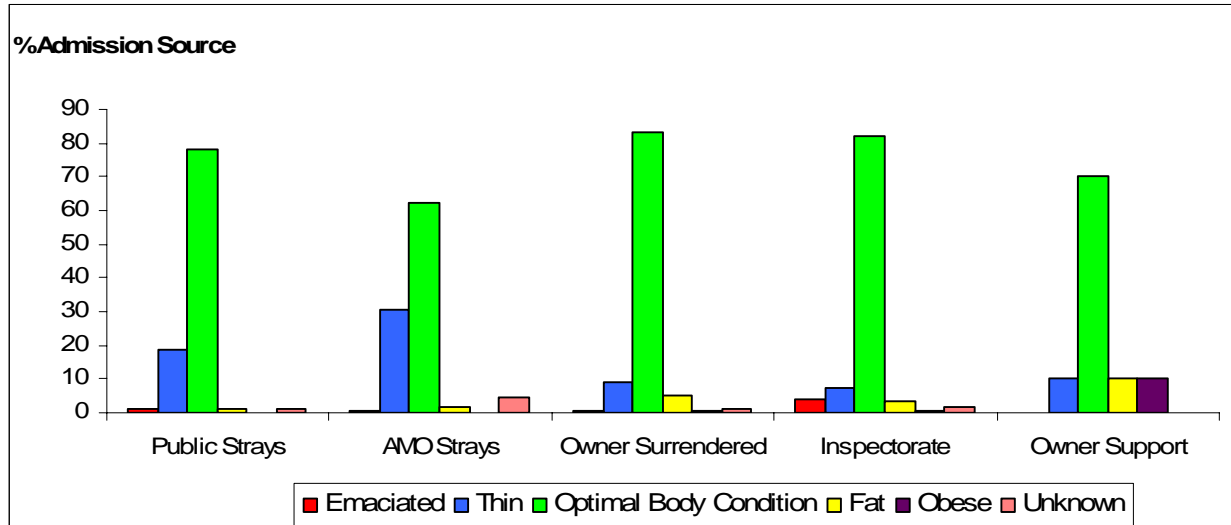


Figure 7. Body Condition by Admission Source

As can be seen from Figure 7, a higher percentage of cats admitted by AMOs are of sub-optimal body condition compared to other types of admission ($\chi^2=1677.24$, $df=20$, $p < .0001$). Not surprisingly, a relatively higher proportion of cats admitted by Inspectors were in an emaciated condition. Interestingly, a relatively high proportion of cats admitted for owner-support reasons were overweight or obese. A larger proportion (45.6%) of colony cats (data not shown) had a less than optimum body condition score compared to any other group.

2.4 Health status of admitted cats

Shelter admission staff were asked to record the presence of a number of common health problems in the cats. These data are presented in Figure 8. As can be seen, although the overall percentage of cats identified as having flea burden (1.93%), ringworm (0.90%) or Squamous cell carcinoma (SCC) (0.34%) was relatively low, almost one third (32.17%) of the sample was recorded as having cat flu. Cat flu occurred significantly more often in the colony admissions than in other types of admission, with 77.4% of Cat flu cases being colony cats and 5223 out of the total 6714 colony cats being affected ($\chi^2=9703.32$, $df=5$, $p < .0001$). Ringworm was more prevalent in 'kitten only' and multiple cat admissions ($\chi^2=183.1$, $df=5$, $p < .0001$) and SCC occurred significantly more often in cats admitted singly ($\chi^2=71.96$, $df=5$, $p < .0001$). A high level

of flea burden ($\chi^2=251.07$, $df=5$, $p < .0001$) was noted significantly more often in colony and single cat admissions. Obvious signs of Feline aids were recorded in very few cats.

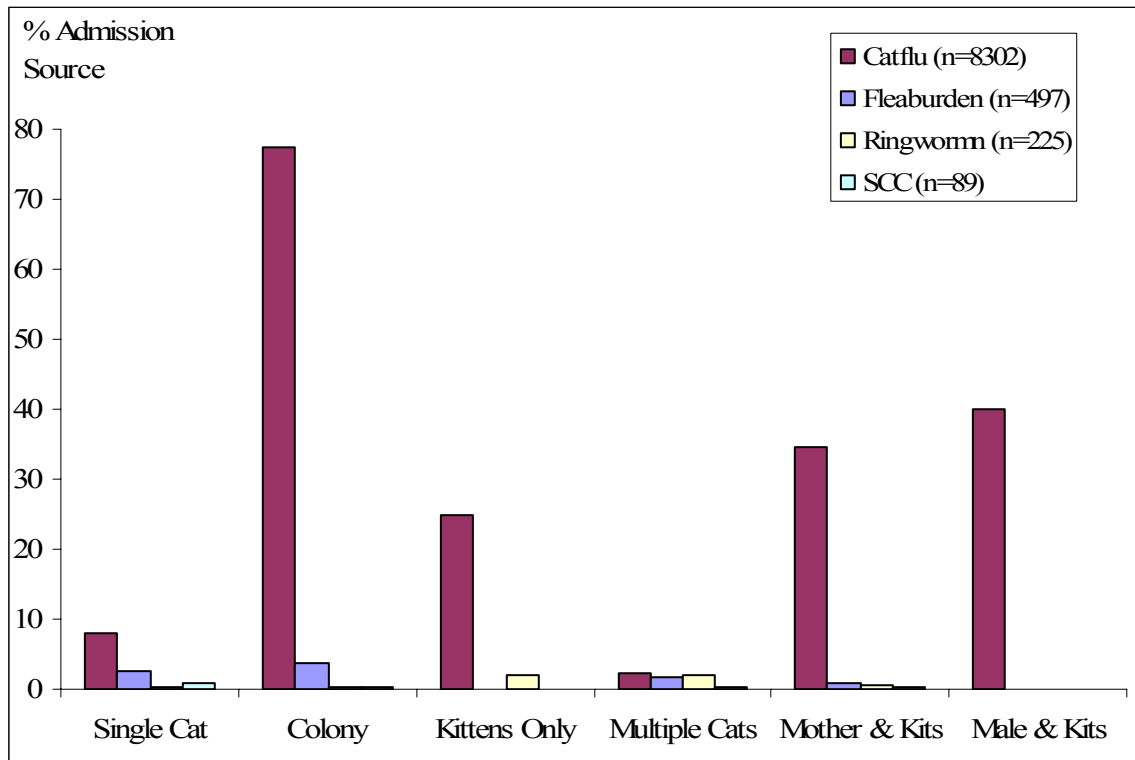


Figure 8. Disease by Admission Type.

Shelter staff recorded the presence of visually obvious injuries and were asked to indicate if they considered them to be old or recently acquired. Old injuries primarily consisted of ‘battle scarring’ resulting from fights with peers and other minor injuries that had healed to some degree, whereas new injuries included fresh wounds and more significant trauma, such as that resulting from being hit by a car. Of the 2,352 cats admitted with injuries (9.3% of total admissions), 58.7% (n=1381) were admitted as a part of a colony ($\chi^2=2308.00$, $df=4$, $p < .0001$) and 38.8% (n=913) as single cats. This indicates that 1381 out of the total 6714 ‘colony cats’, or 20.5% of colony cats admitted, were injured. Over half the injured cats (54.6%) had old injuries, 34.1% had new injuries and 11.2% had both. In four cases (0.2%) shelter staff were unable to decide if injuries were old or new.

Section 3: Sociability of Cats admitted to the shelters

3.1 Sociability scores for different sources of admission

Data relating to the sociability score and the source of admission are presented in Figure 9. Overall, most of the cats were moderately to well socialized, with almost three quarters of the sample receiving a score of 3 or more on the sociability scale i.e. the cat responded positively to gentle voice and was tolerant of being stroked. Over 4000 cats, however, were actively antisocial, representing 16% of the total sample. As expected, the majority (75.12%) of owner-surrendered animals were tolerant of being held and actively sought human interaction (Scores 4 & 5), although it is of interest that 209 cats in this group were actively non-social or very poorly socialized to humans. Compared with owner surrenders, all other categories contained a higher proportion of poorly socialized cats, although it is also interesting that a significantly higher percentage ($\chi^2=2670.31$, $df=20$, $p<.0001$) of public strays were tolerant of human presence, but would not allow a human to hold them (sociability score of 3) compared with other admission types. Over half of the AMO admitted strays (53%) were tolerant of being held or actively sought interaction. Sociability was negatively correlated with age ($r = -0.167$, $p<.01$), but positively correlated with a high body score ($r = 0.167$, $p<.01$).

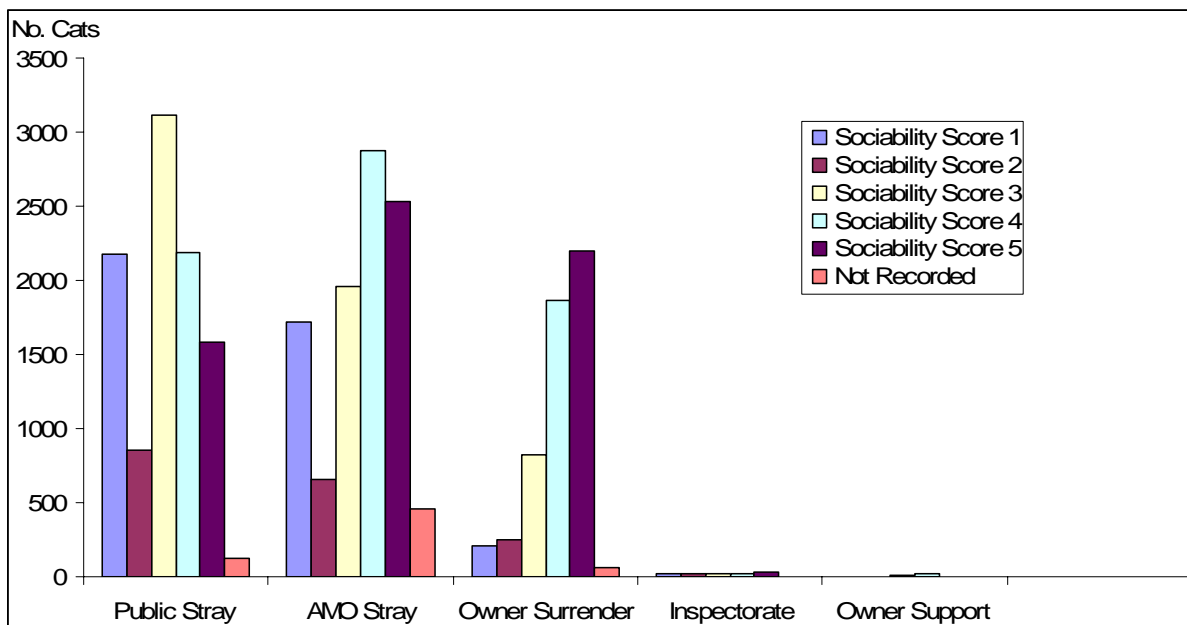


Figure 9. Sociability by Admission Source

3.2 Sociability scores for different types of admission

Sociability score data were analysed by the type of cats admitted and is presented in Figure 10.

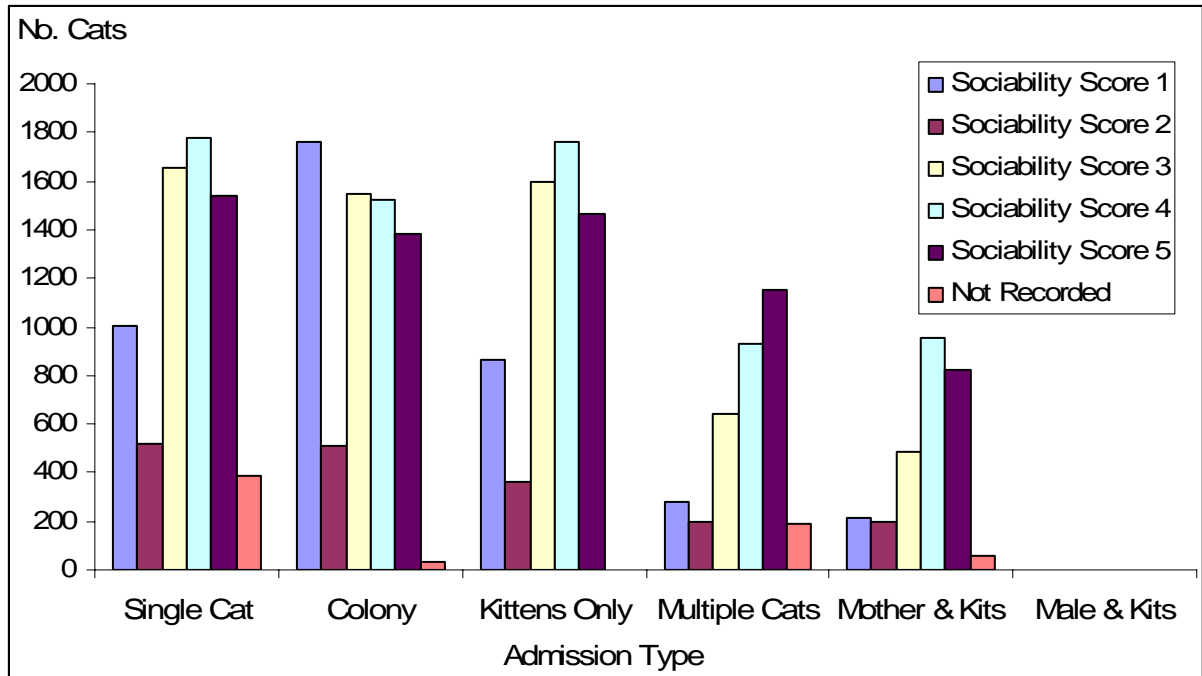


Figure 10. Sociability by Admission Type

As can be seen in Figure 10, there were differences in the sociability scores obtained by different types of cats presented at the shelters. Cats presented as multiple adults, but not described as a colony, tended to be more sociable, while cats living as a colony tended to be more actively unsociable ($\chi^2=1797.00$, $df=20$, $p < .0001$). Almost three-quarters of 'kitten only' admissions were at least tolerant of humans, indicating that some degree of socialisation had probably occurred prior to their admission to the shelter. Only 9.7% of Queens admitted with kittens received sociability scores of 1 and were likely to be feral.

Section 4: Outcomes

4.1 Overall outcomes

The outcomes for the admissions tracked during this study are shown in Figure 11.

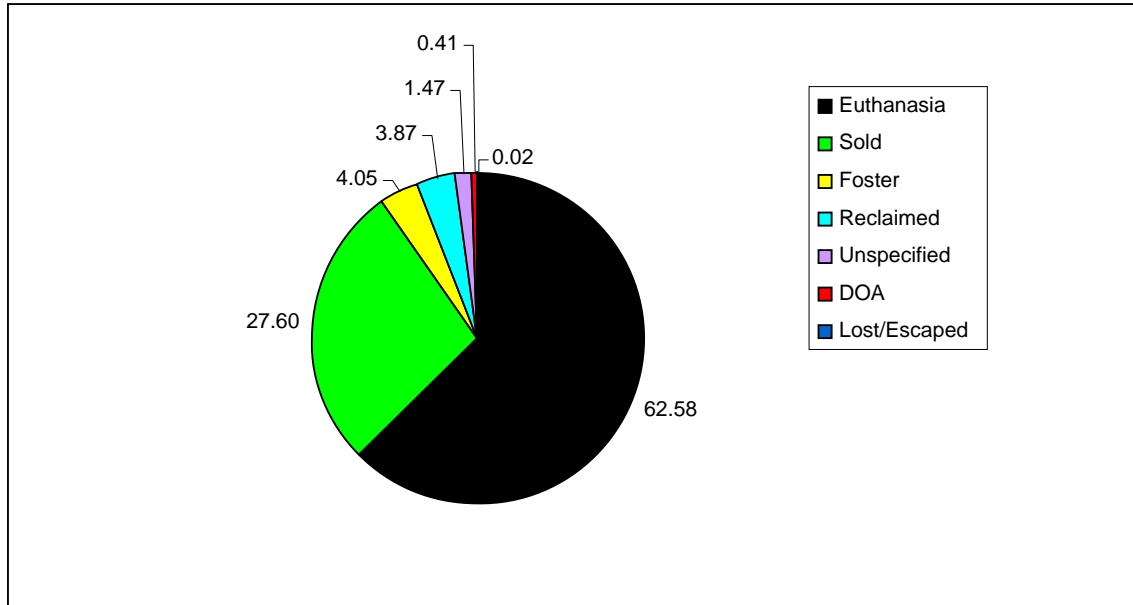


Figure 11. Outcome of Admissions

As can be seen in Figure 11, the majority of cats admitted were euthanased ($n=16,151$). Just over a quarter were sold ($n=7,124$) and less than four percent were reclaimed by their owners ($n=1,000$). If cats were identified in some way at admission the outcome was more optimistic. Over half (56%) of identified cats were rehomed, 38.5% were euthanased and 3.6% were reclaimed. The balance of identified cats (1.9%) was either deceased at the time of admission, fostered out or their fate is unknown.

4.2 Outcome by admission source

Analysis of the admission source by outcome is shown in Figure 12.

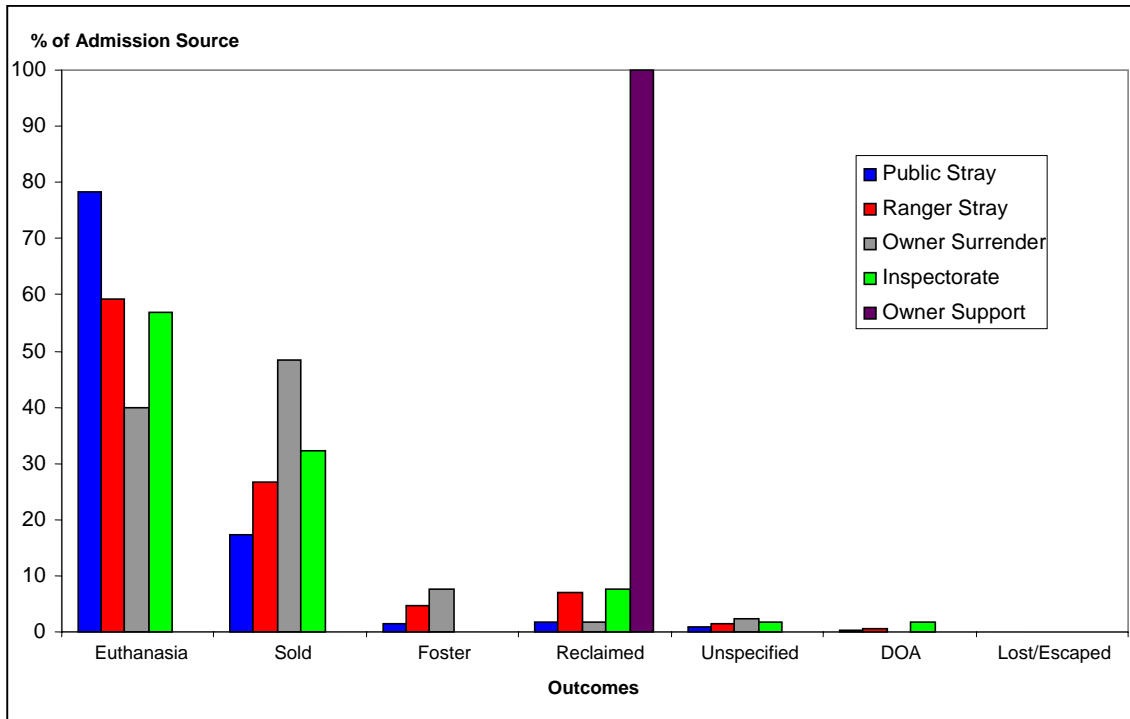


Figure 12. Outcome by Admission Source

As can be seen from Figure 12 significant differences existed in the outcomes for the different admission sources ($\chi^2=3246.23$, $df=24$, $p < .0001$). Proportionately fewer owner-surrendered cats were euthanased and these animals were more likely to be rehomed than other types of admissions. By contrast, cats that were admitted as public strays had a far less optimistic future. All of the cats admitted for ‘owner-support’ reasons were reclaimed.

4.3 Outcome by age

Figure 13 presents the proportional outcomes for each age group, where some significant differences existed between the groups ($\chi^2=981.84$, $df=18$, $p < .0001$). Adult and senior cats were more likely to be reclaimed by their owners than other groups. Senior cats were more likely to be euthanased than other age groups. Younger cats were more likely to be fostered than adult or senior cats. Although the percentage of kittens sold was higher than the other groups, approximately 60% of kittens were euthanased.

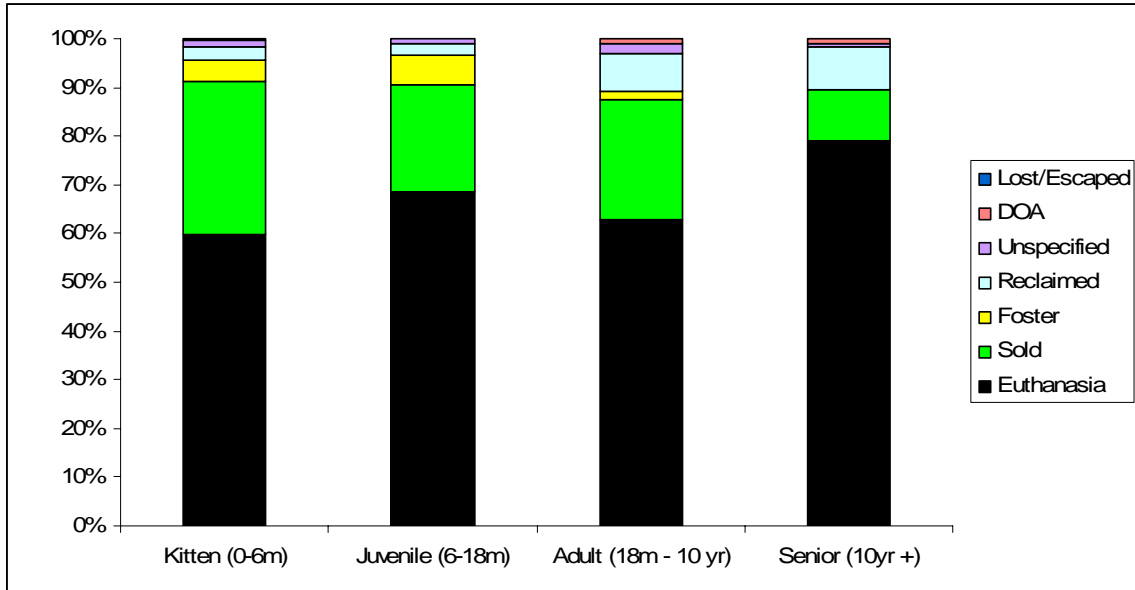


Figure 13. Outcome by Age

4.3 Outcome by sociability

The outcome data, grouped by sociability score, are presented in Figure 14. As might be expected, the perceived sociability of the cat had a significant effect on the outcome ($\chi^2=150890.02, df=30, p < .0001$). The more sociable a cat was, the greater likelihood of it being rehomed or fostered. By contrast, highly unsociable cats were almost universally euthanased.

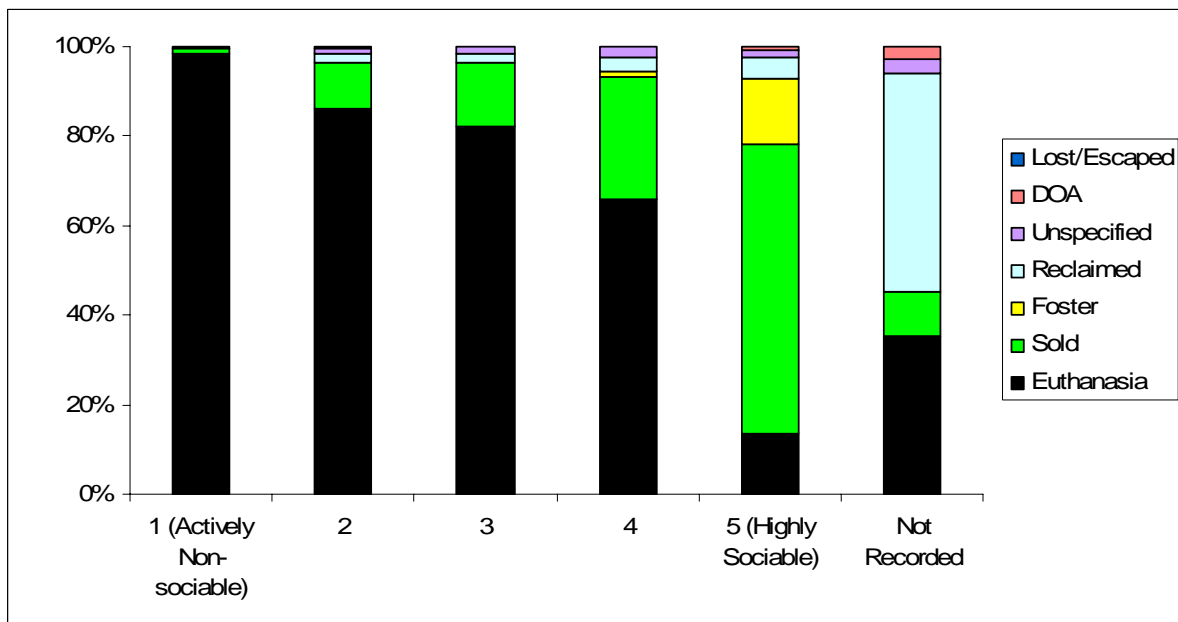


Figure 14. Outcome by Sociability Score

In order to ascertain whether the kittens admitted to the shelters were generally suitable to rehome, a detailed analysis of the outcomes by sociability was conducted for this group. These data are presented in Figure 15.

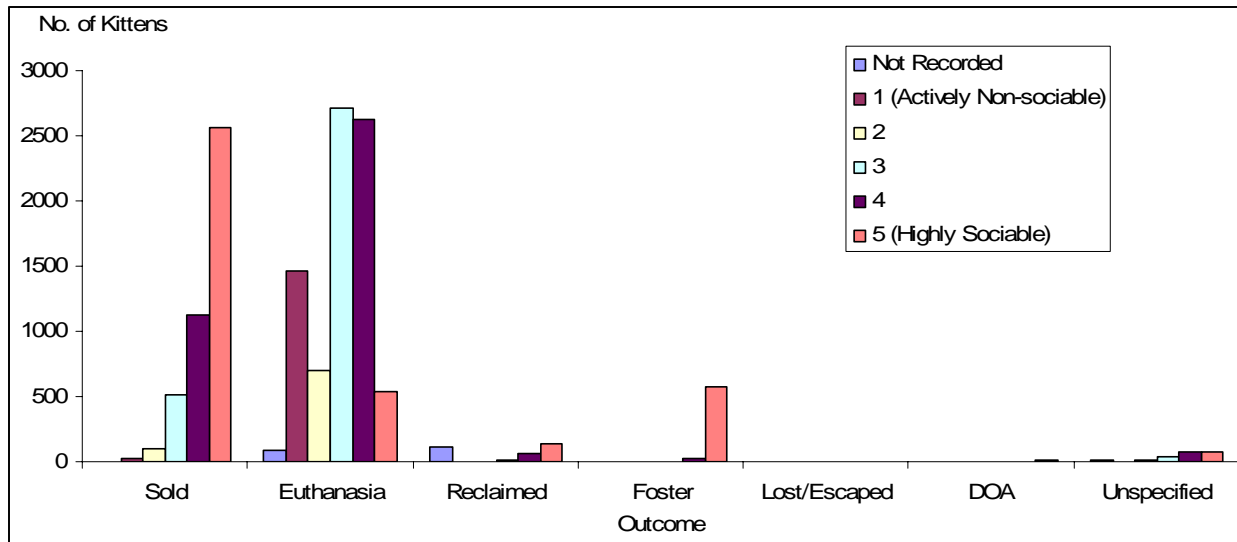


Figure 15. Outcome by Sociability for Kittens (n=13,618)

Although, overall, 60% of admitted kittens were euthanased (cf Figure 13) it is evident from Figure 15 that the rate of euthanasia varied significantly with the sociability score obtained by the kittens ($\chi^2=8114.71$, $df=30$, $p < .0001$). Kittens that were highly sociable (Sociability score of 5) were much more likely to be rehomed, reclaimed or fostered than were kittens with lower sociability scores. Nonetheless, out of a total of 8,125 kittens euthanased, 539 or 6.63% were highly sociable (scoring 5 on the sociability scale) and 2620, or 32.25%, were sociable (scoring 4 on the sociability scale). This is significant because it indicates that almost 40% of the kittens euthanased during this study were sufficiently well socialized to be suitable for placement in pet homes. Although the data are not shown, it was also noted that a higher percentage of colony kittens were euthanased (69.4%) reflecting their poorer sociability scores.

4.4 Reasons for Euthanasia

The reasons cited for euthanasia are collated in Table 5. Although in many cases the reason for euthanasia was unspecified, it can be seen from the table that almost half of the cats that were euthanased (47.68%) were assessed as wild/feral and not rehomeable. The category ‘Not Suitable to Rehome’ included cats that appeared to be socialised to humans but were aggressive, very timid or had long-term health issues. Notably, few owners requested euthanasia. When they did it was because a cat displayed unwanted behaviour, notably hunting or timidity (5 cases), was incompatible with existing pets (4 cases), the family was expecting a baby (2 cases), the owner had allergies (2 cases) or could no longer care for their animal (2 cases) and because the owner was moving (2 cases).

Table 5
Reasons for Euthanasia

| Reason | n | % |
|--|-------|--------|
| Wild/Feral | 7700 | 47.68 |
| Unspecified | 3214 | 19.90 |
| Too Young | 3026 | 18.74 |
| Ill Health | 997 | 6.17 |
| Not Suitable to Rehome (Temperament / Health) | 488 | 3.02 |
| Suitable to rehome but no room at shelter | 486 | 3.01 |
| Humane Reasons | 116 | 0.72 |
| No Buyer Interest | 65 | 0.40 |
| Too Old | 42 | 0.26 |
| Owner Requested Euthanasia | 17 | 0.11 |
| Total | 16151 | 100.00 |

4.5 Predicting Euthanasia from Admission Variables

Many of the variables hypothesised as being potentially predictive of cat euthanasia were dichotomous (i.e. had Yes/No answers). These included whether the cat was obviously desexed, displayed injuries or signs of disease, and age. Other variables were ordinal in nature such as body score and sociability score. In order to explore whether it could be predicted that a cat would be euthanased based on admission data, a new dichotomous outcome variable was created to reflect whether a cat was euthanased or not. Stepwise forward conditional binary direct logistic regression was performed to determine which aspects of admission data were predictive of euthanasia. Admissions missing the relevant data were excluded from the analysis, resulting in 18,040 cases being analysed.

Table 6. Results of Logistic Regression Prediction of Euthanasia (N= 18,040).

| | B | Wald | df | Sig. |
|--------------------------|----------|-------------|-----------|-------------|
| Sociability Score | -2.83 | 3837.12 | 1 | 0.00 |
| Obvious Signs of Disease | 0.87 | 210.29 | 1 | 0.00 |
| Obviously Desexed | -1.16 | 70.79 | 1 | 0.00 |
| Age | -0.29 | 54.59 | 1 | 0.00 |
| Injured | 1.00 | 31.92 | 1 | 0.00 |
| Body Condition | 0.14 | 4.71 | 1 | 0.03 |

As can be seen in Table 6, a test of the full model was statistically reliable ($\chi^2 = 2364.97$, $df=8$, $p < .001$), accounting for between 47.6% and 67.9% of the variance. The predictive value of this model was very high with a classification accuracy of 91.3 percent. All variables contributed significantly to the ability of the model to predict an outcome of euthanasia. Negative relationships indicate that increased sociability, ability to determine an animals desexed status and increased age all reduce the likelihood of euthanasia occurring. In contrast, the findings demonstrate that injuries, disease and body condition were predictive of euthanasia. However, sociability had by far the greatest effect, accounting for between 46.8% and 66.7% of the total variance by itself. Removal of this variable reduced the ability of the model to correctly predict which cats would be euthanased to chance levels. Whether a cat was trapped or not did not contribute to the predictive value of the model.

Section 5: Data Extracted from the Microchip Database

Data extracted from the microchip database for the period 01/05/2005 to 31/05/06 indicated that 6,459 microchips were implanted at the three participating shelters. A further 469 cats, that were microchipped prior to admission, were sold during this period. These figures are a little lower than the number of cats reported by the shelters as sold ($n=7124$) but this probably reflects a lag in processing between shelter records and updating of the microchip database. When cats are admitted to a shelter they are scanned for the presence of a microchip. If one is found the shelter then requests ownership data from the Microchip database. Using these data it was possible to analyse the time period between chip implantation and admission to one of the participating shelters for the 469 cats microchipped prior to admission (Figure 16).

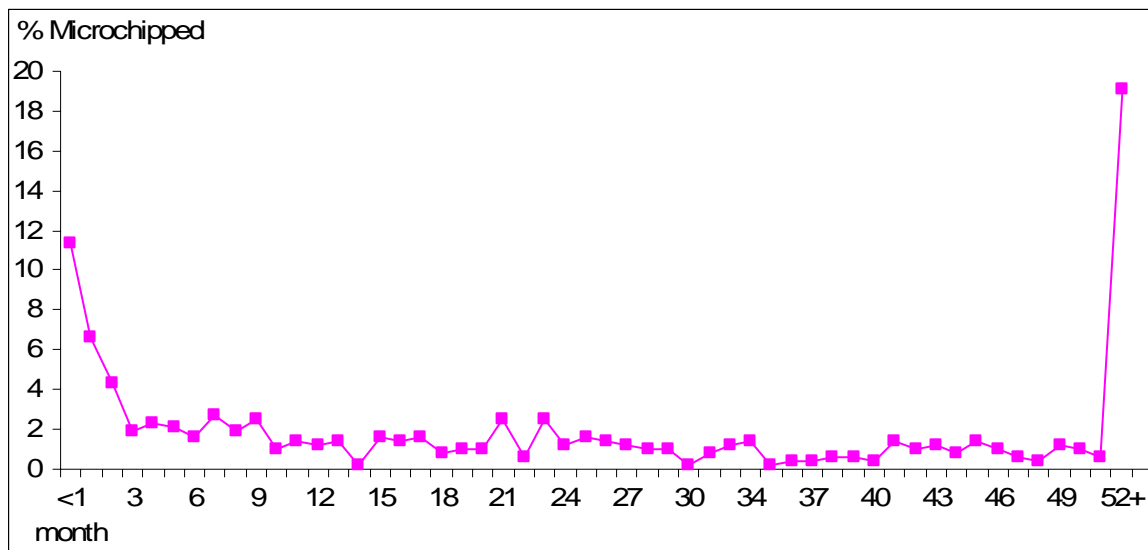


Figure 16. Microchipped Cats Admitted by Month Post-Implantation (data relating to month 52 and later is consolidated due to a low monthly rate of admission)

As can be seen from Figure 16; 11.4% of the microchipped cats admitted to the shelters were admitted within the first month post-implantation and over a quarter (26.5%) of microchipped admissions took place within four months of implantation. As the rate of microchipping in this sample was generally very low, yet shelters microchip cats when they sell them, it seemed likely

that many of the microchipped cats could have been adopted from a shelter. Therefore, an analysis was performed of cats admitted within four months of microchip implantation. This revealed that the implantation site was identical to the admitting shelter in most cases. Seventy-five out of 85 microchipped admissions, admitted within four months of being microchipped, were rehomed shelter cats. Although it must be noted that readmission to the shelter occurred in only 1.05% of the 7,124 cats sold, it may be that some cats are prone to wandering and that this should be documented when cats are readmitted after being rehomed. Only 10 microchipped cats were identified on the database as having died during the study period.

DISCUSSION

The primary aim in this study was to characterise the cats admitted to three Melbourne shelters over a thirteen month period, quantifying sources, the physical and social characteristics of cats admitted and outcomes for the cats after admission. A second aim was to gather evidence regarding the relative contribution that semi-owned, stray, pet and feral cats may be making to shelter admissions and particularly to explore whether admissions from non-pet populations might explain a reported increase in shelter admissions, even though the number of pet cats in Australia appears to have decreased significantly. A third aim was to begin to determine the success of cat rehoming, using data from a major Victorian microchip database.

In relation to the first aim, it was found that almost 80% of the 25,810 admissions were admitted as stray cats, presented either by Animal Management Officers (AMOs) or by members of the public. Most of the remaining 20% were cats surrendered by a person who claimed ownership. Three quarters of the admissions involved multiple cats and just over one third involved either queens with kittens or multiple kittens admitted without their mother. Cat colonies were also well represented, making up over one quarter of the total sample. Whereas 63% of colony admissions were presented by an AMO, 96% of 'kitten only' admissions and 56% of 'mother and kitten' admissions were presented by a member of the public, either as strays or as owner surrenders. Reasons for owner surrender varied but over a third claimed to be surrendering one or more cats because they owned 'too many cats'. Notably, most of the animals admitted for this reason were kittens. This study is consistent with past research, which has shown that owner-centric factors are more important in the relinquishment of a cat than cat-centric ones (Patronek, Glickman, Beck, McCabe, & Ecker, 1996) but contrasts with other findings, where relinquishment was often related to behaviour problems, including being 'too active', biting or house soiling (New et al., 2004; Patronek et al., 1996). Feline behaviour issues only accounted for 2.09% of the relinquishments in this study. Moving/accommodation issues accounted for 5.1% of the reasons given to surrender a cat, although an earlier study (Kendall et al., 2006) found that 40% of cat-owners who were renting reported experiencing problems with finding pet-friendly accommodation. Other reasons for relinquishment, such as owner health issues, were cited in 4.29% of cases. The high rate of relinquishment (21.8%) of cats due to a 'New Child' is presumably due to the fear of Toxoplasmosis. This may provide a possible avenue for a future intervention, whereby a public education program could inform pregnant mothers that there is minimal risk of zoonotic infection if normal hygiene procedures are followed.

Notably, few stray cats were admitted on the first day they were observed wandering. This is somewhat different to the situation with dogs (Marston et al., 2004). Perhaps people wait a few days before collecting stray cats because they view cats as being far more independent and self sufficient than dogs or, perhaps because many owned cats are allowed to wander, people may be reluctant to take an observed cat to a shelter in case it is actually owned. Possibly this is exacerbated because cats cannot be easily identified as owned. Very few cats in the sample were clearly identifiable (3.9%) and less than four percent of all cat admissions were reclaimed. Mandatory microchipping is being enacted in the state of Victoria, Australia, in 2007, and hopefully the low reclaim rates will be increased. However, since microchips are not a clearly visible type of identification, this is unlikely to encourage members of the public to collect cats

that they observe straying more quickly than is presently the case. Also, although the majority of adult cats admitted to the shelters had been observed straying for less than one week, many colonies and many mothers with kittens had been observed for 3-6 months prior to admission. This suggests that many cats may be abandoned or lost for a long period before being collected and admitted to a shelter.

As expected, marked seasonal trends were observed in the rate of cat admissions to shelters. While admission of juvenile, adult and senior cats was reasonably constant, kittens peaked dramatically in the months from November to April, with two pronounced peaks in December and March. The presence of two peaks possibly indicates that many female cats produce two litters during the breeding season, emphasizing the importance of controlling the cat population by desexing queens. Although male and female cats were equally represented among kittens, female cats were over-represented in all other age groups. This may indicate that, because stray males are less dependent on finding food to support kittens, they interact less with humans and are therefore less likely to be captured and admitted to a shelter. Alternatively, competition for mates amongst entire males may mean that many more male cats fail to survive to adulthood. Certainly life expectancy is poor for free-living urban cats, with only 10% surviving their first year of life (Natoli, 1994). As urban toms begin reproducing as soon as they reach sexual maturity, they have to compete for territory when not fully mature physically, perhaps this reduces their life expectancy (Say et al., 1999). Consistent with either of these explanations, very few cats (3.3%) admitted to the shelters were desexed and almost all of these were amongst that small proportion of cats (4.77%) admitted as owner surrenders. Surprisingly, the frequency of desexed males and females was quite similar (3.5% as compared to 3.3%). This is an interesting contrast to dogs where far more females than males are desexed (Marston et al., 2004). The level of desexing in this sample compares poorly with estimates from other sources (Baldock et al., 2003; McMurray, 2004). This issue is discussed in greater detail later in this report.

Generally, the cats in the sample received an optimum body score (72.8%). Very few were overweight (2.6%) but quite a few were rated as underweight or emaciated (22%). The underweight cats were generally admitted by AMOs or inspectors rather than members of the public and many of these were identified as colony cats. Cats living in a colony may have reduced access to food, resulting in more of these cats having poor body condition. Over one quarter of the sample was physically unwell, with cat flu being quite prevalent (32.1%) especially amongst colony cats (77.4%). Almost ten percent (9.3%) of the cats admitted were injured; most of these were colony cats. In fact, over half the 'colony' cats admitted were injured. The majority of these injuries were old, suggesting that they were likely to be the result of battle-scarring rather than road trauma, which was the cause of many newly acquired injuries. The life of a wild-living colony cat seems to be tough, with a significantly higher risk of injury, lower body condition and disease.

Sociability ratings varied with the source of the cats, but most cats were reasonably well socialized to humans, at least tolerating human presence, even if they did not tolerate being picked up and handled. As expected, a higher proportion of colony cats were actively unsociable compared to cats from other groups. Whilst kittens presented with their mother were mostly quite sociable, those presented without their mother tended to score lower on the sociability scale. Nonetheless, almost three quarters of this group demonstrated some degree of sociability,

indicating familiarity with humans. This finding suggests that kittens presented without their mother may be the progeny of semi-owned or stray cats rather than fully owned cats.

Outcome data revealed that over 60% of the cats admitted to the shelters were euthanased. Owner-surrendered cats had the greatest chance of being rehomed, with cats being admitted by AMO's facing a less optimistic future. Even though kittens were more likely to be rehomed than other age groups, almost 60% of them were euthanased. The strongest predictor of outcome was sociability, with well socialized cats and kittens more likely to be rehomed than less social animals. Cats that were actively unsociable were almost always euthanased. Not surprisingly then, the most common reason given for euthanasia was that the cat was wild or feral. Other common reasons for euthanasia were that the cat was too young to be fostered or rehomed, or was not suitable to rehome because of health or temperament issues. Surprisingly, few cats were reportedly euthanased because there was no room for them at the shelter (3%) or due to a lack of buyer interest (0.4%). Since almost one-fifth of euthanasia was performed for unspecified reasons, however, over supply is likely to be a significant factor in the decision to euthanase many otherwise healthy cats.

Finally, data extracted from the microchip database indicated that, although relatively few cats admitted to shelters were microchipped, many of these had been implanted within the previous four months and had been sourced from the same shelter. This is relevant to the third aim in the study and may indicate a propensity towards wandering or escaping in some cats, which may render them less suitable for rehoming. Only further research will be able to clarify this issue. Because of the small number of cats re-presenting at shelters following rehoming, it was not possible to identify factors critical to the success of this process.

With respect to the second aim in this study, it is now possible to speculate in an informed way about the relative contribution that owned, semi-owned, stray and feral cats may be making to shelter admissions. First, although the shelters were able to find homes for almost 40% of all cats admitted, and reported euthanasing only very few cats because suitable homes were unavailable, the fact that 16,151 cats were euthanased in the three shelters studied confirmed the premise that there is currently an over-supply of cats within the Victorian community.

Second, this study provides strong evidence that there is a group of cat owners in the community who, although they claim ownership of their cat when relinquishing it at a shelter, do not register or desex the animal. Although 57.02% of the desexed cats in the sample were owner-surrendered, this involved only 414 out of 5417 (or 7.6%) of owner-surrendered animals. This level of desexing is far lower than expected from veterinary and council estimates. Council benchmarking suggests that 81.89% of registered cats are desexed (McMurray, 2004), whereas veterinary statistics identify that over 90% (Baldock et al., 2003) of the pet cat population is desexed. It should be noted that, in the Baldock et al. study, the pet cat population was defined as those cats currently being seen by vets. This is estimated at less than 30% of the owned cat population (pers. comm. Dr K. Seksel 5th December 2006). It therefore seems likely that the statistics reported in this study may reflect the ownership practices of a different population of cat 'owners'. Council and veterinary statistics are likely to reflect the behaviour of one group of owners, those that we might call *responsible cat owners*, who register their pet, desex it, provide veterinary care for it and rarely, if ever, relinquish it to an animal shelter. The surrendering

owners in this study, by contrast, might more appropriately be called *casual cat owners*. These persons may feed a cat, provide shelter for it and claim ownership, but be less likely to register or desex it or provide veterinary care, and more likely to relinquish it to a shelter. This is a different level of ownership again from *cat semi-owners*, who engage in some cat ownership behaviours, such as feeding stray cats, but who do not claim ownership (Toukhsati et al., 2005).

The presence of owners with a more casual attitude to their animals would explain the difference in desexing rates observed in this study compared with those reported by councils (McMurray, 2004) and veterinarians (Baldock et al., 2003). However, it serves mainly to confuse the issue of whether owned cats contribute significantly to the cat overpopulation problem currently being experienced by shelters. While 'responsibly owned' cats are almost always desexed, the cats in this study who were 'casually owned' are likely to contribute to the cat over-population issue. Very few were desexed and most were in better physical condition than wild-living cats, presumably because they are supported by human caretakers. In addition, only 22% of owner surrenders were single cats. Just over one third (33.4%) consisted of multiple adult cats, 32.3% were kittens only admissions and 19.8% were mother cats with kittens. The high number of kitten-only surrenders in this group is particularly worrying because the fertile queen remains in the community, able to continue contributing to the numbers of kittens admitted to shelters. Most queens experience an oestrus cycle within three to six weeks post-partum (Dr. Carol Webb BVSc, personal communication, August, 09, 2006); potentially resulting in a second litter being born when the first litter is about three months old. This is exactly the pattern observed in the data, where two peaks of kitten admissions were observed during the 'kitten season'. It seems possible that many casual cat owners permit their queen to have at least one litter prior to desexing, either intentionally or otherwise. By the time the kittens are weaned and taken to a shelter it is highly likely that the queen is pregnant again so that, even with the best of intentions, casual cat owners may produce two or more litters before having an opportunity to desex their pet. Encouraging these more 'casual cat owners' to adopt more of the behaviours associated with responsible ownership, such as desexing, is likely to not only reduce the overall cat population, but also increase the numbers of cats seen by veterinarians.

Third, although we were unable to determine whether cats admitted as strays by AMOs or members of the public were responsibly owned, casually owned, semi owned or genuine strays, the low rate of desexing indicates that most were unlikely to be responsibly owned, and the relatively high rates of sociability indicate that few were totally wild. In the sample, just over one-quarter of the cats admitted were colony cats. Only 4.2% of these were owner-surrendered, most (63.4%) being presented by AMO's and 31.8% being presented to the shelter by a member of the public. Colony cats from all sources typically faced greater welfare challenges than other groups of cats with poorer body condition and higher rates of disease and injury. Importantly, colony cats, as a whole, were less sociable than other types of cats. Only 20% of colony cats were highly sociable, with 26% being actively non-sociable. This compares with overall population rates of 24.6% being highly sociable and 16% being actively non-sociable and provides evidence of little or no human involvement in the maintenance of these cats. Poor sociability is strongly predictive of euthanasia as an outcome, as is poor body condition, ill health or injury. Therefore, the outcome for many colony cats is less than optimistic. It is likely that many of the sociable colony members may have been casually or semi owned at one time, but 'migrated' into the wild/stray population in some way. Colony cats, who have no owner

responsible for them, are unlikely to be affected by a recommendation for early age or compulsory desexing, so alternative methods of population control are required.

Between the highly sociable owner-surrendered cats and the less sociable colony cats is a large population of cats of indeterminable origin. In the current sample, most admissions were identified as strays, presented to the shelter either by an AMO (39.6%) or a member of the public (38.9%). While some of these animals were the colony cats discussed previously, many others demonstrated clear evidence of human support, being admitted in a generally good physical condition, with no evidence of illness or injury. The fact that they could be caught by an AMO or member of the public, along with the surprisingly high sociability scores recorded, indicates that these cats are typically friendly towards humans. To become friendly towards humans requires human socialization during a critical socialization period, so it can be surmised that many of the animals picked up as strays by AMOs were not wild-born, but were owned or semi-owned cats that migrated into the stray population, perhaps having 'disappeared', been abandoned or simply 'wandered off'. Semi-owned or previously-owned cats, therefore, may make up a sizable proportion of cats admitted to welfare shelters.

While strays presented by members of the public made up only 28% of single cat admissions and 31.8% of colony admissions, they made up 63.8% of 'kitten only' admissions, 32.4% of multiple cat admissions and 36.4% of mother and kitten admissions. Of particular concern is the high number of 'kitten only' strays presented at the shelters by members of the public. As described previously in relation to casually owned cats, this means that fertile (possibly semi-owned) queens remain at large in the community. Keeping in mind that semi-owned cats are typically well fed, healthy and reasonably well socialized, allowing them to seek and accept continued support from human caregivers, they may be expected to make a more significant contribution to the cat overpopulation problem than feral cats, who live without human support and are likely to be in poorer physical and reproductive condition.

If semi-owned cats are contributing significantly to the over-population issue, as it appears from this study that they are, then it is critical to explore the psychology of cat semi-owners. A recent study identified that such persons feed cats that they do not own because they believe that they are acting in the best interests of the cat, although they tend to do so for a relatively short period of time (Toukhsati et al., 2005). Perhaps these individuals regard feeding un-owned cats in a similar manner to people who feed pigeons or ducks in parks, which might imply that they view un-owned cats as more like wildlife than as domestic pets. It would be interesting to know why people begin feeding these cats. If this could be established, it may be possible to identify factors that would trigger a change in this behaviour and result in a reduction, or cessation of such feeding. Unfortunately, the feeding of stray/feral cats, which are almost certain to be sexually entire, appears to be contributing significantly to the cat over-population issue. The motivation of semi-owners to help the cats they feed may provide the key to working with these animals. Semi-owners know where the cats live and, due to routinely feeding them, typically have some ability to interact with them. Perhaps, if they could be educated about the long-term consequences of injuries, disease, short life expectancy and competition over food and mates that wild-living cats experience, then it might engender changes in their attitudes and behaviour toward such cats, which could assist efforts to control the cat population. Incentives for cat semi-owners to engage in desexing may reduce the number of repeat unwanted pregnancies in owned/semi-owned cats

by reducing the second peak in 'kitten season'. Some welfare organisations offer programs such as the 'Last Litter Fund' (Wenderhold, 2006), whereby owners or semi-owners receive free desexing of a queen when they surrender her kittens. The owners/semi-owners can then take the queen home with them.

With regard to the third aim of this project, while the majority of cats, that were rehomed during this study, were not readmitted to one of the participating shelters, a small percentage were. A substantial percentage of these readmitted cats were admitted relatively soon after adoption. This may indicate that a small percentage of cats are prone to wandering and therefore problematic to rehome.

SUMMARY

Stray cats formed the majority (78.5%) of cats admitted to the three shelters during this study, with only 3.87% reclaimed by their owners. A very small percentage of cats carried some form of identification, however even when they did, the reclaim rate did not improve. Over a third of all admissions (38.7%) were trapped before admission, mostly by AMOs. AMOs were also responsible for admitting the majority of cat colonies. Approximately one-fifth of admissions were cats that were surrendered by their owners and two reasons accounted for 58% of these. These reasons were 'Too many cats' and a 'New child in the household'. Notably, cats were not commonly relinquished for behavioural reasons.

While an approximately equal percentage of male and female kittens were admitted, in all other age groups females predominated. Over 50% of admissions were kittens and a quarter of all admissions (23.4%) were kittens admitted without their mother. Virtually all kittens were brought to shelters by members of the public either as strays or were owner-surrendered. Kittens were primarily admitted during the kitten season, which occurs over summer. Importantly, there are two peaks observed in kitten admissions indicating that queens may be having multiple litters per season. The frequency of juvenile queens also indicates that many females are reproducing soon after reaching sexual maturity. Less than 3% of the cats admitted were obviously desexed and these occurred more often amongst owner-surrendered cats than other groups.

The majority of cats presented with optimal body condition, although under-nourished cats were more common amongst the colony cats presented by AMOs. The physical condition of cats living in colonies was poorer than other groups, with poorer body condition, more injuries and greater prevalence of cat flu.

Sociability was *the* key factor determining the fate of a shelter cat. Notably, the majority of AMO and public strays and owner-surrendered animals were tolerant of human presence, although a greater proportion of owner-surrendered animals were highly sociable. Over 65% of queens & kitten admissions were actively social with humans. This suggests that these animals had been exposed to humans early in life either as owned or semi-owned cats. Colonies of cats had the greatest proportion of actively avoidant or aggressive cats and are therefore likely to consist of a higher proportion of wild-born animals.

Unfortunately, the most common outcome for cats admitted to welfare shelters is euthanasia. While shelters rehome 27.6% of the cats admitted, over 62% of all cat admissions are euthanased. Partly, this is due to the low reclaim rate of stray cats (3.87%). Lack of space or suitable homes was very rarely given as a reason for euthanasia, however the reason for euthanasia was unspecified in almost 20% of all cases and was listed as the animal being 'too young to rehome' in another 18.74% of cases. There is clearly a cat overpopulation problem in Victoria, with unwanted cats and kittens likely to result from three sources; the feral/wild population, casual cat owners and cat semi-owners. Strategies aimed at reducing cat admissions to shelters from each of these groups are likely to be quite different but are equally important.

RECOMMENDATIONS

In light of the results that have emerged from this study, several recommendations can be made.

First, many more cats are admitted to shelters than can be rehomed, even though many of these are suitable for rehoming. How this situation can be remedied will depend on the target population, so a multi strategy approach will be required.

The majority of cats admitted to shelters have no identifiable owner – they are genuine stray cats. Increasing the availability, affordability and acceptance of desexing, including early-age desexing (EAD) is unlikely to substantially reduce the number of cats and kittens entering shelters from this population in the short term, and the long term effectiveness of this strategy will depend on the degree of movement between owned and un-owned groups of cats, which remains unknown. To effectively control reproduction in un-owned cats it may be necessary to develop chemical methods of contraception/ castration to replace surgical methods of desexing. In the interim, trapping these animals seems the most effective way to control population growth; with healthy, well socialised cats being desexed and rehomed and sick, injured or unsociable animals being euthanased. Internationally, ‘Trap-Neuter-and Release’ (TNR) schemes are widely used (Mechler, 2006a; 2006b; Raven, 2006) to limit the reproductive ability of wild-living cats. There is some evidence that such programs can reduce the numbers of animals in colonies and can significantly improve the health of free living cats managed in this way (Zaunbrecher & Smith, 1993). However, the efficacy of these programs as a long-term means of population control is questionable (Castillo & Clarke, 2003) and their viability in anything other than geographically defined areas is suspect. There is also a lack of knowledge of the cost-benefit analysis of such programs in regions with sensitive native fauna. TNR programs rely totally on committed members of the public intervening to desex colony new-comers, in order to maintain a stable colony population. TNR programs can create high levels of handling stress and trap-wise cats (Kass, 2005). However, there is no question that desexing as many cats as possible pre-puberty would reduce the number of unwanted cats in our community, and until chemical methods of desexing are available, TNR programs may be the only way to enlist the support of persons able to gain access to the feral and stray cat populations.

The relatively high sociability of strays admitted to shelters by members of the public provides evidence that many of these ‘stray’ cats may actually be semi-owned cats or casually owned cats. Indeed, one of the important findings from this study is that the category of cat ownership may be broader than previously assumed, ranging from responsible cat owners who, among other things, desex, register and identify their animals, to casual cat owners who provide few of these things but who nonetheless claim ownership of the animal. Because casually owned and semi owned cats are well fed, reasonably healthy, and rarely desexed, their reproductive capacity is alarmingly high. Educating casual owners and semi owners about the tough reality of life for the cats that they support may promote desexing for at least some of these animals (Toukhsati et al., 2006), particularly if it can be achieved at low-cost and without adverse consequences for either person or cat. In addition, members of the public who present kittens without mothers to welfare shelters, either as strays or as owner surrenders, should be strongly encouraged to return with the

mother and have her desexed. Leaving a fertile queen in the community will simply result in another litter of kittens being born.

It is difficult to know how to motivate casual-cat and semi-cat owners to desex the animals that they care for. The low level of registration in this sample indicates that casual cat owners may be as unlikely as semi-cat owners to desex their cats simply to obtain council registration at a reduced cost. Perhaps additional incentives are required, such as waiving the requirement for council registration or relinquishment for people who present 'stray' queens to shelters for desexing. Letting such people take the now desexed queen home without being charged for the surgery may reduce the number of unwanted second litters. Perhaps a percentage of registration monies could be made available to fund such an initiative, so that desexing (and registration) is offered at the lowest cost possible. It would certainly be worth doing a cost/benefit analysis of such a program versus the costs of processing so many kittens each year through shelters, with the concomitant impact of such high levels of euthanasia on shelter workers (Rohlf & Bennett, 2005). Alternatively, perhaps providing access to heavily subsidised or free desexing would encourage such owners to register their animals. This would not only reduce the numbers of kittens born, but also facilitate tracking of cats in the future, with the ongoing annual registration fees helping to recoup the cost of such a program. Councils would be seen as taking a pro-active position in reducing shelter admissions.

In addition to reducing the number of kittens produced, low-cost desexing might reduce the direct contribution of casually-owned cats to shelter admissions. Owners who relinquish their cat to a shelter are more likely to cite the cost of sterilization as the main reason that their cat is sexually intact (New et al., 2004; Patronek et al., 1996) than are owners who have never relinquished a cat. This may simply reflect the fact that more attached and committed owners spend money on their pet, but may also be associated with the mode of acquisition (New et al., 1999). Most cats are acquired passively for little or no cost. Dog owners who acquire their dog in this manner spend significantly less on veterinary care (Carter, 1990). It is likely that a similar attitude is displayed by cat owners. Perhaps subsidising desexing costs for cats owned by people with below-average incomes or who reside in an area with many cat colonies or a high level of cat semi-ownership may reduce the contribution to shelter admissions from this group. However, other factors may need to be considered, such as access to transport and desexing services, when deciding the most effective method of delivering such a strategy. For example, the relative benefits of providing a mobile desexing unit versus funding desexing at veterinary clinics would need to be established.

Providing inexpensive or free desexing for semi-owned or casually-owned cats may reduce the number of kittens entering shelters from these populations. This is likely to have a significant impact on shelter admission figures. An additional population to consider, however, is the responsibly owned population, those cats that are owned by people who undertake to provide registration, desexing, identification and veterinary care. The percentage of cats currently seen by vets is estimated at less than 30% of the owned cat population (pers. comm. Dr K. Seksel 5th December 2006). This group, often referred to as pet cats, already has a high rate (over 90%) of desexing. However, only 70% of these cats are desexed before 6 months of age (Toukhsati et al., 2005). This means that many young 'responsibly-owned' queens may have an unplanned litter before desexing, a possibility supported by the high percentage of well socialized kittens

surrendered in this study by owners without the mother, and by the many persons who relinquished kittens because they 'already own too many cats'. Educating responsible cat owners about the feline reproductive cycle, or encouraging or requiring early-age desexing, may enable this group of owners to prevent unwanted litters and further reduce the number of kittens presented to shelters during the kitten season.

It was not possible in this study to estimate the contribution that owned cats make to wild-living populations, or to estimate how many semi-owned cats move to the fully owned category. Nor was it possible to accurately track outcomes for cats released from the shelters. When all pet cats are required to be microchipped in 2007, it will be possible to gather meaningful data as to how pervasive movements between cat sub-populations are, and also to track outcomes for all rehomed cats. If there is a sub-population of cats who are not suitable for rehoming, due to a propensity to escape and wander, development of a shelter test to assess relevant behaviours would be recommended.

Importantly, few animals were euthanased in this study due to a lack of room for them at the shelter (3%) or due to a lack of buyer interest (0.4%). Although over 60% of cats admitted to shelters were euthanased, the primary reason for euthanasia was a lack of sociability. If cat numbers were reduced it might be possible for shelters to rehabilitate and rehome some of these 'borderline' cats. In the interim, however, the best way to ensure that fewer cats are euthanased is to reduce the number of poorly socialized cats and kittens being presented to shelters, through encouraging responsible pet ownership, good socialization practices and early age desexing.

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APPENDIX A

Monash Feline Sociability Rating Scale.

Sociability should be rated in a quiet area, which can be secured so that the cat can be allowed out of its cage safely. The evaluation should be performed in a calm, gentle and progressive manner to ensure both assessor safety and provide the cat with the best opportunity to present itself well.

Note -If the cat displays active avoidance, aggression or distress then terminate assessment immediately and score at the highest score achieved.

Procedure

Approach the cage quietly and calmly noting the cat's reaction to your presence. If cat remains calm then stand quietly next to cage, talking to the animal in a soft voice. If cat remains calm, place hand flat on bars of cage noting response. If cat approaches or is tolerance of human presence then allow cat out of cage, approach slowly and attempt to stroke gently on side of head/body. If cat remains calm then attempt to gently restrain cat and gauge response before holding it fully.

Rate the sociability of the cats using this scale:

- 1) Actively avoidant, aggressive **OR** Obviously distressed.
- 2) Avoidant in the cage, but tolerant of human presence when outside it.
- 3) Responds positively to gentle voice, will tolerate being stroked on floor but will not be held.
- 4) Responds positively to gentle voice and will accept being gently held.
- 5) Responds positively to being gently held, actively seeks greater interaction and contact accompanied by purrs.