An Analysis of Factors Relating to Pet Rabbits Relinquished to Two UK Re-homing Centres.

ABSTRACT

Rabbits are a common companion animal in the UK and some reports suggest that large numbers are relinquished to re-homing centres each year. This study aimed to investigate the characteristics of rabbits relinquished to two UK re-homing centres and explore reasons given for relinquishment. The centres contributed data for all rabbits that entered their centre during 2013 (n=205). Most rabbits (59.5%) were relinquished by an owner. A similar number of males to females were relinquished and a larger number of rabbits were not neutered (72.4%) and adults (56%). Most rabbits were healthy on arrival (61.5%). The most common reasons for relinquishment were: too many rabbits / unplanned litters (30.3%) and housing problems (23.8%). Rabbit related reasons accounted for 12.2% of rabbits relinquished. Reasons for relinquishment were associated with one of the recorded rabbit characteristics. Further detailed studies are needed to explore the dynamics of pet rabbit ownership and factors that affect the breakdown of rabbit-owner relationships in the UK.

Keywords: Rabbit, *Oryctolagus cuniculus*, relinquishment, re-homing centre, shelter

INTRODUCTION

Re-homing centres, also referred to as sanctuaries and shelters, take in pet animals with a view to finding them a new home. These re-homing centres, hereafter referred to as centres, vary in size from large chain organisations to smaller, home based operations in the UK. The latter may be more common for smaller pets such as rabbits, with the internet and social media potentially contributing to the ability of home based centres to advertise the animals and find new homes.

An estimated 800,000 domestic rabbits (*Oryctolagus cuniculus cuniculus)* are currently kept as companion animals in 2% of households in the United Kingdom , making them the third most

commonly kept companion animal after dogs and cats (24% and 17% of households respectively) (PFMA, 2016). The Rabbit Welfare Association and Fund estimate that 67,000 rabbits are passing through these centres in the UK each year (RWAF, 2012). In addition to the financial burden high numbers of pet rabbit relinquishment may put on the centres, who provide shelter, food and veterinary treatment for these animals, there may also be welfare implications for the animals as a result of the changing environment as they are moved between home and centre (CAWC, 2004; Rooney *et al.,* 2007; Stavisky *et al.*, 2012) and then potentially to a second home. Three studies have directly investigated the reasons for relinquishing pet rabbits in different settings, to centres in the USA (Cook and McCobb, 2012) and Canada (Ledger, 2010), and through online advertisements in Sweden (Ulfsdotter *et al.,* 2016). It was reported that an inability to care for pet rabbits or a lack of interest in doing so were the most common reasons given by owners relinquishing rabbits in the USA and Sweden (Cook and McCobb 2012; Ulfsdotter *et al.,* 2016). Housing issues and having too many rabbits also resulted in a large number of rabbits given up to four USA centres over a six year period, with just 3.38% being relinquished for rabbit related reasons (Cook and McCobb, 2012). In a study of 30 Canadian centres 94.7% of 2,466 rabbits relinquished were given up due to the owner's circumstances, rather than rabbit related factors (Ledger, 2010). Additionally, Ulfsdotter *et al.* (2016) concluded that as the mean age (17.6 months) of rabbits being advertised for adoption through internet sites was quite low, it is possible that some owners have unrealistic expectations of the rabbits when obtained. However, Wenstrup and Dowidchuk (1999) identified that factors linked to relinquishment of pets to 186 USA centres did vary locally and emphasised the importance of understanding local issues to enable the centres to address the problem of pet relinquishment. Therefore, further research is needed to investigate rabbit and pet owner factors related to the relinquishment of pet rabbits in the UK, and also across the UK, so that the local issues can be understood and any areas of concern can be addressed.

The aim of the current study was to investigate the breakdown of pet rabbit ownership by examining characteristics of relinquished rabbits and reasons for relinquishment provided by owners to UK centres.

METHODS

Participants

Centres were located based on 17 randomly selected starting points across the UK, using the rabbit rescue search website www.rabbitrehome.org.uk. Forty six centres were contacted and six had agreed to contribute data. Ultimately two centres contributed data. Data was collected using an online form (Google Docs © 2015 Google Inc.) for consistency, which enabled centre staff to input data for each rabbit that entered their centres from 1st January to 31st December 2013. Site one based in Yorkshire, England, is a family run centre that takes in small mammals and is not open to the public. Site two, located in Northern Ireland, also takes in cats and dogs and is open to the public.

Questionnaire Design

To enable quick and easy input of data and to generate quantitative data, predominantly closed ended, multiple choice questions were used. The form contained eleven questions, three open ended (animal identifier (i.e. name), date of arrival and date of departure, if appropriate), four multiple choice, and four multiple choice with an option to add 'other'.

The date that each rabbit entered the centre was recorded and an 'intake category' allocated from: pet given up by owner, stray / abandoned, confiscated (by the authorities), from another centre, born on site, or other. The remaining questions were only for rabbits that had been relinquished by their owners as information relating to owners' reasons for relinquishment would not be available for other intake categories. Rabbit characteristic data included: sex; neutered status on arrival; age category, (determined by rabbit life stages, see below); coat colour; and health status on arrival. The majority of breeds reach breeding age by five months (McNitt *et al*., 2013) and so to allow for breed variations,

rabbits under six months were categorised as 'young' and adults were 'six months and over but less than 5 years'. Lennox (2010) suggests starting rabbit geriatric veterinary investigations, such as blood works, at five years of age, and so five years was selected for the 'geriatric' starting point.

Participants could select all options that applied for reasons that the rabbit was relinquished, out of ten pre-determined options and an open field box for an 'other' reasons. If the animal was no longer at the site, date of departure and a destination were requested (options included: rehomed, euthanasia, other centre, and 'other' open response option).

Data Analysis

All statistical analyses were conducted in Microsoft Excel (2010) and IBM SPSS statistics (version 20). The Fisher's Exact test of independence or the Chi squared test was used to determine associations between reasons for relinquishment (where the first reason given for that animal was used) and the site relinquished to, rabbit characteristics of sex, neutered status and health status on arrival. One Way Analysis Of Variance test were conducted to compare the length of stay (LOS) between the two sites. Due to the low numbers in some categories it was not possible to test the 'colour' or 'age' data for any association with reason for relinquishment as the low expected counts would have violated the assumptions of the Fisher's exact or Chi squared test.

RESULTS

Overview

During 2013, 205 rabbits entered the two centres, 122 (59.5%) of which were relinquished by their owners. Other intake categories included; 27.3% stray / abandoned; 7.3% born on site; 4.4% from another centre; and 1.5% confiscated by authorities (table 1). A monthly mean of 10.2 (±1.7 SE) rabbits were taken in across both sites (site one 7.6 ±1.2 SE; site two 2.6 ±0.9 SE) (figure 1).

95 **Table 1** Intake categories for all rabbits (205) taken in during 2013 for two UK rabbit re-homing
96 centres.

	Site 1	Site 2	Total
All rabbits taken in	153	52	205
Born on site	8 (5.2%)	7 (13.5%)	15 (7.3%)
Stray/abandoned	44 (28.7%)	12 (23%)	56 (27.3%)
Confiscated	3 (2%)	0	3 (1.5%)
From another centre	7 (4.6%)	2 (3.8%)	9 (4.4%)
Relinquished by owner	91 (59.5%)	31 (59.7%)	122 (59.5%)

97

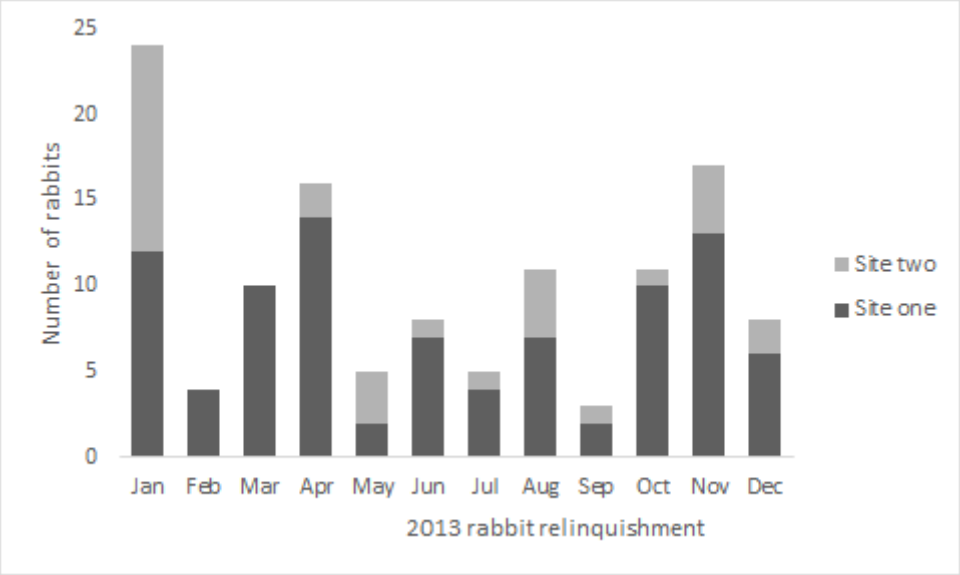
98 **Reasons for Relinquishment**

99 Of the 122 rabbits relinquished by owners, the majority of owners (111, 91%) provided one reason for
100 relinquishing their rabbits, 9% gave multiple reasons. The most commonly cited reasons were 'too
101 many rabbits / unplanned litter' (30.3%), 'housing problems' (23.7%) and 'child no longer interested'
102 (13.1%), all classed as 'human reasons' that were associated with owner circumstance, lifestyle or
103 choice/decisions (Table 1). Rabbit related reasons accounted for 12.2% of reasons for relinquishing
104 rabbits and were all behaviour related (table 2). There was no significant association between the
105 reasons the rabbits were relinquished and the site relinquished to ($p > 0.05$). More males were
106 relinquished for behaviour reasons than females (7 males, 3 females) and only males (2) were
107 relinquished for 'other behaviour issues (not social)'.

108 **Rabbit Characteristics**

109 Of the rabbits relinquished by their owners, males and females were relinquished in relatively equal
110 numbers (52.3% males; 47.5% females). Rabbit sex was not found to be associated with reasons for
111 relinquishment ($p>0.05$).

112 Most rabbits had not been neutered prior to relinquishment (72.4% not neutered). Neutered status
113 was highly significantly associated with reasons for relinquishment ($p<0.001$). No neutered rabbits
114 were relinquished for reasons of 'too many rabbits', 'unplanned litter' or 'financial reasons' (figure 2).



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116 **Figure 1** Annual trend of the number of pet rabbits relinquished by their owner to two UK re-homing
117 centres during 2013 (n=122), monthly mean 10.2 SE 1.8 for both sites (site one 7.6 SE 1.2; site two
118 2.6 SE 0.9).

119 **Table 2** Reasons given for relinquishment of 122 pet rabbits by their owners to two UK re-homing
120 centres during 2013. *Response was multiple choice. ^Other reasons included being too busy (4) and
121 no longer wanting the rabbit when it became ill (1).

Reasons for relinquishment	Site 1 (% of 91 rabbits*)	Site 2 (% of 31 rabbits*)	Total relinquished for this reason* (% of 122 rabbits)
All rabbit related	14 (9.9%)	1 (3.2%)	15 (12.2%)
Behaviour towards adult in home	4 (4.4%)	0	4 (3.3%)
Behaviour towards child in home	3 (3.3%)	0	3 (2.7%)
Behaviour toward another pet	5 (5.5%)	1 (3.2%)	6 (4.9%)
Other behaviour	2 (2.2%)	0	2 (1.6%)
Human related	87 (95.6%)	30 (96.8%)	117 (96%)
Child no longer interested	13 (14.3%)	3 (9.7%)	16 (13.1%)
Financial	11 (12%)	0	11 (9%)
Housing	21 (23.1%)	8 (25.8%)	29 (23.8%)
Personal / Health reasons	15 (16.5%)	4 (12.9%)	19 (15.6%)
Too many rabbits / unplanned litter	22 (24.2%)	15 (48.4%)	37 (30.3%)
Other^	5 (5.5%)	0	5 (4%)

122

123 The majority of rabbits fell in to the 'adult' category (68, 56%) and a large number were under 6
124 months (36%). Just 10 (8%) were geriatric. Young adults were more likely to be given up due to the
125 owner having 'too many rabbits' or an 'unplanned litter', while adult rabbits were given up due to
126 'housing', 'financial' and 'personal / health' reasons (figure 3).

Black (29, 24%) and white (27, 22%) rabbits were the most common coloured rabbits to be given up. Other common colours were grey (15%), mixed (14%) and brown (10%). It was not possible to complete inferential statistics on coat colour data due to the number of categories reported, resulting in small sample sizes within each and the complicated nature of rabbit coat colour making it unrealistic to cluster responses.

Although the majority of relinquished rabbits were healthy (75, 61.5%), 38.5% were relinquished with health issues, including dental health problems, being under or over weight, viral infections and parasite infestations. Multiple health issues were reported in 13% of rabbits. Health status on arrival was not found to be associated with reasons for relinquishment ($p>0.05$).

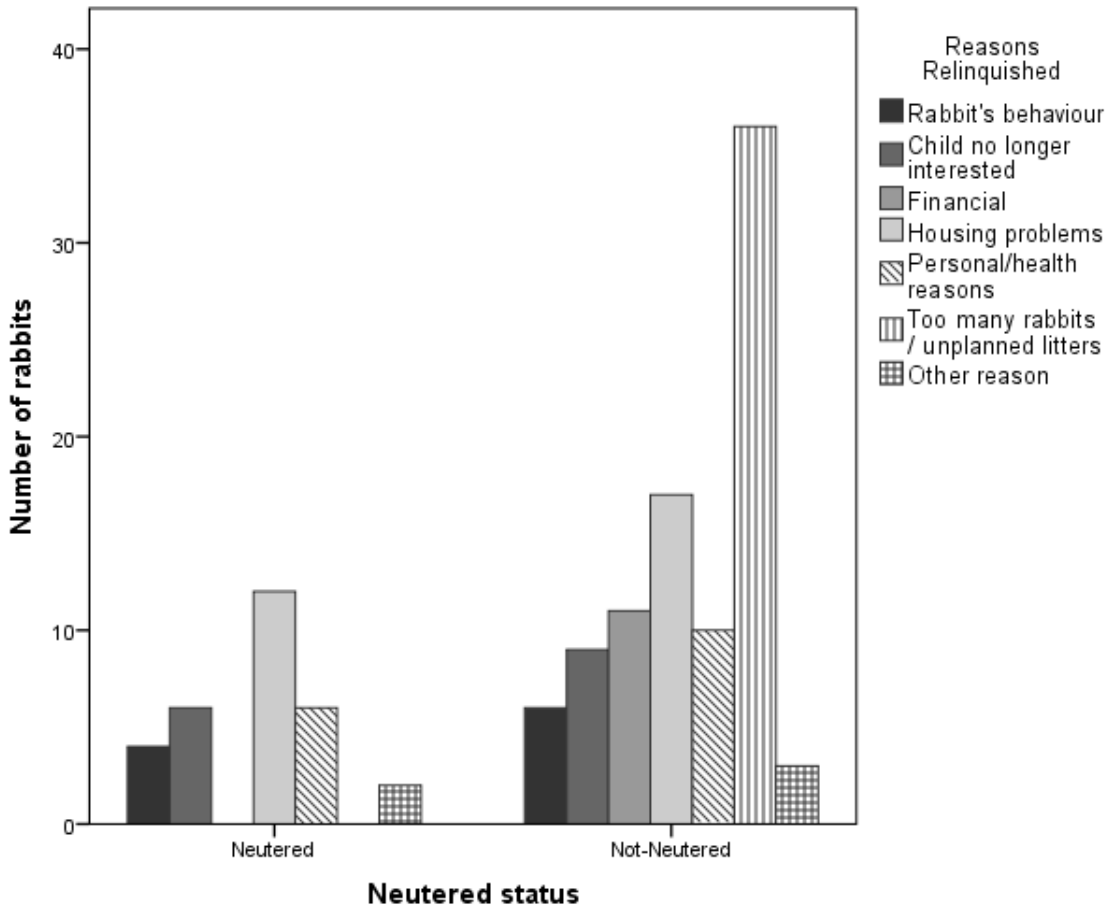


Figure 2 Reasons for relinquishment of neutered versus non-neutered rabbits to two UK re-homing centres during 2013 (n=122). There was a significant difference in reasons given for relinquishing neutered and non-neutered rabbits ($p <0.01$ Fisher's exact).

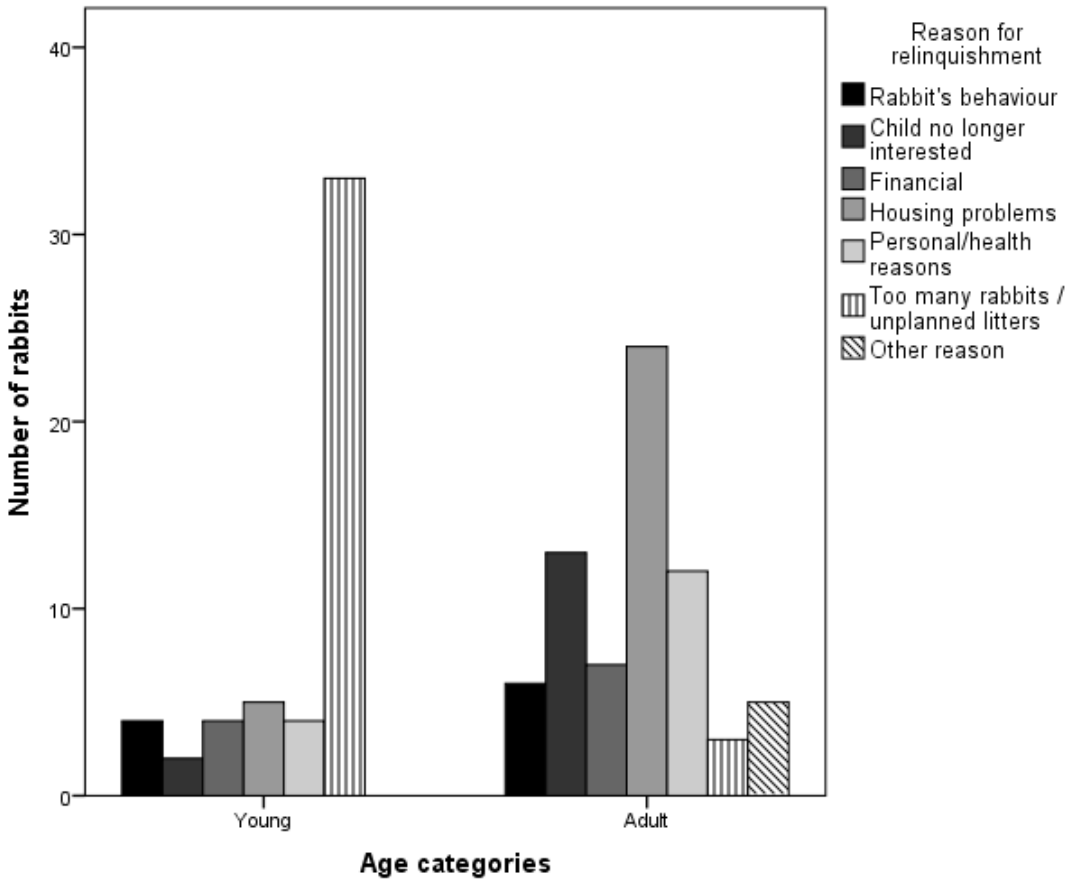
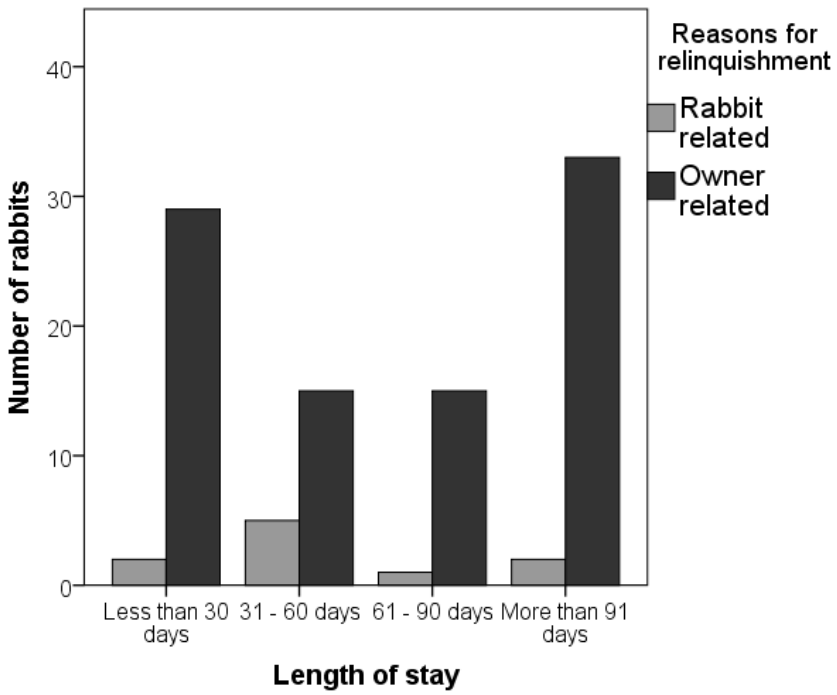


Figure 3 Reasons for owner relinquishment of rabbits categorised as 'young' (less than 6 months McNitt, et al., 2013) and 'adult' (including geriatric, all rabbits over 6 months), to two UK re-homing centres during 2013 (n=122)

Length of stay

The majority of rabbits were rehomed (102, 83.6%), five (4.1%) died or were euthanized due to health reasons and 15 (12.3%) were still on site at the time of data collection. The mean length of stay (LOS)across both sites was 73.3 days SE 5.6 (median 60 days; range 9 – 288 days) for the 102 rabbits rehomed during the time of the study. For site one the mean LOS was 69.5 days SE 6.4 (median 41 days; range 11 – 288 days), for site two the mean LOS was 86.2 SE 11.3 (median 88 days; range 9 – 214 days). A One-Way ANOVA test revealed no significant difference in LOS at the two sites ($p > 0.05$). When considering the two categories for reasons for relinquishment, rabbit related and owner related, there is no obvious difference in LOS for rabbits relinquished for different reasons (figure 4).



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154 **Figure 4** Length of stay for 102 rabbits at two UK re-homing centres during 2013, grouped by reasons
155 for relinquishment.

156 **DISCUSSION**

157 The two centres that took part in the study were able to provide all of the data requested for each
158 rabbit, demonstrating that detailed records were kept when the rabbits were relinquished. During
159 2013, 205 rabbits were taken in by the two centres, 122 of which were relinquished by their owners.
160 Intake categories were remarkably similar for the two sites, specifically the percentage of rabbits that
161 entered as strays and those relinquished by their owners. A large number (56, 27.3%) entered the
162 centres as 'Stray / Abandoned', much higher than the 16.3% in Cook and McCobb's USA study (2012),
163 which may be reflective of regional differences in the two studies. The number of stray rabbits
164 entering centres warrants further investigation to explore the reasons that rabbits are abandoned or
165 becoming stray in the UK. Initiatives for promoting microchipping of pet rabbits may help owners to
166 relocate stray rabbits that may have escaped and allow for owners to be traced by the authorities
167 where rabbits may have been abandoned. A study of lost and found dogs passing through animal
168 protection organisations in Belgrade, Serbia, found that those with a microchip were significantly
169 more likely to be reunited with their owner than those that were not microchipped (Vučinić *et al.,*

2015), with similar findings for microchipped stray dogs in the UK (Dogs Trust, 2015). However, rabbits may be less likely to be microchipped than dogs, with a recent study reporting that less than a quarter of rabbit owners, responding to an online survey, had microchipped their rabbit/s (Oxley *et al.,* 2015). Additionally, some issues have been highlighted regarding the use of microchip data being used to reunite pets with owners, such as out of date or inaccurate information (Lancaster *et al.,* 2015). Nevertheless, some retailers are taking measures to ensure rabbits are microchipped prior to purchase, such as Pets at Home (RWAF, 2014).

The months with the highest intake at each centre were April (Site one) and January (Site two) with high numbers taken in at both sites during November also. Monthly intake is different to Cook and McCobb's (2012) findings where February, May, June and July were reported as the highest months of intake for each of four centres over a six year study. The monthly intake difference between the two studies may be reflective of the present study only representing one year of data.

Reasons for Relinquishment

The most common reasons given by owners for relinquishing rabbits to the centres surveyed here were 'too many rabbits/ unplanned litter', followed by 'housing problems' and a 'child no longer interested' in the rabbit. These reasons may represent poor planning or preparation to own the rabbit for its natural life span. 'Housing problems' were more commonly given for reasons to relinquish older rabbits over 1 year (23 of 28 rabbits relinquished due to 'Housing problems') and rabbits under six months were more likely to be relinquished due to 'too many / unplanned litter', however, it is logical that owners with accidental litters would try to re-home them whilst they are young.

Reasons that the rabbits were relinquished by their owners were not significantly associated with the sites relinquished to and were are similar to Cook and McCobb's (2012) study, which identified

193 'housing issues' and 'too many' rabbits as commonly reported reasons. These findings indicate that
194 issues affecting rabbit relinquishment to centres are similar in the UK and USA.

195 In an effort to address the number of rabbits relinquished for reasons of 'too many rabbits/ unplanned
196 litter', it may be beneficial for those invested in the purchase of pet rabbits, i.e. pet shops, breeders,
197 centres, and those involved in aftercare, i.e. veterinarians, to invest in education for owners about the
198 potential implications of not neutering a rabbit. Efforts to prevent owners giving up rabbits due to
199 'housing issues' may be more complex and not within the owners control. Marder and Duxbury (2008)
200 propose that veterinarians offer pre-adoption counselling to potential new owners of dogs. Such a
201 service may be of value to potential new owners of rabbits also, and may help to reduce the
202 occurrence of welfare related issues that are reported in rabbits (Mullan & Main 2006; Schepers *et al.*
203 2009; RSPCA, 2011; PDSA, 2013).

204 Rabbit related problems, including problem behaviour, have been reported in past studies (5.3%
205 Ledger, 2010; 3.38% Cook and McCobb, 2012; 4.4% of reasons that could be attributed to the
206 individual rabbit in Ulfsdotter *et al.,* 2016) but at a much lower frequency than was found at the two
207 sites in the present study (12.2%). Rabbit specific reasons for relinquishment have received little
208 attention in past studies, with no known research looking at behavioural issues affecting
209 relinquishment in rabbits or methods to reduce the occurrence of behavioural issues that result in
210 relinquishment. In contrast to reasons for relinquishing rabbits such as, unplanned litters and housing
211 problems, centre staff may be in a position to provide advice about behavioural problems to help the
212 owner overcome the problem and avoid relinquishment.

213 Behaviour problems were only reported for a small number of rabbits in the present study, but
214 interestingly, where behaviour issues were reported, behaviour towards humans and behaviour
215 towards other animals were never reported in the same rabbit. Aggression towards people was
216 reported as a common behaviour problem in rabbits (Normando & Gelli, 2011) and was seen in 6% of
217 rabbits relinquished in the current study. A higher number of male rabbits were relinquished for

behavioural reasons and only males were relinquished for non-social behaviour reasons. Crowell-Davis (2007) reports that male rabbits are more likely to show behavioural problems such as urine spraying and territorial related behaviours. Cook and McCobb (2012) and Ulfsdotter *et al.* (2016) suggest that owners may be reluctant to disclose information relating to the animal's behaviour that may affect chances of being re-homed. Reluctance to disclose information that could affect an animals chances of being re-homed may have also been the case in the present study.

It is difficult to make many comparisons between studies for the reasons pets are relinquished as different terminology is used to categorise reasons given. For example, Ledger (2010 p. 37) states 'owner circumstances' and 'behavioural reasons' only, while Cook and McCobb (2012 p. 304) state 'Owner-related problem', but have additional categories of 'housing issues' and 'inability to care for / lack of interest' as separate categories, in addition to 'too many' and 'rabbit related problem'. Neither study states how the 'reasons for relinquishment' data was collected at each site. It is unclear if the centres were asked an open question, which was later coded to the categories cited, or if they were forced to select pre-determined categories, as with the present study. Additionally, each centre, including those sampled in the present study, is likely to use different forms of data collection at intake and so the retrospective data available may be limited.

Rabbit Factors

Previous studies have highlighted sex differences for the number of dogs and cats being relinquished to centres (Salman *et al*., 1998; Lepper *et al*., 2002; and Diesel *et al*., 2010) and Ulfsdotter *et al.* (2016) also reported a 5.1% difference in the number of male and female rabbits being relinquished through online advertisements in Sweden, with more males being relinquished. Similarly to Ulfsdotter *et al*., there were 4.8% more male rabbits relinquished in the present study. However, the ratio of males to females relinquished may reflect the ratio of males to females kept as pets in the UK as Rooney *et al*. (2014) found that there was 17.6% more males than females being reportedly kept by respondents to

242 a UK survey. In the present study, neither sex was found to be more likely than the other to be
243 relinquished for any specific reasons.

244 The majority of rabbits were not neutered (72.4%), as found in Cook and McCobb's (2012) study of
245 USA centres where 81.5% of rabbits taken in were not neutered, however this figure includes stray,
246 returned, confiscated and abandoned rabbits, in addition to those relinquished by an owner. Recent
247 surveys of UK, pet rabbit owners suggest that a higher percentage of rabbits in the UK are neutered
248 (42% neutered in Mullan and Main (2006); 59.1% neutered in Rooney *et al.,* (2014)). The difference
249 between the percentage of neutered rabbits relinquished to centres in the present study and those
250 currently kept as pets in the UK, could have been expected as a large number of rabbits relinquished
251 were less than six months old (recommended age for rabbit neutering is three to nine months, McNitt
252 *et al.,* 2013) and relinquished for reasons of 'too many rabbits / unplanned litter'.

253 Different reasons were given for relinquishing rabbits that were neutered, compared to those that
254 were not neutered in the present study. The significant finding for reasons neutered and non-neutered
255 rabbits were relinquished could be due to the samples in the two groups being skewed (three times
256 as many not neutered than neutered) and so should be interpreted cautiously. However, it is
257 interesting to note that 'financial' and 'too many rabbits / unplanned litter' reasons were never given
258 as reasons for relinquishing neutered rabbits. These findings suggest that additional efforts to
259 encourage owners to neuter pet rabbits is likely to be beneficial in reducing the number of rabbits
260 relinquished to centres in the UK. Emphasis could be placed on educating owners about rabbit
261 neutering at point of purchase / adoption and financial incentive schemes should be highlighted, such
262 as the 'Neutering grant' available with the Blue Cross (Blue Cross, 2016) to reduce the cost of
263 neutering.

264 There was a spread of rabbit colours in the present study, but the two most common were black or
265 white. Appearance, has been found to be a factor that affects the adoption of dogs and cats (Lepper
266 *et al*., 2002; Diesel *et al*., 2007, Weiss et al., 2012) but appearance as a factor of pet rabbit adoption

has not been explored and additional factors, such as breed, size and coat type would need to be considered. Additionally, Edgar and Mullan (2011) reported that a rabbits' 'personality / friendliness' was the most commonly reported factor affecting the purchase of a pet rabbit.

The majority of rabbits were healthy at the time of relinquishment however 47 were taken with health issues. It is not clear if owners were aware of these health issues or if these were identified by centre staff on arrival. Mullan and Main (2006) reported that dental health issues were likely to be unnoticed by rabbit owners and similar findings have been reported of owner's perceptions of obese dogs (White *et al*., 2011).

Length of stay

Rabbits took longer to be adopted from the UK centres sampled than rabbits at four USA centres, (UK median 60 days; USA median 34 days or less) (Cook and McCobb, 2012). When compared to other pets within the UK, rabbits appear to be slower to be adopted. The median LOS for cats in Gourkow and Fraser's (2006) study was 12.5 days or less, and Diesel *et al*. (2007) reported a median of 28 days for dogs. Observed differences in LOS for these different species may be reflective of the popularity of rabbits as pets in the UK in comparison to dogs and cats (PFMA, 2016), or could potentially highlight that there are more rabbits available at centres or through other sources (for example, in pet shops, online adverts) than there is demand for. Additionally the longer LOS may reflect the types of centres sampled in the current study.

Future Research

Although sampling centres is a common way of understanding the reasons people relinquish pets and factors related to relinquishment, it is suggested that owners may not provide full details at the time of relinquishment for fear of it affecting the animal's ability to be re-homed. Additionally, there may be challenges in achieving large sample sizes for re-homing centre based studies, which may be a limitation of the data presented.

Given the similar findings of the present study and Cook and McCobb's (2012) study related to reasons that rabbits are relinquished, a wider study might further investigate the relationship between rabbit owners and their pets to explore factors related to the pet-owner bond outside of the re-homing centre setting. An owner no longer being interested in the pet was never reported for dog or cat relinquishment in the UK by Diesel *et al*. (2010) or Casey *et al*. (2009) respectively. Perceptions of different companion species by people in the UK have not been previously explored, however González-Redondo and Contreras-Chacón (2012) showed that Spanish students regarded rabbits less favourably as a companion species over dogs and cats, suggesting that they may have reduced regard as a pet to some people, although historical cultural differences in the use of rabbits across different countries should be considered.

Rabbits are under studied in comparison to other popular pets and further research investigating their needs and levels of owner knowledge may be beneficial to highlight any potential welfare concerns.

CONCLUSIONS

The trends shown in the data are very similar to those of Cook and McCobb (2012) in their survey of rabbits entering centres in the USA, highlighting that rabbits tend to be relinquished for owner related factors more so than rabbit related factors. There may be an issue in the UK with rabbits entering centres as strays or being abandoned which warrants further investigation. The majority of rabbits in the present study were relinquished due to the owner having too many rabbits or an unplanned litter, which may be addressed with wider education campaigns about the benefits of neutering pet rabbits before they reach sexual maturity. Factors linked to reasons the rabbits were relinquished suggest that owner education about the breeding age of rabbits and encouraging neutering may be beneficial to reduce the number of relinquished rabbits. Rabbits at UK centres appear to stay on site for longer than the USA centres in previous studies and longer than other popular pet species in the UK. It is suggested that further detailed studies are needed to explore the dynamics of pet rabbit ownership

315 and factors that affect the breakdown of such relationships and additionally, to explore interventions
316 that may reduce the number of pet rabbits entering centres.

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