Characteristics of persons convicted for offences relating to animal hoarding in New South Wales

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Objective   To highlight the characteristics of persons convicted for offences related to animal hoarding in NSW Australia, document the outcomes of cases and compare these to overseas studies.

Design   Retrospective case series.

Methods   Records of finalised prosecutions for offences relating to animal hoarding between 2005 and 2011 were examined. Data recorded included: the age of each subject at the first offence, gender, postcode, occupation, living conditions, number of charges, number of prosecutions, title of each charge, number and species of live animals, whether animals needed veterinary attention, the medical conditions that the animals suffered, whether dead animals were on the property, how animals were obtained, veterinary and legal costs accrued and case outcomes. The data were analysed to obtain frequencies and relative frequencies for categorical variables and summary statistics for quantitative variables. Observed frequencies were compared using Chi-square test with the expected frequencies calculated based on the Australian Bureau of Statistics for NSW.

Results   The number of persons included was 29. Most were female (72.4%), 82% were 40-64 years of age at their first offence. Almost one third (31%) identified themselves as breeders, 27% were pensioners and 13.8% unemployed. Most resided in inner regional Australia (45%), 28% lived in major cities and 28% lived in outer regional Australia. Dogs were the species hoarded most frequently (79%). Animals requiring veterinary attention were identified in all cases. Dead animals were found on premises in 41.4% of cases.

Conclusions   Persons prosecuted for charges relating to animal hoarding in NSW have similar

characteristics to those of previous studies, although the outcomes may be different. More farm animals and horses were hoarded in NSW and hoarders in NSW were more likely to live in inner regional and outer regional areas (rural areas) than animal hoarders in the USA.

Abbreviations AWL, Animal Welfare League
HARC, Hoarding of Animals Research Consortium
NSW, New South Wales (Australia)
RSPCA, Royal Society for the Prevention of Cruelty to Animals
USA, United States of America

Hoarding, or pathological collecting of animals, is an animal welfare and public health issue[1]. that is reported to occur throughout Australia[2]. 'Hoarding' has been defined in medical literature as pathological accumulation of inanimate objects and is associated with squalor, impaired function and psychological comorbidities [3-5]. The Hoarding of Animals Research Consortium (HARC) define animal hoarding using the following criteria:

- Having more than the typical number of companion animals [17];
- Failing to provide appropriate standards of nutrition, sanitation, shelter, and veterinary care, often resulting in illness and death from starvation, spread of infectious disease, and untreated injury or medical condition[17];
- Denial of the inability to provide appropriate care and the impact of that failure on the animals, the household, and human occupants of the dwelling [17];
- Persistence, despite this failure, in accumulating and controlling animals [17].

Variations of these have been developed and used in other studies but the main points remain the same. [3, 6-16].
The welfare of the animals is compromised due to deprivation of sufficient food, water, shelter, space, socialisation, healthcare, and stimulation [2, 7, 11, 17-19]. Animal hoarders have been found to neglect not only their pets, but also the care of other people in their home [2, 7, 13, 17, 18]. Homes of animal hoarders often lack utilities such as running water, functional bathrooms, and electricity [2, 7, 17, 18, 20]. These homes (and the animals within) present significant occupational health and safety issues for inspectors and other personnel who are involved with intervention and seizure of animals [2, 9].

In New South Wales, the Royal Society for the Prevention of Cruelty to Animals (RSPCA), the NSW Animal Welfare League (AWL) and the NSW Police are legally charged with investigating potential hoarding related cases. Both the RSPCA and AWL are charities and therefore rely on donations from the public as their main source of income [21, 22]. There is no standard protocol for defining and recording hoarding cases. The investigation and prosecution of hoarding related offences places a significant burden on these organisations, which are obliged to provide accommodation, food and treatment for the animals seized, typically without recovery of costs [2, 3, 8]. Some prosecutions are drawn out for years. Additional costs include property visits for investigations that do not result in prosecution.

Estimates of costs borne by investigating organisations suggest that hoarding cases cost tens of thousands of dollars [3, 11, 23]. With an estimated 700-3000 cases of animal hoarding per year in the USA involving >250 000 animals, the total cost is likely to be significant [11, 24]. In Australia it is

estimated that there are 200 new animal hoarding cases per year and that most veterinary practices have had contact with an animal hoarder [2]. Anecdotal reports suggest that up to 40 per cent of animal management officers have dealt with an animal hoarder [5].

The prevalence of hoarding is likely significantly underestimated, as many cases remain undetected due to the secretive nature of hoarders, lack of agreed upon definition of an animal hoarder and the limited resources of investigating organisations [2, 24].

There are few studies that have investigated the characteristics of animal hoarders. Published studies suggest that the typical hoarder in the USA and Canada is an older, single female, living alone [3, 7, 9, 17, 24, 25].

We hypothesised that animal hoarders in NSW would have similar characteristics to those in the USA and Canada.

Materials and methods

The largest barrier to characterising the problem of animal hoarding is that there is no identifiable sampling frame from which to obtain a random sample [1]. For the purposes of this study, the HARC definition of animal hoarding was used. To obtain a sufficient number of cases for this study the authors approached the largest animal welfare agency which prosecutes cases under the Prevention of Cruelty to Animals Act (NSW) (1979). The Chief Inspector of RSPCA NSW gave the authors permission to view records of finalised prosecutions at the RSPCA Headquarters. As there is no specific charge relating to animal hoarding in Australia, the files were identified retrospectively based on the Chief Inspector examining the database the files and identifying hoarding cases that met the inclusion criteria. The authors viewed records of persons determined by the RSPCA Chief Inspector to be animal hoarders between January 2005 and December 2011.
Data collected included the age of each subject at the first offence, gender, postcode, occupation, living conditions, number of charges accumulated, number of prosecutions and title of each charge. The data collected in relation to animals included the number and species of live animals found on the property, whether animals needed veterinary attention, the medical conditions that the animals had, whether dead animals were found on the property and how the animals were obtained. Data were also collected on the veterinary and legal costs accrued and court orders. Where files were incomplete, missing data were recorded as 'unknown'.

The Accessibility/Remoteness Index of Australia (ARIA) was found for the suburbs in which the hoarders lived, using the Map Locator developed by the Australian Government's Department of Health and Aging [26]. The classifications under remoteness index as defined in the Remoteness Structure of the Australian Standard Geographical Classification include: Major cities in Australia, Inner Regional Australia, Outer Regional Australia, Remote Australia, and Very Remote Australia. These are calculated using the road distance to the nearest Urban Centre and population size [26, 27].

Statistical analyses

The data were analysed using Microsoft® Excel and Minitab® Statistical Software to identify trends in the characteristics of animal hoarders in NSW. The proportions of hoarders with each characteristic were obtained for the categorical variables. Basic summary statistics were obtained for the quantitative variables. Some of the data such as the titles of the charges, the disease state of the animals and the court decision, were not analysed statistically but evaluated qualitatively.

Chi-square analyses were conducted to compare the proportion of male and female, regional population distribution and the age distribution of hoarders in this study to the expected proportions in NSW calculated based on the Australian Bureau of Statistics for NSW [28].

Results

The number of persons included was 29 on 24 premises. The RSPCA NSW prosecuted a mean number of 4.1 persons for animal-hoarding related offences per year (range 3-6) between 2005 and 2011. The population at risk (18 and over) in NSW 2011 was 4 676 894 people. This extrapolates to an incidence of 1-2 new cases prosecuted by the RSPCA each year per 1 600 000 people at risk in NSW [29].

The majority of offenders (21 out of 29, 72.4%) were female. When compared with the expected proportion of females in NSW (50.4%), females were significantly overrepresented in this group (P = 0.024; 95% confidence interval: 52.8%, 87.3%).

The mean age of animal hoarders was 54.8 years. Most hoarders were middle aged at their first offence (40-64 years of age), while only two offenders were under the age of 40 (For more details see online Supplementary Table 1). This is significantly different from the expected age distribution in NSW (P = < 0.001) [28]. The under 40 age group was significantly underrepresented and the middle aged group was significantly over represented, however the old aged group was not significantly different to the proportion of people in this group in NSW [28].

Employment information was available for 25 out of 29 cases. Several people were identified as having more than one occupation. The most common self-reported occupations were animal breeding, followed by pensioners and unemployment (For more information see Online Supplementary Table 2).
Classification by ARIA categories indicated that 45% of animal hoarders lived in inner regional Australia, with the remainder equally distributed between major cities and outer regional Australia. No subjects lived in remote or very remote Australia. This is significantly different from the expected resident population by remoteness structure in NSW (P = < 0.001) [27]. There was a significantly higher proportion of the subjects in the study living in inner regional Australia and outer regional Australia in NSW and a significantly lower proportion that lived in major cities [27].

In all cases, the living areas of the animals were described as unsanitary by the attending RSPCA, while the entire premises (including areas of the property occupied by humans) was described as unsanitary in 31% of cases. The living conditions of the human residents were unknown or not recorded in 69% of cases.

Thirteen species or groups of animals were involved in hoarding cases (for more details see Online Supplementary Table 3). Dogs were hoarded most frequently, followed by cats, farm animals, horses and birds. A single species was involved in 8 cases, two and three species were involved in 6 cases each, and four or more species were involved in the remaining 9 cases.

More than half of the animals involved were acquired by breeding, intentional or unintentional (For more details see Online Supplementary Table 4).

The total number of animals found on a hoarder's property ranged from 6 to 500. The mean number of live animals found on a hoarder's property was 80 with a median number of 41. The total number of animals on the property was unknown or unable to be determined in 4 cases, however they were described by the attending inspector as having large numbers of animals.

Animals required veterinary attention in all cases as assessed by RSPCA inspectors. Dead animals were found on at least one house visit by the RSPCA for 12 out of 29 hoarders (41.4%). In most cases, animals were found with inflammatory or infectious diseases and nutritional disease (For more details see Online Supplementary Table 5). In all cases there were animals that had behaviour problems of varying severity as assessed by RSPCA veterinarians.

The mean number of charges for each person was 29.6 (range 2-133, median 17). The number of prosecutions per person ranged from 1-8 with a mean of 1.6 and a median of 1. Recidivism was common, occurring in 7 of 29 cases. In three of these cases, the hoarder relocated to another residence elsewhere in Australia and was charged similarly months or years later in another state, according to RSPCA NSW records.

There is no charge specific for animal hoarding in Australia. Table 1 summarises the types of charges that were made against hoarders by RSPCA NSW and AWL NSW and the proportion of hoarders that received each of these charges in this study. Most notably 28 out of 29 received a charge for failing to provide veterinary treatment to an animal.

Table 1. Number of charges made against persons prosecuted for charges related to animal hoarding in NSW (2005-2011)

Charge	Frequency
Failed to provide veterinary treatment to an animal	28
Failed to provide proper an sufficient food and/or water to an animal	18
Committed an act of aggravated cruelty upon an animal	14
Failed to provide reasonable care for an animal	9
Committed an act of cruelty upon an animal	6
Failed to alleviate the pain and suffering of an animal	4
Failed to provide sufficient shelter for an animal	2
Used an electrical device to contain an animal	2
Conduct of animal trades	1
Failed to comply with the breeding code	1
Possession of a device capable of electric shock	1
Failed to exercise reasonable care to prevent an act of cruelty upon an animal	1
Failed to provide sufficient ventilation	1
Hindered an officer	1
Confined animal in a cage insufficient for adequate exercise	1
Failed to ensure that housing was clean and hygienic	1

The outcome of each case is summarised in Table 2. Most offenders were convicted while 17% of cases were dismissed under Section 32 of the Mental Health (Forensic Provisions) Act 1990 (NSW). The outcome was unknown in 7% of cases. In one of the cases, the accused was convicted of some charges while others were dismissed under the Section 32 of the Mental Health Act.

Table 2. Outcomes of prosecutions related to animal hoarding in NSW (2005-2012)

Outcome	Number
Convicted	**23**
Fined for each charge	9
Ordered to pay veterinary and/or legal costs	22
Prohibited from owning animals (on occasion except for some animals specified by name)	17
Lifetime order	5
10 years	4
7 years	1
5 years	5
3 years	2
Good behaviour bond	11
72 months	1
24 months	3
18 months	4
12 months	2
9 months	1
Imprisonment	4
Regular inspection by RSPCA	8
Dismissed (section 32 of the mental health act)	5
Regular contact with mental health practitioner	5
Prohibited from acquiring a certain number of animals (6months)	2
Regular inspection by RSPCA/ RSPCA involvement	4
Unknown	**2**

Information available about costs was limited, in some cases to the costs the defendant was ordered to pay in court. Information about legal costs was missing in two cases. The mean for veterinary and boarding costs was $18970 and for legal costs was $7092. The median veterinary and boarding cost was $7183 and $2544 for legal costs.

Discussion

The findings of the present study are consistent with studies conducted in the USA and Canada, in that animal hoarders are most likely to be female (76-83.3%), middle aged or older (83.3-100% over 40) and unemployed or on a pension [11, 14, 15, 18, 25]; however there are reports of animal hoarding across all demographic groups and socioeconomic boundaries, involving men, married couples and families [3, 10, 17, 18]. In this study, 12 different occupations were recorded amongst persons convicted for animal hoarding related offences. The three occupations with highest frequency were breeder, pensioner and teacher. The variety in occupations recorded is consistent with the observation that animal hoarders may have a wide variety of occupations including white collar jobs and healthcare careers such as veterinarians, nurses, psychiatrists and age care workers [2, 3, 17, 18, 24, 30].

One of the major barriers to resolution is that there is a lack of public awareness about the issue of animal hoarding [2, 5, 24]. Traditionally the media has presented animal hoarding cases in a sensationalised manner, rather than educating the reader about the complex, multifactorial nature of animal hoarding [3, 19, 23, 31]. The stereotype of the animal hoarder as an older, single, unemployed, female, living alone with many cats persists in the media [3, 7, 9, 10, 17, 25]. Determining the characteristics of animal hoarders may facilitate earlier detection and resolution at less cost to animal welfare organisations [2].

Dogs are more commonly hoarded than cats in Australia. This contrasts with previous studies where 65-82% of cases involved cats, and 55-60% of cases involved dogs) [11, 18, 25]. This may simply reflect a higher prevalence of dog owning households in Australia (36%, compared to 23% of households owning a cat)[32] or may be due to another reason. Farm animals were hoarded 66% of the time and birds were hoarded 28% of the time where past studies have reported 6-11% and 11-17% respectively [3, 17, 24]. Horses were involved in 41% of our cases whereas in past studies they have been reported as being involved only occasionally. This may be due to the lower person to land ratio in Australia, allowing more land for larger animals to be kept (3 people per square km in Australia and 9 in NSW compared to 32 people per square km in the USA) [24, 26]. It may also be due to the finding that approximately one third of animal hoarders in NSW lived in inner regional and outer regional Australia which includes rural areas whereas in the USA over half of hoarders lived in urban areas and were potentially less able to accommodate large animals.
Organisations such as the RSPCA and AWL require extensive resources to adequately house and provide veterinary care to seized animals, including large animals such as horses. This requires a wider range of housing, feed and other resources to adequately care for all hoarded species and adds to the overall cost of these cases in NSW [2].

In our study animal hoarders in NSW were more likely to live in inner regional or outer regional Australia and less likely to live in major cities than expected according NSW population data [27]. This is slightly different to a previous overseas study which found that animal hoarders are more likely to live in urban areas (52%) than rural (28%) or suburban areas (20%), but that study had no established standard definition like the remoteness index [11].

Hoarders acquired animals through breeding, purchasing animals or collecting strays[11]. There are also reports of animal hoarders claiming to be animal rescuers or shelters as were two of the hoarders in this case [3, 17, 24]. This claim to be an animal shelter is often cited as a problem in investigating and prosecuting animal hoarding cases as it can restrict case resolution by acting as an effective excuse for accumulating animals in court or for the media [2]. Despite claims that they love animals and want to aid unwanted pets, animal hoarders are by definition oblivious to the suffering of their animals [2, 3, 17, 24, 31]. Prosecution in such cases is complicated by the absence of legally mandated husbandry practices for such institutions in the USA [24, 31]. In NSW there is a code of practice entitled NSW Animal Welfare Code of Practice No 5 - Dogs and Cats in Animal Boarding Establishments [33], however it is not mandated.

Animals that are deprived of care face both physical and psychological problems [2, 7, 13]. In all cases in this study, seized animals required some form of veterinary intervention. Common problems observed included weight loss and emaciation, internal and external parasitism, and a poor or soiled fur coat. Other health issues included viral diseases, respiratory disease, soft tissue injuries due to fighting or self-trauma, dental disease, neoplasia, abscesses, heartworm, dystocia, infections, entanglement, anaemia and dehydration, also noted in previous studies [25]. This study found that up to 500 animals were found on the premises of animal hoarders, underscoring the fact that hoarding impacts animal welfare on a large scale.

Behavioural problems were observed in all cases, including fearfulness, distress, cannibalism, aggression, and dispacement behaviours such as circling and pacing. These occur due to extreme overcrowding, lack of socialization and in some cases confinement without exercise [3, 8, 24]. Overcrowding means that the animals must compete for food and water, fight to protect themselves and their offspring, and may be forced into close proximity to a predator species, which increases stress [3, 24]. It is difficult to determine the psychological effect that animals experience from long-term crowding and lack of socialisation [24, 34]. Ascione (2001) suggested that abused animals exhibit similar behaviours to abused children, including anxiety disorders, extremes in behaviour, learned helplessness and aggression [35]. The severity of the health and behavioural problems of these animals is shown by the high rate of euthanasia that is necessary following the seizure of hoarded animals [2, 3, 17, 34].

There are also important public health implications. Animal hoarders have been found to neglect not only their pets, but also the care of other people in their home. This may include dependent children, elderly or disabled individuals [7, 13, 17, 18]. In previous studies, up to 78% of premises were heavily cluttered and unsanitary, often with accumulations of animal faeces and urine in the human living areas [11, 14, 18, 25, 30]. Lack of working facilities such as bathroom, cooking, refrigeration and heat were common findings [11, 30]. Many hoarders had extensive collections of newspaper, trash, pet food or human food and a few had collections of holiday decorations, books, dolls, containers, pornography, medicines and clothing [2, 11, 18]. Such data was not collected in this study; however it was clear from the RSPCA records that in all cases the living areas of the animals were unsanitary and in a third, the entire premises (ie that including the areas where humans dwell) was unsanitary. Future studies may employ a visual scale, such as the International OCD Foundation's Clutter Image Rating, to quantify the severity of clutter and squalor on a premises [36].

Unsanitary living conditions facilitate the spread of zoonotic diseases [2, 11, 13, 18, 19, 30]. The human inhabitants of the house may sustain injuries from animal scratches or bites and become anaemic due to flea bites [9]. It is suggested that animal hoarding may be a sentinel for unmet human health and medical needs [5]. The lack of basic utilities on premises of hoarders leads to impaired sanitation and food preparation [13, 17, 18, 20]. Rodent and insect infestations, as well as odours, can create a neighbourhood nuisance [17, 18]. In one study, the majority of animal hoarding incidents were detected following the lodgement of complaints about noxious odours, insect or rodent infestations originating from hoarding residences by neighbours [3]. Personnel inspecting premises are exposed to high ammonia levels from urine accumulation that causes eye and respiratory tract irritation. There is also a significant risk of injury due to physical hazards, inadequate lighting and structural damage to the property [9].

One of the main similarities between object and animal hoarding other than the cluttered premises is the unwillingness to give up the object or animal [5, 14, 15, 37]. Animal hoarders will often refuse to give up animals that are obviously suffering or even dead. In one study, one third of all object hoarding cases observed involved animal hoarding [37]. One of the major differences is that in many animal hoarding cases only one or two species of animal is hoarded whereas object hoarders usually collect many different items [14, 15, 30].

The parallel between object and animal hoarding may provide some suggestions for how animal hoarding should be treated in order to decrease the chance of recidivism as there has been more research into this field [15, 37].

It is unclear why animal hoarding behaviour develops. It has been proposed that a stressful childhood environment may contribute to poor adult functioning and reliance on animals for emotional comfort [15, 30]. Three types of animal hoarder are described in the literature: the

overwhelmed caregiver, the rescuer and the exploiter [10, 16]. The rescuer and the overwhelmed care giver are both unable to provide adequate food, water, shelter, healthcare and other basic needs, due to the number of animals that they have in their care having overwhelmed their resources [10, 16]. The exploiter fails to provide what the animals need due to indifference to animal suffering [10, 16]. No attempt was made to classify animal hoarders according to these criteria in the current study due to the limited amount of information available, however such classification may be helpful in future studies.

The mean for recorded veterinary, boarding and legal costs in this study was $26 062. This is similar to the estimated cost of tens of thousands of dollars per case from previous studies [11]. At this cost, even 3-6 cases per year results in a significant financial burden on the charity organisations that are involved. Timelier resolution of cases may ameliorate costs significantly. Animal hoarding cases are protracted and time consuming [3, 17]. In the USA they can overlap or fall between the jurisdictional cracks of numerous state and local government agencies (e.g., mental health, public health, zoning, building safety, animal control, aging, sanitation, fish and wildlife, and child welfare agencies). Resolution is further confounded by difficult issues of personal freedom, lifestyle choice, mental competency, and private property rights [3, 17, 31]. It is clear that mental competency can be an issue in Australia as well, as in 17% of the cases in this study; the charges were dismissed under Section 32 of the Mental Health (Forensic Provisions) Act 1990 (NSW).

There are few reports documenting the outcomes of hoarding cases and none from Australia [3]. The main outcomes reported include the hoarder being placed under guardianship or institutional care (26%), psychiatric evaluation (24%), ongoing monitoring (18%), prohibition from owning animals for a period of time (17%) and some short jail terms [11]. This study shows that in NSW, animal hoarders are more likely to be prohibited from owning animals (59%), be placed on good behaviour bonds (38%) and pay fines (31%) than be placed under some sort of care or be ordered to have psychiatric evaluation (17%).

Animal hoarding is complicated by its association with psychological disorders. If the situation is not handled appropriately, recidivism approaches 100% even with prosecution and removal of the animals from the property [2, 20, 23, 24, 30, 38]. Patronek found in 1999 that 60% of hoarding cases were repeat offenders. Studies from the USA have shown that after animals are removed from the home, many hoarders begin collecting animals again [3, 30]. In the current study, fewer hoarders (24%) were repeat offenders with three of those having changed states so that they could continue to accumulate animals. This number only takes into account those that have been prosecuted more than once between 2005 and 2011. There may have been cases where recidivism was managed without re-prosecution. This raises the question of whether animal hoarding cases are actually handled better in NSW than in the USA, however further studies with a larger sample size and over a greater time period would be required to confirm this finding. Another issue with only taking into account prosecuted cases, is that the calculated incidence of 1-2 new cases prosecuted each year per 1600000 people at risk is likely to be artificially low. The incidence of animal hoarding in Australia cannot be calculated as only data from NSW was used in this study.

Our study had limitations that are common to overseas studies into animal hoarding. Like most states in the USA (except Hawaii and Illinois [39]), there is no legal definition of animal hoarding in Australia. Instead, in both Australia and most states in the USA broad anti-cruelty laws are used to address animal hoarding [23, 39]. The Prevention of Cruelty to Animals Act 1979 (NSW) (POCTA) makes no reference to animal hoarding specifically [40]. Hoarders of animals are therefore charged according to violations of POCTA for each animal; for example in part 2, section 8, animals are to be provided with food and water [40]. This in itself presents a problem when attempting to study animal hoarding as it is difficult to retrospectively identify animal hoarding cases definitively, as opposed to other

cases of animal cruelty. None of the published definitions define 'more than the typical number' of animals. This means that someone who has a relatively small number of animals in their care can still be classified as an animal hoarder if the other criteria are met. The definition also specifies that companion animals are involved. It is commonly accepted that a companion animal is an animal that is domesticated and kept for companionship or pleasure [41]. This may need to be amended in future as although cats and dogs were the most commonly reported hoarded species, there were also recorded incidents of hoarding farm animals, horses, birds, reptiles, rodents and wildlife [3, 17, 24].

Reliance on the Chief Inspector of the RSPCA to identify cases was a limitation and source of potential bias in this study, and may have lead to an under-estimation of animal hoarding cases. The inclusion of cases resulting in successful prosecution meant that aborted prosecution and cases managed without prosecution were not included. Where possible the RSPCA works with animal hoarders to attempt to rectify the situation before it reaches a point where prosecution is required, therefore the majority of suspected animal hoarding cases were not included in this study. These cases should be considered in future studies.

There were four cases in which a husband and wife and one where a mother and son were involved. In all of these cases both members of the couple fell under the definition of an animal hoarder and therefore were included in the study. This created instances where some data were duplicated for one case of animal hoarding as the data were collected for each person rather than each case. This was done as the aim of the study was to determine characteristics of animal hoarders not hoarding cases, however it may have falsely elevated the number and species of animals, health conditions of the animals, the way in which the animals were obtained and the place of residence for calculating the remoteness index.

Another difficulty encountered with this study was that the records were not homogenous and information was incomplete in some cases. This could be resolved in a future study by developing a standard recording and question sheet for completion in suspected animal hoarding cases. These records could be stored electronically in a central location accessible to all animal welfare agencies.

The characteristics recorded were chosen not only for their importance but because they were recorded in most of the cases. Since this study was undertaken, the RSPCA has begun trialling a new case recording system for potential animal hoarding cases. With more extensive and consistent record keeping, a prospective study may be able to include a wider range of characteristics which may permit further insights into animal hoarders and enable earlier detection of animal hoarding and therefore earlier, more effective and potentially less costly intervention.

Conclusion

This study found that persons prosecuted for charges relating to animal hoarding in NSW have similar characteristics to those found in previous studies in the USA. An important difference was an increased incidence in the hoarding of farm animals and horses in NSW compared to the USA, which has implications for organisations investigating and prosecuting animal hoarding related offences. This study also found that animal hoarders in NSW are more likely to live in inner regional and outer regional areas (rural areas) than animal hoarders in the USA and general population in NSW. The rate of recidivism was lower amongst animal hoarders in NSW compared to previous overseas studies. Further studies are required to explore this finding.

Ethics approval
Data collection for this study was approved by the University of Sydney's Human Ethics Research Committee.

Tables

Online Supplementary Table 1. Age distribution of persons prosecuted for charges related to animal hoarding in NSW (2005-2011)

Age group	Number	Percentage (%)
0-20	0	0
20-24	1	3.6
25-29	0	0
30-34	1	3.6
35-39	0	0
40-44	2	7.1
45-49	3	10.7
50-54	6	21.4
55-59	4	14.3
60-64	8	28.6
65-69	0	0
70-74	3	10.7
75-79	0	0
≥80	0	0
Total	**28**	**100**

Online Supplementary Table 2. Occupations of persons prosecuted for charges related to animal hoarding in NSW (2005-2011)

Occupation	Number	Percentage (%)
Breeder	9	31.0
Pensioner	8	27.6
Teacher	5	17.2
Unknown	5	17.2
Unemployed	4	13.8
Council/government employee	2	6.9
RSPCA foster carer	2	6.9
Farmer	2	6.9
Nurse	1	3.4
Locksmith	1	3.4
Self employed	1	3.4
Accountant	1	3.4
Security guard	1	3.4

Online Supplementary Table 3. Species involved in animal hoarding cases in NSW (2005-2011)

Animal	Number	Percentage (%)
Dog	23	79.3
Cat	20	69.0
Horse	12	41.4
Bird	8	27.6
Goat	6	20.7
Sheep	4	13.8
Fowl	4	13.8
Donkey	3	10.3
Pig	2	7.0
Alpaca	2	7.0
Rabbit	2	7.0
Ox	1	3.4
Rat	1	3.4

Online Supplementary Table 4. Method of acquisition of animals found on the premises of persons prosecuted for charges related to animal hoarding in NSW (2005-2011)

Method of acquisition	Number	Percentage (%)
Breeding	15	51.7
Breeding and purchased	5	17.2
Breeding and strays	2	7.0
Purchased and strays	2	7.0
Strays	1	3.4
Purchased	1	3.4
Unknown	3	10.3

Online Supplementary Table 5. Common health conditions of the animals found on the premises of persons prosecuted for charges related to animal hoarding in NSW (2005-2011)

Health condition	Number	Percentage (%)
Behavioural	29	100
Inflammation/infection	**28**	**96.6**
External parasites	26	89.7
Internal parasites	16	55.2
Bacterial	26	89.7
Viral	6	20.7
Fungal	3	10.3
Immune mediated	2	7.0
Nutritional	26	89.7
Degenerative	14	48.3
Neoplastic	10	34.5
Trauma	8	27.6
Anomalous	4	13.8
Idiopathic	1	3.4
Metabolic	1	3.4
Vascular	0	0

*data was not recorded consistently

References

1. Patronek GJ. Hoarding of animals: An under-recognized public health problem in a difficult-to-study population. *Public Health Reports*. 1999; 114: 81-7.

2. Lawrie M. Animal hoarders in Australia - shining light through dark shades. *Urban Animal Management Confrence Proceedings* Canberra Australian Veterinary Association Urban Animal Management Confrence 2005, p. 77-82.

3. Berry C, Patronek GJ and Lockwood R. Long-term Outcomes in Animal Hoarding Cases. *Animal Law*. 2005; 11: 167-93.

4. Snowdon J and Halliday G. A study of severe domestic squalor: 173 cases referred to an old age psychiatry service. *International psychogeriatrics / IPA*. 2011; 23: 308-14.

5. Billman S. Towards an Understanding of the Psychological Underpinnings of Animal Hoarding: A Normative Community Sample. *Neuroticism and Empathic Concern*. 2005: 59-119.

6. Arluke A, Frost RO, Luke C, et al. Hoarding of Animals Research Consortium Tufts University 2010.

7. Fleury A. An Overview of Animal Hoarding *PRAXIS*. 2007; 7: 58-64.

8. Snyder J. Animal hoarding: A multi-disciplinary approach. *RSPCA Australia Scientific Seminar*. 2009; The Humane Society of the United States 1-5.

9. Castrodale L, Bellay YM, Brown CM, et al. General public health considerations for responding to animal hoarding cases. *Journal of environmental health*. 2010; 72: 14-8; quiz 32.

10. Patronek G, Loar L and Nathanson J. Animal Hoarding: Structuring interdisciplinary responses to help people, animals and communities at risk Tufts University 2006.

11. Patronek GJ. Hoarding of animals: an under-recognized public health problem in a difficult-to-study population. *Public health reports (Washington, DC : 1974)*. 1999; 114: 81-7.

12. Reinisch AI. Understanding the human aspects of animal hoarding. *The Canadian veterinary journal La revue veterinaire canadienne*. 2008; 49: 1211-4.

13. Nathanson JN. Animal hoarding: slipping into the darkness of comorbid animal and self-neglect. *Journal of elder abuse & neglect*. 2009; 21: 307-24.

14. Frost RO, Patronek G and Rosenfield E. Comparison of object and animal hoarding. *Depression and anxiety*. 2011; 28: 885-91.

15. Patronek GJ and Nathanson JN. A theoretical perspective to inform assessment and treatment strategies for animal hoarders. *Clinical psychology review*. 2009; 29: 274-81.

16. Brown SE. Theoretical Concepts from Self Psychology Applied to Animal Hoarding. *Society & Animals*. 2011; 19: 175-93.

17. Patronek GJ. The Problem of Animal Hoarding *Municipal Lawyer* 2001; 15: 6-9.

18. Arluke A, Frost RO, Luke C, et al. Health implications of animal hoarding *Health & Social Work* 2002; 27: 125-36.

19. Arluke A, Frost R, Steketee G, et al. Press reports of animal hoarding. *Society & Animals*. 2002; 10: 113-35.

20. Kuehn BM. Animal hoarding: A public health problem veterinarians can take a lead role in solving. *Journal of the American Veterinary Medical Association*. 2002; 221: 1087-9.

21. Annual Report 2010-2011. Animal Welfare League NSW, 2011.

22. The Royal Society for the Prevention of Cruelty to Animals New South Wales Annual report for the financial year ended 30 June 2011. RSPCA NSW, 2011.

23. Kuehn BM. Lawmakers tackle animal hoarding. *Journal of the American Veterinary Medical Association*. 2003; 222: 1190-.

24. Patronek GJ. Animal hoarding: Its roots and recognition. *Veterinary Medicine*. 2006; 101: 520-+.

25. Reinisch AI. Characteristics of six recent animal hoarding cases in Manitoba. *The Canadian veterinary journal La revue veterinaire canadienne*. 2009; 50: 1069-73.

26. DoctorConnect. Australian Government Department of Health and Aging, 2012.

27. Regional Population Growth, Australia, 2010-11. Australia: Australian Bureau of Statistics, 2012.

28. Population by Age and Sex, Regions of Australia, 2010. *32350*. 4/8/2011 ed. Australia: Australian Bureau of Statistics Commonwealth of Australia, 2011, p. 8.

29. Estimated Resident Population by Single Year of Age, New South Wales. *31010*. 25/6/2012 ed. Australia: Australian Bureau of Statistics Commonwealth of Australia 2012, p. 4.

30. Steketee G, Gibson A, Frost RO, Alabiso J, Arluke A and Patronek G. Characteristics and Antecedents of People Who Hoard Animals: An Exploratory Comparative Interview Study. *Review of General Psychology*. 2011; 15: 114-24.

31. Vaca-Guzman M and Arluke A. Normalizing passive cruelty: The excuses and justifications of animal hoarders. *Anthrozoos*. 2005; 18: 338-57.

32. ACAC. Contribution of the Pet Care Industry to the Australian Economy. 7th ed. Victoria: Australian Companion Animal Council, 2010.

33. NSW Animal Welfare Code of Practice No5 - Dogs and Cats in Animal Boarding Establishments. NSW, Australia: NSW Department of Primary Industries 1996.

34. Seksel K. In: Joffe M, (ed.). 2011.

35. Ascione FR. Animal abuse and youth violence. *OJJDP: Juvenile Justice Bulletin*. 2001: 1-15.

36. Walker C. Everyday ethics. *In Practice*. 2007; 29: 56-.

37. Frost RO, Steketee G and Williams L. Hoarding: a community health problem. *Health & Social Care in the Community*. 2000; 8: 229-34.

38. The psychology of animal hoarding. *Veterinary Medicine*. 2006; 101: 525-.

39. Hays V. Detailed Discussion of Animal Hoarding. Michigan Michigan State University College of Law 2010.

40. Prevention of Cruelty to Animals Act *200*. NSW: The Government of New South Wales 1979.

41. Australian Animal Welfare Strategy. In: LTD HJP, (ed.). Companion Animals Working Group, 2006.