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Amit Chaudhari

Humane Society International

Tamara Kartel

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Chaudhari, A., Kartal, T. 2017. *Survey of the Dog Population of Nainital, Uttarakhand, India*. Humane Society International. July 2017.

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**HUMANE SOCIETY
INTERNATIONAL**
INDIA

Survey of the private dog population Nainital, Uttarakhand India

July 2017

Tamara Kartal and Dr Amit Chaudhari

Executive Summary

Humane Society International (HSI) conducted two dog population surveys in all wards of Nainital (human population of 41,377). One was a street dog survey and the other was a survey of the private (pet) dog population.

The survey generated an estimate of the street dog population of 770 dogs (1.9 street dogs per 100 people; 7.0 street dogs per km). Results from the household survey generated an estimate of the private dog population of 2155 dogs (21.38 % dogs owning households and 0.23 dogs per household).

Sterilization rates among private dogs were high and 40 (42.6%) of the 94 dogs were sterilized, leaving 57.4% of the dogs intact, eleven (11, 11.7%) dogs out of 40 sterilized dogs were sterilized at the ABC facility run by HSI India in Nainital. The monitoring street count surveys estimate an average density of 7.0 adult roaming dogs per km of street in the early morning of which 45.3% are female. None of the females were spayed and none of the males were castrated. Almost one third (29.4%) of the adult females were lactating.

Most private dogs (72%) had received a rabies vaccination in the last 12 months. About 3.3% (0.03 bites per household) of households reported that someone in the household had experienced a dog bite in the last 12 months.

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Background

Nainital is a Himalayan resort town in the Kumaon region of India's Uttarakhand state, at an elevation of roughly 2,000m. Formerly a British hill station, it's set around Nainital Lake the northern Indian state of Uttarakhand. It is about 288 kilometres from the state capital of Dehradun and 300 km north of the national capital of New Delhi and has a human population of 41,377.

Image 1: Geographic location of Nainital, Uttarakhand (Google Maps)



In October 2016 Humane Society International (HSI) conducted a survey of the street dog population and a survey of the owned dog population in July 2017, to estimate the number of dogs in Nainital. This document describes the methodology and results of the surveys, which may now be used in further discussions of a possible dog population management program.

In planning any dog management project, it is essential that one obtains a baseline assessment of the street dog (and private dog) population before developing and implementing a management program. These population estimates serve several important functions. First, a street dog population size estimate quantifies the scope of the “problem”. Second, quantifying the problem allows proposed implementers of a program to make an informed estimate of the resources and the timeline required to achieve the desired outcomes. Finally, the population estimates function as a yardstick against which to measure progress as the dog management program moves forward.

Baseline survey estimates establish a framework for the calculation of metrics that may be used to plan effective, feasible, and properly targeted strategies for reducing roaming dog population size, reducing or eliminating human and dog rabies cases (enables spot checks of vaccination rates), and reducing public health and nuisance costs over time.

Survey Design and Methodology

HSI conducted two surveys in Nainital, India, a street dog survey and a dog demographic and KAP (Knowledge, Attitude and Practices) survey. KAP surveys survey the private dog population as well as the attitudes and behaviours of humans in regard to dog demographics, the reproductive status of private dogs, the rate of dog bites and the relationship residents of Nainital have with their own private dogs and with street dogs. Whereas street dog surveys generate total roaming dog population estimates.

Private dog survey (KAP) objectives:

- Generate a reliable estimate of the private dog population
- Understand private dog demographics and population dynamics
- Estimate sterilization and vaccination rates among privately owned dogs
- Assess the level of responsible dog ownership
- Explore attitudes pertaining to the relationship between households and street dogs
- Assess knowledge about rabies and rabies prevention in case of a dog bite

Dog demographics and KAP survey

The survey was conducted using the smart phone app Epicollect5, which contained a prepared survey form for Nainital. Households were surveyed by a team of two trained surveyors using questionnaires about 15-25 mins in length. Questionnaires included or excluded questions depending on whether the household owned a dog or not. The survey sample size was set at a minimum of 407 households to reach a 95% confidence level. Inclusion criterion for households were:

- Person interviewed had to be over 18 years old and resident at the address
- In case of dog ownership, the interviewee had to be the main care taker or at least well informed about the dog or dogs in the household

Participants were asked to confirm their consent to be part of the study and had the option to opt-out before the interview started. Once questionnaires were completed, the completed forms were saved and uploaded to a cloud-based database by the surveyor.

Household surveys were conducted with a systematic random sampling method, which samples a portion of the total available households in the area. Following the same route that was created for the street dog survey, surveyors interviewed every tenth household. To remain consistent throughout the survey either the left or the right side of the street was surveyed. In case nobody was available at the tenth household, the ninth or the eleventh household was interviewed instead.

Systematic random sampling in comparison to simple random sampling is less susceptible to researcher error.

Results

Private dog demographic and KAP (Knowledge, Attitude and Practices) Survey

We interviewed 407 households, of which 87 (21.8%) owned a dog (Table 3). These 87 households owned 94 dogs which translates to 0.23 dogs per household. Extrapolated from this result we estimate a total private dog population of 2155 dogs in Nainital (9329 households in the town).

Survey participants were 43.7 % female and 56.3 % Male and lived in a semi-detached house (60%) and Detached houses (26.8%). Only 8 Participants had owned other dogs in the last 12 months and kept dogs for two reasons, either for protection (65 HHs) or as a pet (22 HHs) (Table 4).

Table 3: Survey participant demographics

Human Demographics			Sample size: 407				
	Survey Participants		Housing type			Dogs per household	Private dog population estimate*
	Female	Male	Semi-detached house	Detached house	Apartment	0.23	2155
Number	178	229	244	109	54		
Percentage	43.7%	56.3%	60%	26.8%	13.3%		
	Dog Owners		Number of dogs in the household				
	Yes	No	1 Dog	2 or more Dogs			
Number	87	320	81	6			
Percentage	21.8%	78.2%	93 %	7 %			

- Source: Census 2011; based on 9329 households (excluding non-residents)

Table 4: Reasons for owning a dog and if other dogs lived in the household in the last 12 months

	Owned other dogs in the last 12 months		Reasons for owning a dog	
	Yes	No	I want him/her to protect the property or crops	Pet/Companion
Number	8	79	65	22
Percentage	9.2%	90.8%	74.7%	25.3%

Table 5: No-dog owners' stated reason for not owning a dog

	Reasons for not owning a dog			
	No need for a dog	I do not like dogs	I owned a dog but not currently	It is against my religious believes
Number	247	49	17	7
Percentage	77.2%	15.3%	5.3%	2.2%

Only 5.3% (17) of the “no-dog owning” participants had owned a dog in the past but not currently (Table 5). Therefore, additionally to 21.8% of the households in Nainital owning a dog at the time of the survey there are another 5% (17) of all households who owned a dog in the past but not at the moment.

Private Dog Demographics

The majority of private dogs were male (69%, 65) and 74.2% were between the age of 1 and 6. Only 7.4% were older than 6 years. Most dogs were adopted from the streets (51%, 48) which is high in comparison with other areas we surveyed in India. Further studies should explore why street dog adoptions are higher in Nainital. About a third (27%, 25) of owned dogs were purchased from outside of Nainital and only 18% were received as a gift from someone either from Nainital or outside of Nainital.

Responsible Dog Ownership Practices

Sterilization

Fifty Seven percent (54) of the recorded dogs were intact and forty-three percent (40) dogs were sterilized. Seven owners would be willing to sterilize the dog for a fee. Reasons given for not sterilizing their dogs and the unwillingness to sterilize them in the future (even when offered free) included: unnecessary (43%), too dangerous for the dog (32%), don't have time (11%) and the wish to have puppies from the dog (2%). Education campaigns will be needed to encourage dog owners to embrace sterilization.

Litters by private female dogs

There were 29 female dogs of which 20 females were sterilized while five female had litters in their life. All these females are still under 5 years of age.

Vaccination

Seventy two percent (68) dogs were vaccinated against rabies in the last 12 months. Of the twenty-six remaining dogs, nine owners would have their dogs vaccinated free of charge (8) or for a small fee (1) and seventeen dog owners would not allow their dogs to be vaccinated. Five owners explained that their dogs were not vaccinated because they were vaccinated once, and 10 owner thinks it is not necessary at all.

Visiting a veterinarian in the last 12 months

Sixty-three (63) of the eighty-seven (87) dog owning households had visited a veterinarian in the previous 12 months, while twenty-four (24) did not visit a veterinarian. This seems in line with the number of vaccinated dogs in this study and suggests that the vaccination status claimed by owners is somewhat trustworthy and reflects the vaccination coverage of owned dog sin Nainital.

Confinement of dogs throughout the day

Exploring confinement practices of private dogs is challenging as questions are readily misinterpreted and respondents are either genuinely uncertain about the level of control they provide to their dogs on a regular basis or respondents are nervous about admitting that the level of control is low to non-existent. Therefore, the interviewee was asked about confinement at specific times (at the time of the interview as well as during the night).

The survey was conducted between 10 am and 6 pm during the day when it was still light outside. The majority had their dogs roaming outside (59.4%, 19) and 39.1% (27) households kept the dog inside the house while one (1) had the dog tethered outside in an area that was uncontrolled (e.g. no fencing) and unsupervised. Night time confinement was similar, with 57% keeping their dogs free roaming and 43% keeping their dogs inside the house. This suggests that a high percentage of owned dogs contributes to the street dog population and street dog sterilization programs should include private dogs in their strategy to address this source of likely new street dogs (e.g. abandoned puppies, breeding etc.).

Dog bites and Rabies Prevention

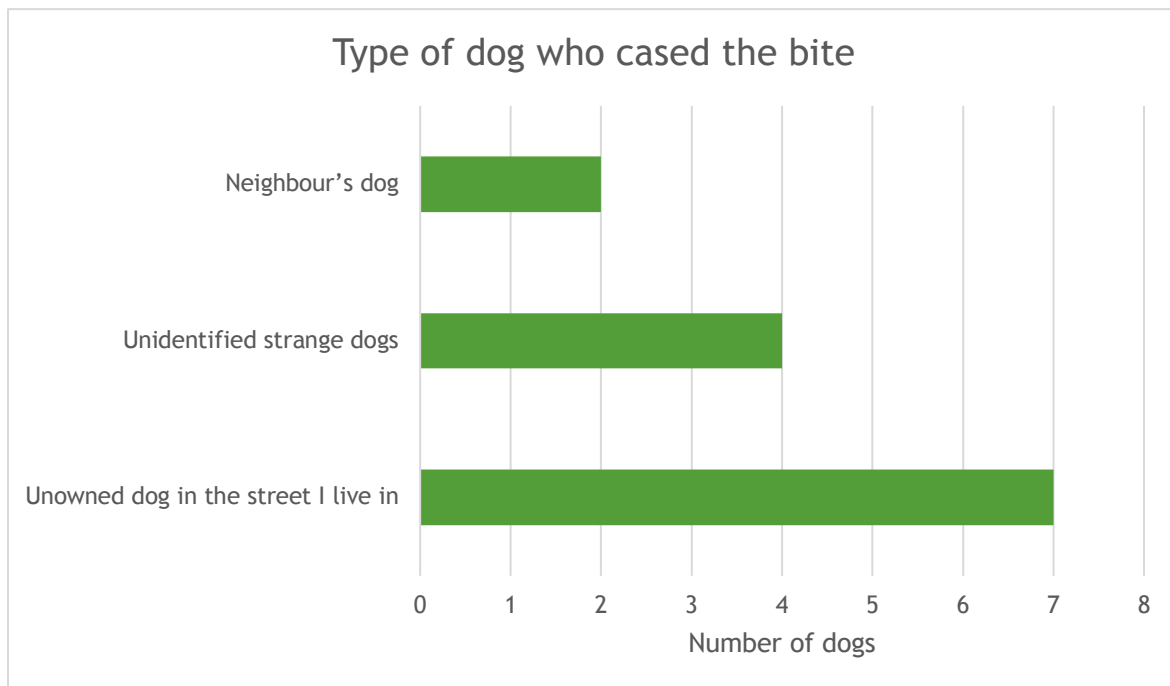
In general, households experienced a low incidence of dog bites with 3.2% reporting that one of the household members had experienced a dog bite in the previous 12 months (Table 6).

Table 6: Dog bites in the last 12 months.

Has anyone in the household been bitten by a dog in the last 12 months in Nainital?		
	Yes	No
Number	13	394
Percentage	3.2%	96.8%

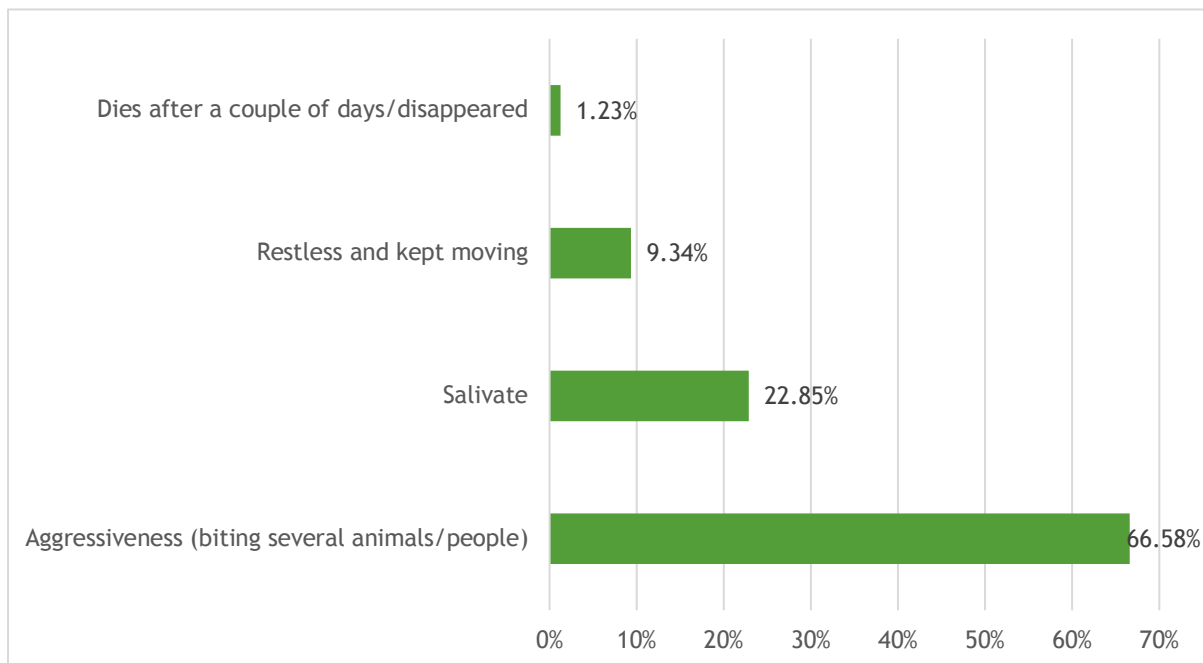
More than half of the recorded dog bites were caused by unowned street dogs from the street person lived in (Figure 1). 53.8% (7) were unowned dogs in the street the person lived in, 30.7% (4) unidentified strange dogs and 15.4% (2) neighbour's dogs in Nainital.

Figure 1: Dogs who caused the dog bites



Rabies was generally well known (Figure 2). 66.58% recognize by Aggressiveness of the dog and 22.85% by salivation.

Figure 2: Rabies knowledge



Survey participants were generally aware how to treat a dog bite, with 46.7% of all interviewees following the right procedure. Forty-six percent (46.2%, 188) were aware about the procedure but did not feel the urgency to visit the hospital immediately. The remaining 7.1% would treat a wound with home remedy and by other ways according to its severity (Table 7).

Table 7: Wound care

What would you do if you or someone in your household gets bitten by a dog?				
Wash the wound with water and go to the hospital later	Wash the wound with soap and water and go to the hospital immediately	Depending on the size of the bite, treat it at home	Put a bandage on it and let it heal	Wash the wound with water and see what happens
188	190	10	12	3
46.2%	46.7%	2.5%	2.9%	0.7%

Human-Dog Relationship: With private and street dogs

We increasingly collect data indicating that street dog populations and private dog populations are not separate or totally independent from each other (see e.g. Morters et al., 2014¹). In fact, both are actively sustained by the human community they live in and their population dynamics are usually a result of human choices rather than purely a result of reproductive capacity (puppies will have a higher chance of survival when humans feed and care for them). The difference between the private and street dog populations is often only the level of confinement individual dogs receive. There are hints that the level of confinement/control increases following the implementation of large scale sterilization and vaccination programs. Confinement/control of dogs should be monitored over time as an indicator for a changing human-dog relationship.

Perception of street dog density and previous dog management

When asked interviewees (26.8%, 109) reported that they see about more than 10 dogs in their streets in the early morning hours. About 37.3% (152) see 7-10 dogs, 27.5% (112) see 4-6 dogs and only 8.4% (34) see 0-3 dogs in their street.

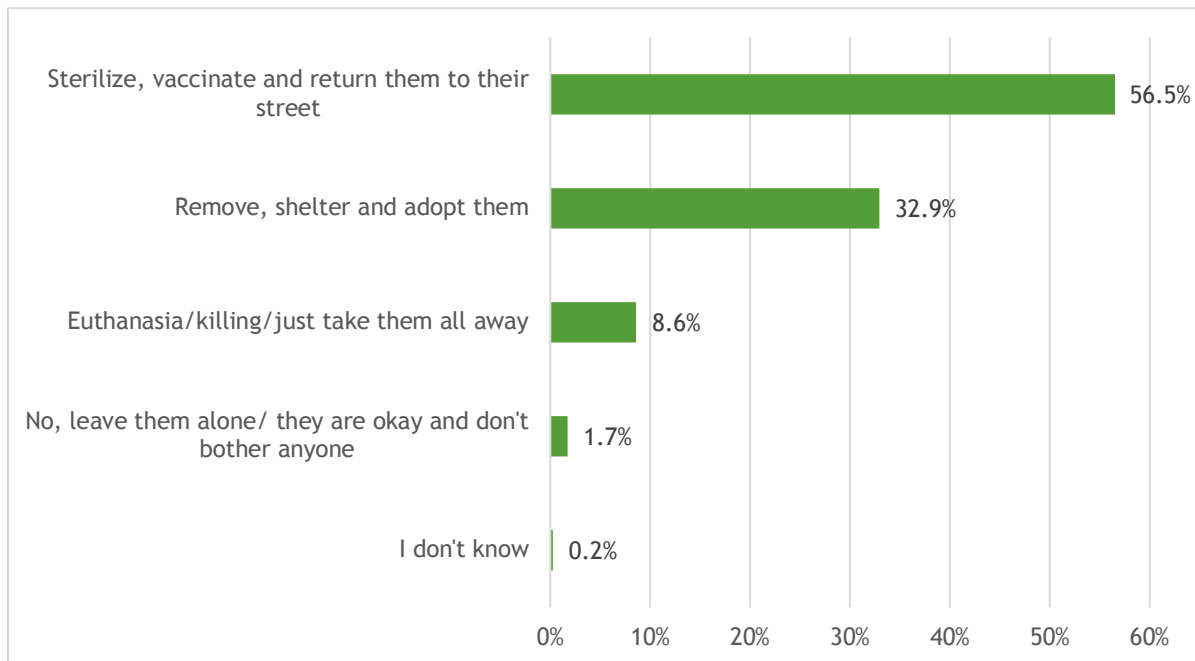
When asked how they felt about the number of dogs on their street, the majority of respondents were concerned about the number of dogs in their street. 44.5% (181) thought that there were too many dogs on their street, 17.7% (72) thought that there were far too many dogs and another 29% (118) thought that there were not too few not too many dogs on their streets. Only 3.4% (14) felt that there were too few dogs and 5.4% (22) felt that there were far too few dogs in their streets.

¹ Morters, M. K., McKinley, T. J., Restif, O., Conlan, A. J., Cleaveland, S., Hampson, K., Whay, H.R., Damriyasa, I. & Wood, J. L. (2014). The demography of free-roaming dog populations and applications to disease and population control. *Journal of Applied Ecology*, 51(4), 1096-1106.

When asked whether the number of dogs on the streets had changed in the last 12 months, 70.5% (287) thought the number had increased, 27.5% (112) thought the number was about the same and very few (2%, 8) thought it had decreased.

Opinions on how street dogs should be managed majority (56.5%,230) had suggested for Sterilize, vaccinate and return them to their street, 32.9% (134) had suggested for remove, shelter or adopt them as they would like to see no dogs on the streets (Figure 3).

Figure 3: Do you think street dogs should be managed and if so how?

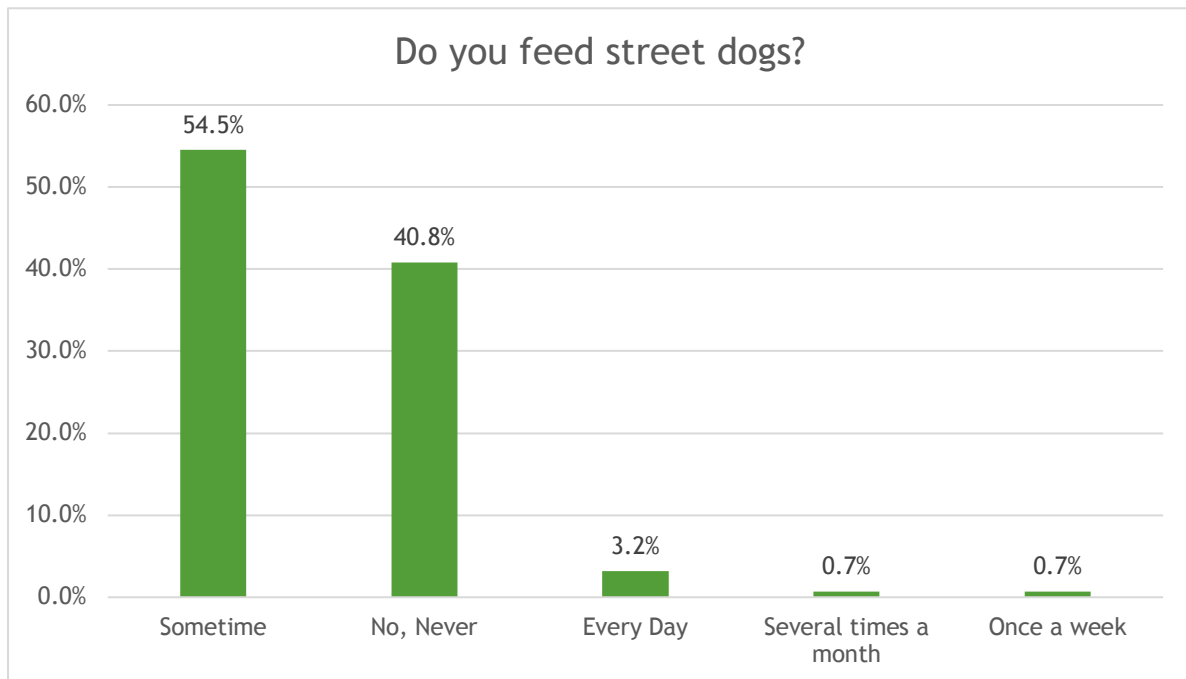


Positive interactions with street dogs

The questionnaire included several questions on the level of interaction and the care respondents devoted to street dogs.

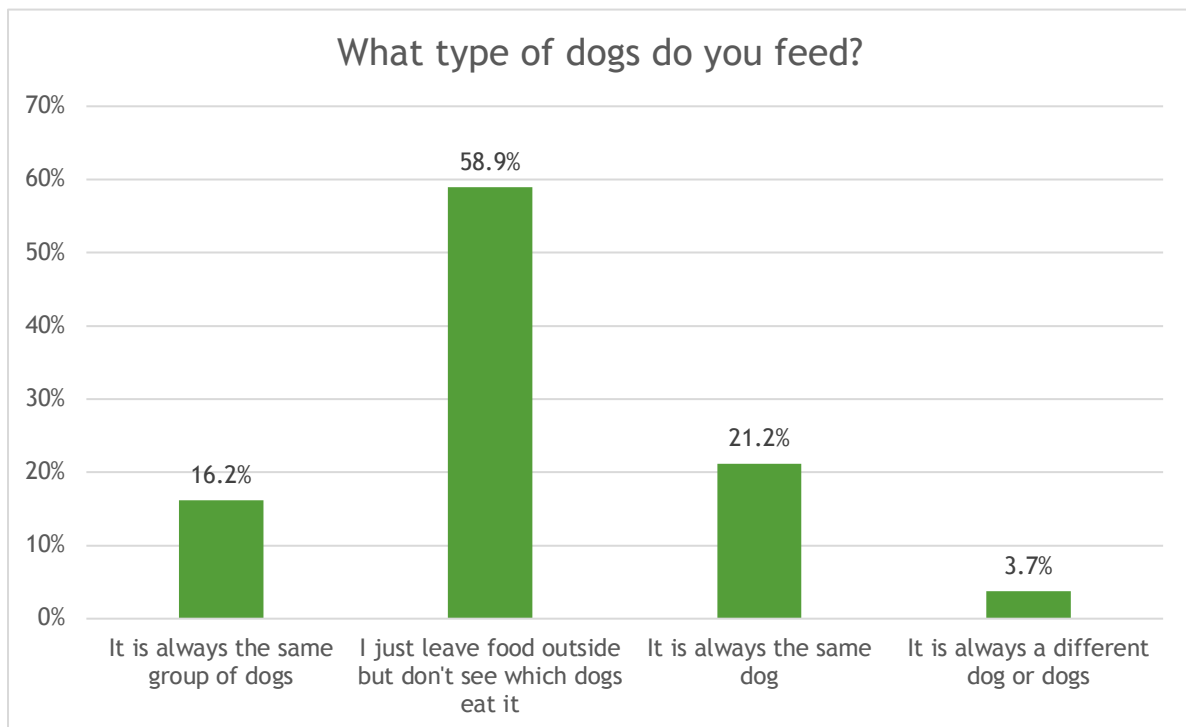
The majority of interviewees fed street dogs more or less frequently (3.2% - daily, 54.5% - sometime or more frequently) but 40.8% (166) never fed street dogs (Figure 4).

Figure 4: Proportion of respondents feeding street dogs



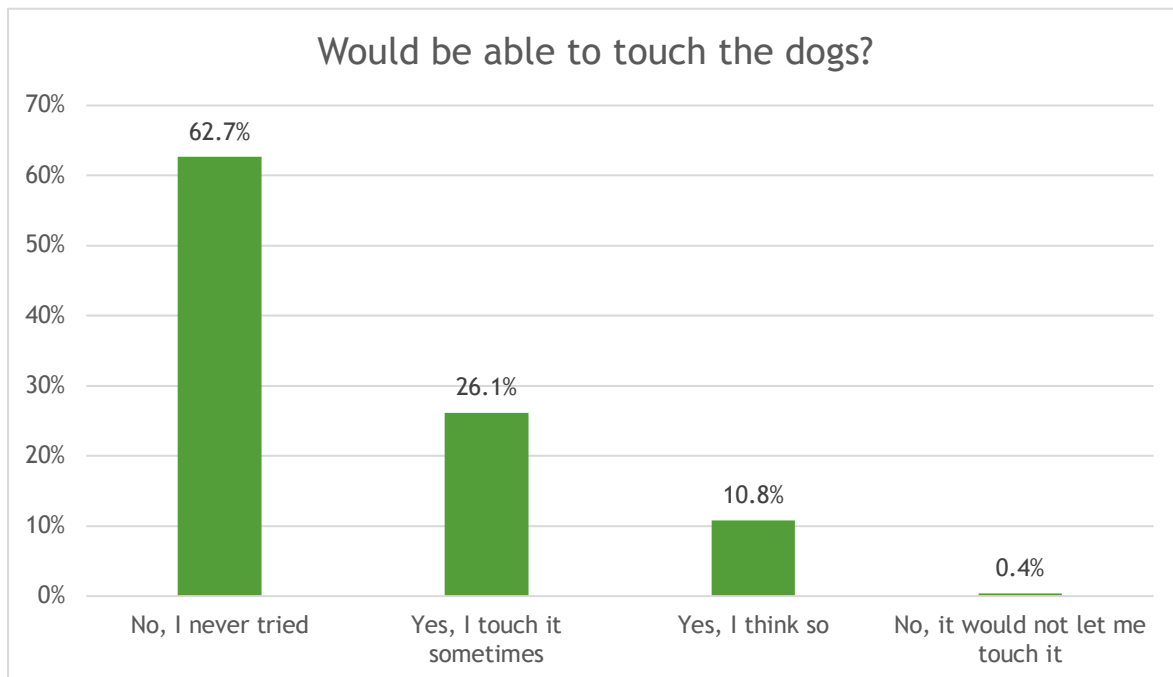
More than half (58.9%, 142) just left food outside for dogs to eat while 21.2% (51) fed specific groups of dogs and 16.2% (39) fed a particular dog (Figure 5).

Figure 5: What kind of dog or dogs are they?



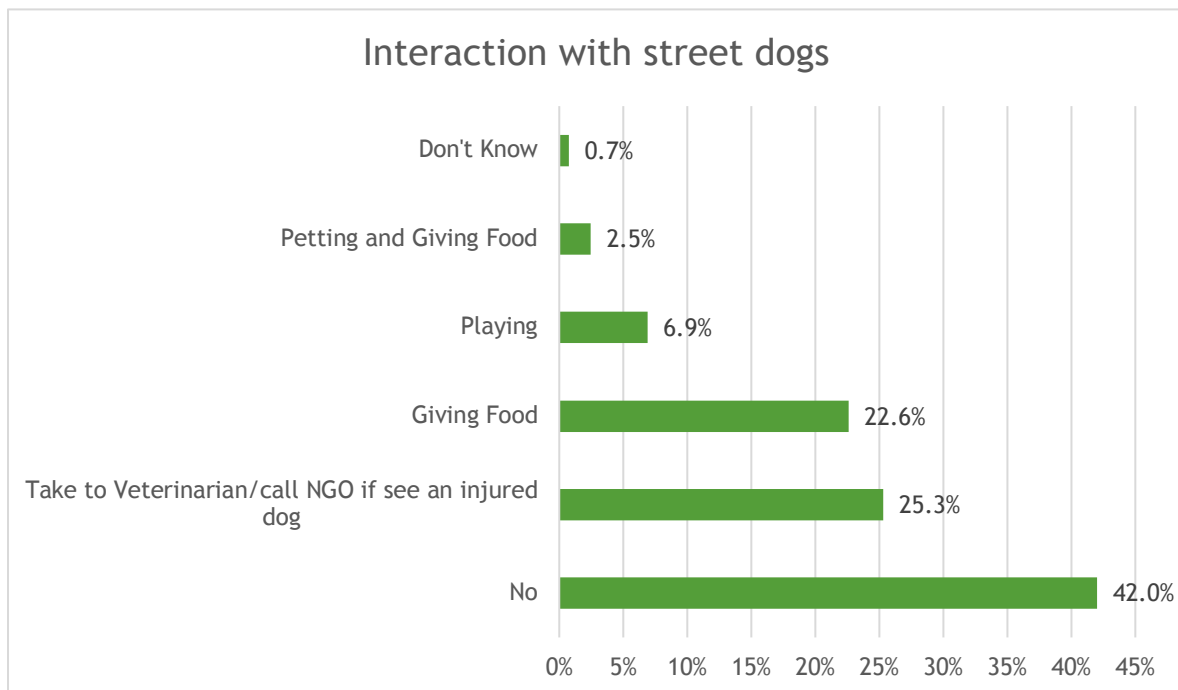
Dog feeders commonly reported that, beyond providing food, they do not touch or pet the dog (Figure 6). However, 26.1 % (63) reported that they sometimes touch the dog or dogs they feed, 10.8% (26) reported that they think they can touch the street dog and another 62.7% (151) think they never tried touch the dog.

Figure 6: Level of interaction



Survey interviewees were asked if s/he or other members of the household, including children, ever interacted with street dogs in any of the stated ways (Figure 7). The majority of the households had interacted with dogs in different ways, 22.6% (92) feed dogs on the street, 25.3% (103) take care of injured dogs by taking them to the vet or calling a NGO, 6.9% (28) reported that someone in their family plays with street dog and less than half (42%, 171) of the households did not interact at all with street dogs.

Figure 7: Do you, your children or other members of the household ever interact with street dogs in the following ways?

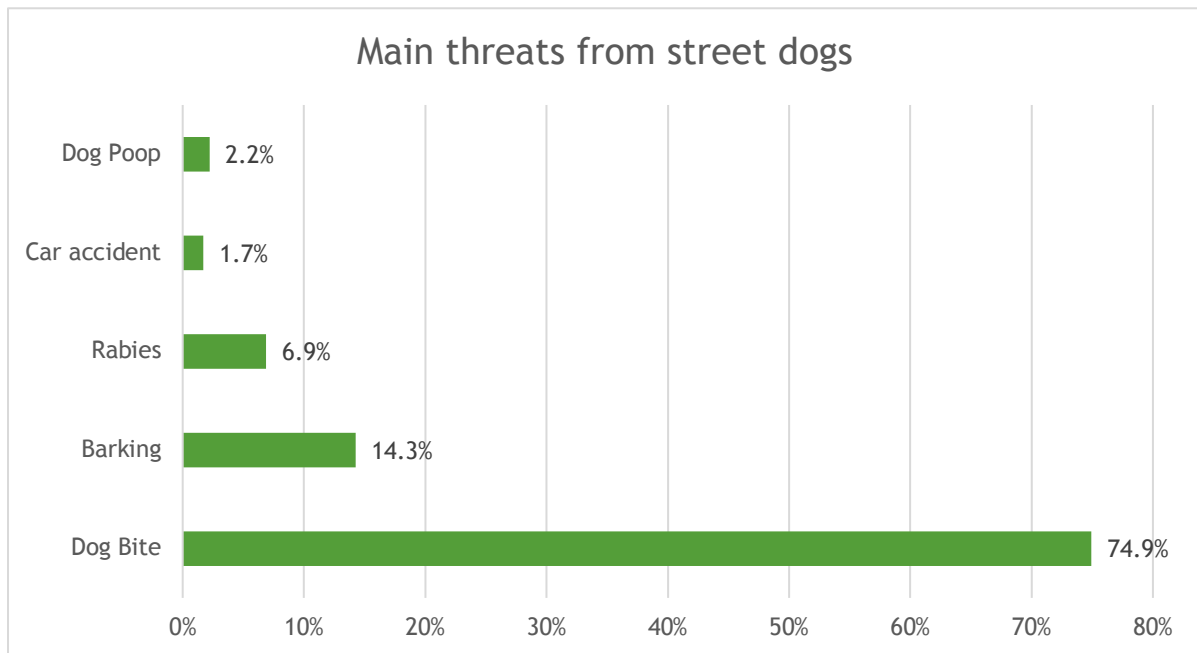


Negative interactions with street dogs

Majority of interviewees felt that they were threatened sometimes by street dogs (55.5%, 226) and 4.2 % (17) often felt threatened. However, 17.4% (71) rarely felt threatened, 22.6% (92) never felt threatened.

By far the most common concern in these circumstances, in which the interviewee felt threatened, was getting bitten by a street dog (74.9%, 305), followed by feeling threatened by barking or growling street dogs (14.3%, 58). Despite a real threat of contracting rabies only 6.9% reported that they are concerned about rabies when feeling threatened by a dog (Figure 8).

Figure 8: In these circumstances, what would you consider threatening or concerning about the street dogs?



Attitudes towards street dogs

To quantify attitudes of interviewees regarding street dogs and street dog management, the questionnaire included 6 Likert items with five answer options, from strongly agree, agree, don't know/neutral, disagree to strongly disagree. The results are summarized in figure 9 and table 8.

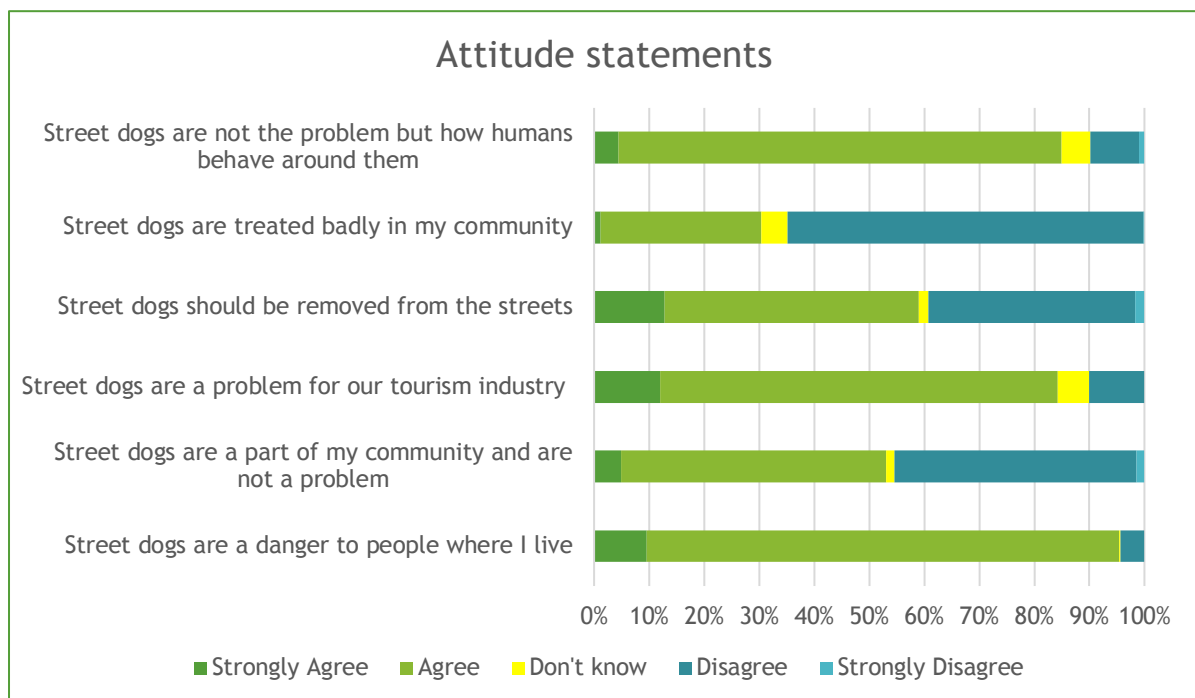
A composite mean attitude score can be calculated for each respondent by appointing numerical values to the answers to generate a mean score, however its usefulness is questionable on a number of issues including the assumption that there are equal differences between answer choices. We refrain from such analysis but compare the statements instead.

How answers were distributed for each statement as percentages can be found in table 8, which generally shows that most interviewees do not think that dogs are intrinsically the problem (statement 2 & 6). However, there seems to be a division among interviewees whether street dogs should be removed (12.8% Strongly agreed and 46.2% agreed that they should be removed) as well as whether dogs do pose a threat to the community (9.6% strongly agreed and 85.7% agreed that dogs are dangerous).

Table 8: Percentage of responses for each attitude statement (Note: Statement 1,3 and 4 are negative).

	1. Street dogs are a danger to people where I live	2. Street dogs are a part of my community and are not a problem	3. Street dogs are a problem for our tourism industry	4. Street dogs should be removed from the streets	5. Street dogs are treated badly in my community	6. Street dogs are not the problem but how humans behave around them
Strongly Agree	9.6%	4.9%	12.0%	12.8%	1.2%	4.4%
Agree	85.7%	48.2%	72.2%	46.2%	29.2%	80.6%
Disagree	4.4%	44.0%	10.1%	37.6%	64.6%	8.8%
Strongly Disagree	0.0%	1.5%	0.0%	1.7%	0.2%	1.0%
Don't know	0.2%	1.5%	5.7%	1.7%	4.7%	5.2%

Figure 9: Attitude statement responses colour coded for whether interviewees responded positively (strongly agree and agree) = green, neutral (I do not know) = yellow or negatively (disagree and strongly disagree) = blue, towards street dogs.



Discussion and Recommendations

Private ("owned") dog populations have long been ignored in discussions of street dog population management. First, there is a widely held assumption that there are relatively few

private dogs in India. Second, it is assumed that private dogs and street dogs are two separate non-interacting populations. As a result of several recent surveys in India, HSI now reports that dog demographic and KAP surveys show that not only should private and street dogs be considered as interacting communities (both are dependent on human behaviour, control and food/water provision), but also that the private dog population in Nainital is substantially higher with 2.8 fold more dogs than the estimated street dog population. However, both populations (lack of control of private dogs) potentially breed and contribute to the others community, especially in Nainital where 59.4% and 57% let their dogs free to roam during the day and at night, respectively. Further, the majority of private dogs were sourced/adopted from the street (51%).

This has multiple implications for sterilization and vaccination programs.

Private dogs need to be included in dog population management programs. They likely contribute to the street dog population because their litters are reared under relatively close human supervision and food provision and because a large number (about two-thirds) of them roam the streets with street dogs. The rate of abandonment of private dogs and pups from private dogs has not been determined but it is likely that street dogs are recruited from the private dog population.

The sterilization rate among private dogs in Nainital was somewhat high with 43% sterilized at the time of the survey, however 57% of the private dogs were still intact, after a year of the sterilization clinic in place. Also, willingness of owners to have their intact dogs sterilized was low. Street dogs benefited from the sterilization program in 2016 and a higher proportion of sterilized dogs was achieved. This survey, however, indicates that sterilization efforts should target both private and street dogs.

Confinement/control of private dogs is an important issue when dog management programs aim to reduce the number of roaming dogs and aim to control rabies. Campaigns need to be planned carefully to prevent secondary welfare issues both for public health and for dogs. For example, if confinement of dogs is promoted without proper guidance, it may lead to an increase in tethered dogs which would be an undesirable outcome (for both dog welfare and the bite risk for humans – tethering increases the bite risk).

Only 3.3% of the households reported experiencing a dog bite in the previous 12 months but dog bites are the number one concern among interviewees.

The attitude statements show that Nainital is a dog friendly place with a lot of people living in harmony with street dogs, regarding them as part of their community (53.1%) and also caring for street dogs (3.2% feed dogs daily and 54.5% sometimes). About 85% of interviewees realize that the behaviour towards dogs is the problem and not the dogs themselves, however 95.3% also believe that dogs are a danger to people where they live. This is a good reflection of the ambivalence of the situation in which people actively care for street dogs and acknowledge that the quality of the interaction with them is important but at the same time interviewees feel threatened by street dogs. It is recommended that responsible pet ownership campaigns should build on this relatively positive human-dog relationship through programs promoting the advantages of sterilization and vaccination, as well as promote rabies awareness and prevention.