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The Private and Free Roaming Street Dog Population in Coimbatore, Tamil Nadu, India

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HUMANE SOCIETY INTERNATIONAL

INDIA

SURVEY REPORT

THE PRIVATE AND FREE ROAMING STREET DOG POPULATION IN COIMBATORE, TAMIL NADU, INDIA July 2018

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Executive Summary

Humane Society International - India (HSI- India) together with Humane Animal Society (HAS) and a team of volunteers conducted two dog population surveys in 100 wards of Coimbatore, India (The 2011 census provides a human population of 1050721¹; An estimate from 2017 estimates a human population of 1890000²). The first was a street dog survey and the other was a household survey of the private (pet) dog population and their owners.

The survey generated an estimate of the street dog population of 46,292 dogs. Based on the 2011 census data this translates to 4.41 dogs per 100 humans or based on the 2017 estimate to 2.45 street dogs per 100 people; However regardless of the human population we found 8.87 street dogs per km and suggest to use this density for Coimbatore.

Results from the household survey suggest that 20% of households own at least one dog. Based on the 2011 census data we estimate a private dog population of approximately 82,023 private dogs, about twice as many private dogs as street dogs. However, the overlap of street and roaming private dogs is unknown and assuming that the entire dog population is the sum of both estimates would be incorrect. We suggest that monitoring surveys and clinical data combined will generate more accurate estimates over time. Sterilization rates were low in the private dog population with only 19% of dogs being sterilized, however the proportion of currently vaccinated dogs was significantly higher with 75% of private dogs being up-to date on anti-rabies vaccines.

¹ <http://www.censusindia.gov.in/pca/SearchDetails.aspx?Id=749391>

² <http://indiapopulation2017.in/population-of-coimbatore-2017.html>

Sterilization rates of street dogs vary from zone to zone and further between sub zones as well. The West zone and the Centre zone had the highest sterilization rates among all zones. We recorded 40.4 % sterilized dogs in West zone-1, 42.1 % sterilized dogs in West Zone-2, 48.6% sterilized dogs in Centre Zone-1 and 39.8 % sterilized dogs in Centre Zone-2.

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Background

Coimbatore also known as Kovai is a major city in the Indian state of Tamil Nadu (Image 1). It is the second largest city in the state after Chennai and the 16th largest urban agglomeration in India. It is administered by the Coimbatore Municipal Corporation and is the administrative capital of Coimbatore district. In July 2018 HSI-India together with Humane Animal Society (HAS) agreed to conduct two surveys to explore and quantify different communities of dogs in the dog population of Coimbatore, the street and private dogs. Methodologies and results of the surveys are presented in this report.

Image 1: Geographic location of Coimbatore, Tamil Nadu (Google Maps)



Survey Design and Methodology

HSI conducted two surveys in Coimbatore, India, a street dog survey and a household survey. The street dog survey covered all 100 wards of 5 zones, which were further divided into 10 sub-zones for convenient data collection.

Street survey objectives:

- Generate a reliable estimate of the relative and total dog population in Coimbatore
- Estimate the proportion of sterilized dogs in the street dog population in July 2018
- Assess street dog welfare by tracking body condition score and skin conditions as a proxy measure

Private dog survey (KAP) objectives:

- Generate an estimate of the private dog population
- Estimate sterilization and vaccination rates among privately owned dogs
- Assess the level of responsible dog ownership (in terms of confinement of the dog)
- Estimate the dog bite rate in Coimbatore

Street Dog Survey

To generate a dog abundance estimate (total dog population size) we created set routes, also called index or standard routes, in Google Maps along residential roads and highways but avoiding expressways (dogs tend to avoid these roads). Routes are marked with a starting (flag) and end point (police officer). For easy access, the routes are saved as KML files and stored in Google My Places, which can be accessed from smart phones (online and offline).

A survey team, consisting of a driver and an observer mounted on motorcycles, conducts the surveys early in the morning at dawn time. The observer uses both the Google Maps app and the OSM Tracker app on a mobile phone. OSM tracker is an application that enables the observer to record a dog sighting and relevant specifics about a dog (female, male or unknown adult, sterile/notched female or sterile/notched male, pup, lactating) as well as record welfare indicators such as skin problems and body condition scores (C1 to C5), which are saved together with GPS coordinates of the sighted dog. OSM Tracker produces a track record of all sighted dogs and their specifics along the route which was followed during the survey. The data is subsequently downloaded and stored in an Access database for analysis. The survey route was surveyed on two consecutive days, by the same survey team, to measure the accuracy and power to detect change.

Household survey

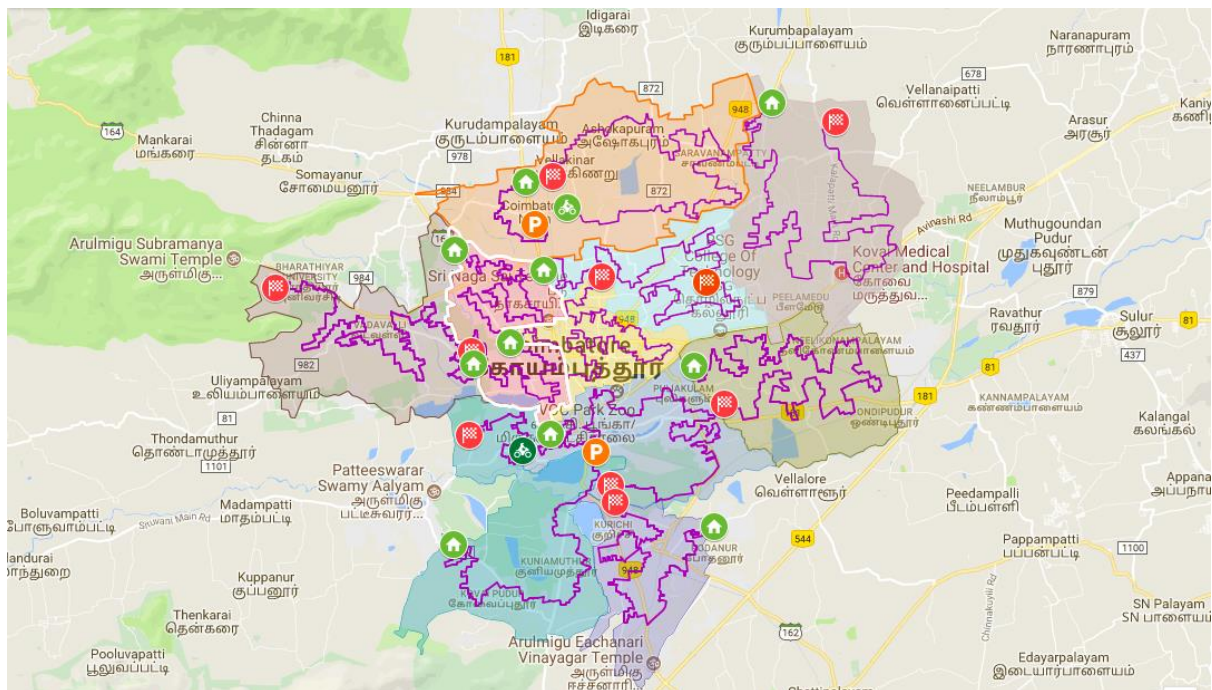
The survey was conducted using the smart phone app Epicollect5, which contained a prepared survey form for Coimbatore. Households were surveyed by a team of two trained surveyors and questionnaires were about 5-10 mins in length. Questionnaires included or excluded questions depending on whether the household owned a dog or not. The survey sample size was set at a minimum of 385 households to reach a 95% confidence level. Inclusion criteria for households were:

- Person 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 filled-out 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 by randomly selecting the first household in the sample population, which was set as the 20th household counted from the set routes starting point (marked by a flag and home symbol). To obtain a representative sample, households were selected randomly following a pattern of every 20th household, either by foot or on a motorbike. Systematic random sampling in comparison to simple random sampling is less susceptible to researcher error. To remain consistent throughout the survey either the left or the right side was chosen to be the survey side. In case nobody was available at the tenth household, the ninth or the eleventh household was interviewed.

Image 2: Map of Coimbatore including the survey routes (market with a flag and home symbol)



Results

Street dog survey

Based on HSI's long standing monitoring and evaluation surveys, we know that to an (yet undefined) extent dog densities depend on the human population and it's density. To estimate a dog-human ratio we need the most recent census data, however in Coimbatore

the last census was in 2011. The 2011 census provides a human population of 1050721³, however a website provides an estimate for 2017 of about 1890000⁴. We found 8.87 dogs per km street length in the Municipal corporation Coimbatore and estimate a total dog population of 49,292. Based on the 2011 census data this translates to 4.41 dogs per 100 humans or based on the 2017 estimate to 2.45 street dogs per 100 people. The difference is so significant that we suggest to refer to the dogs per street kilometer density, which is 8.87 street dogs per km.

Table 1 shows the count results, extrapolation to total dogs roaming the streets in the early morning and to total population by correcting for detectability. In the fourth column the average number of dogs counted over the one or two surveys conducted along each route is expressed as the number of dogs counted per km of street length. The dogs per km is multiplied by the total street length in column three to give the estimated number of dogs on all the streets in the ward group at the time of the surveys (column five). The final column estimates the total number of dogs that may roam at any time in each zone (the roaming dog abundance) by dividing the number in column five by the estimated probability of 0.46 that a dog that may roam at any time will be on the streets at the time of the surveys ("detectability"). The total roaming estimates summed over the 10 zones is 46,292.

Zone	Survey track length	Street Length for Zone	Dogs per KM street (Excluding Pups)	Dogs visible on the street (Before adding Detectability)	Total dog population
North Zone 1	28	256.9	12.46	3201.4	6960
North Zone 2	27.8	322.5	5.65	1822.3	3962
Center Zone 1	30	157.7	5.54	873.4	1899
Center Zone 2	26.6	200.0	8.35	1670.2	3631
West Zone 1	29.3	171.7	8.62	1479.7	3217
West Zone 2	28.2	146.0	10.14	1480.7	3219
South Zone 1	26.4	171.2	16.44	2815.2	6120
South Zone 2	28.8	218.5	12.64	2761.4	6003
East Zone 1	31	319.4	8.16	2606.6	5666
East Zone 2	31	366.4	7.05	2583.4	5616
Total	287.1	2330.4			46292

Table 1: Count results for all zones

³ <http://www.censusindia.gov.in/pca/SearchDetails.aspx?Id=749391>

⁴ <http://indiapopulation2017.in/population-of-coimbatore-2017.html>

Zone	Track length	Street length	% street coverage during the survey
North Zone 1	28	226.7	12.35
North Zone 2	27.8	83.25	33.39
Center Zone 1	30	310.9	9.65
Center Zone 2	26.6	433.4	6.14
West Zone 1	29.3	171.7	17.06
West Zone 2	28.2	146	19.32
South Zone 1	26.4	171.2	15.42
South Zone 2	28.8	218.5	13.18
East Zone 1	31	319.4	9.71
East Zone 2	31	366.4	8.46

Table 2: Street lengths and coverage of total street length for each zone

Zone Number	Survey Day and average	% Total Sterilized	% Sterilized Female	% Sterilized Male	Male:Female Ratio	% Pups	% Lactating	Dogs with Skin Problems	% Skin Problems	% C1/C2 Body score
East Zone 1	1	26.6	27.1	26.4	1.9 : 1	5.5	16.9	46	27.2	2.4
	2	28.1	26.3	29.5	1.3 : 1	9.7	18.4	30	17.5	1.8
	Average	27.4	26.7	27.8	1.5 : 1	7.5	17.8	38	22.3	2.1
East Zone 2	1	13.0	14.3	12.2	1.8 : 1	3.2	25.0	5	6.5	0.0
	2	5.6	0.0	8.7	1.8 : 1	3.9	38.5	4	5.6	1.4
	Average	9.4	7.4	10.5	1.8 : 1	3.5	31.5	4.5	6.0	0.7
West Zone 1	1	36.2	31.5	40.9	1 : 1	3.8	3.3	7	3.8	0.5
	2	44.6	32.5	53.2	1.4 : 1	0.4	6.5	4	2.2	0.0
	Average	40.4	32.0	47.0	1.2 : 1	2.1	4.7	5.5	3.0	0.3
West Zone 2	1	40.8	29.6	47.7	1.6 : 1	5.6	7.4	10	4.7	0.5
	2	43.5	34.1	49.6	1.5 : 1	5.6	6.6	6	2.6	0.4
	Average	42.1	31.8	48.7	1.6 : 1	5.6	7.0	8.0	3.6	0.5
Central Zone 1	1	46.9	44.1	50.0	0.9 : 1	4.1	8.8	18	13.8	0.0
	2	44.4	50.0	40.4	1.4 : 1	2.5	7.9	7	7.8	1.1
	3	54.1	55.9	51.9	0.9 : 1	3.1	15.3	4	3.6	0.0
	Average	48.6	49.7	47.6	1 : 1	3.3	10.9	5.5	5.0	0.5
Central Zone	1	39.3	36.4	41.9	1.1 : 1	2.5	7.3	10	8.5	0.9

2	2	40.3	39.7	40.7	1.2 : 1	1.6	5.9	15	10.1	0.7
	Average	39.8	38.2	41.3	1.2 : 1	2.0	6.5	12.5	9.4	0.8
North Zone 1	1	27.1	25.0	28.7	1.3 : 1	9.7	17.5	16	8.8	0.6
	2	23.0	21.8	23.8	1.3 : 1	5.2	12.8	14	7.7	0.0
	Average	25.0	23.4	26.2	1.3 : 1	7.4	15.2	15.0	8.2	0.3
North Zone 2	1	5.0	5.3	4.8	1.7 : 1	7.4	5.3	0	0	2.0
	2	4.2	0.0	6.7	1.7 : 1	9.9	11.1	1	1.0	0.0
	Average	4.6	2.7	5.7	1.7 : 1	8.7	8.1	0.5	0.5	1.0
South Zone 1	1	9.8	13.0	7.2	1.9 : 1	2.5	14.8	8	6.5	1.6
	2	16.7	14.3	18.3	1.3 : 1	1.4	19.6	3	2.2	0.7
	Average	13.4	13.6	13.2	1.5 : 1	1.9	17.3	5.5	4.2	1.1
South Zone 2	1	21.9	18.9	23.4	2.1 : 1	3.8	21.6	5	4.4	0.9
	2	8.6	8.1	8.9	1.5 : 1	7.3	19.4	5	3.3	0.7
	3	24.6	20.0	28.8	1.1 : 1	6.9	13.8	4	2.9	1.4
	Average	18.4	15.7	20.3	1.5 : 1	6.0	17.7	4.5	3.3	1.1
Coimbatore MC	Average	21.5	17.8	24.6	1.4 : 1	4.5	12.6	99.0	7.38	0.8

Table 3: composition of the dog population observed on the street

Monitoring and survey consistency

The route files provided with this report are a resource that can be used to monitor the population into the future. However for the results to be comparable, it is vital that the same search protocol and, if possible, the same observers are used on each track. On upload of the street counts to the database the driver and observer names and the timing and duration of each survey are recorded. The protocol used during the surveys was kept deliberately simple: all dogs seen from the motorcycle were recorded and those that could not be sexed without getting off the motorcycle to make the dog stand up were recorded as “Unknown adult”.

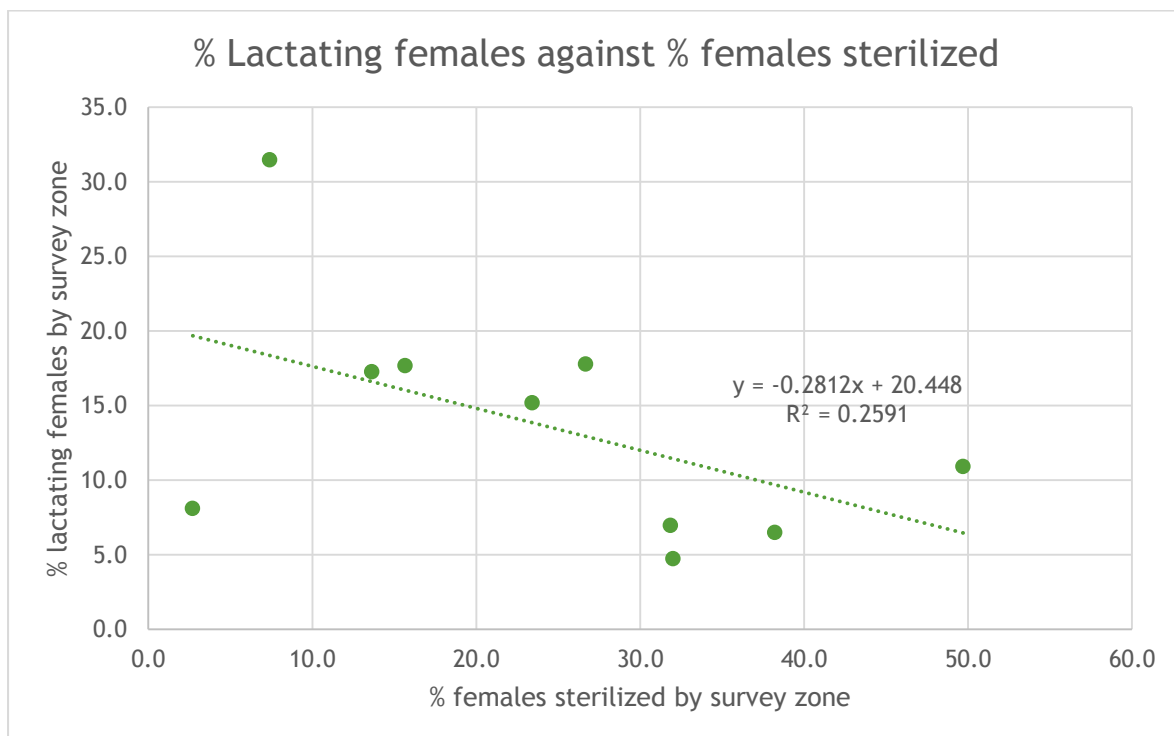
Table 4 illustrates the generally limited amount of variation in the remaining dog counts made on the replicated route surveys.

Zone Number	Date	Route Length	Total Count	Dogs counted per km
East Zone 1	25/05/2018	28	289	10.3
	26/05/2018	28	258	9.2
	Average	28	273.5	9.8
East Zone 2	25/05/2018	27.8	221	7.9
	26/05/2018	27.8	232	8.3
	Average	27.8	226.5	8.1
West Zone 1	28/05/2018	30	260	8.7
	29/05/2018	30	256	8.5
	Average	30	258.0	8.6
West Zone 2	30/05/2018	26.6	286	10.8
	31/05/2018	26.6	320	12.0
	Average	26.6	303.0	11.4
Central Zone 1	27/05/2018	29.3	194	6.6
	28/05/2018	29.3	162	5.5
	29/05/2018	29.3	160	5.5
	Average	29.3	172.0	5.9
Central Zone 2	26/05/2018	28.2	202	7.2
	27/05/2018	28.2	251	8.9
	Average	28.2	226.5	8.0
North Zone 1	24/05/2018	26.4	370	14.0
	25/05/2018	26.4	384	14.5
	Average	26.4	377	14.3

North Zone 2	26/05/2018	28.8	162	5.6
	27/05/2018	28.8	182	6.3
	Average	28.8	172	6.0
South Zone 1	27/05/2018	31	444	14.3
	28/05/2018	31	441	14.2
	Average	31	442.5	14.3
South Zone 2	30/05/2018	31	390	12.6
	31/05/2018	31	396	12.8
	01/06/2018	31	376	12.1
	Average	31	387.3	12.5

Table 4: Replicate route counts

Survey zones with higher sterilization rates of females showed a lower proportion of lactating females. Chart 1 summarizes the results in this regard for the ten survey zones.



Zone	Ward number fall in the sub-zone	Total number of wards
North Zone 1	18,19,20,21,25,26,27,28,29,30	10
North Zone 2	1,2,3,4,10,11,12,13,14,15	10
Center Zone 1	62,63,64,65,66,80,81,82,83,84	10
Center Zone 2	31,32,46,47,48,49,67,68,69,70	10
West Zone 1	17,33,34,42,43,44,45,71,72,73,74	11
West Zone 2	16,35,36,37,38,39,40,41,75	9
South Zone 1	85,94,95,96,97,98,99,100	8
South Zone 2	76,77,78,79,86,87,88,89,90,91,92,93	12
East Zone 1	50,51,52,53,54,55,56,57,58,59,60,61	12
East Zone 2	5,6,7,8,9,22,23,24	8

Table 5: Ward groups

Household Survey

We conducted a short household survey to estimate the private dog population as well as estimate the sterilization and vaccination coverage across Coimbatore. We spoke with 434 households of which 432 participated in our survey (99.5% responds rate). Eighty-seven (87) households owned 124 dogs, which translates to 1.42 dogs per dog owning household or 0.29 dogs per household. As per the 2011 census, there were 282,839 households in Coimbatore. Based on this we estimate a private dog population of approximately 82,023 private dogs, almost twice as many as street dogs. However, the overlap of street and roaming private dogs is unknown and assuming that the entire dog population is the sum of both estimates would be incorrect. We suggest that monitoring surveys and clinical data combined will generate more accurate estimates over time.

The participants were 56% female and 44% male. One fifth of all households (20%) owned a dog and the majority (79%) owned one dog (table 6). In line with what we have recorded in other cities in India, only 4% of the interviewees had experienced a dog bite in the last 12 months (table 7). And only about half of all dog bites were from street dogs, with 25% from their own dog and 19% by a neighbor's dog.

Housing type			Do you own a dog?			How many dogs do you own?		
Answer	Number	Percentage	Answer	Number	Percentage			
Apartment	75	17%	Yes	87	20%	1	69	79%
Detached House	189	44%	No	345	80%	2	12	14%
Semi-Detached House	168	39%				3	3	3%
						4	1	1%
						5	1	1%
						10	1	1%
Total	432	100%	Total	432	100%	Total	87	100%

Table 6: Housing types and dog ownership

Got bitten by a dog?			What dog type?		
Answer	Number	Percentage	Answer	Number	Percentage
Yes	16	4%	Unidentified strange dog	0	0%
No	416	96%	Unowned dog somewhere in Coimbatore	2	13%
			Own household dog	4	25%
			Unowned dog in the street I live in	7	44%
			Neighbour's dog	3	19%
Total	432	100%	Total	16	100%

Table 7: Dog bites in the last 12 months and by what dog

Care provided to private dogs in Coimbatore

In general dog owners in Coimbatore appear to be aware of anti rabies vaccinations and it's importance, with 75% of owners stating that their dog was vaccinated in the last 12 months, however almost half (48.4%, 15) of the owners with unvaccinated dogs said that they did not have time to vaccinate their dog and another 22.6% (7) do not think it is necessary (table 8). In Coimbatore and any other anti-rabies program, emphasize should be given to behavioral change in dog owners, specifically making vaccinations a priority in the minds of dog owners and communities.

Sterilization rates were very low among private dogs with only 19% (24) of the dogs being sterilized. When owners were asked why they had not sterilized their dogs the most common answer was that it is not necessary (51%, 51) followed by the answer that the owner did not know why s/he had not done it yet (17%, 17). Both leave a lot of room for campaigns to increase the sterilization rate among private dogs (table 9).

Table 11 summarizes the results of the question whether the owned dog was able to roam the streets at any given time during a 24 hour. The level of confinement varied but appears to not differ between times of the day (night vs. day time). Most owners responded that they never let their dogs roam in a 24 hour period (76.6%, 95), however almost a third allows their dogs

to roam the streets, either sometimes (13.7%, 17) or mostly (9.7%, 12).

Vaccination status			Why not?		
Answer	Number	Percentage	Answer	Number	Percentage
Yes	93	75%	Was vaccinated once	2	6.5%
No	30	24%	Too expensive/I don't have the money	1	3.2%
I don't know	1	1%	Other	2	6.5%
			I don't know	4	12.9%
			I don't have time	15	48.4%
			Not necessary	7	22.6%
Total	124	100%	Total	39	100%

Table 8: Was the dog vaccinated in the last 12 months

Sterilization status			Why not?		
Answer	Number	Percentage	Answer	Number	Percentage
Yes	24	19%	Too expensive/I don't have the money	2	2%
No	98	79%	I don't have time	14	14%
Don't Know	2	2%	I want to have puppies	15	15%
			Not necessary	51	51%
			I don't know	17	17%
			Too dangerous for the dogs	1	1%
Total	124	100%	Total	110	100%

Table 9: Is the dog sterilized?

Confinement		
Answer	Number	Percentage
Yes, Mostly	12	9.7%
No, Never	95	76.6%
Sometimes	17	13.7%
I don't know	0	0.0%
During the night only	0	0.0%
During the day only	0	0.0%
Total	124	100%

Table 10: Is your dog able to roam on the street/s at any time during a 24 hour day?

Discussion

The private dog population in Coimbatore is in general well attended to in terms of anti-rabies vaccinations, however responsible dog ownership could still be increased in terms of vaccinations, sterilizations and confinement of dogs. Dog bite rates were similar to other places in India and do not give reason to believe that the human-dog relationship is in any way negative in Coimbatore.

Street dog surveys show that dogs in Coimbatore are relatively healthy in terms of body conditions, however skin issues are a wide spread issue, particularly in East Zone 1 with a much higher percentage of skin issues (22.3%) compared to other areas within Coimbatore (on average 7.38% had skin issues in the MC Coimbatore area) and HSI program areas.

Sterilization rates were overall low but the Central Zones 1 and 2 (48.6% and 39.8% respectively) as well as the West Zones 1 and 2 (40.4% and 42.1% respectively) showed significantly higher sterilization rates. Humane Animal Society has focused their sterilization efforts on the West zone, however the survey results suggest that the sterilization efforts are in fact spread over all the zones in the city with varying sterilization rates ranging from very low to high.