

Relationship Between Factors of Behavior and ¹Length of Stay in Dogs Housed in A No Kill Animal Shelter.

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Source: J.W (student)

Introduction

Millions of dogs are admitted into United States animal shelters each year (American Society for the Prevention of Cruelty to Animals [ASPCA], 2012). Sixty percent of these dogs are euthanized, fifteen to twenty percent are returned to caregivers, and the remaining dogs are adopted into new homes (ASPCA, 2012). The “No Kill” movement in the United States presents a new and growing humane effort to end the practice of euthanasia for purposes of space restraint, presenting a new model of animal shelter operation (Winograd, 2009). No-kill shelters, defined as shelters euthanizing only for reasons of critical health or behavior issues, differ from “traditional” shelter policy which euthanize animals because of space limitations in addition to other reasons (Brown, Davidson, & Zuefle, 2013). No-kill are less common in the United States than traditional shelters, and despite only emerging as a movement in the 1990’s the prevalence of the no kill movement is attributed to the massive decline in shelter animals euthanized each year (Brown, Davidson, & Zuefle, 2013; Winograd, 2009). Once admitted to a no kill shelter, animals could remain for extended periods of time until they are adopted and the average length of stay is greater than that of traditional shelters (Brown, Davidson, & Zuefle, 2013). This study examines the connection between the length of time dogs are exposed to the shelter environment to the animals’ displayed behavior. This research is the investigation of the observed phenomenon by a Southern California no-kill animal shelter in which dogs broadly display increasingly reactive behavior toward other dogs, shelter visitors, and or shelter animal caregivers as their duration of stay increases. The appearance of this phenomenon is cause for concern for the mental health and wellbeing of dogs subject to longer lengths of stay like that seen in no kill shelters.

Literature Review

In a review of academic sources, a paper co-authored by researchers Jacqueline Stephen and Rebecca Ledger finds that “prolonged exposure to kennels may prevent a dog from engaging in species specific behaviors (interactions with people and other dogs) that promote well being and may result in experiencing frustration in the longterm” (Stephen, & ledger, 2005). Similar studies find evidence of stress, a biological response to change in environment as a major component of shelter dog reaction to the kennel environment. Stress implies the presence of “threat to which the body needs to adjust”(Part et al. 2014;7:55-57) which results in behavioral and physiological changes (Part et al.2014). The Admittance of a dog to an animal shelter has been found to cause an immediate increase to the animals levels of cortisol (a glucocorticoid hormone released in response to stress) and increased rates of stress indicating behavior (Hennessy et al.1997). These behavior changes often lead to increased reactivity of shelter dogs to stimulation from their environment (Part et al. 2014). This increase in reactivity is seen through a prevalence of undesirable behavior such as such as barking, hiding or lunging at the kennel door upon being approached, snarling, or growling (Part et al.2014) (Hennessy et al.1997).

In the a foundational study led by Dr.Michel B. Hennessy which found that exposure to the shelter environment causes stress, the study also found that levels of blood corsitorol in dogs return to a constant baseline on average after three days in the shelter (Hennessy et al.,1997). The Hennessy study’s the longest observation lasted 38 days and was included in a more general statistic for dogs which spent more than ten days in the environment (Hennessy et al. 1997). Previous investigations into the effect of the shelter environment on dogs that have included

additional analysis on more prolonged exposure appear to contradict the observed phenomenon which initiated this study. The decrease in hormone levels was explained to be the adjusted response to a stressful environment from the animals' HPA-axis (a system responding to stress involving the interactions of the Hypothalamus, Pituitary gland, and Adrenal gland), as investigated by both Hennessy's 1997 paper and a review by prominent animal behavioral psychologist and researcher Alexandra Protopopova. In Protopopova's study highlights a complication in interpreting cortisol is the difference between acute and chronic stress response, acute response being evidenced by a spike in cortisol levels before returning to basal levels, similar to what Hennessy describes in his study, while chronic response is more complicated, involving an immunological suppression and dysregulation of the HPA-axis in the form of an initial heightened level of cortisol followed by hypocortisolism in which levels remain low even when under stress (Protopopova 2016; Hennessy et al 1997). Because of the complication described in the Protopopova paper, results from cortisol based evaluations of stress are less reliable for animals which have been in the kennel environment for extended periods of time, such as those looked at in this study due to difficulty determining whether cortisol levels are low due to an absence of stress, of the animal become adjusted, or the animal's HPA-axis is entering this described state of "exhaustion" (Protopopova 2016). As discussed both in the Hennessy study and the Protopopova review this deregularization of the stress response system in animals is linked to the development of a number of psychological and physiological disorders, as such this suppression of the HPA-axis is a likely factor in behavioral developments in dogs exposed to the stressors of the shelter system for extended periods of time.

Uncertainties of cortisol based test for the reason of HPA-axis deregularization has led since to the appearance of behavior based tests to reflect stress in dogs (Part et al., 2014). Such tests are based on observations of behavior displayed by dogs in a kennel compared to behavior typically displayed when a dog is under-stress, this is the procedure used in this study (Arhant & Troxler, 2014). This method of behavioral observation has been chosen for the purpose of this study as a more relevant and available method of measurement of animal stress and its effects.

Further studies have found correlation in behavior to length of stay show in research by Dr. Protopopova into the behavior of a shelter dog has on length of stay in the shelter, which found that responsive (approaching the front of the kennel without reactive aggressiveness) behavior from a dog is preferred by adopters to reactive behavior (trying to create distance by ways such as growling, lunging at kennel door, or hiding from human approach) in the sampled florida traditional shelter, showing that dogs which in general displayed responsive behavior had shorter stays while more reactive dogs would be in the kennel longer (Protopopova et al. 2014). A study by Stephen and Ledger found that the dogs were found to spend more time hiding out of view and were less responsive to external social stimuli with time spent at the shelter, showing a link between longer time spent in the shelter to a display of undesirable behaviors (Stephen & Ledger, 2005). The importance of research into the adoption preferences of shelter visitors to this study is that it highlights impact negative behavioral development may have on dog welfare, as that the findings that longer length of stay leads to development of behavioral issues which then, as shown in the above research, leads to longer length of stay.

The Stressors which contribute to a shelter dog's heightened cortisol levels are derived from a variety of factors, present on the kennel environment. As predicted by the Hennessy

study, such factors include social isolation in the case of domestic dogs becoming impounded to a shelter, separation anxiety from previous owners or companions of an animal prior to impoundment, as well as new, exciting stimulus from not only a dog's new physical surroundings, but also exposure to new animals, unfamiliar noise, and the disruption of familiar routines through the schedule a shelter subjects an animal to (Hennessy et al. 1997). The prevalence of these factors in shelters are linked to poor welfare (Kiddie et al 2015) and has such poor welfare is found to lead to behavioral changes reflecting stress (Protopopova 2016). The noise typical in kennels housing large dogs is observed to regularly exceed 100 dB and the noise level OSHA regulation for workers (Coppola et al. 2006). The effect of noise on shelter dog welfare was investigated also in a study by Sales et al., both of these noise related studies finding that, though not all stress-induced elevations in cortisol are due to noise levels, they are a contributing factor. Smell, another cited factor in the Hennessy study is shown to have an effect on animal behavior in a study by Graham et al. the study uses smell as enrichment and elimination of typical shelter order and observes an increase of calm behavior to dogs subject to smells of herbs or fragrances as opposed to normal shelter smell (Graham et al. 2005). Other factors which may contribute to behavioral changes in dogs at the animal shelter is the use of sterilization in impounded dogs, a study by Dr. Duffy found that dogs which are spayed or neutered in the kennel display more dog directed aggression or fear ($N=672 > N=247$), more barking ($n=373/695 > n=298/373$), and more non social fear ($n=709/603 > n=267/328$) than non neutered dogs as according to the Mann-Whitney U Canine Behavioral Assessment and Research Questionnaire (Duffy & Serpell 2006).

Past studies are often conducted on samples with relatively short period of exposure to the kennel environment (Arhant & Troxler 2014). This study seeks to fill that gap by including

subjects across a very long range of length of stay. The difference in average length of stay between kill and no-kill shelters was analyzed in a study by Brown, looking into the effects of phenotypic characteristics on a dog's length of stay at no-kill animal shelters. Brown found that the length of stay of dogs in no kill shelters averaged nearly 8 times as long compared to the length of stay of dogs in traditional shelters (Brown, Davidson, & Zuefle 2013). The results of the Brown study highlight an additional insight this research may reflect, with the longer length of stay associated with no-kill shelters there is special reason to investigate the effects this longer length of stay may have on these animals, giving added relevance to this study investigating the effect length of time spent in a shelter has on the development of antisocial or reactive behavior in dogs at a no-kill shelter. Foundational texts also report a lack of information regarding the onset of behavior relating to poor welfare in dogs housed in shelters for more than two weeks, behavior and stress being used as primary indicators of welfare (Stephen, & Ledger, 2005). Therefore, this study seeks to address the gaps of knowledge in stress and behavior displayed in dogs exposed to the shelter environment for in many cases multiple years and is distinct from other studies by its population of charity run non-kill shelter.

Methods and Material

The purpose of this study is to investigate the correlation between length of stay to behavior of dogs impounded in no kill animal shelters. Factors of behavioral response, Time since admitted, sex, bite history, returns, age, anxiety medication prescription, and response to approach were used in comparisons and determined to be either influencing factors or alternative indicators of length of stay and behavior. The determination of these factors as relevant to the purpose of this study was informed by preliminary research or recommended for the study as

relevant factors to investigate by the shelter's own dog behavior specialists who acted as consultative experts for this study (Brown, 2013; Clevenger & Kass, 2003; Duffy & Serpell, 2006; Protopopova et al. 2014; Flannigan, Gerrard, & Dodman, 2001). The approach response factor used in this study was gathered by use of an adapted method of the Arhant and Troxler study in order to catalogue displayed behavior using an established method (Arhant & Troxler 2014). The collected data for each subject is provided in this paper as appendix 1-3.

Sample

This study was conducted at a no-kill animal shelter in suburban Los Angeles California. The target population of this study were dogs in American animal shelters exposed to typical shelter stressors for extended amounts of time (Arhant & Troxler, 2014). No-kill shelters were chosen as the sample due to the longer time of exposure to the shelter environment that a dog may experience.

The sample shelter has the capacity for 120 medium to large breed dogs on the main adoption floor. The adoption floor of the shelter was contained in the building's courtyard and was organized in a line block design (see fig 2) which limited visual, but not auditory, stimulation from other shelter dogs. All kennels used in this study were comprised of an outdoor area, (8 ft 9 in long x 4ft 1in wide and 7ft 1in in height) and a back indoor "cubby" (4ft long x 3ft in height) separated by a steel guillotine door in cement wall. The kennels had cement sidewall with a



Figure 1. Kennel. Source: J.W (student)

heavy metal cage door (see fig 3). The standard furnishings for each kennel includes a material dog bed or blanket in the back cubby and a drinking fountain located in the front area of the kennel as shown here in figure 1.

The entirety of the sample shelter’s population of dogs available for adoption on the main adoption floor was used for the purposes of this study. Use of the only the main floor excludes the shelter “small dogs” designated by the shelter to be any dog under 25 pounds, this exclusion was done purposely to avoid the possible confounding variables that come from small dogs different living conditions, as they are disproportionately enriched compared to those of larger dogs and small dog kennels are shaped and cared for differently, and most often house multiple dogs while larger breed kennels house typically just one dog.

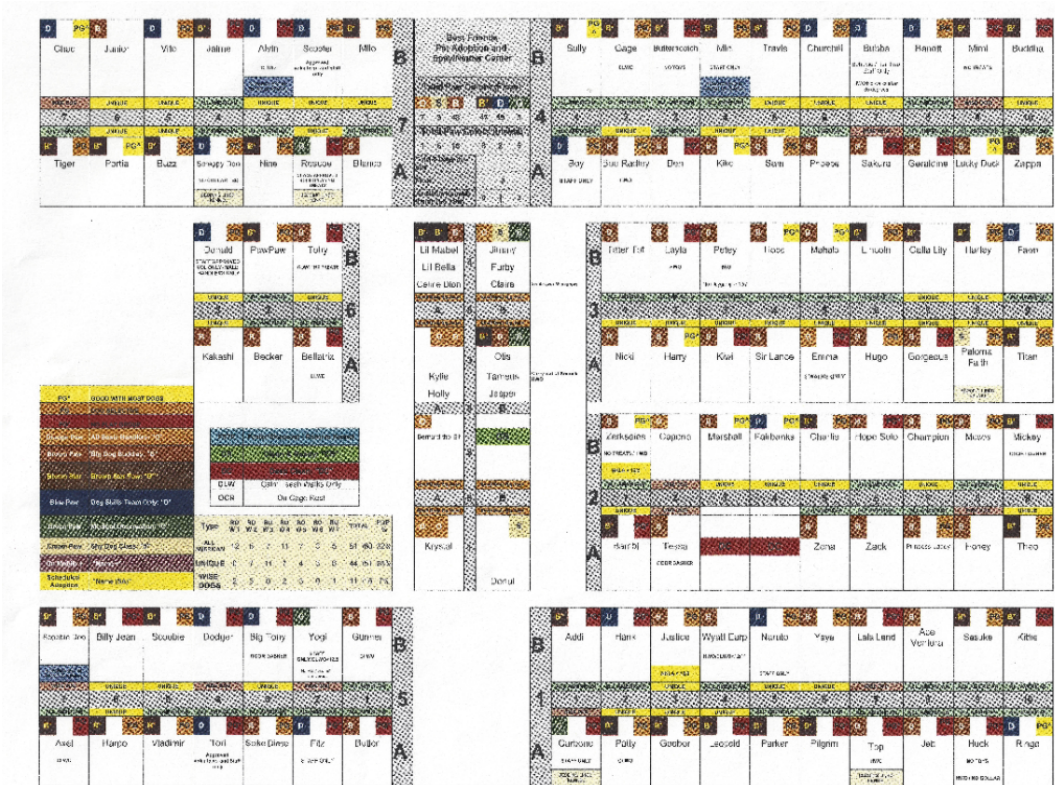


Figure 2. Shelter Layout. Source: Best Friends Animal Society. The layout of the shelter, shown here is comprised of rows of individual kennels with a public walkway and viewing area in front of the kennels and a staff only alley which ran between the back cubbies of each numbered kennel block. The central two columns of eight kennels between blocks 6 and 3 is the elevated small dog “island” which was not included in this study.

The large dog population of the shelter's main floor is sorted into three groups by the shelter: "All American" (dogs which phenotypically appear as predominantly pitbull), "Wise Dogs" (dogs eight years old or older), and "Unique" (all other dogs which do not fall into the previous two categories). The intended capacities of these three groups are 47.3%, 12.6%, and 40.1%, respectively.

Approach test

Dog behavior was measured using an approach based response test from the Arhant and Troxler study in which an assistant tester approaches the gate to each subject's kennel and presents the back of their hand in order to elicit a response from the dog.

Procedures as set by the Arhant and Troxler study were put into place to minimise any variation from the tester. The tester would calmly walk along the corridor and approached the closed kennel door of the subject maintaining a distance of approximately 1 ½ feet from the kennel door. They then raise their extended arm towards the kennel until the back of the hand is just few inches away from the kennel door, presenting it to the subject. The experimenter presented her hand to for five seconds, following the procedure from the Arhant and Trexler 2014 study. Eye contact, or otherwise provoking the dog was avoided during the entire test. The assistant of each sample had had no previous interaction with any of the shelter animals in order to eliminate any chance of bias response. An example of this procedure is seen in figure 3.



Figure 3. Demonstration of approach test. Source: J.W (student).
The approach based test being performed on the dog “Tori” who’s reaction is non-responsive. The front of each kennel is a large iron mesh gate through which full visibility is maintained. The gutter at the feet of the tester marked a line from which distance of 1 ½ feet was maintained for each kennel.

This procedure was performed three times each gathering a full census of the shelter floor, the time of each recording was between the hours of 3 to 5pm on the days 12/2/17, 12/20/17, and 2/24/18. Dogs which were asleep or unavailable to the adoption floor were marked as such and their observations were excluded from the measurements of the approach test’s findings. For dogs which were available, their response to the approach test was recorded as one of the following:



Non Responsive

Dogs that ignored the experimenter, avoiding looking at, moving toward or otherwise acknowledging the person's' presence, were categorized “Non-Responsive”. The response category of dogs is a break away from the aligned Arhant and Troxler method which grouped reactive and non responsive behavior under the broader “non operative” category.

Figure 4 “Non-Responsive” response.
Source: J.W (student).

Responsive



Figure 5 “Responsive” response.
Source: J.W (student).

A dog was categorized as “responsive” if the dog approached and explored the experimenter. Frequently observed reactions were a dog approaching and stopping at the kennel door or some distance short of the door and sniffing in the direction of the experimenter or jumping up the kennel door and trying to lick the hand. Dogs that approached and explored by sniffing but barked or growled intermittently were included in the category

“Responsive”.

Reactive



Figure 6 “Reactive” response.
Source: J.W (student).

Finally dogs which displayed behaviours that were intended to increase the distance to the experimenter such as attacks, hiding or uninterrupted barking or growling at the experimenter were classified as “Reactive”.

Additional Data Gathering

Other factors which influence or indicate dog’s length of stay or behavior were gathered using recorded data sourced from the sample shelter’s own database of admitted dogs on an online commercially available shelter management system “Petpoint”. After each sample was taken a map of the shelter was recorded including all the names and identifiers of all dogs on the shelter floor, using this catalogue the records for each dog present that day were found in the database and relevant information was recorded with the dogs name and kennel number for each sample (See Appendix 1-3). These factors were recorded for each dog regardless of whether they

were available for the approach test or not and used to compare between themselves, though such data is ignored when comparing factors to the results of the approach test. Factors recorded this way are as follows:

Length of stay- The length of stay was determined by the difference from the day a dog was admitted into the shelter to the day the observation took place. This data was broken into groups of increasing durations which are used to illustrate the distribution of stay duration. This factor is divided into binary groups for simplified comparisons between similarly binary grouping of other factors, in the case of length of stay these two groups are more than one year and less than one year.

Number of returns - This factor is the sum of each subjects recorded returns after adoption by shelter patrons. The gathered data for subjects regarding returns was then simplified into binary groups for comparison with other factors, here these groups were “has been returned” and “has not been returned”.

Sex- The gender of each dog was recorded for record of comparison to behavior and average length of stay to identify possible correlation gender between behavior or duration of stay. The policy of the sample shelter dictates that all dogs be sterilized before made available to adoption, as such all recorded males have been neutered while all females have been spayed. This data was sorted into the binary categories of “male” and “female” for comparison to other factors.

Age- The age of each animal is estimated by the shelter itself however is found to be rarely kept up to date. In order to more accurately represent the age of each subject the difference between

the day of the observation and the subject's estimated birthday (information listed on the dog's pet point record) is calculated and recorded in days and in years. The range of recorded ages were split into broad binary groups split between the estimated mean of the shelter dogs' age, 5. These dogs "younger than 5" and "older than 5" were then compared with other factors to determine correlation.

Bite history- The bite history of each dog is a recorded factor kept by the shelter database which lists whether or not a dog had bitten someone in the past. The shelter policy is defined that a "bite" is any event in which a dog's teeth break the skin of a person. A dog biting a human results in immediate confinement of the animal for one week in a solitary kennel in the interior of the shelter building. Bite history represents an obvious alternative indication of behavioral issues in dogs and was compared to the results of other factors as "has bitten" or "has not bitten".

Use of anxiety medication- The shelter database allows access into the medical records of each dog sampled, using this each subject's medical records were checked for prescription to one of the forms of anxiety or mood controlling medications used by the shelter. These medications include Gabapentin, a painkiller used to moderate anxiety in dogs, Trazodone, a medication used in treatment of anxiety or behavioral disorders, Hydroxyzine, an antihistamine used in the treatment of anxiety, and Fluoxetine, a selective serotonin reuptake inhibiting antidepressant used to treat separation anxiety and obsessive compulsive behaviors in dogs. The gathered data of this factor were broken into the broad binary groups "on medication" and "not on medication" to be used in comparison to other factors.

Findings & Analysis

Comparison by Approach response

The purpose of this study was to investigate the observed phenomenon of lengthy duration of stay in the shelter environment leading to the development of behavioral issues in a non-kill shelter. The three observation samples' results to the approach test were each compared between each samplings respective subjects and each subjects involved factors of length of stay in the shelter as more or less than one year, whether or not the subject had ever bitten a person, whether or not the subject was on anxiety medication, the gender of the subject, whether or not the subject had been returned, and the age of the subject as older or younger than five years. The tables below show of the results of each of the three observation samples with each response group broken into the results of each of the binary factor groups, and lastly a chart with the average results of the three observations.

Factor	Observation 1		
Time in Shelter	Non	Rea	Resp
One year or less	76%	38%	53%
more than 1 year	24%	63%	47%
n=	21	8	62
Bitten	Non	Rea	Resp
Yes	19.05%	62.50%	38.71%
No	80.95%	37.50%	61.29%
n=	21	8	62
Medication (n=	Non	Rea	Resp
Yes	71.43%	75.00%	67.74%
No	28.57%	25.00%	32.26%
n=	21	8	62
Gender	Non	Rea	Resp
Female	19.05%	25.00%	32.26%
Male	80.95%	75.00%	67.74%
n=	21	8	62
Returned	Non	Rea	Resp
Yes	38.10%	50.00%	59.68%
No	61.90%	50.00%	40.32%
n=	21	8	62
Age	Non	Rea	Resp
Younger than 5	57.14%	37.50%	48.39%
Older than 5	42.86%	62.50%	51.61%
n=	21	8	62

Factor	Observation 2		
Time in Shelter	Non	Rea	Resp
One year or less	53%	44%	60%
more than 1 year	47%	56%	40%
n=	30	16	42
Bitten	Non	Rea	Resp
Yes	40.00%	43.75%	33.33%
No	60.00%	56.25%	66.67%
n=	30	16	42
Medication (n=	Non	Rea	Resp
Yes	36.67%	31.25%	71.43%
No	63.33%	68.75%	28.57%
n=	30	16	42
Gender	Non	Rea	Resp
Female	33.33%	37.50%	38.10%
Male	66.67%	62.50%	61.90%
n=	30	16	42
Returned	Non	Rea	Resp
Yes	43.33%	75.00%	47.62%
No	56.67%	25.00%	52.38%
n=	30	16	42
Age	Non	Rea	Resp
Younger than 5	43.33%	68.75%	33.33%
Older than 5	56.67%	31.25%	66.67%
n=	30	16	42

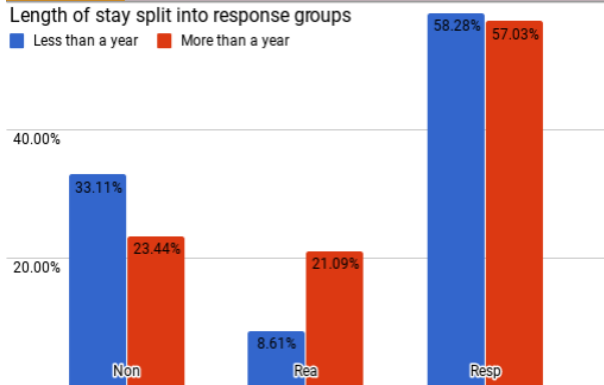
Factor	Observation 3		
Time in Shelter	Non	Rea	Res
One year or less	61%	21%	54%
more than 1 year	39%	79%	46%
n=	29	14	57
Bitten	Non	Rea	Resp
Yes	27.59%	64.29%	40.35%
No	72.41%	35.71%	59.65%
n=	29	14	57
Medication (n=	Non	Rea	Resp
Yes	24.14%	28.57%	29.82%
No	75.86%	71.43%	70.18%
n=	29	14	57
Gender	Non	Rea	Resp
Female	34.48%	21.43%	31.58%
Male	65.52%	78.57%	68.42%
n=	29	14	57
Returned	Non	Rea	Resp
Yes	48.28%	42.86%	47.37%
No	51.72%	57.14%	52.63%
n=	29	14	57
Age	Non	Rea	Resp
Younger than 5	48.28%	28.57%	42.11%
Older than 5	51.72%	71.43%	57.89%
n=	29	14	57

Factor	Average of all observations		
Time in Shelter	Non	Rea	Resp
One year or less	63.35%	34.39%	55.37%
more than 1 year	36.65%	65.94%	44.63%
n=	26.67	12.67	53.67
Bitten	Non	Rea	Resp
Yes	28.88%	56.85%	37.46%
No	71.12%	43.15%	62.54%
n=	26.67	12.67	53.67
Medication (n=	Non	Rea	Resp
Yes	44.08%	44.94%	56.33%
No	55.92%	55.06%	43.67%
n=	26.67	12.67	53.67
Gender	Non	Rea	Resp
Female	28.95%	27.98%	33.98%
Male	71.05%	72.02%	66.02%
n=	26.67	12.67	53.67
Returned	Non	Rea	Resp
Yes	43.23%	55.95%	51.55%
No	56.77%	44.05%	48.45%
n=	26.67	12.67	53.67
Age	Non	Rea	Resp
Younger than 5	49.58%	44.94%	41.28%
Older than 5	50.42%	55.06%	58.72%
n=	26.67	12.67	53.67

Length of stay	Non	Rea	Resp	N=
Less than a year	33.11%	8.61%	58.28%	151
More than a year	23.44%	21.09%	57.03%	128

Length of stay split into response groups

■ Less than a year ■ More than a year



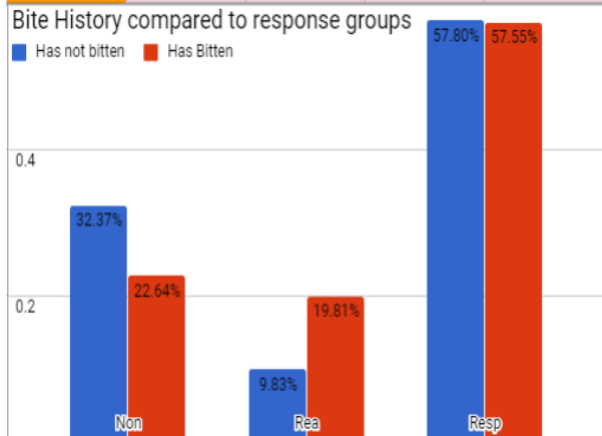
Analysis of Length of stay compared to approach test response

This study, observed subjects which have length of stays in the shelter of more than one year (N=128) have a significantly higher percentage of “Reactive” responses (Less than a year= 8.61%, More than a year=21.09%) than observed subjects with lengths of stay of less than one year (N=151). The significant difference in response between the two groups based on duration of stay shows increased rates of behavior indicating poor welfare and behavioral issues in dogs which have a length of stay for a year or greater, supporting the hypothesis and initial observed phenomenon that longer length of stay leads to the development of behavioral issues (Arhant & Troxler, 2014).

Bite History	Non	Rea	Resp	N=
Has not bitten	32.37%	9.83%	57.80%	173
Has Bitten	22.64%	19.81%	57.55%	106

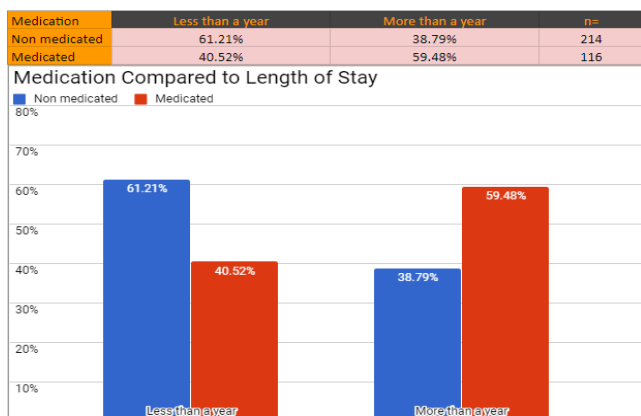
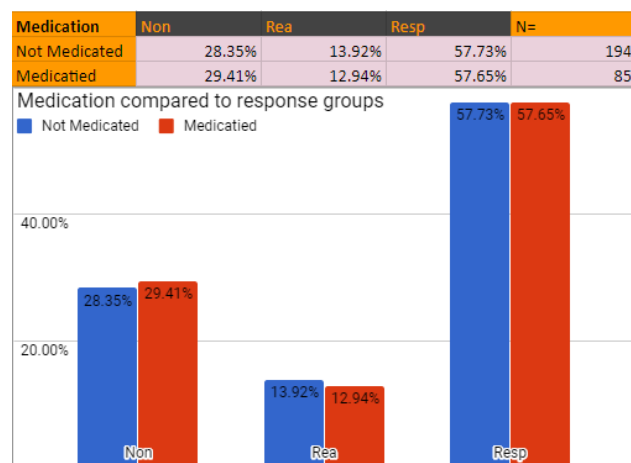
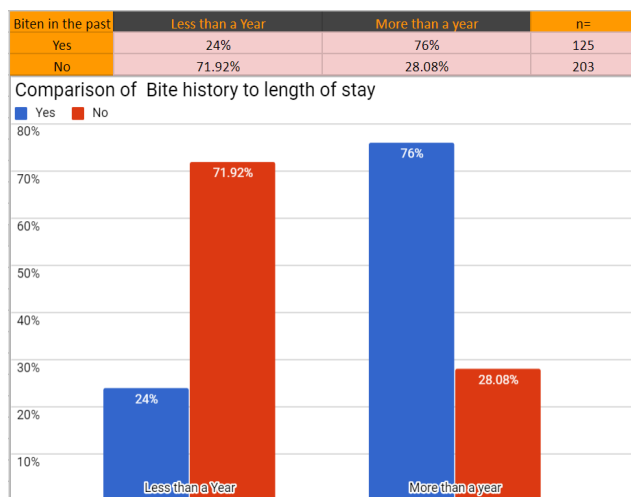
Bite History compared to response groups

■ Has not bitten ■ Has Bitten



Analysis of Bite History compared to approach test response

Comparing the response to the approach test to the bite history of observed dogs reveals a significantly higher percentage of dogs with a positive bite history (n=106) than dogs with a negative bite history (173) to respond reactively to the approach test (Has Not Bitten= 9.83%, Has Bitten= 21.09%). This significant relationship demonstrates a clear connection of reactive response on the approach test to clear indications of behavioral issues and serves to justify the assumption that a reactive response to the approach test is reflective of problematic behavior.. The significance of observed subjects bite history to the response of the approach test was shown to be closely comparable to the distribution of responses to length of stay, revealing a pattern of distribution among certain factors which have shown to have significant correlation of reactive responses.



Analysis of Bite History compared to Length of Stay

Comparison between Bite history and length of stay is used as an alternative comparison of behavior and length of stay, assuming bite history to be an indication of behavioral issue as supported by preliminary sources (Part et al. 2014). This Comparison finds significant correlation between dogs with a positive bite record (n=125) and a stay of over one year in the shelter (Less than a year=24%, More than a Year=76%). Inversely the comparison of negative bite records (n=203) to length of stay finds that a vast majority stay for less than one year (Less than a year=72.92%, More than a Year=28.08%). The significance of this correlation shows that dogs which have a history of biting are most likely to have stayed in the shelter for an extended length of time.

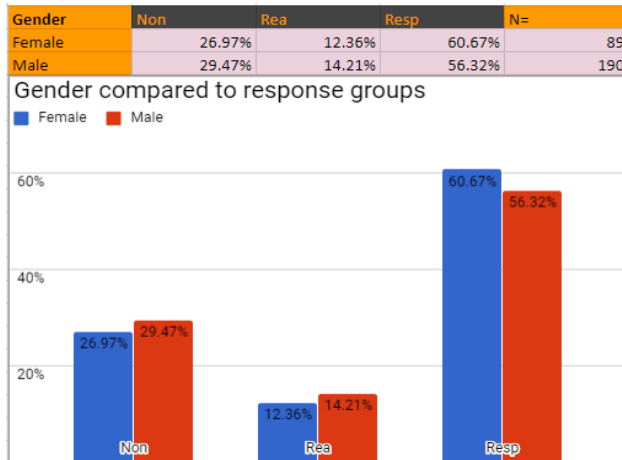
Analysis of Anxiety medication compared to approach test response

This study analysis finds no significance in the relationship between approach test response and whether a subject was prescribed medication for anxiety. The most apparent explanation for this lack of a notable correlation is the intended effect of the medication, which would affect the mood and behavior of the subject and thus alter the subjects response.

Analysis of Anxiety medication compared to approach test response

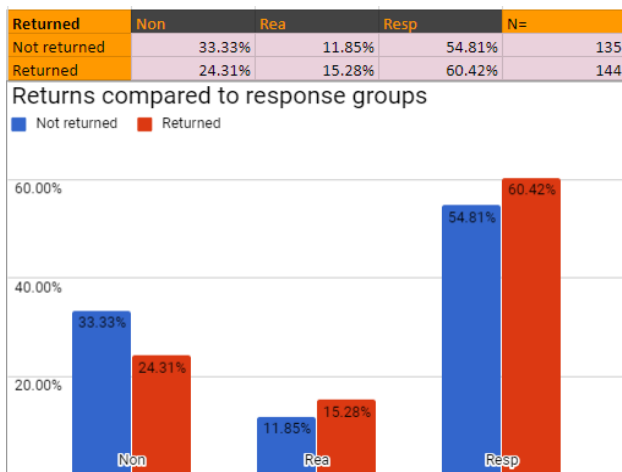
Comparison between length of stay and use of anxiety medication better measures behavior compared to time as that the prescription of anxiety is itself an indicator of shelter stress. By this comparison a clear significant percentage of dogs on medication (n=116) have a length of stay for one year or more (Less than a year=40.52%, More than a Year=59.48%). This finding support the original hypothesis of the study and links

longer length of stay to apparent behavioral or anxiety disorders.



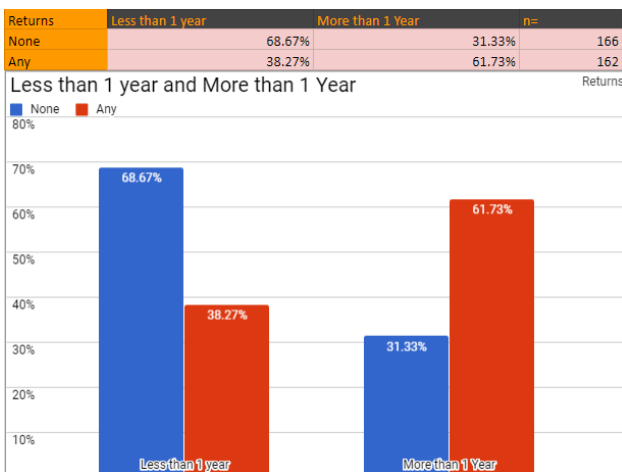
Analysis of Gender compared to approach test response

This study's findings relating gender to reactivity find no significant relationship between response and the gender of the observed dog. This lack of notable correlation may be explained by the no-kill sample shelter offering only neutered males and spayed females as available on the adoption floor and thus for the observations, meaning any hormonal influence which may have influenced the response of dogs observed would be greatly of not entirely eliminated.



Analysis of Returns compared to approach test response

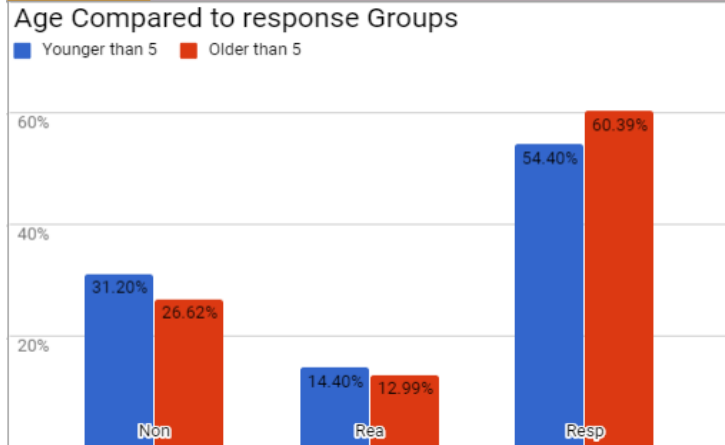
While this study finds that most of the response groups of reactive and responsive have insignificant relationships between those returned and not returned, there is a moderately significant correlation (Not returned= 33.33%, Returned= 24.31%) between non-responsive dogs and having no returns (n=135) over non responsive dogs having been returned at least once (n= 144).



Analysis of Returns compared to approach test response

Predictably the correlation of returns to length of time in shelter was positive. For the dogs which had been returned at least once (n=162) the percentage of dogs whom had stayed for at least one year was significantly greater (Less than a year=38.27%, More than a Year=61.73%). This rise on rate of return between the one year divider has the opposite effect on dogs without any history of biting (n=162) significantly dropped (Less than a year=68.67%, More than a Year=31.33%) showing a strong relationship between return and longer stay

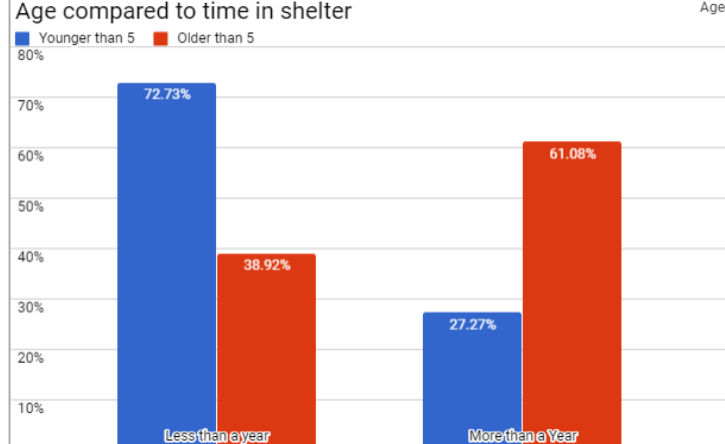
Age	Non	Rea	Resp	N=
Younger than 5	31.20%	14.40%	54.40%	125
Older than 5	26.62%	12.99%	60.39%	154



Analysis of Age compared to approach test response

The Comparison of approach test results to the age of observed dogs reveals no difference in distribution between the two age groups, dogs less than five years old (n=125) and dogs older than 5 years old (n=154). The observed distribution of possible approach A lack of response trends to either broad age group indicates that a range of behavioral patterns exist across all observed dogs and highlights the impacts of other factors such as length of stay on the result of the approach test.

Age	Less than a year	More than a Year	n=
Younger than 5	72.73%	27.27%	143
Older than 5	38.92%	61.08%	185



Analysis of Age compared to Length of stay

Analysis of length of stay compared to the age of subjects shows a significant difference in dogs above the estimated mean age to their recorded length of stay. Dogs older than 5 years were approximately 40% more likely to have experience a stay of more than one year e (Less than a year=38.92%, More than a Year=61.05%).

Discussion

This study supports the observed phenomenon of dog's length of stay correlating with undesirable, and reactive behavior. This correlation was hypothesised to be the result, at least in part, of selectivity of adopters against behavior displayed by dogs with a "reactive" response. This information of poor behavior correlated to longer length of stay in the shelter highlights a harmful effect

Noteworthy limitations of my study comes from the limited or estimated info used by the shelter in some cases. The dogs age is often approximated by dental analysis, which can vary in accuracy. Additionally, the length of stay was is recorded from each dogs first admittance, meaning that of a dog was adopted and returned after less than thirty days, this length of time is included in the dogs recorded length of stay, inflating the length of stay for some dogs. In opposite effect, the sample shelter does not have access to the data of dogs from before they are admitted, meaning that a dog's previous length of stay in other shelters may not be included in the overall recorded length of stay for each dog. These limitations, though perhaps significant in any analysis on any individual subject, are less impactful in the findings of this study due to the clear trends set by large sampling groups.

Concluding, there is an overall clear correlation between extended stay in shelters and problematic behavior, this may present a harmful loop, by which a long stay in a shelter leads to adverse behavior which may, as indicated by research into influencing factors on length of stay, lead to longer stays, leading to worse behavior, leading to longer stay, and so on. This study suggests a serious welfare issue for dogs with long durations of stay in animal shelters, an issue especially relevant today with the increasing rise of “no kill” movements across the country.

For future research, I believe that further study may best be conducted by a closer long term analysis though case study, and would benefit by looking into additional factors such as enrichment, gender of tester, and dog reactivity to other dogs to better understand the effects of long term kennel exposure.

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Appendix, samples 1,2,& 3

RowID	Age	Response	Notes A	Transfered to or from	Transfer to	Days since first transfer to	Days since first transfer to	Return	Sex	Age Notes	Sub	Days since first to	Age in Years (2)	Neuro Medication	
1A1	Carlone	Res	Sn	N/A	10/2/2014	1157	3.32	5 M	Yes		10/1/2008	2344	8.163643836	gabapentin	
1A2	Patty	Res	Empty	N/A	1/5/2014	1437	3.94	2 M	No		11/30/2013	1863	4.008219178	N/A	
1A3	Gooder	Res	sn	N/A	5/5/2017	211	0.58	1 M	Yes		5/6/2015	941	2.578082102	N/A	
1A4	Lesgold	Res		N/A	12/30/2016	337	0.92	2 M	Yes		12/30/2015	703	1.926027707	Trizadone	
1A5	Parler	Res	tp	N/A	7/11/2016	509	1.39	1 M	Yes		7/11/2014	1240	3.167260274	hydroxyone	
1A6	Pilgrim	Res		N/A	11/11/2017	31	0.06	0 M	No		11/5/2015	758	2.076712329	N/A	
1A7	Top	Non		N/A	8/15/2016	474	1.30	2 M	No		2/28/2010	2814	7.764383562	N/A	
1A8	Jett	Non		N/A	9/27/2017	66	0.18	1 M	No		6/1/2015	913	2.501369863	Trizadone	
1A9	Huck	Res		N/A	1/7/2015	1060	2.90	0 M	No		10/11/2009	2954	8.093150685	hydroxyone	
1A10	Ringo	Res	Adsep	N/A	6/30/2017	155	0.42	0 M	Yes		12/7/2013	1456	3.989041096	hydroxyone	
1B1	Add	Res		N/A	10/10/2013	1594	4.15	4 F	Yes		2/8/2010	2813	7.816438356	fluoxetine	
1B2	Hank	Res		N/A	2/5/2015	1031	2.82	1 M	Yes		8/6/2011	2307	6.120547945	N/A	
1B3	Justice	Non	JW	N/A	11/24/2017	8	0.02	1 M	Yes		10/15/2015	779	2.134046675	N/A	
1B4	Wyatt Earp	Non		N/A	11/24/2017	8	0.02	0 M	No		6/18/2017	228	0.6246575142	Trizadone	
1B5	Nanato	Res		N/A	8/21/2017	150	0.38	0 M	No		7/24/2013	1587	4.347945205	N/A	
1B6	Yaya	Res		N/A	12/10/17	6/5/2013 [1]	1641	4.50	1 [4] F	No	8/8/2013	1730	4.739726027	N/A	
1B7	Lata Land	Res		N/A	11/1/2017	39	0.05		F	No	10/1/2010	2606	7.139726027	N/A	
1B8	Ace Ventura	Res		N/A	12/18/2017	31	0.03	0 M	No		5/7/2012	2035	5.57542466	N/A	
1B9	Sasuke	Non		N/A	8/21/2017	150	0.38	4 F	No		8/5/2013	1580	4.328767123	N/A	
1B10	Kiloe	Res		N/A	11/20/2016	377	1.09	1 F	No		7/25/2014	1216	3.35890411	N/A	
2A1	Bambi	Res		N/A	6/4/2017	181	0.50	0 F	No		5/1/2012	2041	5.595786822	N/A	
2A2	Tessa	Res	SA, CN	N/A	12/16/17	11/24/2017	8	0.02	0 F	No	6/18/2010	2724	7.850513698	N/A	
2A3	Dandelion	Non		N/A	11/24/2017	6	0.02	0 F	No		5/14/2015	933	2.556164384	N/A	
2A4	Keylton	Res		N/A	12/1/17	10/16/2017	47	0.13	2 F	No	10/6/2015	788	2.15890411	N/A	
2A5	Zena	Res		N/A	12/1/17	11/24/2017	6	0.02	0 F	No	10/6/2015	1883	5.15890411	hydroxyone	
2A6	Zack	Non		N/A	11/26/2017	6	0.02	0 M	No		10/6/2015	788	2.15890411	N/A	
2A7	Lacy	Res	Sn	N/A	11/26/2017	639	1.72	2 F	No		8/6/2014	1183	3.24109580	N/A	
2A8	Honey	Res		N/A	11/12/2017	30	0.05	2 F	No		8/18/2010	2662	7.291150685	N/A	
2A9	Thao	Res		N/A	12/2/2014	1096	3.00	0 M	Yes		9/10/2010	2640	7.312876712	Trizadone	
2B1	Empty														
2B2	Capone	Res		N/A	12/3/2017	11/26/2017	6	0.02	0 M	No		11/16/2017	3669	10.05205479	N/A
2B3	Marshall	Res	Sp, BL, Lu	N/A	1/7/2018	1/30/2017	306	0.84	2 M	Yes	1/2/2016	679	1.860273973	Trizadone	
2B4	Fairbanks	Res	Pod	N/A	3/1/2012	2103	5.76	4 M	Yes		8/30/2010	2651	7.263013698	N/A	
2B5	Charlie	Res	Sn	N/A	5/31/2015	936	2.51	6 M	Yes		3/25/2008	3539	9.695890411	N/A	
2B6	Hope Solo	Res		N/A	10/6/2017	55	0.15	0 F	No		2/1/2009	3216	8.838356166	N/A	
2B7	Champion	Res	Sn	N/A	11/28/2015	735	2.01	1 M	Yes		3/1/2010	2813	7.763643836	Trizadone	
2B8	Moses	Res	Sn, BL	N/A	3/16/2015	902	2.72	2 M	Yes		10/7/2009	2978	8.15890411	N/A	
2B9	Nicky	Res	JP	N/A	3/28/2017	249	0.68	1 M	Yes		2/27/2015	3009	2.764383562	N/A	
3A1	Nicki	Res	Sn, BL	N/A	12/21/2017	7/24/2012	1951	5.35	2 F	No	3/10/2010	2824	7.730986302	N/A	
3A2	Harry	Res		N/A	2/5/2018	7/5/2017	150	0.41	0 M	No	5/18/2014	1294	3.545205479	hydroxyone	
3A3	Kivi	Res	Sn	N/A	9/5/2016	453	1.24	4 F	No		6/27/2012	1984	5.435616438	N/A	
3A4	Sir Lance	Adsep		N/A	12/26/2017	11/24/2017	8	0.02	0 M	No	10/28/2015	746	2.098630137	N/A	
3A5	Emma	Adsep		N/A	10/10/2017	51	0.15	0 F	No		6/14/2010	2718	7.473973668	N/A	
3A6	Hugo			N/A	2/21/2017	288	0.78	0 M	Yes		10/17/2010	2603	7.135506849	N/A	
3A7	Gorgonut	Res		N/A	10/28/2017	35	0.10	1 M	No		12/27/2014	1071	2.934046675	N/A	
3A8	Paloma Faith	Res		N/A	8/1/2017	329	0.34	0 F	No		6/23/2013	1620	4.446575142	N/A	
3A9	Tzan	Res		N/A	1/14/2016 [5]	1488	3.99	1 M	Yes		5/14/2014	1299	3.556164384	N/A	
3B1	Tater Tot	Res		N/A	2/2/2018	11/25/2017	7	0.02	0 F	No	11/13/2013	1480	4.054794521	N/A	
3B2	Layla	Res	Empty	N/A	3/5/2017	300	0.82	0 F	No		11/20/2011	2194	6.010958904	N/A	
3B3	Petey	Res	Empty	N/A	11/26/2017	6	0.02	0 M	No		9/15/2011	2276	6.219178002	N/A	
3B4	Hope	Res	Sn, BL	N/A	9/11/2017	82	0.22	2 F	No		7/7/2013	1609	4.408219178	N/A	
3B5	Mahala	Res	Sn	N/A	11/22/2017	30	0.03	2 M	No		10/26/2014	1133	3.104109580	N/A	
3B6	Lincoln			N/A	1/7/2016	695	1.90	1 M	Yes		10/9/2013	1515	4.150684912	N/A	
3B7	Calla Lily	Res		N/A	1/20/2018	11/26/2017	6	0.02	0 F	No	10/22/2014	1137	3.115068491	N/A	
3B8	Harley	Res	Empty	N/A	3/24/2017	251	0.69	2 M	Yes		1/5/2016	697	1.909489641	Trizadone	
3B9	Fawn	Res		N/A	8/6/2012	1944	5.13	2 F	No		4/6/2012	2066	5.660273973	Trizadone	
4A1	Boy	Non		N/A	3/6/2017	271	0.74	0 M	No		9/11/2013	1543	4.22739736	fluoxetine	
4A2	Boo Radley	Res		N/A	8/14/2017	130	0.30	1 M	Yes		6/20/2012	1901	5.454794521	N/A	
4A3	Ben	Res	Sn, BL	N/A	1/21/2018	4/5/2013	1700	4.65	4 M	Yes	10/21/2012	1868	5.117890209	N/A	
4A4	Kiko	Res	Pod	N/A	12/19/2017	11/25/2017	7	0.02	0 M	No	6/17/2014	1264	3.463013698	N/A	
4A5	Sam	Res		N/A	5/15/2017	205	0.55	0 M	No		7/4/2010	2709	7.423917808	N/A	
4A6	Phoebe	Res		N/A	1/16/2018	11/25/2017	7	0.02	1 F	No	11/17/2014	1111	3.048375616	N/A	
4A7	Salara	Res	Empty	N/A	8/27/2017	97	0.27	0 F	No		5/24/2009	2109	8.517890209	N/A	
4A8	Geradine	Non		N/A	11/16/2017	36	0.04	0 F	No		1/25/2013	1772	4.854794521	N/A	
4A9	Lucky Duck	Res		N/A	12/24/2017	7	0.02	1 M	No		5/8/2016	571	1.569863014	N/A	
4A10	Zappa	Res	Empty	N/A	8/5/2017	272	0.75	0 M	Yes		8/30/2013	1555	4.260273973	N/A	
4B1	Sully	Non		N/A	5/4/2017	212	0.58	1 M	No		11/18/2014	1110	3.04109580	N/A	
4B2	Gage	Res		N/A	11/7/2016	390	1.07	1 M	Yes		5/6/2013	1668	4.569863014	hydroxyone	
4B3	Armstrong	Non		N/A	6/4/2015	930	2.49	0 F	Yes		1/6/2012	2522	6.909589641	hydroxyone	
4B4	Mimi	Res	Empty	N/A	3/9/2016	616	1.67	0 F	No		7/16/2012	1965	5.185616438	fluoxetine	
4B5	Travis	Res		N/A	7/9/2016	531	1.40	0 M	Yes		4/2/2012	2009	5.504109580	Trizadone	
4B6	Churchill	Res	Pod	N/A	12/27/2016	340	0.93	2 M	No		12/24/2015	709	1.940273973	N/A	
4B7	Bubba	Res		N/A	11/28/2017	4	0.01	0 M	No		10/18/2012	1871	5.126027397	N/A	
4B8	Bandit	Res		N/A	6/6/2016	584	1.49	0 M	Yes		3/13/2011	2454	6.728767123	N/A	
4B9	Mimi	Res	ODB	N/A	9/13/2013	1541	4.22	2 F	No		8/18/2008	3293	9.295890411	hydroxyone	
4B10	Buddha	Res	Empty	N/A	6/6/2016	584	1.49	0 M	Yes		4/8/2010	2794	7.654794521	fluoxetine	
5A1	Butter	Res	Adsep	N/A	1/10/2017	326	0.89	2 M	No		10/18/2011	2216	6.126027397	hydroxyone	
5A2	Fitz	Non		N/A	7/6/2017	149	0.41	N/A	M	No	6/11/2013	1635	4.479452005	fluoxetine	
5A3	Spike diawl	Non		N/A	1/29/2018	6/22/2017	163	0.45	0 M	No	9/22/2012	1897	5.197260274	N/A	
5A4	Tori	Res		N/A	6/15/2016	535	1.47	5 F	Yes		1/8/2012	2155	5.904109580	Trizadone	
5A5	Vladimir	Non		N/A	1/5/2017	331	0.86	0 M	No		10/20/2011	2215	6.123287671	N/A	
5A6	Hargo	Res		N/A	10/26/2014	1133	3.30	3 M	Yes		5/30/2010	2743	7.515068491	N/A	
5A7	Avai	Res	Adsep	N/A	3/3/2014	1370	3.75	2 M	No		3/4/2011	2466	6.756164384	Trizadone	
5B1	Gunner	Non		N/A	12/14/2016	353	0.97	0 M	No		7/11/2009	3066	8.4	N/A	
5B2	Yogi	Res		N/A	1/20/2018	11/24/2017	6	0.02	0 M	No	8/8/2007	2769	8.326027397	N/A	
5B3	Rig Tony	Res		N/A	11/18/2016	379	1.04	2 M	No		9/24/2013	1510	4.191780822	Trizadone	
5B4	Dodger	Res	Adsep	N/A	8/4/2015	622	2.33	0 M	Yes		9/21/2008	3357	9.197260274	N/A	
5B5	Scobie	Non		N/A	6/14/2015	902	2.47	0 M	Yes		10/7/2010	2613	7.15890411	N/A	
5B6	Billy Jean	Res		N/A	1/14/2016	688	1.88	4 M	Yes		1/10/2015	1057	2.895890411	Trizadone	
5B7	Scobie Do	Res		N/A	3/9/2016	643	1.82	2 M	Yes		12/15/2007	3640	8.972602739	N/A	
5A1	Benbatra	Res	Adsep	N/A	12/24/2016	343	0.94	0 F	No		5/1/2012	2041	5.595786822	hydroxyone	
6A2	Becker	Res		N/A	2/1/2018	11/22/2017	30	0.03	0 M	No	9/7/2015	817	2.230516166	hydroxyone	
6A3	Kakashi	Res	Pod	N/A	8/29/2017	95	0.26	1 M	No		8/21/2016	466	1.276712329	N/A	
6B1	Tilly	Res		N/A	5/20/2015	947	2.								

Serial	Dog	Response	Notes A	Adapted/Transferred	Transfer in	Days since first transfer in	Years since transfer	Return	Sex	Has Bites	Dub	Days since Birth [1]	Age in Years [2]	Asphyx Medication
1A1	Carlson	Res		N/A	11/2/2008	1175	3.22		S M	Yes	11/6/2008	3362	0.21058864	Galapentol
1A2	Patty	Non		N/A	1/5/2004	555	3.86		2 M	No	11/3/2013	5481	0.05754347	N/A
1A3	Goobar	Res		N/A	1/3/2008	228	0.63		1 M	Yes	5/6/2005	958	2.62739726	N/A
1A4	Unopid	Res		N/A	12/3/2006	205	0.87		2 M	Yes	12/3/2013	721	1.87542466	Trasdoxol
1A5	Parker	Res		N/A	7/11/2006	527	3.48		1 M	Yes	7/11/2004	1258	3.46075142	Hydroxyzine
1A6	Pigman	Res		N/A	11/11/2007	26	0.11		0 M	No	11/1/2011	776	2.126027887	N/A
1A7	Tip	Res		N/A	8/15/2006	460	3.35		2 M	No	2/28/2009	2852	7.81349653	N/A
1A8	Jett		Empty	N/A	9/7/2007	84	0.23		1 M	No	6/1/2011	931	2.550684912	Trasdoxol
1A9	Huck		Adapt	N/A	3/7/2005	3378	2.95		0 M	No	10/11/2009	2972	8.542465751	Hydroxyzine
1A10	Ringo		Adapt	N/A	6/10/2007	179	0.47		0 M	Yes	12/7/2013	5474	6.88956558	Hydroxyzine
1B1	Adis	Non		N/A	10/24/2007	1540	0.73		4 F	Yes	2/9/2009	2879	7.865751425	Fluoxetine
1B2	Wark	Res		N/A	2/5/2005	5385	2.47		1 M	Yes	8/9/2011	3235	4.369863004	N/A
1B3	Blue Sapphire	Non		N/A	11/24/2007	34	0.07		0 F	No	2/5/2012	2145	5.876712329	N/A
1B4	Wyatt Corp		Adapt	N/A	11/24/2008	24	0.07		0 M	No	4/18/2017	246	5.6730726027	Trasdoxol
1B5	Nandu	Non		N/A	8/21/2007	129	0.33		0 M	No	7/29/2013	3605	4.297260274	N/A
1B6	Misty	Non		N/A	11/3/2007	30	0.05		1 F	Yes	6/1/2013	5571	4.30459589	N/A
1B7	Lila Land		Adapt	N/A	2/2/2008	37	0.10		0 F	No	10/9/2009	2424	7.589041096	N/A
1B8	Gordo	Res		N/A	1/14/2008	679	3.84		2 M	Yes	5/6/2013	5808	8.850561884	N/A
1B9	Angelica	Res		N/A	1/7/2008	22	0.06		0 F	No	15/6/2012	5876	5.121287671	N/A
1B10	Kriste	Res		N/A	11/20/2006	265	3.08		1 F	No	7/2/2014	1244	3.489219178	N/A
2A1	Bambi	Res	Win	N/A	6/8/2007	198	0.55		0 F	No	5/1/2012	2058	5.64059589	N/A
2A2	Boo Radley		Adapt	N/A	8/14/2007	128	0.35		1 M	Yes	6/20/2012	2009	5.50459589	N/A
2A3	Yara		Adapt	N/A	2/17/2005	237	2.44		4 F	Yes	5/9/2011	2416	6.602739726	Trasdoxol
2A4	Booy Brown	Res		N/A	12/29/2007	21	0.06		0 F	No	10/23/2010	2615	7.56438562	Trasdoxol
2A5	Sai	Non		N/A	11/28/2007	22	0.06		0 M	No	11/15/2008	1138	3.09863017	N/A
2A6	Zack	Res	Win	N/A	11/24/2007	24	0.07		0 F	No	11/6/2011	806	2.208219178	N/A
2A7	Lucky	Res		N/A	11/24/2007	647	0.37		2 F	No	6/6/2008	1205	2.290410958	N/A
2A8	Chang	Res		N/A	1/6/2008	23	0.06		0 M	No	6/29/2010	2731	7.482191781	N/A
2A9	Thia	Res		N/A	12/2/2008	1144	3.45		0 M	Yes	9/2/2009	3658	7.282191781	Trasdoxol
2B1	Woody	Non		N/A	11/27/2007	21	0.06		0 F	No	11/21/2011	2221	6.684915027	Trasdoxol
2B2	Bub	Res		N/A	11/30/2007	26	0.05		0 M	No	11/18/2009	811	1.126027887	N/A
2B3	Marshall	Res	Pod	N/A	1/3/2008	324	0.89		2 M	Yes	1/23/2016	607	1.805890041	Trasdoxol
2B4	Farbanks	Res	Pod	N/A	3/5/2002	2120	5.81		4 M	Yes	8/30/2009	2668	7.312328767	N/A
2B5	Charlie	Res		N/A	5/11/2005	934	2.56		4 M	Yes	3/25/2008	2557	9.745205439	N/A
2B6	Hopie Sola	Res		N/A	11/8/2007	79	0.20		0 F	No	2/1/2009	1244	8.887671233	N/A
2B7	Change	Res		N/A	11/28/2005	753	2.86		1 M	Yes	3/1/2010	2851	7.81058866	Trasdoxol
2B8	Moran	Non		N/A	3/9/2005	3310	2.77		2 M	Yes	10/7/2009	2996	8.208219178	N/A
2B9	Mickey	Res	Ja	N/A	3/24/2007	267	0.73		1 M	Yes	2/27/2015	5327	2.81349653	N/A
3A1	Nicki	Non		N/A	12/21/2007	168	0.46		2 F	No	3/9/2009	2842	7.78630137	N/A
3A2	Warry		Empty	N/A	2/3/2008	168	0.46		0 M	No	5/18/2014	1212	3.594520548	Hydroxyzine
3A3	Kia	Res	Se	N/A	8/5/2006	475	3.29		4 F	No	6/27/2012	2002	5.484815027	N/A
3A4	Si Lan ce	Res	Se	N/A	12/24/2007	26	0.07		0 M	No	10/28/2011	784	2.547945205	N/A
3A5	Enma	Adapt		N/A	10/25/2007	75	0.29		0 F	No	6/18/2009	2766	7.522287671	N/A
3A6	Hugo	Empty		N/A	3/21/2007	30	0.09		0 M	No	10/17/2010	2621	7.588219178	N/A
3A7	Wish	Empty		N/A	12/28/2007	14	0.04		0 M	No	10/21/2009	405	1.56438562	N/A
3A8	Paloma Faith	Non		N/A	1/14/2008	149	0.39		0 F	No	6/23/2013	2641	4.465890041	N/A
3A9	Titan	Res		N/A	1/14/2008 [4]	706	2.82		1 M	Yes	5/18/2008	1214	3.605479452	N/A
3B1	Vernice-mars	Res	Set down	N/A	1/2/2018 [4]	842	3.31		2 F	No	8/1/2014	1235	3.38561644	N/A
3B2	Tia	Res		N/A	7/23/2017 [5]	156	0.41		0 F	No	7/6/2009	4185	11.46575342	N/A
3B3	Petey	Res		N/A	1/24/2007	328	0.90		0 M	No	6/11/2011	2288	6.268493151	N/A
3B4	Hopie	Res	lg	N/A	9/11/2007	106	0.27		2 F	No	7/7/2009	1627	4.457534247	N/A
3B5	Layla	Non		N/A	2/5/2007	218	0.87		0 F	No	11/3/2011	2212	6.602739726	N/A
3B6	Griffin	Res	Se	N/A	3/7/2006	713	3.81		1 M	Yes	10/9/2009	1533	4.2	N/A
3B7	Calla Lily	Res		N/A	1/24/2008	24	0.07		0 F	No	10/22/2014	1155	3.56438562	N/A
3B8	Harley	Res	CHL, BK	N/A	3/24/2007	268	0.74		2 M	Yes	5/5/2006	715	1.95890411	Trasdoxol
3B9	Fawn	Res		N/A	8/16/2012	1942	5.34		2 F	No	4/6/2012	2084	5.709589041	Trasdoxol
4A1	Boy		Adapt	N/A	3/6/2007	288	0.79		0 M	No	9/11/2013	1560	4.276712329	Fluoxetine
4A2	Chickies	Res		N/A	6/12/2007	195	0.52		1 F	No	7/2/2011	2363	4.478726027	Hydroxyzine
4A3	Ben	Res		N/A	4/5/2008	1720	4.31		4 M	Yes	10/11/2012	5886	5.567123288	N/A
4A4	Camelia	Res		N/A	1/2/2008	30	0.05		0 F	No	7/5/2017	3812	10.44489642	N/A
4A5	Sam	Non		N/A	6/19/2007	218	0.60		0 M	No	7/9/2008	2727	7.471212877	N/A
4A6	Gloria	Res		N/A	12/3/2007	11	0.04		0 F	No	10/3/2010	782	2.440465758	Trasdoxol
4A7	Sakura	Res	CHL	N/A	8/27/2007	141	0.32		0 F	No	5/29/2009	1627	4.567673288	N/A
4A8	Gerardine	Non		N/A	11/16/2007	34	0.09		0 F	No	1/25/2013	1796	4.93459589	N/A
4A9	Henrietta	Res		N/A	12/24/2007	15	0.04		0 F	No	11/2/2012	1874	5.134260275	N/A
4A10	Zappa	Non		N/A	2/5/2007	296	0.79		0 M	Yes	8/30/2013	1573	4.305890041	N/A
4B1	Sully	Non		N/A	5/8/2007	230	0.63		1 M	No	11/18/2014	1128	3.094110959	N/A
4B2	Gage	Non		N/A	11/7/2006	408	1.12		1 M	Yes	5/9/2013	5686	6.419738082	Hydroxyzine
4B3	Buttersworth		Adapt	N/A	6/6/2005	928	2.54		0 F	Yes	3/6/2011	2548	6.95890411	Hydroxyzine
4B4	Mimi	Res		N/A	3/11/2006	629	1.72		0 F	No	7/6/2012	1983	5.412876712	Fluoxetine
4B5	Travis	Res		N/A	7/9/2006	529	1.45		0 M	Yes	6/2/2012	3327	5.51428608	Trasdoxol
4B6	Churchill	Res		N/A	12/27/2006	106	0.88		2 M	No	12/24/2015	727	1.891380822	N/A
4B7	Mimi	Non		N/A	9/13/2013	1558	4.27		2 F	No	8/18/2008	3815	9.345205439	Hydroxyzine
4B8	Ben di		Adapt	N/A	6/4/2006	562	1.54		0 M	Yes	3/1/2011	2474	6.778682182	N/A
4B9	Budda	Res		N/A	1/13/2008	22	0.06		0 M	No	10/18/2012	588	5.17542466	N/A
4B10	Budda	Res	Empty	N/A	6/4/2006	562	1.54		0 M	Yes	4/9/2010	2812	7.3459589	Fluoxetine
5A1	Budger	Non		N/A	3/29/2007	384	0.94		3 M	No	10/9/2011	2256	6.17542466	Hydroxyzine
5A2	Andy		Adapt	N/A	11/29/2004	1117	3.06		2 F	Yes	5/9/2010	2504	7.368863004	Hydroxyzine
5A3	Spike Desert	Res		N/A	6/22/2007	180	0.50		0 M	No	9/22/2012	3915	5.246575342	N/A
5A4	Tori	Non		N/A	6/15/2006	153	0.52		5 F	Yes	5/9/2012	2179	5.61428608	Trasdoxol
5A5	Vladimir	Res		N/A	3/5/2007	389	0.94		0 M	No	10/23/2011	2252	6.17260274	N/A
5A6	Hopie	Res		N/A	10/24/2004	1151	3.15		3 M	Yes	5/30/2010	2765	7.56438562	N/A
5A7	Avai		Adapt	N/A	3/7/2008	1388	3.83		2 M	No	3/1/2011	2484	6.805479452	Trasdoxol
5B1	Gunner	Res		N/A	12/14/2006	379	1.02		0 M	No	7/11/2009	2084	8.449315068	N/A
5B2	Yugi	Res		N/A	1/23/2008	24	0.07		0 M	No	8/8/2007	2787	10.37534247	N/A
5B3	Big Tony	Res		N/A	11/18/2006	207	0.88		2 M	No	6/24/2013	1548	4.2459589	Trasdoxol
5B4	Googler	Non		N/A	8/1/2005	870	2.38		0 M	Yes	6/23/2008	1175	9.246575342	N/A
5B5	Scobie	Res		N/A	6/14/2005	920	2.52		0 M	Yes	10/7/2010	2620	7.208219178	N/A
5B6	Willy Jean	Res		N/A	1/18/2006	705	1.93		4 M	Yes	1/10/2015	5375	2.945205439	Trasdoxol
5B7	Scobie Doc		Empty	N/A	2/8/2006	685	1.87		2 M	Yes	12/15/2017	3658	10.02191781	N/A
6A1	Bellatrix	Res		N/A	12/24/2006	364	0.99		0 F	No	5/1/2012	2058	5.64059589	Hydroxyzine
6A2	Sarah	Res	Se	N/A	8/21/2007	121	0.33		4 F	No	8/1/2013	1508	4.78682182	N/A
6A3	Han	Non		N/A	9/11/2007	106	0.27		1 M	No	8/5/2012	5832	5.24150685	N/A
6B1	Tory	Res		N/A	5/19/2011	915	2.56		1 M	No	5/1/2013	112	1.84489642	N/A
6B2	Frankie	Res		N/A	3/25/2007	298	0.82		0 M	No	11/23/2012	3654	5.884815	

Serial	Eng	Negative ID	Notes A	Subsequent Transfer to	Transfer to	Days since first transfer to	Days since first transfer to	Return	Life	Has After	Cost	Days since first	Age in years	Notes
1A1	Carlson	Res	ib	N/A	11/2/2004	1241	2.40	5 M	Yes	Yes	10/6/2008	3428	9.391780022	Galapagos
1A2	Patty	Res	AK	N/A	3/5/2008	1551	4.54	2 M	Yes	Yes	11/30/2013	1547	4.23015514	N/A
1A3	Mohalo	Res	ib	N/A	11/22/2017	94	0.26	2 M	No	No	10/24/2014	1217	3.13424577	N/A
1A4	Shogid	Res	ib	N/A	12/30/2006	421	1.15	2 M	Yes	Yes	12/30/2015	787	2.15656484	Trinidad
1A5	Parker	Res	ig	N/A	7/11/2006	583	1.62	1 M	Yes	Yes	7/11/2014	1124	3.62739726	Hydroxide
1A6			Empty				0.00						0	
1A7	Top	Res	uk	N/A	8/15/2006	558	1.53	2 M	Yes	Yes	2/28/2010	2918	7.894520548	N/A
1A8	Pignus	Res	ib	N/A	11/14/2007	385	0.29	0 M	Yes	Yes	11/6/2009	882	2.404849115	N/A
1A9	Wack	Res	ib	N/A	1/7/2005	1144	3.51	0 M	Yes	Yes	10/11/2009	3038	8.223287071	Hydroxide
1A10	Wack	Res	ib	N/A	8/14/2005	1067	2.87	0 M	Yes	Yes	7/7/2014	2424	5.44109589	N/A
1B1	Adri	Res	ib	N/A	10/10/2013	1584	2.18	4 F	Yes	Yes	2/9/2010	2927	8.60575242	Fluoxetine
1B2	Wack	Res	PoD	N/A	2/5/2005	1135	3.05	1 M	Yes	Yes	8/9/2011	2395	6.550688012	N/A
1B3	Danny	Res		2/25/2018	1/23/2018	32	0.08	0 M	No	No	1/8/2016	778	2.111504848	N/A
1B4	Elie	Res	Deaf	N/A	8/5/2016	568	1.54	4 F	No	No	8/4/2012	2152	5.895894111	Galapagos
1B5	Nanuta	Res	ib	N/A	8/1/2017	187	0.51	0 M	No	No	7/29/2013	1671	4.578621212	N/A
1B6	Jack	Res	ib	N/A	1/27/2018	28	0.08	1 M	No	No	8/25/2013	188	0.501364863	N/A
1B7	Munchie	Res	Cn	3/4/2018	2/18/2018	14	0.04	0 M	No	No	2/6/2017	283	1.089315068	N/A
1B8	Peat	Res	Cn	2/15/2008	2/15/2008	59	0.04	0 F	No	No	2/8/2006	751	2.057534287	N/A
1B9	Yasmine	Res	ib	N/A	8/14/2006	557	1.53	3 F	No	No	4/29/2014	1387	3.82738726	N/A
1B10	Kriste	Res	ib	N/A	11/20/2006	461	1.26	1 F	No	No	7/25/2014	1311	3.58861086	N/A
2A1	Bambi	Res	ib	N/A	6/4/2017	265	0.73	0 F	No	No	5/1/2012	2125	5.821817808	N/A
2A2	Boo Radley	Res	ib	N/A	8/9/2007	378	0.53	1 M	Yes	Yes	6/30/2012	2075	5.68451507	N/A
2A3	Madira	Res	uk	N/A	12/4/2017 (2)	77	0.21	1 F	Yes	Yes	5/1/2012	2108	5.77862182	Galapagos
2A4	Bole	Res		3/2/2018	2/15/2018	18	0.04	4 M	No	No	7/14/2013	1415	4.04448124	N/A
2A5	Chompie	Res		N/A	11/28/2005	639	2.34	1 M	Yes	Yes	3/1/2010	2917	7.981791822	Trinidad
2A6	Jade	Res	St	N/A	12/24/2017	62	0.17	4 M	No	No	12/16/2014	801	2.184521548	N/A
2A7	Gongolai	Res		N/A	10/24/2017	119	0.33	1 M	No	No	12/27/2014	1151	3.164881862	N/A
2A8	Smooch	Res		3/9/18	2/19/2018	14	0.04	0 F	No	No	12/19/2007	2309	11.56144384	N/A
2A9	Thao	Res	ib	N/A	12/2/2014	1180	3.22	0 F	Yes	Yes	6/10/2010	2724	7.463613699	Trinidad
2B1	Denzel	Res		2/21/2018	2/8/2018	18	0.05	5 M	No	No	1/13/2011	2595	7.10583045	N/A
2B2	Subo	Res		N/A	11/30/2017	84	0.24	0 M	No	No	11/4/2016	477	1.304849125	N/A
2B3	Olly	Res	Mid	N/A	1/12/2017	408	1.12	3 M	Yes	Yes	1/2/2012	2245	6.150684932	N/A
2B4	Farbarkis	Res		N/A	3/1/2012	2186	5.99	4 M	Yes	Yes	8/30/2010	2735	7.491550885	N/A
2B5	Charlie	Res		N/A	5/15/2005	1000	2.74	4 M	Yes	Yes	3/25/2008	3623	9.426227387	N/A
2B6	Wayo Solo	Res		N/A	11/8/2017	139	0.38	0 F	No	No	2/1/2019	1311	9.048491511	N/A
2B7	Arpy	Res	PoD	3/5/2018	12/21/2017	63	0.17	1 M	No	No	12/12/2014	1176	3.205474652	N/A
2B8	Macan	Res	ib	N/A	2/14/2005	1076	2.95	2 M	Yes	Yes	10/7/2009	3062	8.88641086	N/A
2B9	Fawn	Res		N/A	8/6/2012	2038	5.56	2 F	No	No	4/6/2012	2150	5.890451959	Trinidad
3A1	Coco	Res		N/A	12/27/2017	54	0.16	3 F	Yes	Yes	12/12/2014	1176	3.205474652	N/A
3A2	Rippon	Res		3/18/2018	1/25/2018	36	0.08	1 F	No	No	1/25/2013	1854	5.084915507	N/A
3A3	Yad	Res		N/A	9/1/2006	537	1.47	4 F	No	No	6/27/2012	2048	5.665753425	N/A
3A4	Wesley	Res		2/15/2018	2/8/2018	16	0.04	0 M	No	No	5/17/2015	1134	3.104849115	Hydroxide
3A5	Conna	Res	ib	N/A	10/10/2017	137	0.38	0 F	No	No	6/14/2013	2812	7.20450918	N/A
3A6	Hugo	Res		N/A	2/21/2017	368	1.01	0 M	Yes	Yes	10/17/2009	2687	7.361643836	N/A
3A7	Jack	Res	ib	N/A	11/24/2017	90	0.25	0 M	No	No	10/5/2015	872	2.389043096	N/A
3A8	Ono	Res		2/14/2018	2/8/2018	16	0.04	5 M	No	No	1/5/2018	2972	8.142465753	N/A
3A9	Wesley	Res		N/A	3/24/2017	335	0.92	2 M	Yes	Yes	1/5/2016	781	2.137726227	Trinidad
3B1	Sully	Res		N/A	5/8/2017	286	0.81	1 M	No	No	11/18/2014	1184	3.271212877	N/A
3B2	Tia	Res	St	N/A	7/23/2017 (3)	254	0.59	0 F	No	No	7/6/2016	4251	11.64657534	N/A
3B3	Petey	Res		N/A	1/26/2017	246	0.68	0 M	No	No	9/15/2011	2354	6.449115068	N/A
3B4	Nisat	Res		2/15/2018	2/5/2018	23	0.06	0 M	No	No	1/11/2016	775	2.123287471	N/A
3B5	Lyla	Res	Adapt	N/A	2/5/2017	388	1.05	0 F	No	No	11/30/2011	2278	6.2450989	N/A
3B6	Lucas	Res		N/A	1/7/2006	779	2.13	1 M	Yes	Yes	10/9/2013	1598	4.280821958	N/A
3B7	Filbert	Res		N/A	1/18/2018	35	0.11	1 M	No	No	4/1/2016	694	1.901364863	Hydroxide
3B8	Chickie	Res	Adapt	N/A	6/12/2017	257	0.70	1 F	No	No	7/2/2011	2429	6.654794522	Hydroxide
3B9	Mickey	Res		N/A	3/28/2017	333	0.91	1 M	Yes	Yes	2/27/2015	1083	2.984521548	N/A
4A1	Bowie	Res		2/17/2018	11/4/2017	112	0.31	1 M	No	No	3/5/2017	384	1.052054796	N/A
4A2	Wesley	Res		N/A	7/2/2018	460	1.45	1 M	No	No	6/15/2018	466	6.712428747	N/A
4A3	Shonda	Res	ib	3/21/18	1/18/2018	17	0.01	0 F	No	No	12/25/2014	1157	3.188863181	N/A
4A4	Bernie	Res		N/A	4/7/2018	86	0.13	4 M	No	No	8/23/2014	1286	3.505894911	Fluoxetine
4A5	Jade	Res	PoD	2/16/2018	2/12/2018	12	0.03	0 F	No	No	2/14/2017	375	1.42738726	N/A
4A6	Amelia	Res		N/A	6/1/2014	1364	3.72	2 F	No	No	2/18/2011	2564	7.021857808	N/A
4A7	Wan	Res		N/A	6/11/2017	164	0.45	1 M	No	No	5/5/2012	1988	6.473072602	N/A
4A8	Gertrude	Res		N/A	11/18/2017	103	0.27	0 F	No	No	1/25/2013	1854	5.084915507	N/A
4A9	Florence	Res		N/A	5/4/2016	640	1.81	3 F	Yes	Yes	2/1/2010	2945	8.064811552	N/A
4A10	Zappa	Res		N/A	3/5/2017	356	0.88	0 M	Yes	Yes	8/30/2013	1638	4.490410959	N/A
4B1	Floyd	Res		N/A	12/28/2017	58	0.16	0 M	No	No	12/12/2015	805	2.205474652	Trinidad
4B2	Gage	Res		N/A	11/7/2006	476	1.30	1 M	Yes	Yes	5/9/2013	1752	4.8	Hydroxide
4B3	Butterworth	Res		N/A	4/4/2005	984	2.72	0 F	Yes	Yes	1/4/2011	2606	7.120726027	Hydroxide
4B4	Wesley	Res	ib	N/A	8/29/2017	179	0.48	4 F	Yes	Yes	11/18/2006	463	1.264881154	N/A
4B5	Travis	Res	PoD	N/A	7/1/2006	585	1.63	0 M	Yes	Yes	6/2/2012	2093	5.734260234	Trinidad
4B6	Churchill	Res	Adapt	N/A	12/27/2006	426	1.26	2 M	No	No	12/18/2015	784	2.17360234	N/A
4B7	Mimi	Res	Adapt	N/A	9/14/2013	1625	4.45	2 F	No	No	8/18/2008	1477	9.526227387	Hydroxide
4B8	Randi	Res		N/A	4/6/2006	428	1.32	0 M	Yes	Yes	5/18/2011	2548	6.94934611	N/A
4B9	Blue Sapphire	Res		N/A	11/24/2017	12	0.01	0 F	No	No	3/5/2012	2211	6.057534287	N/A
5A1	Wesley	Res	Adapt	N/A	3/6/2017	365	0.97	0 M	No	No	9/15/2008	1627	4.457842467	Fluoxetine
5A2	Wesley	Res		N/A	1/28/2015	1123	3.28	7 M	No	No	1/26/2013	1861	5.084915507	N/A
5A3	Sally	Res		N/A	11/29/2014	1189	3.24	2 F	Yes	Yes	8/9/2009	2354	7.550688012	Hydroxide
5A4	Samson	Res		3/4/18	3/15/2018	11	0.04	0 M	No	No	1/12/2016	734	2.120547346	N/A
5A5	Tori	Res		N/A	6/15/2006	609	1.70	5 F	Yes	Yes	1/8/2012	2228	6.134260234	Trinidad
5A6	Vladimir	Res		N/A	1/5/2017	455	1.54	0 M	No	No	10/30/2011	2319	6.351428658	N/A
5A7	Wesley	Res	PoD	N/A	10/24/2008	1257	3.33	3 M	Yes	Yes	5/30/2008	2827	7.345205479	Fluoxetine
5A8	Maria	Res	ib	N/A	4/6/2017	324	0.88	0 M	No	No	6/17/2015	881	2.48108488	Fluoxetine
5B1	Gunner	Res		N/A	12/14/2006	417	1.20	0 M	No	No	7/11/2009	1158	4.430534985	N/A
5B2	Milly	Res		N/A	11/30/2017	86	0.24	1 F	Yes	Yes	8/1/2013	1637	4.484915507	N/A
5B3	Big Tex	Res		N/A	11/18/2006	463	1.27	2 M	No	No	8/24/2013	1614	4.421817808	Trinidad
5B4	Dodger	Res		N/A	8/1/2005	936	2.56	0 M	Yes	Yes	9/23/2008	1441	9.42738726	N/A
5B5	Scarlet	Res		N/A	6/14/2015	986	2.70	0 M	Yes	Yes	10/7/2009	2687	7.88641086	N/A
5B6	Simba	Res		3/1/2018	2/12/2018	12	0.03	0 M	No	No	6/27/2010	2799	7.684811552	N/A
5B7	Scarlet Doe	Res		N/A	2/8/2006	787	2.05	2 M	Yes	Yes	12/19/2007	2724	10.20273673	N/A
6A1	Bertrine	Res		N/A	12/14/2006	427	1.17	0 F	No	No	5/1/2012	2125	5.821817808	Hydroxide
6A2	Sadie	Res	St	N/A	8/21/2007	187	0.51	4 F	No	No	8/6/2008	1464	4.50494011	N/A
6A3	Justin	Res	PoD	N/A	11/24/2017	90	0.25	1 M	No	No	10/15/2011	2790	7.644815614	N/A
6B1	Toby	Res	PoD	N/A										