Surviving no-kill shelters: An analysis of animal outcomes at the Austin Animal Center, Texas, USA.

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ABSTRACT

Pet abandonment is a global issue. Despite a history of healthy animals being euthanised at shelters if not adopted or reclaimed quickly enough (Lepper et al., 2002), in recent years there has been a dramatic global *decrease* in number of animals euthanised in shelters. This is considered to be due to the emergence of a global 'rescue culture' (Hertzog, 2018; Robert & Kartal, 2018). Nevertheless, there are still valid concerns regarding the welfare of surrendered animals, even at 'no-kill' shelters (PETA, 2020). The Austin Animal Center (AAC) in Texas, USA, aspires to maintain a 90% survival rate for all animals who pass through the shelter (Austin Animal Center, 2020). The purpose of this report is to analyse animal outcomes at the AAC, and to investigate the rate of adoption and euthanasia of domestic animals between 2013 and 2019. Using the RStudio data analysis software, this report demonstrates outcomes across animal types, identifies which animals are most likely to be adopted, and which ones spend the most time at the AAC, as well as the main reasons for and rate of euthanasia. The report finds that younger animals are the most likely to be adopted or transferred to a partner shelter, especially if they are desexed, and that cats and dogs have similar outcomes as opposed to birds, livestock and wildlife. Older animals are more likely to be euthanised, however the report finds that the 90% survival rate claim is sound.

INTRODUCTION

The Austin Animal Center (AAC) in Texas, USA, is an open-intake shelter, providing care to 16,000 injured, lost or surrendered animals each year (Austin Animal Center, 2020). Since 2010, the shelter has worked in line with a no-kill plan to ensure that at least 90% of animals are rehomed or returned to their owner (Lurie, 2010). Regardless, euthanasia is still an option in cases where it is considered necessary to ease a sick or injured animal's suffering, if the animal is considered aggressive to humans, or to curtail the risk of spreading infectious diseases, such as rabies, in line with the no-kill plan and the AAC's ethos (Austin Animal Center, 2020).

There are four broad categories of animal at the AAC, comprising cats, dogs, birds, livestock (predominantly pigs) and 'other' animals, which include wild animals (such as bats, raccoons and foxes), exotic pets (sugar gliders), rodents (rabbits, rats and guinea pigs) and reptiles (snakes and lizards). There are six distinct outcomes for these animals: 'Adoption' (from the AAC directly, and generally applicable to the domestic animal categories), 'Transfer' (to another rescue center), 'Return to Owner', 'Euthanasia', 'Died' and 'Missing'.

This report focuses on the following questions: How long do different types of animals typically spend at the AAC?; At what age are domestic animals typically adopted from the AAC?; What are the main reasons for euthanasia and which animals are most likely to be euthanised?; and, Do the data support the AAC's reputation as a no-kill shelter? Duration and euthanasia rates are further analysed, comparing cats and dogs as subsets of the data. More broadly, this report aims to settle concerns about animal survival rates at no-kill shelters.

DATA

The data used in this report are available to the public and can be accessed at *Data.World* at https://data.world/cityofaustin/9t4d-g238. The csv. file was retrieved for the purpose of this study in February 2020.

The AAC animal outcome data comprise information about 95,397 animals, set out amongst 12 variables, all of which were initially classified as factor variables. *Appendix 2* shows each variable and its properties. The data are observational, and have been recorded by staff at the AAC between 2013 and 2019, although the data continue to be updated in the present. It should be noted that the 'Date.of.Birth' variable, when applied to animals of unknown origin, would be an estimate based on zoological indicators such as body dimensions, body weight, and eye, tooth and claw condition (Morris, 1972). The data have not undergone any cleaning or pre-processing, and required several stages of cleaning and reorganisation in order to become useable in this study. The stages of data cleaning undertaken in this study are outlined in the 'Methods' section, below.

METHODS

The AAC animal outcome data was accessed, cleaned and analysed using the RStudio open source software, version 1.2.5033 (Orange Blossom). The following packages were used to analyse and visualise the data: **tidyr**, **ggplot2** and **diplyr**. Refer to *Appendix 1* for the R code used in the analysis.

Data cleaning

The original AAC data included several different date and time formats that required standardising. Two of the date variables ('Day/Month' and 'Month/Year') contained identical information, listing the date and time (*DD/MM/YYYY hh:mm:ss*) of each animal's arrival at the AAC. It was decided that the time data contained within these variables were not vital to this study, so the **as.Date** function was used (on only 'Day/Month' – 'Month/Year would be deleted later) to retain only date data and convert all observations to a standard *YYYY-MM-DD* format. The variable 'Month/Year' would hence be known as 'Date_Arrival'.

Next, age data had been input as text in terms of days, months and years. In order to standardise, it was decided that, since animals have relatively short life spans, age (and all other measures of time) should be expressed in terms of months. All observations between 1 and 24 years were filtered and saved as a new dataframe, called 'FilterByYears', in which the 'Age.upon.Outcome' variable was converted to a character variable, and amended with **strtrim** so as to keep only the first two characters. The resulting age, in years, was then converted back to a numeric variable and multiplied by 12 in order to achieve the age of each animal in months. A complimentary 'FilterByMonths' dataframe was treated in a similar fashion (See *Appendix 1 – R code*). These two dataframes were then combined using **rbind** and the 'Age.upon.Outcome' variable now contained all ages in months. This process also had the effect of excluding any data less than one month and any '0 years', which would have been too vague to provide meaningful information.

Variable selection/transformation

In order to undertake an analysis of time spent at the AAC, it was necessary to create a 'Duration' variable, created using the **mutate** function from the **dplyr** package. 'Date_Arrival' was subtracted from 'Date_Birth', with the resulting absolute value (divided by 365 and multiplied by 12) providing the 'BirthtoArrival' variable, representing the time between each animal's birth to arrival at the AAC, in months. 'BirthtoArrival' was then subtracted from 'Age.upon.Outcome' to provide the duration of each animal's stay at the AAC, in months.

Finally, variables were renamed so as to be more user-friendly and descriptive, using direct assignment, redundant and/or irrelevant rows were removed, and columns were re-ordered to follow a logical pattern. Rows with missing (*NA*) data were removed using **na.omit**, resulting in a tidied dataframe comprising 36,308 observations and 11 variables. A tabular summary of 'new' variables, listed against the original variables, is located in *Appendix 2* (also see section on type conversion, below).

Type conversion

Several variables in the AAC data were converted from factor variabels in order to become more manageable, outlined in *Appendix 2*. Namely, ‘Animal.ID’ and ‘Age.on.Outcome’ were converted to numeric variables, ‘Animal_ID’ and ‘Age’ using **as.numeric**, and ‘Month.Year’ and ‘Date.of.Birth’ were converted to date variables, ‘Date_Arrival’ and ‘Date_Birth’ using **as.Date**.

Data subset selection and group-based data summarisation

In order to compare outcomes for different kinds of animals, the data needed to be divided into subsets, named ‘Cats’, ‘Dogs’, ‘Birds’, ‘Livestock’ and ‘Other’. These subset dataframes were created by using the **filter** function from the **dplyr** package, filtering the cleaned AAC_Data into five subsets by the variable, ‘Animal_Type’. The resulting dataframes allow direct comparison of outcomes between, for example, cats and dogs, and allows insight into reasons for euthanasia across species. *Table 1* in the results section shows summarisation of the data on the basis of animal type, which informed further analysis of cats and dogs as the main animals in the data.

RESULTS AND DISCUSSION

Exploratory visualisation using ggplot2 - General outcomes

The exploratory visualisation stage of this analysis yielded several interesting conclusions. *Figure 1* shows that the most common outcome for animals in general was ‘Transfer’, followed by ‘Adoption’ and ‘Euthanasia’. ‘Return to Owner’ and ‘Missing’ comprised an insignificant portion of the data. Cats have the lowest euthanasia rate of all categories (except for livestock, comprising a total of seven animals, none of which were euthanised, and one of which was adopted), and the highest adoption rate. ‘Other’ animals have the highest rate of euthanasia, followed by birds.

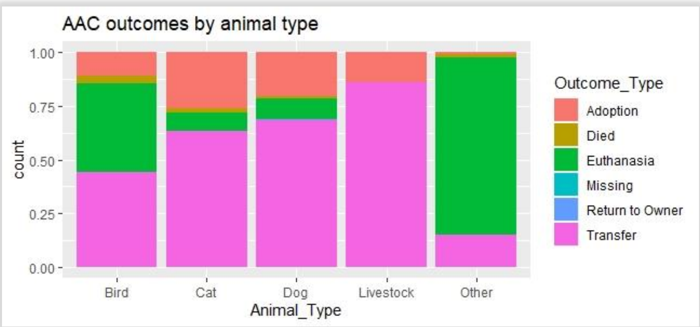

Figure 1: 100% stacked bar plot showing different outcomes across animal type.

Dogs spend the greatest length of time at the AAC, although there are several cats (as well as dogs – represented as outliers) that have spent up to 12 months at the center awaiting an outcome (*figure 2*). All other animal categories generally spend a comparatively short amount of time at the center.

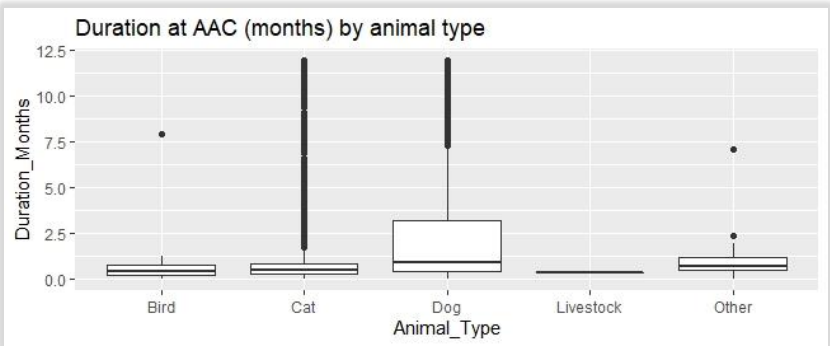

Figure 2: Box plot showing time spent at AAC for each animal type. Dogs generally spend the most time at the shelter.

The mean duration at the AAC by animal type (*figure 3a*) reflects this pattern; the mean duration for dogs is the highest for all animal categories, while cats and livestock spend almost half the duration at the center, and birds and 'other' animals even less so. Cats, livestock and 'other' animals are also younger than dogs and birds at time of outcome, in particular in terms of adoption (*figure 3b*).

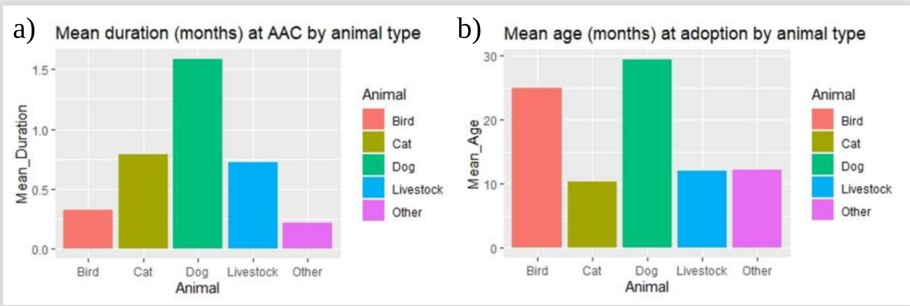

Figure 3: Bar plots showing a) mean duration at AAC for each animal type; b) mean age at time of adoption/

Cats and dogs – data summarisation and subsampling

A quick assessment of 'Animal_Type' using **summarise** revealed that cats and dogs comprise the main two animal groups in the data, and that their numbers are roughly comparable (*Table 1*). The remainder of this report will therefore provide a comparison of outcomes for these two animal types.

Table 1: Data summarisation showing number of each animal type in the AAC data.

Total_Animals	Total_Cats	Total_Dogs	Total_Birds	Total_Livestock	Total_Other
36308	16412	15856	208	7	3825

Figure 4 shows that cats and dogs have similar outcome styles as they age; that is, for both groups euthanasia, while rare, becomes more common as animals age, while adoption and transfer both become less common – particularly when comparing the first few months to the last few. Both groups are more often adopted when they are spayed/neutered (*figure 5*), and these groups also undergo the lowest rates of euthanasia. *Figure 5* also shows that outcome rates for female and male animals of the same type are similar. *Appendix 3* shows that the number of adoptions decline over time for both cats and dogs, with the majority occurring in the early months of life.

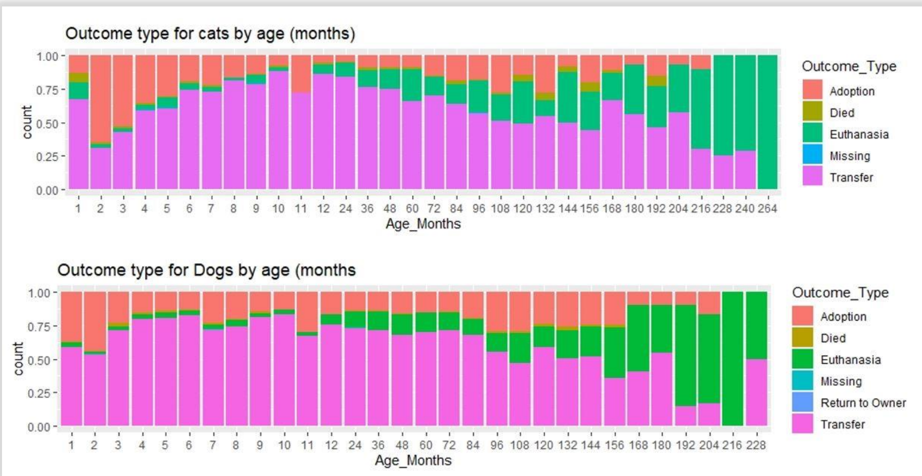

Figure 4: 100% stacked bar plots comparing outcome for cats and dogs by age, showing increase in euthanasia rates with age.

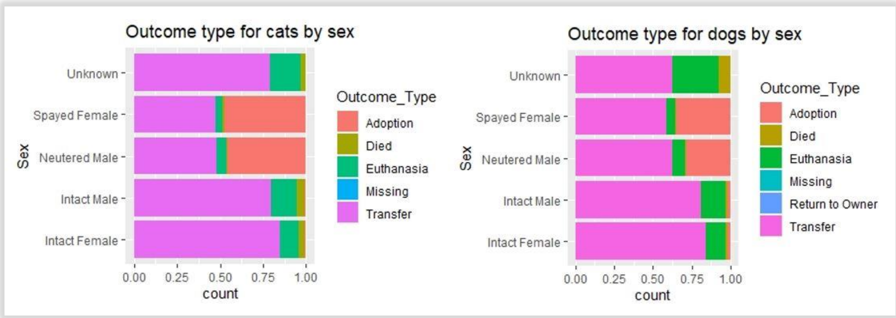

Figure 5: 100% stacked bar plots comparing outcome for cats and dogs by age, showing similar patterns in terms of outcome by sex.

Euthanasia

Figure 6 demonstrates that dogs experience the highest rate of euthanasia, and that the predominant reason is due to aggression (presumably towards humans). Birds and cats are typically euthanised for reasons relating to minimising their suffering, likely due to illness or injury. For other animals, the main reason is due to 'rabies risk'. No livestock have been euthanised at the ACC since data collection commenced, and so have been omitted from the plot.

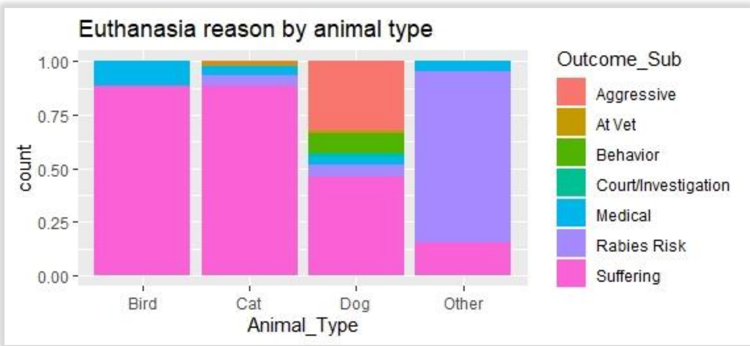

Figure 6: 100% stacked bar plot showing reason for euthanasia for each animal type.

In the original dataset of 95,367 observations, 6,873 contained 'Euthanasia' for 'Outcome_Type'. This equates to a 7.20% euthanasia rate and a 92.80% survival rate.

CONCLUSION

In conclusion, this report finds that rates of adoption and transfer to other shelters decrease as animals age, while rates of euthanasia increase. The reasons for euthanasia vary across animal types; cats and birds are usually euthanised in order to minimise their suffering, while for dogs, the main reason is aggression and for other animals the primary reason is due to rabies risk.

Dogs spend the longest duration at the AAC, and are adopted at a higher mean age than cats. Younger animals in general are more readily adopted than older ones. Among both cats and dogs, desexed animals tend to be adopted in favour of those that have not been desexed.

The analysis of these data supports the 90% survival rate claim made by the AAC; There is a 92.80% survival rate for animals at this center. The Austin Animal Center is a true no-kill shelter and the data show that the AAC does live up to the no-kill plan implemented in 2010.

REFERENCES

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APPENDIX

Appendix 1 - Assignment 5 capstone project R code

```
# Set working directory and import data
	setwd('C:/Users/laura/OneDrive/Desktop/MA5800')
	AAC_Data <- read.csv("AAC_Outcomes.csv", header = TRUE, sep = ",", na.strings = c("", "NA"))
	dim(AAC_Data)
# Add libraries
	library(tidyr)
	library(dplyr)
	library(ggplot2)
# RStudio Version
	RStudio.Version()
DATA CLEANING~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~#
# Type conversion
	Animal_ID <- as.numeric(Animal_ID)
	Age <- as.character(Age)
# Create new variables
	AAC_Data$Date_Birth <- as.POSIXct(AAC_Data$Date.of.Birth, format = "%m/%d/%Y")
	Date_Birth <- as.Date(AAC_Data$Date_Birth)
	AAC_Data$Date_Arrival <- as.POSIXct(AAC_Data$DateTime, format = "%m/%d/%Y")
	Date_Arrival <- as.Date(AAC_Data$Date_Arrival)
#filter by years, convert to character to remove 'years', convert back to numerical, multiply by 12 to convert to
months
	YearsOnly <- c("1 year", "2 years", "3 years", "4 years", "5 years", "6 years", "7 years", "8 years", "9
	years", "10 years", "11 years", "12 years", "13 years", "14 years", "15 years", "16 years", "17 years",
	"18 years", "19 years", "20 years", "21 years", "22 years", "23 years", "24 years")
	FilterByYears <- filter(AAC_Data, Age.upon.Outcome %in% YearsOnly)
	FilterByYears$Age.upon.Outcome <- as.character(FilterByYears$Age.upon.Outcome)
	FilterByYears$Age.upon.Outcome <- strtrim(FilterByYears$Age.upon.Outcome, 2)
	FilterByYears$Age.upon.Outcome <- as.numeric(FilterByYears$Age.upon.Outcome)*12
#As above, for months, no conversion needed as already in months
	MonthsOnly <- c("1 month", "2 months", "3 months", "4 months", "5 months", "6 months", "7
	months", "8 months", "9 months", "10 months", "11 months", "12 months")
		FilterByMonths <- filter(AAC_Data, Age.upon.Outcome %in% MonthsOnly)
	FilterByMonths$Age.upon.Outcome <- as.character(FilterByMonths$Age.upon.Outcome)
	FilterByMonths$Age.upon.Outcome <- strtrim(FilterByMonths$Age.upon.Outcome, 2)
	FilterByMonths$Age.upon.Outcome <- as.numeric(FilterByMonths$Age.upon.Outcome)
# Join two dataframes together
	AAC_Data <- rbind(FilterByMonths, FilterByYears) #This omits any data containg 'days' or '0 years'
# Create new variables - BirthtoArrival and Duration, both in months
	AAC_Data <- mutate(AAC_Data, BirthtoArrival = abs(Date_Birth - Date_Arrival)/365*12)
	AAC_Data <- mutate(AAC_Data, Duration = abs(Age.upon.Outcome - BirthtoArrival))
# Rename variables
	AAC_Data$Animal_ID <- AAC_Data$Animal.ID
	AAC_Data$Outcome_Type <- AAC_Data$Outcome.Type
	AAC_Data$Outcome_Sub <- AAC_Data$Outcome.Subtype
	AAC_Data$Duration_Months <- AAC_Data$Duration
	AAC_Data$Sex <- AAC_Data$Sex.upon.Outcome
	AAC_Data$Age_Months <- AAC_Data$Age.upon.Outcome
	AAC_Data$Animal_Type <- AAC_Data$Animal.Type
# Remove redundant rows
```

```
	AAC_Data <- select(AAC_Data, -Name, -DateTime, -MonthYear, -Date.of.Birth, -
	Sex.upon.Outcome, -Age.upon.Outcome, -Duration, -Animal.ID, -Outcome.Type, -Outcome.Subtype,
	-Animal.Type, -BirthtoArrival)
#Reorder Rows
	colnames(AAC_Data)
	AAC_Data <- AAC_Data[,c(5,11,1,2,9,10,6,7,3,4,8)]
# Remove rows with missing data
	AAC_Data <- na.omit(AAC_Data)
#Dataframe has now been cleaned and organised
	dim(AAC_Data)
DATA SUMMARISATION~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~#
	AAC_Summary <- summarise(AAC_Data, Total_Animals = n(), Total_Cats = sum(Animal_Type ==
	"Cat"), Total_Dogs = sum(Animal_Type == "Dog"), Total_Birds = sum(Animal_Type == "Bird"),
	Total_Livestock = sum(Animal_Type == "Livestock"), Total_Other = sum(Animal_Type ==
	"Other"))
	View(AAC_Summary)
DATA EXPLORATION~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~#
# Set variables
	Animal_ID <- AAC_Data$Animal_ID
	Name <- AAC_Data$Name
	Date <- AAC_Data$DateTime
	DOB <- AAC_Data$Date_Birth
	Outcome <- AAC_Data$Outcome_Type
	Outcome_Sub <- AAC_Data$Outcome_Sub
	Animal_Type <- AAC_Data$Animal_Type
	Sex <- AAC_Data$Sex
	Age <- AAC_Data$Age_Months
	Breed <- AAC_Data$Breed
	Colour <- AAC_Data$Color
	Duration <- AAC_Data$Duration_Months
#SUBSAMPLE~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~#
#CATS, DOGS, BIRDS, LIVESTOCK, OTHER
	Cats <- filter(AAC_Data, Animal_Type == "Cat")
	Dogs <- filter(AAC_Data, Animal_Type == "Dog")
	Birds <- filter(AAC_Data, Animal_Type == "Bird")
	Livestock <- filter(AAC_Data, Animal_Type == "Livestock")
	Other <- filter(AAC_Data, Animal_Type == "Other")
#ADOPTED CATS, DOGS, BIRDS, OTHER
	Adopted <- filter(AAC_Data, Outcome_Type == "Adoption")
	Adopted_Cats <- filter(Adopted, Animal_Type == "Cat")
	Adopted_Dogs <- filter(Adopted, Animal_Type == "Dog")
	Adopted_Birds <- filter(Adopted, Animal_Type == "Bird")
	Adopted_Livestock <- filter(Adopted, Animal_Type == "Livestock")
	Adopted_Other <- filter(Adopted, Animal_Type == "Other")
#MEAN DURATION~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~#
	AAC_Data$Duration_Months<- as.numeric(AAC_Data$Duration_Months)
	Cat_Dur <- mean(Cats$Duration_Months)
	Dog_Dur <- mean(Dogs$Duration)
	Bird_Dur <- mean(Birds$Duration)
	Livestock_Dur <- mean(Livestock$Duration)
	Other_Dur <- mean(Other$Duration)
#Create dataframe
	Animal <- c("Cat", "Dog", "Bird", "Livestock", "Other")
	Mean_Duration <- c(Cat_Dur, Dog_Dur, Bird_Dur, Livestock_Dur, Other_Dur)
	Duration_AAC <- data.frame(Animal, Mean_Duration)
```

```
#MEAN AGE ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~#
        CatAge <- mean(Adopted_Cats$Age)
        DogAge <- mean(Adopted_Dogs$Age)
        BirdAge <- mean(Adopted_Birds$Age)
        LivestockAge <- mean(Adopted_Livestock$Age)
        OtherAge <- mean(Adopted_Other$Age)
#Create dataframe
        Animal <- c("Cat", "Dog", "Bird", "Livestock", "Other")
        Mean_Age <- c(CatAge, DogAge, BirdAge, LivestockAge, OtherAge)
        Adopted_Age_AAC <- data.frame(Animal, Mean_Age)
GENERAL PLOTS~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~#
        Plot1 <- ggplot(data = AAC_Data) +
                geom_bar(mapping = aes(x = Animal_Type, fill = Outcome_Type), position = "fill")
                Plot1 + (labs(title = "AAC outcomes by animal type"))
        Plot2 <- ggplot(data = Duration_AAC) +
                geom_bar(mapping = aes(x = Animal, y = Mean_Duration, fill = Animal), stat = "identity")
                Plot2 + (labs(title = "Mean duration (months) at AAC by animal type"))
        Plot3 <- ggplot(data = Adopted_Age_AAC) +
                geom_bar(mapping = aes(x = Animal, y = Mean_Age, fill = Animal), stat = "identity")
                Plot3 + (labs(title = "Mean age (months) at adoption by animal type"))
Adopted <- mutate(Adopted, log_Age_Months = log (Adopted$Age_Months))
        Plot4 <- ggplot(data = Adopted) +
                geom_boxplot(mapping = aes(x = Animal_Type, y = log_Age_Months))
                Plot4 + (labs(title = "Age at adoption (months) by animal type"))
        Plot5 <- ggplot(data = Adopted) +
                geom_boxplot(mapping = aes(x = Animal_Type, y = Age_Months))
                Plot5 + (labs(title = "Age at adoption (months) by animal type"))
        Plot6 <- ggplot(data = Adopted) +
                geom_boxplot(mapping = aes(x = Animal_Type, y = Duration_Months))
                Plot6 + (labs(title = "Duration at AAC (months) by animal type"))

CAT PLOTS~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~#
Cats$Age_Months <- as.factor(Cats$Age_Months)
        Cat_Plot1 <- ggplot(data = Cats) +
                geom_bar(mapping = aes(x = Age_Months, fill = Outcome_Type), position = "fill")
                Cat_Plot1 + labs(title = "Outcome type for cats by age (months)")
        Cat_Plot2 <- ggplot(data = Cats) +
                geom_bar(mapping = aes(x = Sex, fill = Outcome_Type), position = "fill")
                Cat_Plot2 + labs(title = "Outcome type for cats by sex") + coord_flip()
        Cat_Plot3 <- ggplot(data = Adopted_Cats) +
                geom_bar(mapping = aes(x = Age_Months, y = Outcome_Type), stat = "identity")
                Cat_Plot3 + (labs(title = "Cat adoption by age"))

DOG PLOTS~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~#
Dogs$Age_Months <- as.factor(Dogs$Age_Months)
        Dog_Plot1 <- ggplot(data = Dogs) +
                geom_bar(mapping = aes(x = Age_Months, fill = Outcome_Type), position = "fill")
                Dog_Plot1 + labs(title = "Outcome type for Dogs by age (months")
        Dog_Plot2 <- ggplot(data = Dogs) +
                geom_bar(mapping = aes(x = Sex, fill = Outcome_Type), position = "fill")
                Dog_Plot2 + labs(title = "Outcome type for dogs by sex") + coord_flip()
        Dog_Plot3 <- ggplot(data = Adopted_Dogs) +
                geom_bar(mapping = aes(x = Age_Months, y = Outcome_Type), stat = "identity")
                Dog_Plot3 + (labs(title = "Dog adoption by age"))
```

```
EUTHANASIA PLOTS~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~#
Euthanasia <- filter(AAC_Data, Outcome_Type == "Euthanasia")
	Euth_Plot1 <- ggplot(data = Euthanasia) +
		geom_bar(mapping = aes(x = Animal_Type, fill = Outcome_Sub), position = "fill")
		Euth_Plot1 + labs(title = "Euthanasia reason by animal type")
#>90% SURVIVAL?
	Euthanasia <- filter(AAC_Data, Outcome_Type == "Euthanasia")
	6873*100/95367
	100-(6873*100/95367)
```

Appendix 2 – Table showing variable type, (original and new) and data contained in variables.

VARIABLE	TYPE	VARIABLE (NEW)	TYPE (NEW)	DATA
Animal.ID	Factor	**Animal_ID**	Numeric	Unique ID number for each animal
Name	Factor			
DateTime	Factor	**Date_Arrival**	Date	Date and time of arrival
MonthYear	Factor			
Date.of.Birth	Factor	**Date_Birth**	Date	Estimated or known date of birth
Outcome.Type	Factor	**Outcome_Type**	Factor	Outcome
Outcome.Subtype	Factor	**Outcome_Sub**	Factor	Further information on outcome
Animal.Type	Factor	**Animal_Type**	Factor	Category of animal
Sex.upon.Outcome	Factor	**Sex**	Factor	Sex at time of outcome
Age.upon.Outcome	Factor	**Age_Months**	Numeric	Age at time of outcome
Breed	Factor	**Breed**	Factor	Breed of animal
Color	Factor	**Color**	Factor	Colour of animal
		Duration	Numeric	Total months spent at the AAC

Appendix 3 – Bar plots showing declining instances of adoption for cats and dogs with age.