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Legislating Components of a Humane City: The Economic Impacts of the Austin, Texas "No Kill" Resolution (City of Austin Resolution 20091105-040)

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	3
ABBREVIATIONS	5
INTRODUCTION: LEGISLATING A HUMANE CITY	6
BACKGROUND	7
AUSTIN AND TRAVIS COUNTY COMMUNITY PROFILE	7
AUSTIN ANIMAL CENTER OVERVIEW	9
AUSTIN PETS ALIVE! OVERVIEW	9
HISTORY OF CITY OF AUSTIN'S RESOLUTION 20091105-040	10
IMPACT ASSESSMENT METHODOLOGY	13
IMPACTS ON SHELTER MANAGEMENT AND OUTCOMES	16
INTAKE	16
OUTCOMES	21
TRANSFER PARTNERSHIPS	27
ASSESSMENT OF LIVE OUTCOMES	29
IMPACTS ON CITY OF AUSTIN COMMUNITY	33
AUSTIN ANIMAL SERVICES BUDGET	33
SHELTER OPERATIONS	36
VETERINARY CARE AND PET SERVICES	37
PET RETAIL	39
CITY OF AUSTIN BRAND EQUITY	40
POTENTIAL ADDITIONAL IMPACTS	43
PUBLIC HEALTH	43
SOCIAL CAPITAL	45
COMMUNITY ENGAGEMENT	46
LIMITATIONS AND IMPLICATIONS	49
CONCLUSION	49

APPENDICIES	51
APPENDIX A: PET OWNERSHIP ESTIMATES BY STATE (AVMA)	51
APPENDIX B: PET OWNERSHIP ESTIMATES BY MSA (AMERICAN HOUSING SURVEY)	53
APPENDIX C: AUSTIN ANIMAL CENTER INTAKE	54
APPENDIX D: TRAVIS COUNTY DEAD ANIMAL PICK UP	55
APPENDIX E: POSITIVE ALTERNATIVES TO SHELTER SURRENDER (PASS) INTAKE	56
APPENDIX F: AAC AND APA OUTCOME DATA	57
APPENDIX G: 2016 APA LENGTH OF STAY DATA	58
APPENDIX H: AUSTIN ANIMAL CENTER BUDGET	59
APPENDIX I: IMPLAN DATA	60
APPENDIX J: LIFETIME ANIMAL SPEND (BASED ON THE NATIONAL PET PRODUCTS ASSOCIATION STUDY)	62
APPENDIX K: PET-FRIENDLY RENTAL HOUSING COMPARISON	63
APPENDIX L: REASONS FOR MOVING (CURRENT POPULATION SURVEY, ANNUAL SOCIAL AND ECONOMIC SUPPLEMENT)	64
APPENDIX M: SUMMARY OF BRAND EQUITY CALCULATIONS	65
APPENDIX N: AUSTIN ANIMAL SERVICES BITE DATA	66
APPENDIX O: CITY OF AUSTIN CRUELTY TO ANIMALS CASES	67
APPENDIX P: AUSTIN PETS ALIVE! DONATIONS	68

Executive Summary

A Humane City is characterized by the presence of leadership, institutions, and policies working collaboratively across systems to create and implement sustainable human, animal, and environmental welfare. In addition to improving animal welfare, cities that align their policies with humane tenets of compassionate engagement may accrue important economic, public health, and social benefits for their human residents. This report investigates and measures the economic impacts of the City of Austin Resolution 20091105-040, commonly referred to as the “No Kill” resolution, utilizing standard impact assessment methodology. Resolution 20091105-040 resulted in the implementation of a series of recommendations that included achieving and maintaining a 90% Live Release Rate for all companion animals housed at the City of Austin’s municipal animal shelter. In order to effectively determine the impact of Resolution 20091105-040, this study utilized data obtained from a variety of sources, including Austin Animal Center (the municipal animal shelter), Austin Pets Alive! (a private, non-profit animal shelter that takes in Austin Animal Center’s “at risk” for euthanasia animals), public information requests, survey responses from Austin residents, the U.S. Census Bureau County Business Patterns report, American Housing Survey reports, and IMPLAN software.

The economic impact of Resolution 20091105-040 has been measured with consideration for the increased costs and economic outputs resulting from the changes in shelter operations, the potential growth in utilization of veterinary and pet care services, and the potential increases in retail sales of pet products in the Austin/Travis County area. Calculations were also used to estimate the more indirect impacts on the City of Austin’s brand equity. Over the period of study (2010-2016), the regional economic impact of the Resolution has been conservatively measured as follows:

<u>Impacts:</u>	
Resolution Premium	(\$30,379,667)
Shelter Operations	\$40,938,565
Veterinary/Pet Care Services	\$49,307,682
Pet Retail Services	\$25,333,237
City of Austin Brand Equity	\$72,252,686
TOTAL ECONOMIC IMPACT	\$157,452,503

In addition to exploring the specific economic impacts of Resolution 20091105-040, this report also outlines, but does not quantify, the potential broader impacts of the Resolution on human, animal, and environmental health. These areas of impact include: public health, social capital, and community engagement.

Overall, this report concludes that a high Live Release Rate is achievable on a community-wide level. However, Resolution 20091105-040 has resulted in a considerably higher than average cost per animal served by Austin Animal Center when compared to previous City of Austin expenditures and several other major U.S. cities¹. These costs are balanced by a series of economic and public health benefits that may be accrued across the community. These findings are largely generalizable due to the utilization of conservative data assumptions and standard economic analyses. Austin's municipal shelter undertook a major operational shift to implement the legislation, which required coordinated and sustained collaboration between Austin's animal welfare organizations, city policies, city leadership, and citizens (both pet-keeping and otherwise). A city's decision to implement comparable policies should be made with consideration for the capacity of the existing animal welfare organizations, the cost and resources needed from both community members and partner organizations, and the ethical balance the community seeks to achieve between the animal welfare issues associated with euthanasia versus extended lengths of stay under sheltering conditions.

¹ These five U.S. cities do not have legislation that specifically governs municipal shelter operations in terms of Live Release Rate.

Abbreviations

AAC	Austin Animal Center
AAS	Austin Animal Services
ABP	Analysis by Parts
AHS	Austin Humane Society
APA	Austin Pets Alive!
AVMA	American Veterinary Medical Association
CBP	County Business Patterns Survey
IHAC	Institute for Human-Animal Connection
IO	Input-Output
LRR	Live Release Rate
MSA	Metropolitan Statistical Area
RTO	Return to Owner
TLAC	Town Lake Animal Center

Introduction: Legislating a Humane City

One Health, a concept collaboratively proposed by the American Veterinary Medical Association (AVMA) and the American Medical Association (AMA), literature documents the ways in which human, non-human animal (henceforth “animal”), and environmental health outcomes can be interconnected. This concept provides a foundation upon which to advocate for policies that promote attention to animal welfare². Making the case for adopting policies that promote the wellbeing of all living things requires an increase in interdisciplinary engagement that can specifically address the economic and social pressures that bring harm to human populations, animal populations, and the environment alike^{3,4}. A Humane City, as defined by the University of Denver’s Institute for Human-Animal Connection, is characterized by the presence of leadership, institutions, and policies working collaboratively across systems to create and implement sustainable human, animal, and environmental welfare. Animal welfare organizations, specifically local companion animal shelters and rescues, provide an opportunity to understand how one aspect of a Humane City – progressive animal welfare policies – can impact the health and prosperity of a community.

Utilizing a social-environmental-economic impact analysis methodology⁵, the following study measured the social, environmental, and economic impacts of the City of Austin Resolution 20091105-040, commonly referred to as the Austin “No Kill” resolution (the report will reference the resolution number throughout for specificity within the context of several animal-related city resolutions implemented during this time). How these impacts contribute to more global outcomes in areas of public health and safety will also be discussed. Resolution 20091105-040 represents just one policy that contributes to Austin’s advancement towards a Humane City designation, as defined by the aforementioned criteria. A Humane City will have a system of policies promoting compassion and respect that transverse all aspects of public life. Additional examples of humane policies in Austin include the conservation measures for the bat colonies under the Congress Avenue Bridge, ordinances that prohibit the chaining of dogs, the establishment of pet-friendly office spaces⁶, and the passage of a Children’s Outdoor Bill of Rights Resolution⁷. These policies are all indicative of a city committed to promoting a balance among human, animal, and environmental systems. This report will present Resolution 20091105-040 as a case study of the impacts that may result from efforts directed towards establishing a Humane City.

² American Veterinary Medical Association (2008). One health: A new professional imperative. Retrieved from: https://www.avma.org/KB/Resources/Reports/Documents/onehealth_final.pdf.

³ Edwards, P. & Abivardi, C. (1998). The value of biodiversity: where ecology and economy blend. *Biological Conservation*. 83:3. 239-246.

⁴ Folke, C., Holling, C.S., & Perrings, C. (1996). Biological diversity, ecosystem and the human scale. *Ecological applications* 6, 1018-1024.

⁵ Vanclay, F. (2015). Social impact assessment: guidance for assessing and managing the social impacts of projects. International Association of Impact Assessment.

⁶ <http://www.builtinaustin.com/2017/04/24/office-perks-dogs>

⁷ <http://www.childrenandnature.org/2017/05/25/a-childs-right-to-nature-why-the-city-of-austin-created-a-childrens-outdoor-bill-of-rights/>

Background

Austin and Travis County Community Profile

The population of Travis County has increased by 17.1% over the last six years with the population estimated at 1,199,323 individuals as of July 2016⁸. Of the residents in the county, 49.4% identify as white only, 33.8% identify as Hispanic or Latino, and 8.9% identify as Black or African American, with the remaining 7.9% identifying as another race or ethnicity⁹. Approximately 62% of the population is within the age range of 18 and 65, and 46% of all Austin residents report that they have attained an education of a Bachelor's degree or higher. In rankings of the most educated cities in the U.S., Austin frequently appears in the top 10¹⁰. As of 2016, there are an estimated 499,062 housing units, with the median gross rent listed as \$1,054 and the median household income reported at \$61,451¹¹.

The city of Austin's pet-keeping rate is estimated to be higher than the rates on both the national level and in the state of Texas. Although no survey has been conducted in Austin to specifically measure the rate of pet-keeping, two data sources for pet-keeping rates across the U.S. were used to calculate Austin's pet-keeping for the purposes of this report. In a survey conducted by the AVMA in 2012¹², which collects data on the state level but not at the county or city level, Texas ranked 21st in pet-keeping (data in Appendix A). The American Housing Survey presented by the U.S. Census Bureau¹³ indicated that the Austin-Round Rock area was 3rd out of the 25 Metropolitan Statistical Areas (MSAs) in percentage of housing units that are occupied with pets in 2013 (Appendix B)¹⁴. When assessing the two sources for an estimate of pet-keeping in Austin, AVMA and the American Housing Survey yield different pet-keeping rates likely due to definitional issues¹⁵. For the purposes of this report, Austin is estimated to have a 63.4% pet-keeping rate as of the year 2012 (Table 1)¹⁶.

⁸ <https://www.census.gov/quickfacts/fact/table/traviscountytexas,austincitytexas/PST045216>

⁹ Ibid.

¹⁰ <https://wallethub.com/edu/most-and-least-educated-cities/6656/>

¹¹ <https://www.census.gov/quickfacts/fact/table/traviscountytexas,austincitytexas/PST045216>

¹² <https://www.avma.org/KB/Resources/Statistics/Pages/Market-research-statistics-US-pet-ownership.aspx>

¹³ https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=AHS_2013_S06AO&prodType

¹⁴ This data comes from a survey that include a question on the presence of pets in occupied units as part of the 2013 Emergency and Disaster Preparedness supplement conducted for 25 Metropolitan Statistical Areas (MSA). This data was not available longitudinally because the American Housing Survey does not regularly track pet-keeping.

¹⁵ The American Housing Survey is designed to determine pet-keeping rates for disaster preparation purposes, which include considerations such as ease of entry and potential exits to occupied units where pets may reside

¹⁶ National and TX ownership rates as reported in AVMA 2012 Report.

Region	Estimated % of Households with Pets
USA	56.0%
Texas	58.5%
Austin - Round Rock MSA	63.4%

Table 1. Austin pet-keeping rate was estimated using 2013 American Housing Survey data, where Austin-Round Rock MSA’s “units occupied with pets” rate was reported to be 113% of national pet-keeping rates. Because American Housing Survey data were not available at the state-wide level, 113% was then applied to national AVMA reported pet-keeping rates to estimate Austin’s pet-keeping rate of 63.4%¹⁷.

Within the city limits of Austin, there are three animal shelters that provide the majority of services for unhoused companion animals. Austin Animal Center (AAC) is the publicly funded municipal shelter for the city, whereas Austin Pets Alive! (APA) and the Austin Humane Society (AHS) are private, nonprofit facilities that provide the largest percentage of remaining companion animal relinquishment and/or adoption opportunities within the city. Through transfer partnerships among the three shelters, and with an extensive network of rescue groups in the area, the city of Austin serves over 31,000 companion animals each year¹⁸. For the purposes of the impact analysis as it pertains to the implementation of Resolution 20091105-040, this study documented the specific processes of two of these three major sheltering organizations, AAC was selected because it was the primary shelter impacted by Resolution 20091105-040. APA was selected due to its role as a formal partner to AAC in increasing lifesaving for those animals most “at risk” (of euthanasia), both prior to and following the Resolution. These two organizations represent a significant majority of the sheltering available for animals in Austin, with AAC and APA handling a combined 68% of all animals sheltered in the city in 2016 (Figure 1).

¹⁷ Due to the limitations of existing data on rates of pet-keeping, comparisons of pet-keeping rate prior to the implementation of the Resolution and following the Resolution could not be calculated.

¹⁸ http://www.austinhumanesociety.org/about-us/about_faqs/

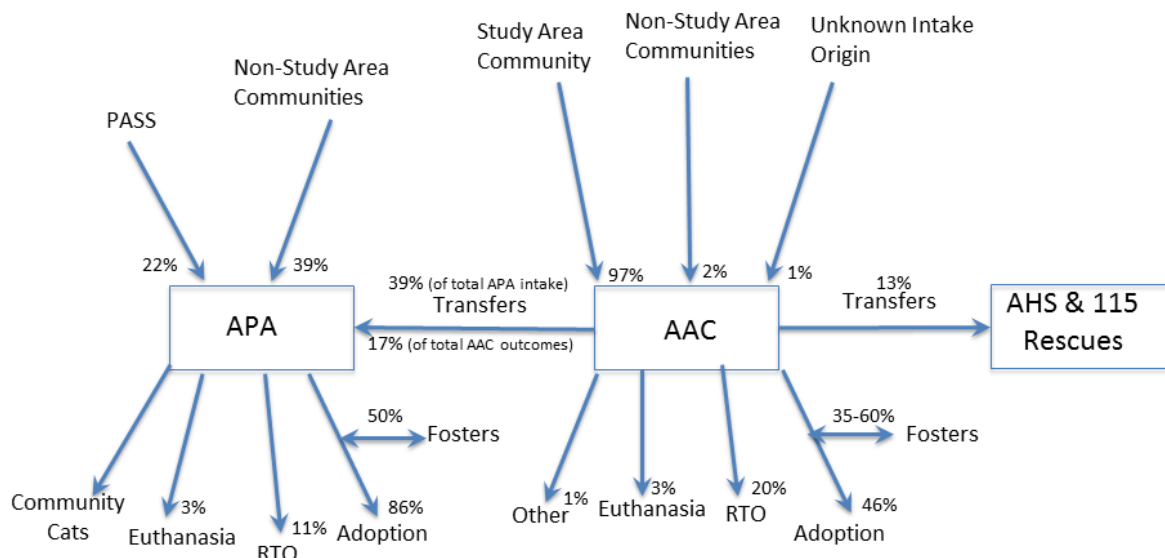


Figure 1. The dynamics of intake and outcomes within two of Austin’s primary animal shelters in 2016¹⁹. Percentages represent the portion of all animals taken into the care of AAC and APA that were documented within the intake or outcome category.

Austin Animal Center Overview

AAC is one of the largest publicly-funded, municipal animal shelters in the United States that aligns itself with the “No Kill” shelter management practices²⁰ under municipal mandate. In 2016, AAC took in over 16,000 animals²¹. The shelter operates largely as an open admission facility, with the exception of times in which sheltered animal volume is high (this operational model as a result of Resolution 20091105-040 is described in greater detail in the “Shelter Management and Outcomes” section of this report). As a component of the implementation plan for Resolution 20091105-040, AAC established a formal partnership with APA to serve Austin’s most at-risk (of euthanasia) companion animals.

Austin Pets Alive! Overview

APA is a privately funded, 501(c)(3) non-profit organization that was reorganized in 2008 as a companion animal rescue focused on serving the populations of dogs and cats that were most at risk to be euthanized at AAC prior to the passage of Resolution 20091105-040. Those identified as most at-risk included: puppies with parvovirus, neonatal orphaned kittens, cats with ringworm or feline leukemia, large adult dogs, and animals requiring significant behavioral and/or medical treatment. As a result of its early focus on these challenging populations, APA has a collection of innovative programs designed to support medical and behavioral challenges that were previously considered grounds for euthanasia. APA’s medical clinic operates on a model of cost-effective care

¹⁹ Based on animal intake and outcome data provided by AAC and APA.

²⁰ http://www.nokilladvocacycenter.org/uploads/4/8/6/2/48624081/no_kill_101.pdf

²¹ AAC intake data

for critically injured and ill dogs and cats. The behavior program is designed for the enrichment and stress relief of dogs with extended stays and includes daily playgroups as well as Canine Good Citizen training and certification²². To facilitate adoption of its animals, APA utilizes on-site matchmakers with intimate knowledge of individual animals, an extensive foster care network that makes animals in off-site care available to potential adopters, and virtual fosters who support APA staff in communicating with potential adopters. APA does not offer owner relinquishment services. Therefore, the animals available for adoption at APA are comprised of transfers from AAC, other local shelters, and increasingly, other shelters in Texas. APA also accepts animals from the Positive Alternatives to Shelter Surrender (PASS) program offered through AAC and APA's websites (described in more detail in the "Shelter Management and Outcomes" section). In 2016, APA took in over 7,000 animals, many of which (39%) came as transfers from AAC²³.

History of City of Austin's Resolution 20091105-040

Historically, Austin's municipal shelter (formerly located at Town Lake Animal Center, and now AAC) had an exceptionally low rate of live outcomes for animals that entered its care. Prior to 1997, nearly all orphaned kittens and puppies under the age of eight weeks, dogs with parvovirus, and cats with ringworm were euthanized at the time of intake. The Live Release Rate (LRR) (defined as the percentage of animals leaving the shelter alive, no matter what their health or behavior status, through adoption, return to owner, or transfer) during this time frame is estimated to have been approximately 15%. In 1997, Austin's animal welfare leaders came together to evaluate these outcomes and worked with the Austin City Council to pass the No Kill Millennium resolution (City of Austin Resolution No. 971211-41²⁴). This resolution stated that the city's Animal Advisory Commission would work with the group of citizens organized under the name Austin Pets Alive! to take steps towards ending the killing of adoptable sheltered companion animals by the year 2002. In Austin, the Animal Advisory Commission is responsible for: advising the city council and the Travis County Commissioners Court on compliance with Texas Health and Safety Code; advising the city council on animal welfare policies and on budget priorities identified by the Commission and the community; promoting collaboration between the City and interested parties relating to animal welfare in the city; identifying proactive, creative approaches to engage and facilitate communication within the animal welfare community; and fostering and assisting the development of animal welfare programs in the community²⁵. In accordance with best practices in reducing companion animal populations, substantial resources were committed at this time towards accessible

²² <http://www.akc.org/dog-owners/training/canine-good-citizen/>

²³ APA intake data

²⁴ <http://www.austintexas.gov/edims/document.cfm?id=131520>

²⁵ <https://austintexas.gov/aac>

spay/neuter services^{26,27,28,29}. As a result of this initial resolution, the LRR was reported to have increased to 50% by 2005³⁰.

In January of 2009, the efforts to continue to increase Austin's LRR were renewed with Resolution No. 20090115-059³¹, which provided a directive to the Animal Advisory Commission to "evaluate and make recommendations on policies and programs proven to be effective at reducing the killing of homeless animals, including, but not limited to, policies and programs related to reducing the intake, and increasing live outcomes, of sheltered animals." As a result of this directive, Resolution 20091105-040³², commonly referred to as the "No Kill" resolution, was passed in November of 2009. This resolution directed the City Manager to operationalize the Animal Advisory Commission's recommendations, one of which committed the city to achieving a 90% LRR^{33,34,35}. The implementation plan for achieving this goal (approved March 11, 2010) included: an immediate moratorium on the euthanasia of animals if there were available kennels at the municipal facility; redefining the mission of the Austin Animal Services (AAS) department; transitioning the municipal facility out of the Town Lake Animal Center (TLAC)³⁶ to the AAC facility (built in 2011); offering off-site adoptions; increasing medical capacity; hiring full-time companion animal behaviorists; revising the relinquishment processes to require counseling appointments; expanding the foster care program; enhancing spay/neuter outreach; returning stray cats to their source communities; increasing relationships with rescue groups; and increasing public awareness through marketing campaigns. An additional Resolution was passed in March of 2010 (Resolution No. 20100311-021³⁷) to include supplemental funding for programs that were believed to be contributing to the increase in City of Austin's LRR, including off-site adoptions, on-site veterinary and behavior staff, stray cat relocation field services, and spay/neuter outreach.

The process of gaining public support for the resources needed to achieve the goal of 90% live outcomes for all animals at the municipal facility did not proceed without resistance^{38,39}. The "No Kill" movement has emerged as a contentious issue across local and national animal sheltering communities, generating critical discussion around topics of data collection, reporting of outcomes, and best practices in animal

²⁶ Frank, J.M., Carlisle-Frank, P.L. (2007). Analysis of programs to reduce overpopulation of companion animals: Do adoption and low-cost spay/neuter programs merely cause substitution of sources? *Ecological Economics*, 62, 740-746.

²⁷ Frank, J. (2004). An interactive model of human and companion animal dynamics: the ecology and economics of dog overpopulation and the human costs of addressing the problem. *Journal of Human Ecology* 32 (1), 107-130.

²⁸ Hodge, G.H. (1976). The reign of dogs and cats' or contemporary concepts of animal control. *Management Information Service Report* 8 (10), 1-20.

²⁹ Clancy, E.A., Rowan, A.N. (2003). Companion animal demographics in the United States: a historical perspective. *The state of the Animals II: 2003*. Humane Society of the United States, Washington DC.

³⁰ <https://www.austinpetsalive.org/2016/07/history-of-no-kill-part-1/>

³¹ <http://www.austintexas.gov/edims/document.cfm?id=125481>

³² <http://www.ci.austin.tx.us/edims/document.cfm?id=131732>

³³ http://www.austintexas.gov/sites/default/files/files/Animal_Services/priority_recs_0211.pdf

³⁴ http://www.austintexas.gov/sites/default/files/files/Animal_Services/aac_no_kill_implementation_plan.pdf

³⁵ http://www.austintexas.gov/sites/default/files/files/Animal_Services/aac_report.pdf

³⁶ Green, A. (2015, December 11). Austin moves forward with plans to expand Animal Center. *My Statesman*. Retrieved from: <http://www.mystatesman.com/news/local/austin-moves-forward-with-plans-expand-animal-center/hxs5K7DhksQoofm8WIPnsM/#95e1573e.3594764.735717>

³⁷ <http://www.austintexas.gov/edims/document.cfm?id=135138>

³⁸ http://www.americapetsalive.org/wp-content/uploads/2012/11/how_apa_started.pdf

³⁹ <http://www.ci.austin.tx.us/edims/document.cfm?id=134839>

care and welfare⁴⁰. The implementation of Resolution 20091105-040 and the programmatic changes required to maintain a 90% LRR for animals entering into Austin's municipal facility required increases to the city budget, ongoing renovations to the AAC facility, and an increased demand for community volunteers to perform the various animal care responsibilities of the shelter. Concerns around restricted intake of animals, increased lengths of stay, higher costs per sheltered animal, and an increased burden on surrounding communities remain topics of interest when evaluating the impacts of the shift in sheltering operations as a result of Resolution 20091105-040.

Despite the success of the city in achieving and exceeding their 90% LRR goal following the implementation of the Resolution in 2010, an audit of Austin Animal Services conducted by the City of Austin in April of 2015 identified the existence of several of the concerns described above. The audit concluded: "(Austin) Animal Services does not have sufficient facilities and resources allocated to meet the 90% live outcomes goal and remain in line with State requirements⁴¹ and industry best practices." Factors informing the audit's conclusion included lack of appropriate housing units, inadequate staffing for the various programs and services, inappropriate cohabitation of animals, extended length of stays, and extended response times to animal control/protection calls⁴². An important lesson learned from the experience in Austin is the importance of capacity-building prior to implementing such a dramatic shift in procedures. This shift in operations (specifically the increased number of animals housed and the moratorium on euthanasia for space considerations) likely contributed to the issues identified in the 2015 audit, which AAC was then able to respond to by implementing a variety of operational changes. The changes included: increased staffing in areas of animal care, increased kenneling and foster capacity, and improved communication with the community around issues of animal protection officer response time as well as the situations that require limited or managed admission of relinquished animals. Each of these components represents an area of organizational capacity that can be optimized to improve the LRR across a variety of sheltering systems.

Now seven years into the implementation of Resolution 20091105-040, the City of Austin and its animal welfare organizations, partly in response to the city audit, continue to work to improve the operational effectiveness of its shelters in the interest of providing high-quality veterinary and behavioral care to unhoused animals. In January 2014, the city designated \$5.5 million to build 100 new kennels to address overcrowding at AAC⁴³. These kennels were under construction at the time of this report (October 2017). Furthermore, AAC has more recently revised its intake processes to include a shift in orientation to a community resource model. Within this new framework, patrons seeking services at the shelter are first connected to the services that can be offered through other community partners and then offered surrender services at the municipal shelter should all other resources be exhausted⁴⁴. By identifying the existing community assets that support pet-keeping and serving as a conduit to these resources, AAC

⁴⁰ <https://www.austinchronicle.com/news/2011-02-18/safety-net-or-dead-end/>

⁴¹ The specific state requirements that Austin Animal Services was allegedly in violation of were not cited in the body of the Animal Services Program Audit.

⁴² City of Austin (2015, April). Animal Services Program Audit. Retrieved from: <http://austintexas.gov/page/archive-auditor-reports>.

⁴³ <http://www.fox7austin.com/news/664050-story>

⁴⁴ <https://www.austinchronicle.com/news/2016-12-23/five-years-of-no-kill-in-austin/>

expects to continue improving the number of live outcomes at the municipal facility by decreasing the number of animals that are taken into the shelter each year.

While the concerns of the city audit are being addressed and integrated into AAC's operations, the extended animal welfare community continues to engage in critical dialogue around the costs versus the benefits of shelter operations that are aligned with the "No Kill" philosophy, including the ethical issue of potentially stressful increases in length of stay for animals that may have previously been euthanized^{45,46}. While the issue of adopting the practices that are prescribed under Resolution 20091105-040 is subject to each individual community's availability of resources and to their own preferences or policies that guide animal welfare initiatives, the following report will present a unique data-based assessment of the economic, public health, and social impacts of the shift in shelter operations in Austin and the surrounding area of Travis County, Texas that resulted from the implementation of the legislation.

Impact Assessment Methodology

Operations Analyses

This impact assessment has been conducted within an ecological economics paradigm that recognizes that looking at strictly economic inputs and outputs of an issue cannot capture the more complex social or intrinsic value of humane policies. A social-environmental-economic impact assessment is an interdisciplinary evaluation of the potential impacts of a given policy, event, or organization on a community's well-being. For the purposes of this impact assessment, "well-being" is conceptualized in a holistic manner to include socio-economic, physical, mental/emotional, and environmental health, with consideration for the distribution of effects as well as the overall impacts. The current research in impact assessment explores how solving environmental problems like pet homelessness or human health disparities cannot be entirely accounted for using strictly economic analyses, but are more effectively addressed through a discussion of the importance of specific impacts when compared with others^{47,48,49,50}. In this study, the question of whether the increased economic costs of extending the time and resources an animal is allocated in a shelter is a reasonable model for other cities to incorporate is a question that cannot be addressed uniformly. There are a variety of factors that determine the effectiveness of a sheltering organization, including leadership, funding, relationships with surrounding shelters and rescues, the presence of ordinances that promote animal welfare in the community, and the engagement of local community members in animal welfare issues. An ecological systems approach to understanding these complex sheltering systems can contribute to

⁴⁵ <http://www.whypetaeuthanizes.org/quotes/>

⁴⁶ <http://blogs.bestfriends.org/index.php/2011/01/25/petas-better-off-dead-philosophy/>

⁴⁷ Soderbaum, P. (1999). Values, ideology, and politics in ecological economics. *Ecological Economics*, 28. 161-170.

⁴⁸ Franks, D., Vanclay, F. (2013). Social Impact Management Plans: Innovation in corporate and public policy. *Environmental Impact Assessment Review* 43, 40-48.

⁴⁹ Jay et al. (2007). Environmental impact assessment retrospect and prospect. *Environmental Impact Assessment Review* 27, 287-300.

⁵⁰ Vanclay, F. (2004). The Triple Bottom Line and Impact Assessment: How do TBL, EIA, SIA, SEA and EMS relate to each other? *Journal of Environmental Assessment Policy & Management* 6(3), 265-288.

a more robust assessment of the attributing factors by evaluating their impacts on an individual (micro), organizational (mezzo), and community-wide (macro) level^{51,52,53}.

Points of analysis for this assessment include existing data from public health and other government agencies, qualitative responses from surveys administered in the city of Austin, and data provided by two of the primary agencies involved in operationalizing Resolution 20091105-040 (AAC and APA). This process of integrating research evidence, local data, and the knowledge of stakeholders, particularly members of the affected communities, is congruent with impact assessment industry standards⁵⁴.

Data were analyzed using multiple methodologies, including time series event methods such as using before/after analyses (where data from after the implementation of Resolution 20091105-040 through present (2010-2016) were compared to data from prior to the legislation (2005-2009)); and cross-sectional comparisons. These methods were used to identify the potential impacts of the Resolution on the various systems that influence the well-being of both the human and companion animals in the city of Austin and greater Travis County. In general, linear regression analysis was used to identify simple monotonic increases or decreases in trends in the data over time. Slopes with *P* values less than 0.05 were considered to have slopes significantly different than zero, and the slope is reported as the average change per year. Slopes with *P* values greater than 0.05 were considered to represent trends that had not changed significantly over the study period. T-tests were used to identify statistically significant differences between blocks of data (for example, pre- versus post-Resolution).

Economic Analyses

Economic impact analyses are used to estimate the impact of a new activity on a region. The economic impact model used for this report begins with a static delineation of payments between a regional economy's primary institutions (firms, households, and governments). The system of economic impacts can be understood by linking the dollar outputs from a given industry (in this case, animal shelters) to the dollar inputs required from supporting industries (e.g., wholesale purchases of supplies, veterinary equipment purchases, etc.) and the dollar inputs required from households (e.g., labor services in the form of veterinarians, administrative, and support staff). In this way, every dollar of a new output from an industry can be connected to the level of new support required from related industries and regional households.

Economic impacts are estimated as responses to an external stimulus such as new economic activity. The change in final demand for regional production triggered by the stimulus is referred to as the direct effect. In order to accommodate the newly demanded output (e.g., animal adoption, welfare, and educational services), the producers in turn require additional support from their suppliers, and in order for these suppliers to accommodate the new demand, they in turn increase purchases according

⁵¹ Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist*, 32(7), 513.

⁵² Prenzel, P., Vanclay, F. (2014). How social impact assessment can contribute to conflict management. *Environmental Impact Assessment Review* 45, 30-37.

⁵³ Saarikoski, H. (2000). Environmental impact assessment as collaborative learning process. *Environmental Impact Assessment Review* 20, 681-700.

⁵⁴ Mindell, J.S., Bolton, A., Forde, I. (2008). A review of health impact assessment frameworks. *Public Health*, 122, 1177-1187.

to the relationships in the economic model from their supporting industries, and so on. The iterative process of economic increase in output is referred to as the indirect effects of the original stimulus. In addition to indirect effects, an additional layer of economic impact is realized as workers from all levels of the process spend a portion of their additional labor income (and non-labor income). This household spending creates new demand (a second stimulus) from households supporting industries (e.g., health services, retail purchases, food services, etc.) that sets in motion successive economic activity as described previously. The aggregate process of economic activity from household spending is referred to as the induced effects of the initial stimulus.

To analyze the economic impact of AAC and APA's shelter operations, this study utilized an IMPLAN methodology known as Analysis-by-Parts (ABP)⁵⁵, which provides more control over the analysis than the standard industry change methodology and allows for more tailored and accurate outputs. ABP facilitates the analysis of the direct, indirect, and induced effects separately to reflect the lack of proprietor income in the nonprofit and government sectors. For the purposes of calculating the economic impacts of the shelters' operations, IMPLAN's pre-set industry code data⁵⁶ were refined using the additional ABP methodology to increase the sensitivity of the calculations to sheltering-specific effects. Pet care and retail spending were not calculated using IMPLAN because the pre-set categories within the software (industry codes) do not align to the specificity of pet-related services and could not be adjusted sufficiently using the additional ABP methodology. When calculating the total economic impact across the two shelters of interest, 100% of the impact created by the financial activities of APA, and only 3.9% of the impact created by AAC were attributed to the Resolution. While APA was a leader in establishing the standards outlined in the implementation plan, the organization would not have its current impact on the city (financially and otherwise) but for the Resolution. Only 3.9% of the total 2010-2016 impact of AAC was attributed to the Resolution because, as a municipal facility, AAC would still have continued its operations regardless of whether the Resolution had been implemented or not (the calculation of this factor is presented in the Impacts on Veterinary and Pet Services section). Overall, the conclusions presented in this report are consistent with the most conservative possible measure of the data.

Understanding the total impacts of Resolution 20091105-040 is particularly relevant insofar as the legislation continues to be a matter of contention within the animal welfare field. The University of Denver's Institute for Human-Animal Connection (IHAC) is a leading academic center with a robust research agenda aimed at advancing the understanding of the role of the human-animal bond across the lifespan at the individual, organizational, and community level. IHAC's mission is to intentionally elevate the value of the living world and the interrelationship and health of people, other animals and the environment. This is accomplished through natural and social science-

⁵⁵ Economic impact models that estimate the impact of new economic activity based on current linkages between the inputs required from supporting industries and the outputs they support, are known as Input-Output (IO) models. IO models assume a fixed production relationship between inputs and outputs and sufficient slack in the affected markets as to leave prices fixed. The most common IO model application is IMPLAN (IMPLAN, Inc., Huntersville, NC), a data and modeling service commonly used in universities, governments, and economic development agencies to assess the economic impacts of new and existing industry activity. The IMPLAN model application provides a baseline model of state and regional economies.

⁵⁶ The IMPLAN Annual Subscription to Travis County, TX specific-data was used for the economic modeling.

informed research, education, applied knowledge, and advocacy, with an ethical regard for all species. The Institute's location within the University of Denver's Graduate School of Social Work gives it access to a breadth of theoretical and practical knowledge across the social sciences, while also providing the appropriate level of academic objectivity needed to evaluate a policy with many invested parties. This academic perspective informs IHAC's advocacy for evidence-based best practices and policies aligned within its framework of Social Science-Informed Animal Welfare – a framework that emphasizes the importance of addressing the role of human behavior in animal welfare issues. IHAC conducts impact assessments on a variety of animal welfare-related issues in order to inform policy makers at the municipal, county, state, and national level on the positive contributions companion animals make to communities, thereby supporting the establishment of more data-informed animal welfare policies in communities with traditionally high barriers to enacting such legislation. The following report represents a comprehensive assessment of such a policy using a toolset that can be applied to other animal related legislation impact studies in other communities.

Community Impact Assessment Results

Impacts on Shelter Management and Outcomes

Intake

The greatest changes to AAC's shelter operations as a result of Resolution 20091105-040 were the moratorium placed on euthanasia and the resulting need for shifts in procedures for intake. In order to address the increase in the number of animals that would be housed rather than euthanized, the implementation plan for the Resolution included a shift to scheduled intake appointments for any owner surrenders⁵⁷. The management of admission at AAC through these appointments occurs along a continuum that is dependent upon the availability of on-site kennels or community-based foster families, the potential for obtaining a transfer placement, and the intake of animals from the previous day. AAC currently utilizes a coding system to help determine how many owner surrender appointments can be accommodated on a given day and how many animals are to be transferred to shelter or rescue partners such as APA.

The intake coding system (formalized in 2016) communicates the admission status of the shelter both internally to staff members and partner organizations and externally to community members who may wish to surrender their animal. The "green" level of intake is equivalent to what many animal welfare organizations would refer to as "open admission" in which all owner surrendered animals are admitted to the shelter following a relinquishment counseling appointment. The "yellow" level serves as an indicator that kenneling capacity is reaching its limit and results in an increase in communication to community members, either through social media or various news outlets, that there is a need for temporary foster placements or increased rate of adoption. In "yellow" there are also some restrictions on owner surrender appointment

⁵⁷ https://www.austintexas.gov/sites/default/files/files/Animal_Services/priority_recs_0211.pdf

availability. The “red” level of intake restricts intake to, on average, 50% of what can be admitted on a “green” admission day, in which only stray animals whose homes cannot be located or community member’s animals with circumstances for surrender that are elevated to the emergency status are prioritized and all other surrender appointments may be deferred until a yellow or green intake level is restored. In its first official year of implementation (2016), AAC intake was under the “yellow” status for a total of 30 days and the “red” status for 15 days. These varied levels of intake ensure any animals admitted to the municipal facility will either receive appropriate care while being housed at the shelter (as defined by Resolution 20091105-040), or will remain in more temporary placements until the shelter is able to offer them a space in the facility.

The total intake at a shelter is influenced by owner surrender, strays turned in either by the public or by animal protection services, and animals that are transferred in from other facilities. The trends in the various components of AAC’s intake and outcomes have been evaluated using data provided by AAC and APA from 2005 to 2016 (Figure 2). During that period, the trend in total dog intake has decreased by an average of 362 animals per year ($P < 0.001$) to approximately 10,000 dogs in 2016. Similar results are seen when comparing total dog intake before and after 2010 using a t-test analysis, with total intake from 2010-2016 ($M = 10,881$, $SD = 744$) significantly less ($P < 0.001$) than total intake from 2005-2009 ($M = 13,079$, $SD = 666$). Similar to dogs, the trend in total cat intake from 2005 to 2016 has decreased by an average of 207 animals per year ($P = 0.036$) to approximately 7,000 in 2016. However, this trend was not detected in a t-test analysis, with total cat intake prior to the implementation of the Resolution (2005-2009) ($M = 8,697$, $SD = 1,189$) not varying significantly ($P = 0.088$) from total cat intake following the implementation of the Resolution (2010-2016) ($M = 7,451$, $SD = 888$).

The trend most directly impacted by the implementation of the Resolution is that of owner surrender at AAC (Figure 2). The reasons for relinquishment of dogs and cats to animal shelters offered by patrons at intake include behavior or medical concerns for the animal, an individual caretaker’s own financial or social limitations, or a limited goodness-of-fit between the animal and the caretaker’s lifestyle⁵⁸. These individual human and/or companion animal challenges may also be compounded by larger structural issues such as accessibility of pet-supportive services, availability of pet-friendly housing, and/or the presence of city-wide restrictions on particular breeds.

⁵⁸ Coe, J., Young, I., Lambert, K., Dysart, L., Nogueira Borden, L., Rajić, A. (2014) A Scoping Review of Published Research on the Relinquishment of Companion Animals, *Journal of Applied Animal Welfare Science*, 17:3, 253-273.

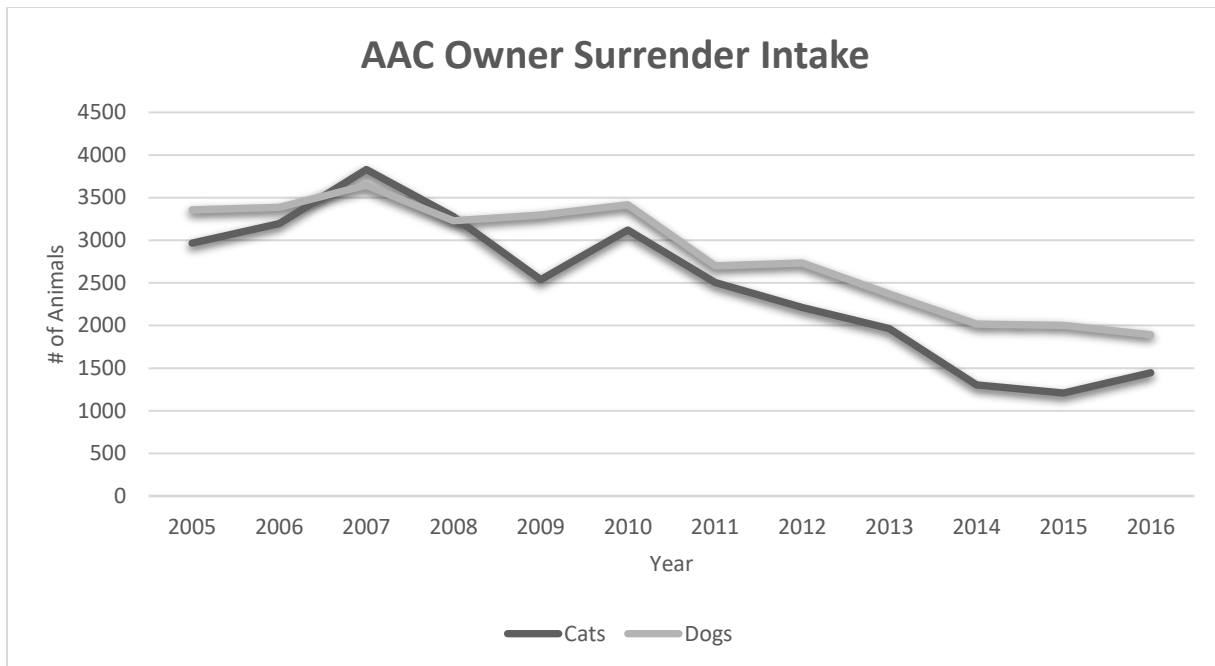


Figure 2. Total annual intake through owner surrender of dogs and cats at AAC from 2005 to 2016. Dataset is provided in Appendix C.

Overall, there has been a decrease in the trend of owner surrendered animals at AAC. Dog relinquishment from 2005-2009 ($M = 3,382$, $SD = 159$) and from 2010-2016 ($M=2,447$, $SD=546$) differed significantly using a t-test analysis ($P = 0.003$). Cat relinquishment from 2005-2009 ($M = 3,162$, $SD = 471$) and from 2010-2016 ($M = 1,966$, $SD = 703$) also differed significantly using the same analysis ($P = 0.005$). While it is not possible to assign a specific source for the changing trends in total intake, potential drivers of the decreased rates of surrender include: the periods of managed admission at AAC that limit number of animals admitted through surrender appointments, increased social awareness of responsible pet-keeping practices as a result of the legislation, or improvements across Austin on issues that drive relinquishment such as pet-friendly rental housing, access to veterinary care, or behavioral training support services.

While owner surrender is offered at AAC as shelter capacity allows, as a municipal facility, the primary purpose of AAC is to provide ongoing animal protection services, including housing lost or stray animals and housing those animals seized through cruelty or neglect investigations. Operationally, stray animals are brought into the shelter's care either by community members who bring them to the facility or by the animal protection officers who conduct field services for Travis County. Analysis of stray dog intake from 2005 to 2016 identified a trend in number of stray dogs that decreased by an average of 147 animals per year ($P = 0.008$) to approximately 7,000 dogs (Figure 3). A t-test analysis of stray dog intake from 2005 to 2009 ($M = 8,525$, $SD = 565$) compared to stray dog intake from 2010 to 2016 ($M = 7,405$, $SD=321$) found a significant decrease ($P = 0.008$) following the Resolution. Although the management of admission as a result of the Resolution does not include changes to how stray animals are received from community members or animal protection officers, the decreasing

trends in number of stray dogs brought into the shelter since the implementation of the Resolution may reflect any of the following practices that have been reported: decreased pick-up of stray dogs by animal protection officers, increased effectiveness of return to owner processes such as microchipping or field returns offered by animal protection officers, or an overall decrease in the number of animals that the community has lost. However, the trend in stray dog intakes as a percentage of total intake has increased by 0.8% per year since 2005 ($P = 0.007$), with 72% of all AAC's dog intake in 2016 being classified as strays (data provided in Appendix C). This increase in percentage is, at least in part, affected by the decrease in owner surrender.

In contrast to dogs, stray cat intake had no statistically significant change in the trend between 2005 and 2016 at an average of 4,497 cats per year ($P = 0.194$). A t-test analysis of stray cat intake from 2005 to 2009 ($M = 5,024$, $SD = 885$) compared to stray cat intake from 2010 to 2016 ($M = 5,221$, $SD = 719$) confirms that there has been no significant change in stray cat intake as a result of the Resolution ($P = 0.693$). However, similar to that seen in dogs, the trend in stray cat intake as a percentage of total intake increased by 2.9% per year since 2005 ($P < 0.001$) to approximately 76% in 2016.

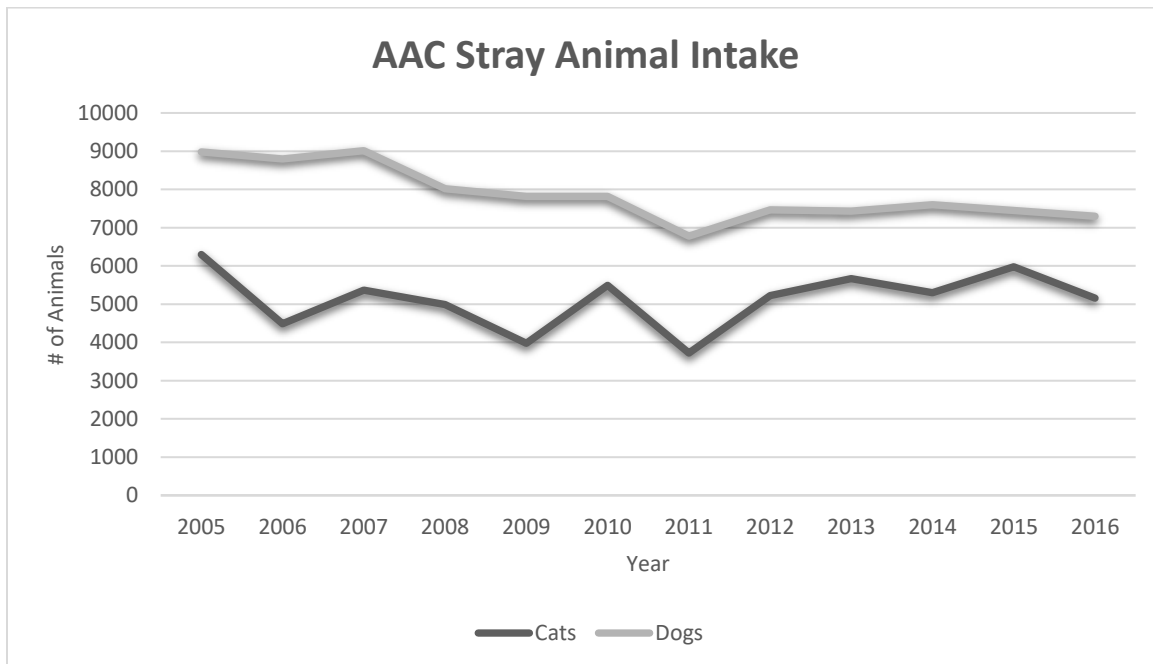


Figure 3. Total annual intake of stray dogs and cats at AAC from 2005 to 2016. Dataset is provided in Appendix C.

Overall, the trends seen in intake from 2005 to 2016 reflect an overall decrease in number of animals in the care of AAC, with the animals who are at AAC being more likely to have come into the shelter as a stray rather than as a transfer from another organization or as an owner surrender. These data indicate that while the management of intake has impacted the total number of dogs taken into AAC, including the number of dogs surrendered by the owner, the total number of cats taken in has not changed significantly (as assessed by the t-test) since the Resolution was implemented. It is important to note that other dynamics in a community around keeping cats as pets,

including the effectiveness of spay and neuter services or community cat programs, can impact a municipal shelter's cat intake numbers.

The implications of AAC's shift in management practices as a result of Resolution 20091105-040 include a new emphasis on creating a continuum of pet-supportive services provided to Austin residents that include but are not exclusively provided by the city's municipal facility. When admission levels are "green" community members seeking to surrender their pet are able to do so following an appointment with a relinquishment counselor, whereas when admission levels are "red" there is a much greater emphasis on supporting community members in identifying alternatives to surrendering to the shelter. Instead, community members who identify a need to surrender their pet are asked to attempt to rehome the animal on their own or to keep their pet in their home, a family member's home, or a friend's home until capacity is freed in the shelter. This practice could be considered a mechanism through which community members are asked to remain accountable for practicing "responsible" pet-keeping, but it is also possible that animals not admitted when owners request to surrender them are then either taken to shelters in surrounding areas or abandoned in the community.

While the management of admission has significantly decreased the total number of animals taken in at AAC, public information request data obtained from the areas surrounding Travis County (San Marcos County, Bastrop County, and Williamson County) indicate that just 37 of the animals that came into their shelters between 2010 and 2016 reported an originating Travis County zip code (including RTO animals). These data indicate that the management of admission is not resulting in Travis County community members relinquishing to shelters outside of Austin, and therefore negatively impacting the sheltering operations of surrounding communities. Additional data obtained through public information request indicated that there is no statistically significant difference in the number of dead companion animals picked up by City of Austin Solid Waste Services before ($M = 874$, $SD = 321$) and after ($M = 862$, $SD = 174$) the passage of Resolution 20091105-040 ($P = 0.936$) (Figure 4)⁵⁹. Therefore, although the periods of managed admission likely affect the overall companion animal outcomes to some extent in Austin and Travis County, the impacts are not substantial enough to be identified within existing data sources. These trends are presumably influenced by factors including community response to the admission coding system and the low percentage of time AAC is under a yellow or red admission code (12% of days in 2016).

⁵⁹ Public Information Request - City of Austin Solid Waste Services

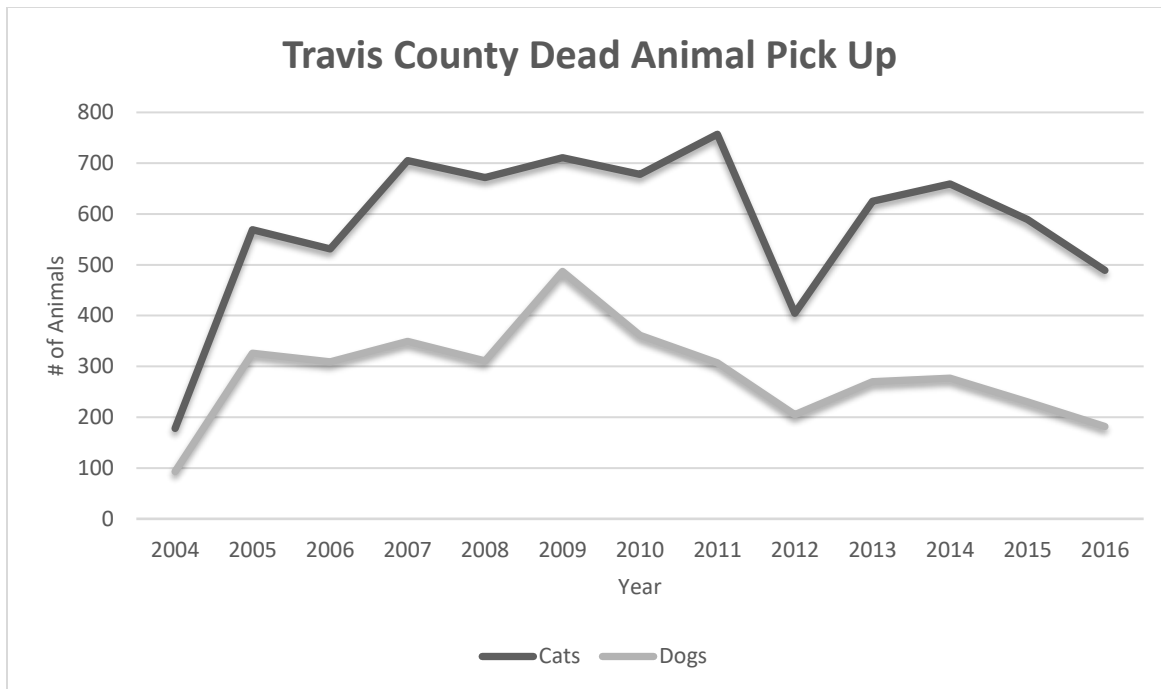


Figure 4. Annual number of dead animals picked up in Travis County from 2004 to 2016. Dataset is provided in Appendix D.

Another program that is likely affecting animal intake at AAC is Positive Alternatives to Shelter Surrender (PASS)⁶⁰. This program, managed by AAC and APA, serves as an informal resource for community members who are looking to either rehome their companion animal or are seeking services like veterinary care or behavioral support in order to prevent a need to surrender their animal. The program offers “individual consultation, education, troubleshooting, and financial support” for those who call the PASS help line that is listed on both AAC and APA’s website. While many of the community members who utilize PASS’ services are able to forgo surrender, the program also has the option of surrendering the animal, in which case these animals may then enter into the care of APA or indeed be surrendered to a shelter. In 2016, APA took in 734 dogs and 740 cats through PASS (Appendix E). These numbers have increased significantly since 2012, with the number of dogs taken in through PASS increasing by approximately 98 dogs per year ($P < 0.001$) and number of cats taken in through PASS increasing by approximately 80 cats per year ($P = 0.010$). This may be an indication of the willingness of community members to utilize services other than the traditional owner surrender process offered at the city’s municipal shelter. This program may also be driving the decrease in number of animals surrendered to AAC.

Outcomes

Resolution 20091105-040 includes a specific attention to live outcomes for animals that enter into the care of AAC rather than the historical practice of euthanasia

⁶⁰ <https://www.austinpetsalive.org/get-pet-help/pass/>

in times when either the shelter was at high capacity or when the animal could not be more immediately adopted out due to medical or behavioral challenges. Shelters can influence outcomes through a variety of programs that include online and social media platforms to market the animals available for adoption, utilization of transfer networks to increase total capacity to serve animals that may come into the shelter’s care, and animal protection field services such as microchip identification or improved in field return to owner services. Due to the integral nature of the partnership between AAC and APA, devised during the design and implementation of the Resolution as a means to streamline the process of achieving live outcomes for Austin’s sheltered animals, the two organizations’ outcome data were aggregated for analysis (Figure 5).

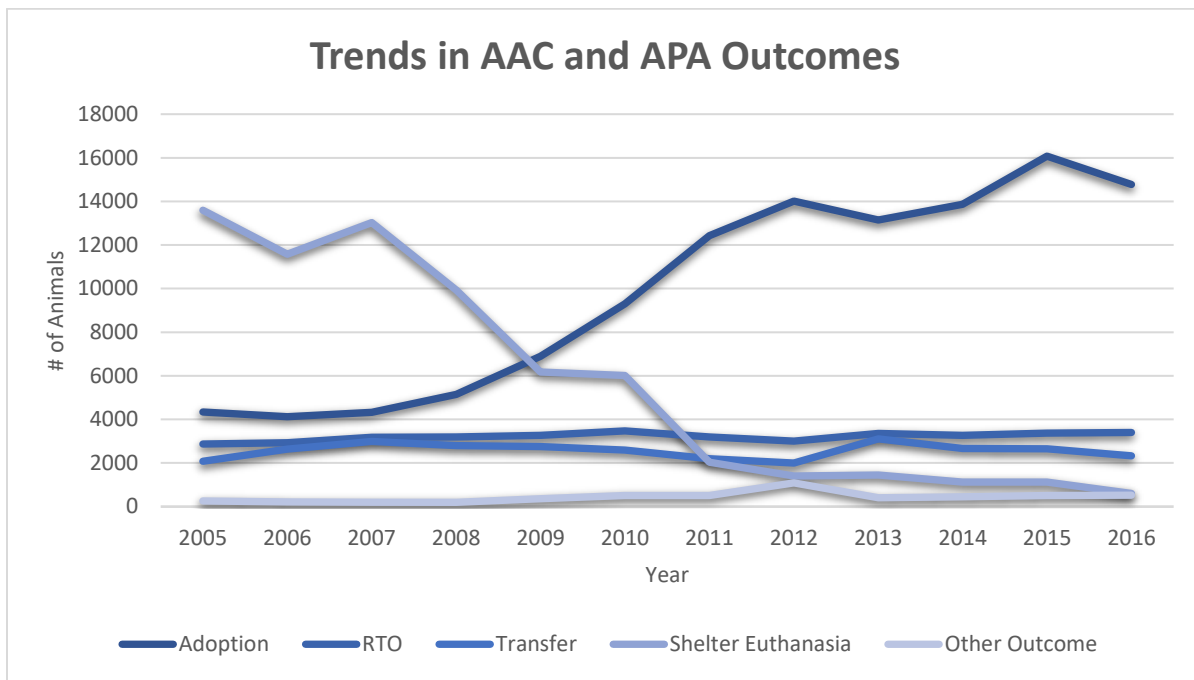


Figure 5. Annual outcomes for dogs and cats that entered into the care of AAC and APA from 2005 to 2016. Those represented as “transfers” were animals transferred to a shelter or rescue organization other than APA. The “other” category includes missing animals, those who died in care, or otherwise unaccounted-for animal outcomes. Dataset provided in Appendix F.

The primary outcome for animals in the care of AAC and APA is adoption. The overall rate of adoptions of both dogs and cats out of these organizations has increased over the study period of 2005 to 2016, even when adjusting for the growth in human population in Austin (Figure 6). There was a significant increase ($P < 0.001$) in the trend in dog adoptions from 2005 to 2016, with an average increase by 277 dogs per year. A t-test analysis comparing the number of dog adoptions from 2005 to 2009 ($M = 2,507$, $SD = 176$) to the number of dog adoptions from 2010 to 2016 ($M = 4,361$, $SD = 458$) identified a statistically significant increase ($P < 0.001$) following implementation of the Resolution. However, from 2010 to 2016 there was no significant change ($P = 0.482$) in the trend in dog adoptions, remaining constant at an average of 4,412 dogs adopted.

The pattern in adoption trends for cats is similar to that for dogs. There was an overall significant increase ($P = 0.002$) from 2005 to 2016 with an average increase of 196 cats per year, but most of this increase occurred prior to implementation of the Resolution. Like dogs, a t-test analysis comparing cat adoption numbers from 2005 to 2009 ($M = 1,913$, $SD = 184$) to those between 2010 and 2016 ($M = 3,169$, $SD = 627$) indicates that the number of cats adopted increased significantly ($P = 0.001$) following implementation of the Resolution. However, from 2010 to 2016 there was no significant change ($P = 0.443$) in cat adoptions, remaining at an average of 2,736 cats adopted per year. These findings are notable insofar as adoption is an important mediator of the capacity of a sheltering facility. An increased rate of adoption places dogs and cats in homes as pets and is a factor that determines the shelter's space to serve additional animals from the community. This increase in capacity has been correlated with a decreased rate of euthanasia⁶¹.

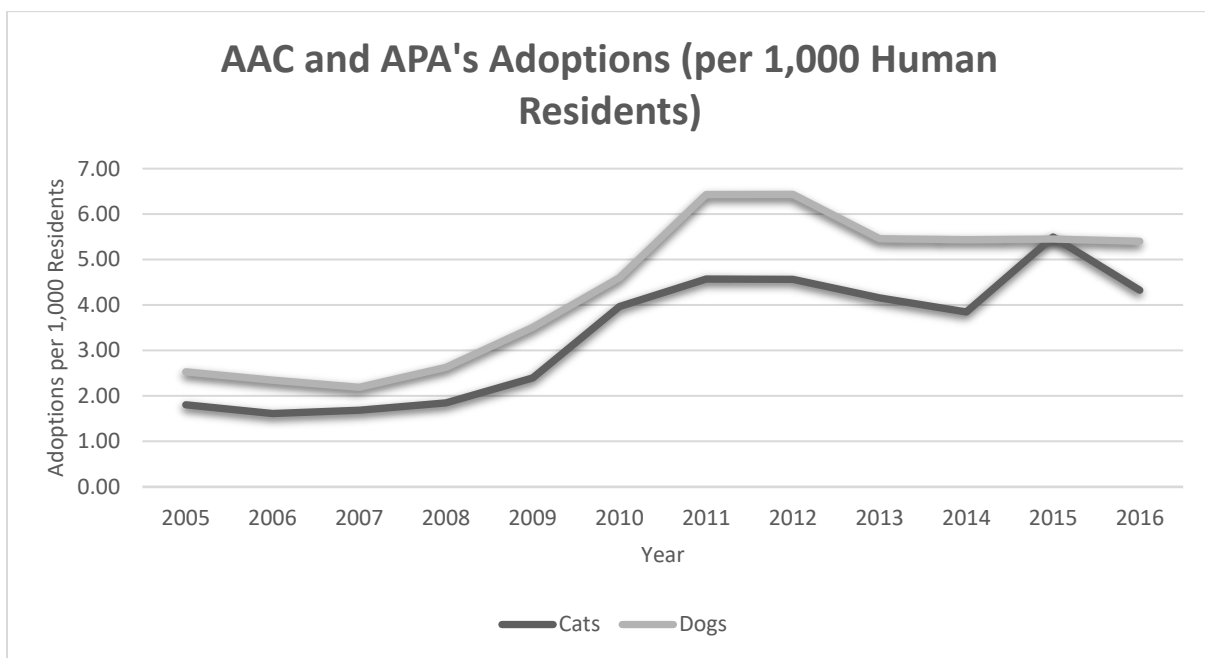


Figure 6. Rates of adoption with adjustment for the growth of the human population in Austin (shown here as number of adoptions per every 1,000 human residents of Austin). The amount of adoption, given the increase in human population, has increased since the passage of Resolution 20091105-040. Data set provided in Appendix F.

The overall increase in adoptions of dogs and cats over the study period may be a result of increased interest within the community in adopting pets, improved social awareness of the animal welfare initiatives of Austin, or improved marketing processes of the individual organizations. Some of the programs that contribute to increased adoptions were in place prior to 2010, but the coordination of these programs across AAC and APA was formally implemented following the Resolution. Therefore, the stabilization of adoption rates since the Resolution may reflect that the processes

⁶¹ Hawes, S., Camacho, B., Tedeschi, P., Morris, K. (in press). Trends in intake and outcome data for animal shelters in Colorado, 2000 to 2015 – another eight years out. *Journal of American Veterinary Medical Association*.

formalized by the legislation have been effective in sustaining the overall adoption rate despite the variety of resulting operational changes made to the organizations. It's important to note that outcome rates at AAC are heavily impacted by the transfer of animals to APA, and therefore it cannot be concluded that AAC trends in adoption alone have been sufficient to meet the requirements of the Resolution. Rather, the combined rates of adoption at both AAC and APA have supported AAC's ability to maintain a 90% LRR.

A factor that may inform the increased rates of adoption of both dogs and cats is the incidence of adoption by individuals or families who report that they reside outside of Travis County (Figures 7 and 8). By reaching potential adopters outside of the Austin or Travis County community, both AAC and APA increase the potential of finding a home for the animals in their care. Increased rates of adoption to non-Travis County zip codes may be an indicator of the success of Austin's shelters' social media and marketing campaigns, but may also be negatively impacting adoption rates from shelters in surrounding counties. While data obtained through public information requests on surrounding communities demonstrate that the increased rates of adoptions to individuals and families who reside outside of Travis County have not resulted in an impact on the intake rates of shelters in surrounding communities⁶², data could not be obtained from these surrounding counties on how the increased rate of adopters from outside of Travis County has impacted these other shelters' adoption rates.

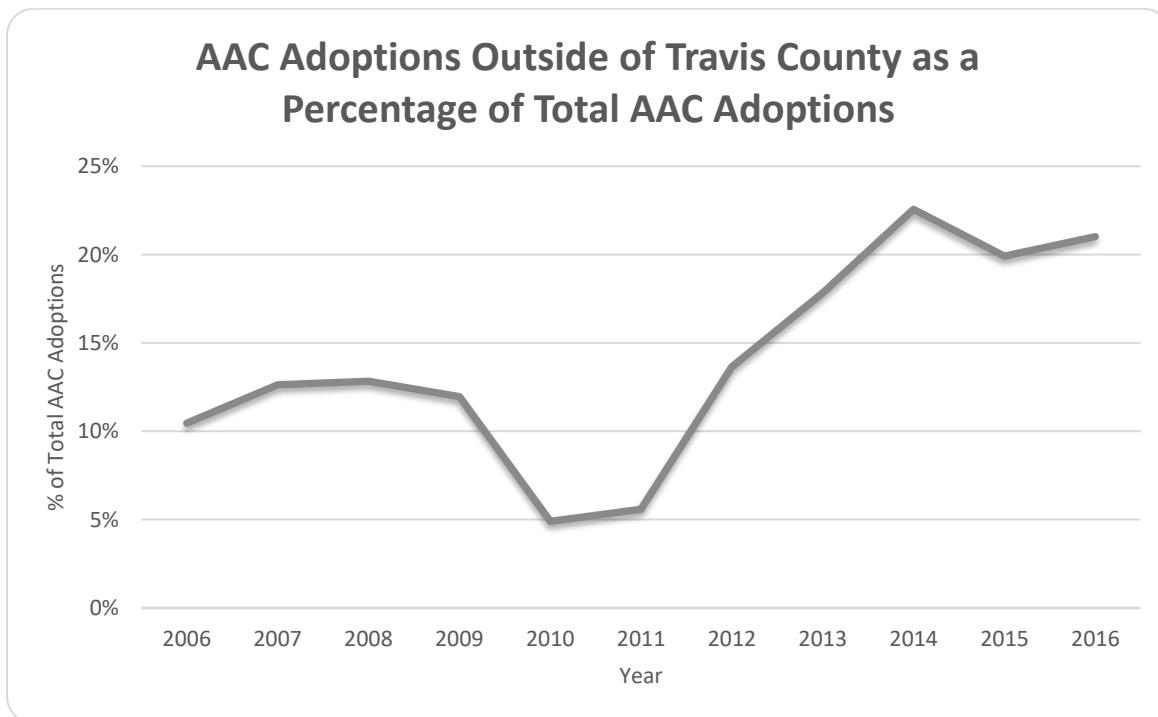


Figure 7. Annual percentages of all animals adopted out of AAC that are adopted to people who reported that they reside in a non-Travis County zip code on their adoption application.

⁶² Data obtained from the areas surrounding Travis County (San Marcos County, Bastrop County, and Williamson County) indicate that just 37 of the animals that came into their shelters between 2010 and 2016 reported an originating Travis County zip code (this is including RTO animals).

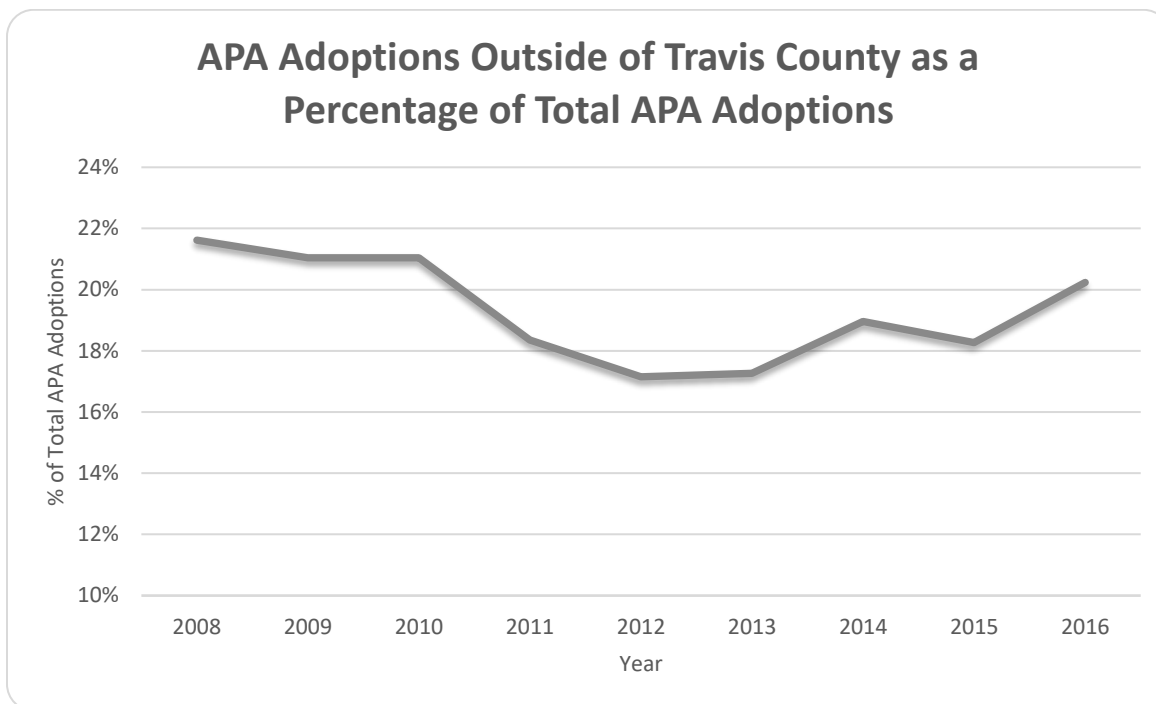


Figure 8. Annual percentages of animals adopted out of APA that are adopted to people who reported that they reside in a non-Travis County zip code on their adoption application.

Adoption rates are optimized through community engagement with the shelters and also by the effectiveness of the shelters' programs in treating any medical or behavioral challenges that may make placement in a suitable home difficult. As APA receives a majority of AAC's highest risk (of euthanasia) animals, return rates of animals adopted from APA is a potential indicator of the effectiveness of the programming provided while the animals are in the shelter's care. In 2016, APA adopted out 6,981 animals, with 819 of these animals returned (12%). Of these animals returned after adoption, there were 34 dogs (0.5%) and 55 cats (0.8%) returned for behavioral challenges that APA was aware of, and had informed the adopter of, prior to adoption. The remaining animals who had been adopted and were then returned were brought back for a variety of reasons related to a lack of goodness of fit between the animal and the adopter. This return rate, particularly the low rate of returns for an animal's existing challenges, indicates that APA does not appear to be adopting out "unsafe" animals into the community. These trends are also consistent with the literature on returned animals insofar as the animals most often returned are males, over the age of six months, and most likely to be returned due to behavioral challenges⁶³.

While Resolution 20091105-040 is often described as the "No Kill" resolution, there continue to be instances where euthanasia is practiced at both AAC and APA. While it is no longer practiced for space considerations (referred to as "killing" within the

⁶³ Mondelli, F., Prato Previde, E., Verga, M., Levi, D., Magistrelli, S., & Valsecchi, P. (2004). The bond that never developed: adoption and relinquishment of dogs in a rescue shelter. *Journal of Applied Animal Welfare Science*, 7(4), 253-266.

“No Kill” movement), certain cases of extreme medical or behavioral challenges may result in a euthanasia decision. However, as a result of high-risk (of euthanasia) animals being transferred to APA, improvements in veterinary care and behavioral support, and an increase in available resources to address challenges that previously resulted in high rates of euthanasia, the rate has decreased dramatically at AAC since the implementation of the Resolution in 2010 (Figure 9). Overall, from 2005 to 2016, the trend in dog euthanasia at AAC has significantly decreased ($P < 0.001$) by an average of 657 dogs per year, and by an average of 144 dogs per year ($P = 0.003$) since 2010. From 2005 to 2016, the trend in cat euthanasia at AAC has also significantly decreased ($P < 0.001$) by an average of 655 cats per year, with the number of cats euthanized at AAC from 2010 to 2016 significantly decreasing by an average of 114 cats per year ($P = 0.013$). A t-test analysis of dog euthanasia at AAC from 2005 to 2009 ($M = 5,409$, $SD = 1,397$) and from 2010 to 2016 ($M = 972$, $SD = 872$) indicates that dog euthanasia has decreased significantly ($P = 0.001$) since the implementation of the Resolution. A similar analysis comparing cat euthanasia numbers from 2005 to 2009 ($M = 5,446$, $SD = 1,657$) to those from 2010 to 2016 ($M = 922$, $SD = 991$) also found a statistically significant decrease ($P = 0.002$). These findings validate the effectiveness of the changes that resulted from the Resolution in continuing to decrease the number of dogs and cats euthanized each year at AAC.

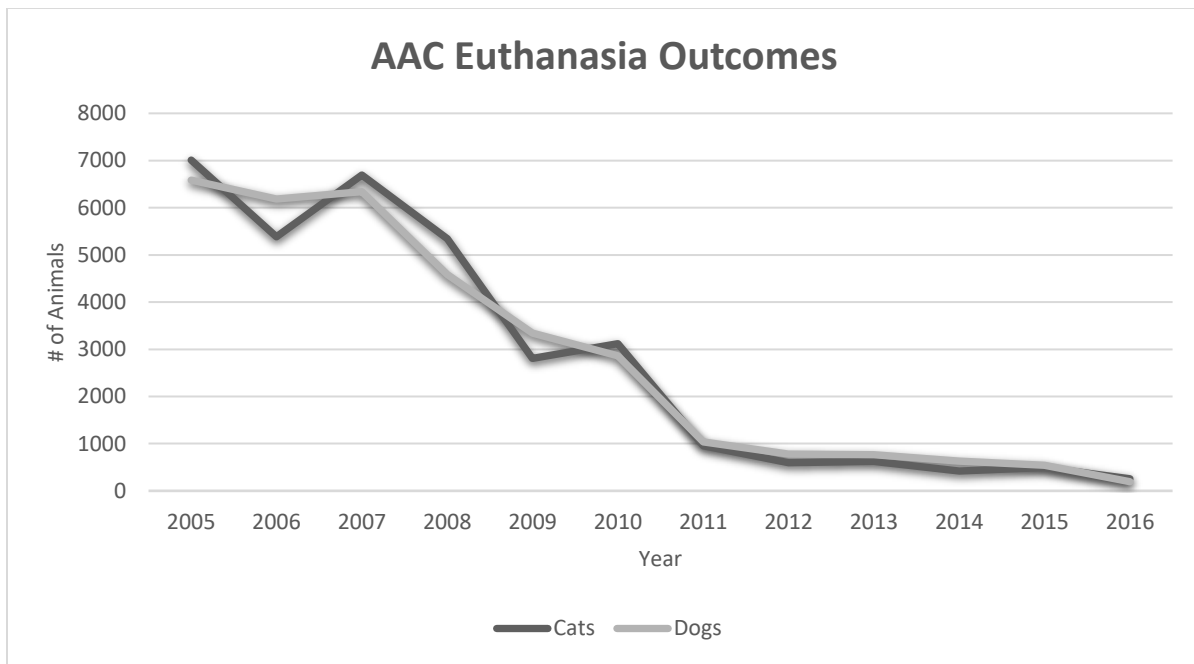


Figure 9. Annual number of animals euthanized at AAC from 2005 to 2016. Resolution 20091105-040 that included the requirement to reach a 90% LRR was implemented in 2010.

The rate of euthanasia at APA, although remaining within the 90% LRR threshold that is required of the municipal shelter, has significantly increased for dogs ($P = 0.003$) and cats ($P = 0.003$) since the implementation of Resolution 20091105-040 (Figure 10). From 2008 to 2016 the average number of dogs euthanized increased by 9 dogs per year and the average number of cats euthanized increased by 6 cats per year. This is

likely due to the specialized “at risk” population of animals that APA transfers from AAC (AAC transfers consist of 39% of APA’s intake). This illustrates an important consideration for the implementation of “No Kill” policies: LRR is a dynamic metric that is highly dependent on the health and behavior status of animals being brought in by the community and/or through transfer networks.

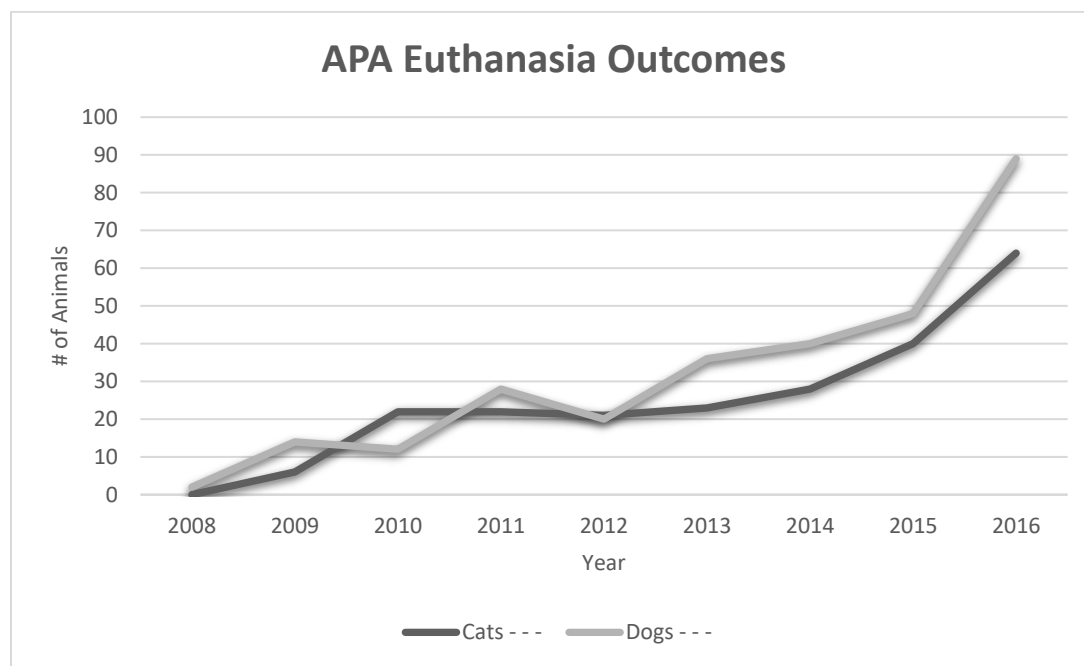


Figure 10. Annual number of animals euthanized at APA from 2005 to 2016. Note that APA was reorganized as a rescue organization in 2008.

Transfer Partnerships

Sheltering networks are emerging as an increasingly important factor informing the effectiveness of animal welfare organizations, insofar as a robust network can provide opportunities to create or expand an individual organization’s capacity to deliver services, increase access to information, and provide a foundation upon which to address issues that affect entire communities^{64,65}. One component of shelter operations utilized by AAC that has greatly increased its capacity to serve their community’s animals is the utilization of organizational partnerships and community members to house animals and/or provide specialized programming. These partnerships optimize AAC’s capacity by permitting the transfer of animals to another facility or home either during low kenneling capacity periods or when there is an animal with especially high need that another organization (such as APA or a foster family) may be more successful in addressing. Furthermore, transfer partnerships allow shelters and rescues that experience intake levels that exceed capacity to find open space for excess dogs and cats at partner facilities instead of euthanizing animals to stay at or below maximum

⁶⁴ Reese, L.A., Ye, M. (2017). Minding the gap: networks of animal welfare service provision. *American Review of Public Administration*. 47 (5). 503-519.

⁶⁵ AHeinz57. Retrieved from: <https://www.aheinz57.com/no-kill-vs-traditional-shelters/>

capacity⁶⁶. This practice may result in improved resource allocation within each shelter as well as improved effectiveness of programming as shelters are able to “specialize” in a population.

Following the implementation of the Resolution 20091105-040, AAC and APA entered into a formal license agreement that specifically governs the selection of the animals at AAC that will be transferred to APA. Under this agreement, animals coded as “at risk” (for euthanasia) are the animals that must be transferred to APA first in the event AAC reaches its capacity, whereas a secondary code of “attention” is used for those animals that will eventually be transferred due to the animals’ increased need for behavior or medical attention. Operationally, the “at risk” and “attention” lists are emailed to APA daily - animals on the “at risk” list are pulled steadily and those on the “attention” list are pulled as fast as possible. Beyond this coding system that supports AAC’s kennel capacity decision-making, APA regularly conducts “space” pulls when they have additional capacity at their facility.

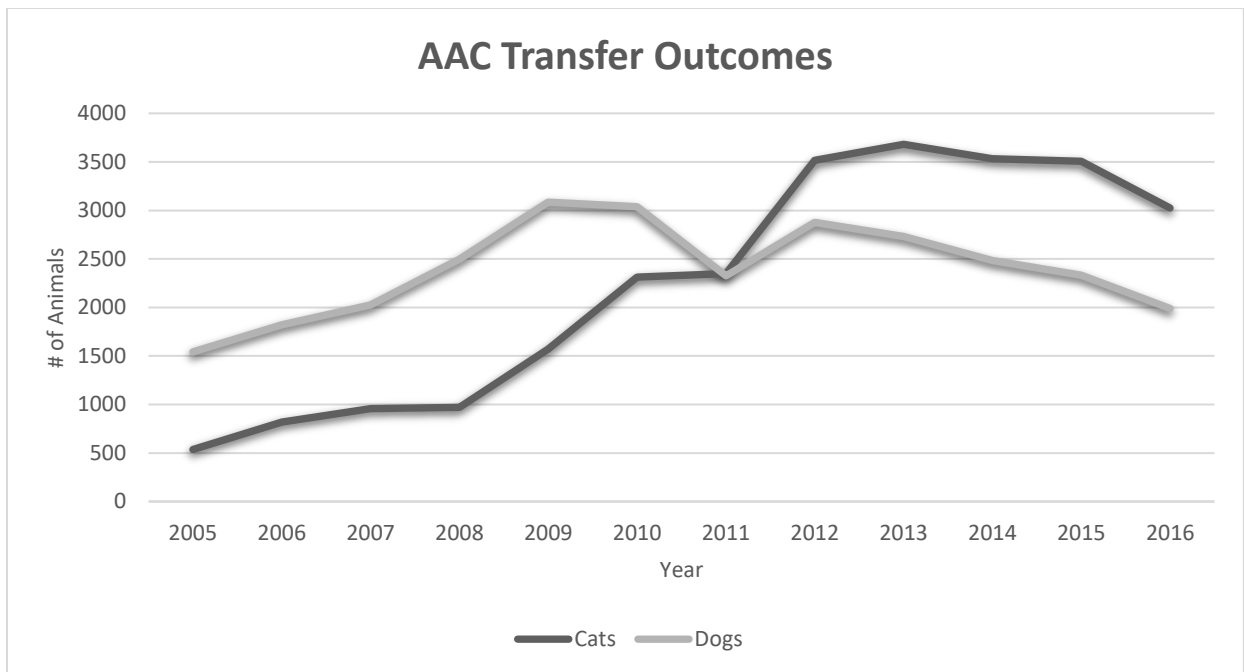


Figure 11. Annual number of animals at AAC that were transferred to another shelter or rescue organization (including APA, AHS, and all other shelter or rescue partners of AAC) between 2005 and 2016.

Over the entire study period (2005-2016), the trend in the number of dogs transferred by AAC to any of its transfer partners has significantly decreased ($P = 0.013$), with an average decrease of 129 dogs transferred per year (Figure 11). Within these data, the transfer of dogs to APA has remained relatively consistent since the formal agreement with APA was established at an average of 1,341 dogs transferred per year since 2008 ($P = 0.903$). However, transfer of dogs to organizations other than APA has significantly decreased ($P = 0.006$) by an average of 125 dogs transferred each

⁶⁶ Hawes, S., Camacho, B., Tedeschi, P., Morris, K. (in press). Trends in intake and outcome data for animal shelters in Colorado, 2000 to 2015 – another eight years out. *Journal of American Veterinary Medical Association*.

year. A t-test analysis of dogs transferred to organizations other than APA also indicates that dogs transferred from 2005 to 2009 ($M = 1,832$, $SD = 179$) and dogs transferred from 2010 to 2016 ($M = 1,197$, $SD = 274$) decreased significantly ($P=0.001$). In contrast to dogs, the number of cats transferred from AAC to any of its transfer partners during the entire study period (2005-2016) has significantly increased ($P= 0.033$) at an average increase of 236 cats transferred per year. Similar to dogs, the number of cats transferred out of AAC to APA has remained relatively consistent at 1,239 cats transferred to APA each year ($P = 0.201$). However, cats transferred from AAC to organizations other than APA increased significantly from 2005 to 2010 at 69 cats per year ($P = 0.026$) but did not change from 2008 to 2016 at 633 cats per year ($P = 0.052$). Overall, these trends for both dogs and cats indicate that the transfer partnerships needed to remain in compliance with the Resolution were in place prior to 2010, and that implementing the Resolution required AAC to continue the number of transfers to both APA and other shelters or rescue partners.

Foster networks formed within the communities are another partnership that can result in improved outcomes for shelters. In addition to rates of adoption and transfer partners, an expanded network for foster care was needed to increase AAC and APA's capacity to serve the additional animals resulting from the Resolution, especially those who require extended lengths of stay. The number of fosters a shelter utilizes may also be an indicator of community investment in the work of the shelter. At any time, 35-60% of AAC's animals may be in a foster placement, whereas about 50% of the animals in APA's care are likely to be in foster care. This is accomplished by a network of almost 3,000 foster homes registered under the two organizations. Community-based sheltering is a growing area of animal welfare insofar as home placements may result in improved health and behavior outcomes for sheltered animals rather than extended stays in shelter facilities that are correlated with high rates of stress⁶⁷. More research is needed in this area to understand the impacts of community-based sheltering and foster networks on the effectiveness of animal welfare outcomes.

Assessment of Live Outcomes

There are a variety of metrics that can be used to evaluate shelter operations on their ability to provide live outcomes for animals in their care. LRR is the primary metric utilized by shelters to assess and compare their operations. While Resolution 20091105-040 identified a 90% LRR as a measure of success for improving companion animal welfare in the city of Austin, the formula used to calculate LRR still varies across the animal welfare industry. To date, there are two primary definitions for LRR that can demonstrate the effectiveness of a shelter's operations over a given year from slightly different perspectives.

The first LRR definition, referred to as the ASPCA LRR Calculation,⁶⁸ is a useful measure for understanding the ways in which the trends in intake over the reporting year impacted the resources available for life-saving programs. The ASPCA LRR Calculation is the number of adoptions plus the number of returns to owner (RTO) plus the number of animals transferred out to other organizations divided by the total intake

⁶⁷ Coppola, C., Grandin, T., Enns, R.M. (2006) Human interaction and cortisol: can human contact reduce stress for shelter dogs? *Journal of Physiology and Behavior*. 87. 537-541.

⁶⁸ http://www.aspcapro.org/sites/pro/files/What%20is%20your%20Rate%2010_2013.pdf

for that year. In 2016, AAC reported having adopted 7,789 animals, transferred out 5,017 animals, and returned 3,388 animals to their owner. With an intake of 16,820 animals, their LRR for 2016 under the ASPCA definition was 96%. In 2016, APA reported having adopted 6,981 animals, transferred 0 animals out, and returned 10 animals to their owner. With an intake of 7,344 animals, their LRR for 2016 under the ASPCA definition was 95%. The ASPCA LRR calculation is an important metric in that it provides an indication of how the management of AAC's intake has supported the organization in meeting the 90% LRR goal described under the Resolution. The decreasing trends in overall intake seen at AAC has supported AAC's attainment of the 90% LRR under the ASPCA definition.

The second LRR definition, referred to as the Asilomar LRR Calculation⁶⁹, is a useful measure for understanding the rate of live outcomes irrespective of the intake of the shelter that year. The Asilomar LRR Calculation is the number of adoptions plus the number of RTOs plus the number of animals transferred out divided by the total outcomes for that year. In 2016, AAC reported 16,194 live outcomes (adoption, transfer, RTO) and 16,812 total outcomes, meaning their LRR for 2016 under the Asilomar definition was 96%. In 2016, APA reported 7,802 live outcomes (adoption, transfer, RTO) out of a total of 7,955 outcomes, yielding a 98% LRR for 2016 under the Asilomar definition. The Resolution's emphasis on live outcomes has driven increases in LRR specifically under this Asilomar definition. By placing a moratorium on euthanasia and establishing the formal partnership between AAC and APA, Resolution 20091105-040 created the pathway through which outcomes for animals sheltered in Austin would greatly improve under this definition.

There are a number of limitations to utilizing LRR as the sole metric for success in animal welfare. For example, the length of stay of an animal is an important consideration that is not captured within these definitions of LRR. Extended lengths of stay for animals in shelters is a matter of contention in the animal welfare industry for several reasons. Shelters are high-stress environments for companion animals, and therefore, an increased length of stay may be correlated with a decreased quality of life^{70,71,72,73,74}. With the implementation of Resolution 20091105-040 and its moratorium placed on euthanasia, many animals that would have previously been euthanized are now remaining under shelter care until they are adopted.

APA's data on length of stay indicate that most animals are in the organization's care within the range of 0-180 days (64% of the random sample of 145 animals at APA in 2016) (Figure 12). While most of these animals spend time in the kennel environment of APA at some point during their stay, most animals are housed through a combination of on-site kennel time and off-site foster time in the broad network of 2,900 volunteer

⁶⁹ http://www.aspcapro.org/sites/pro/files/What%20is%20your%20Rate%2010_2013.pdf

⁷⁰ Hennessy, M.B., Larons, M.E., Williams, M.T., Mellott, C., Douglas, C.W. (1997). Plasma cortisol levels of dogs at a county animal shelter. *Physiology and Behavior*. 62. 485-490.

⁷¹ Protopopova, A. (2016). Effects of sheltering on physiology, immune function, behavior, and the welfare of dogs. *Physiology and Behavior* (159). 95-103.

⁷² Bannasch, M.J., Foley, J.E. (2005). Epidemiologic evaluation of multiple respiratory pathogens in cats in animal shelters. *Journal of Feline Medicine and Surgery* (7), 109-119.

⁷³ Dinnage, J.D., Scarlett, J.M., Richards, J.R. (2009). Descriptive epidemiology of feline upper respiratory tract disease in an animal shelter. *Journal of Feline Medicine and Surgery* (11). 816-825.

⁷⁴ Pedersen, N.C., Sato, R., Foley, J.E., Poland, A.M. (2004). Common virus infections in cats, before and after being placed in shelters, with emphasis on feline enteric coronavirus. *Journal of Feline Medicine and Surgery* (6). 83-8.

foster homes that are shared between AAC and APA. The purpose of this foster model is to alleviate the stress caused by housing under shelter conditions and to provide more focused opportunities to address any medical or behavioral challenges the animal may present. When these animals are not housed in a foster network, they may be kenneled on-site at APA where they receive regular walks, participation in supervised playgroups, and behavioral training.

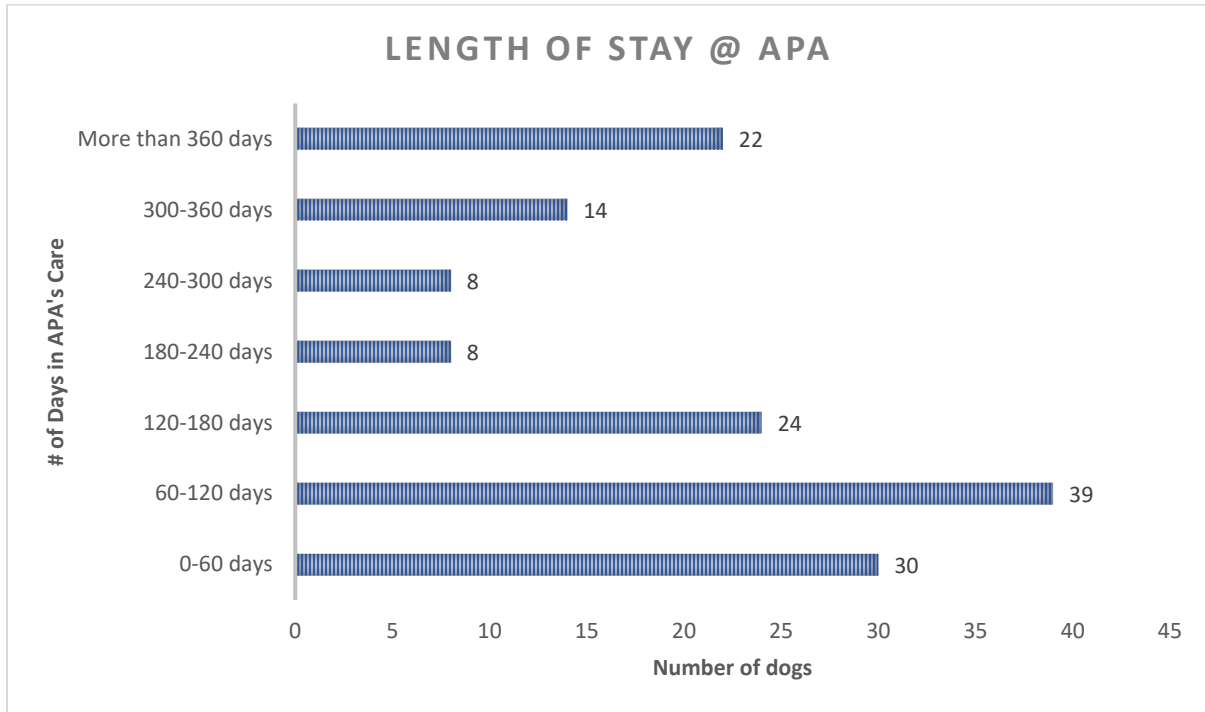


Figure 12. Length of stay for a random sample of 145 dogs in APA’s care in 2016, categorized within 60-day ranges. 64% (93 out of 145) of dogs in APA’s care in 2016 were there for less than 180 days. Dogs may have completed their stays through a combination of being both on-site at APA and off-site in foster care. Data on the random sample of 145 dogs were obtained from APA’s ShelterLuv database.

The second issue associated with length of stay is the *per diem* cost for sheltering an animal. While it is important to acknowledge that not all shelters that house animals for an extended length of stay are providing an increased amount of resources to these animals, at APA, animals with longer lengths of stay are often being treated for costly medical and/or behavioral issues that add substantial cost beyond the *per diem* costs (increased spending on animals is discussed in more detail in the City Governance section). This treatment and the period of times these animals are unavailable for adoption while they are rehabilitated, are a significant “hidden cost” that should be accounted for within the decision to place a moratorium on euthanasia of these high-resource animals (Figure 13). Due to the potential cost and/or the ethical concern around the potential for sufficient additional resources not being directed towards maintaining these animals in a manner that ensures a high quality of life, the housing of animals who may require extended periods of care before being adopted is a matter of contention among animal welfare leadership.

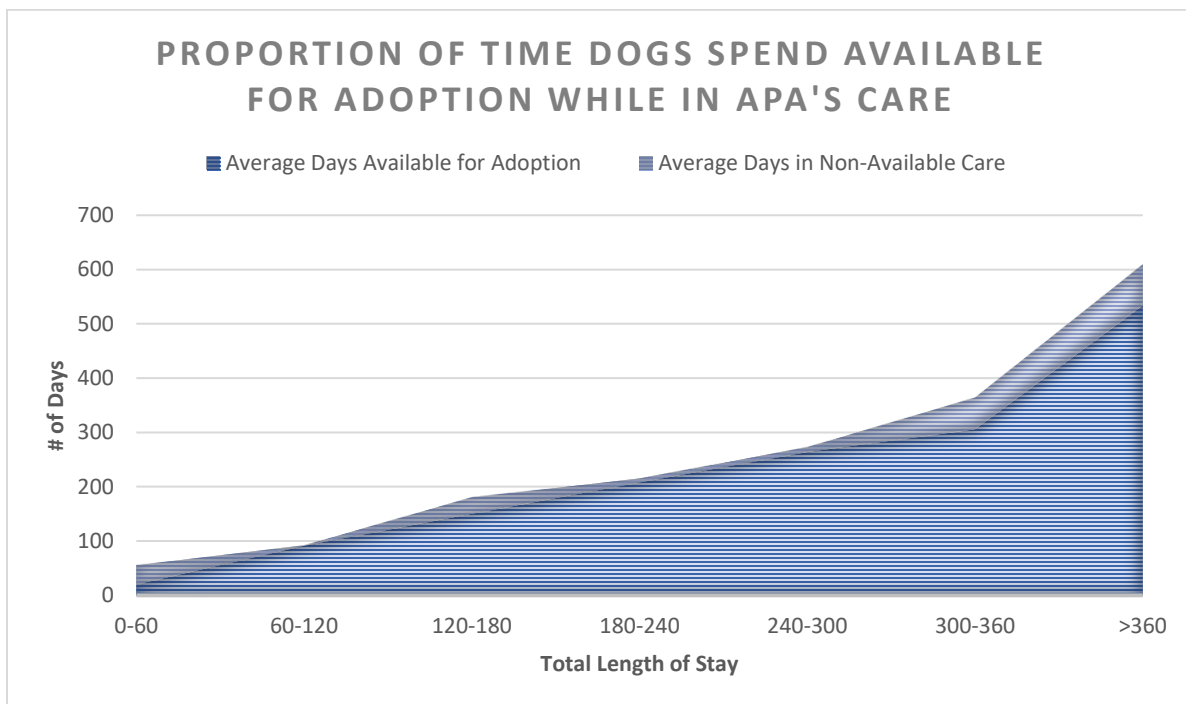


Figure 13. Average number of days a dog (within the random sample of 145 dogs in APA’s care in 2016) spent available for adoption versus not available for adoption during their entire length of stay. There were 8 dogs (in the random sample of 145 dogs) who were never available for adoption in 2016. Their average length of stay was 315 days. Data on the random sample of 145 dogs were obtained from APA’s ShelterLuv database. Data provided in Appendix G.

At APA, animals who are housed for any period of time are provided additional enrichment, as outlined in the implementation plan⁷⁵. As of July 2017, APA had 51 “long stay” dogs (dogs who had been at APA longer than 300 days), with the average number of days these dogs had been in APA’s care being 502 days in 2017 (compared to 557 days and 531 days in 2015 and 2016, respectively). APA reports that 19 of the long-stay dogs are in long-term foster care (the others rotate in and out of foster care and time spent in the shelter). To date in 2017, APA has adopted out an average of 9 long-stay dogs per month compared to 6 per month in 2015 and 2016⁷⁶. These data indicate that at least some of these dogs who may have previously been euthanized had they been placed in the care of AAC prior to the Resolution can find new homes, given the appropriate level of resources from the shelter and the capacity of the community to adopt additional animals. Ultimately, quality of life is one of those impacts that could be considered of higher value than any incremental increase in rate of adoption or overall LRR. Therefore, additional data are needed on the health and behavior of these extended “long-stay” animals to appropriately assess the in-shelter animal health and welfare-related impacts of the Resolution.

⁷⁵ <http://www.ci.austin.tx.us/edims/document.cfm?id=131732>

⁷⁶ www.facebook.com/apalongstaydogs/

Across the variety of mechanisms that inform shelter operations, data-driven decision-making and inter-organizational collaboration are important drivers of the substantial improvements in shelter outcomes across animal sheltering systems. Decreases in total intake and increases in rate of transfer from AAC to APA have been important factors that have supported AAC's compliance with the 90% LRR goal of the Resolution. However, while LRR is an important metric to use in evaluating a shelter's operations, the balance between a community's animal welfare goals and its tolerance for issues such as increased resource allocation (i.e. *per diem* cost per animal) and length of stay is both an ethical and a practical discussion that must be held on a community-wide basis.

Impacts on City of Austin Community

Austin Animal Services Budget

The implementation of Resolution 20091105-040 involved increases in tax-related expenditures to cover AAC's increased operational needs (Figures 14-15). While still representing less than 0.5% of the total City of Austin budget, the annual budget for the municipal shelter more than doubled between 2009 and 2016 to \$12 million. This increase is largely attributable to the increased number of full-time employees at AAC and across Austin Animal Services (Figure 16).

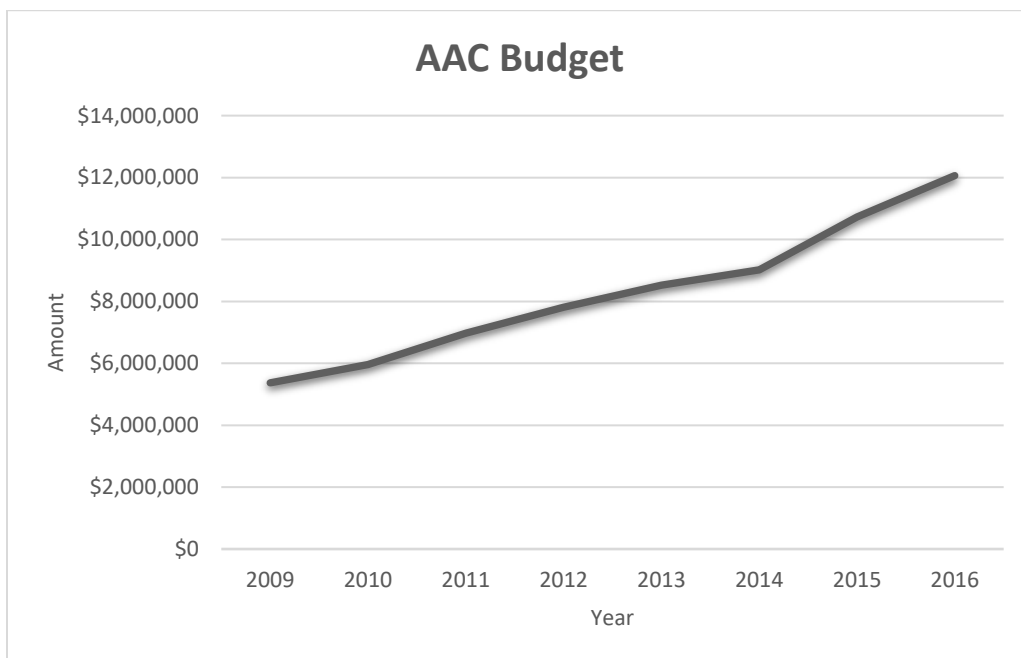


Figure 14. Annual AAC budget from 2009-2016.

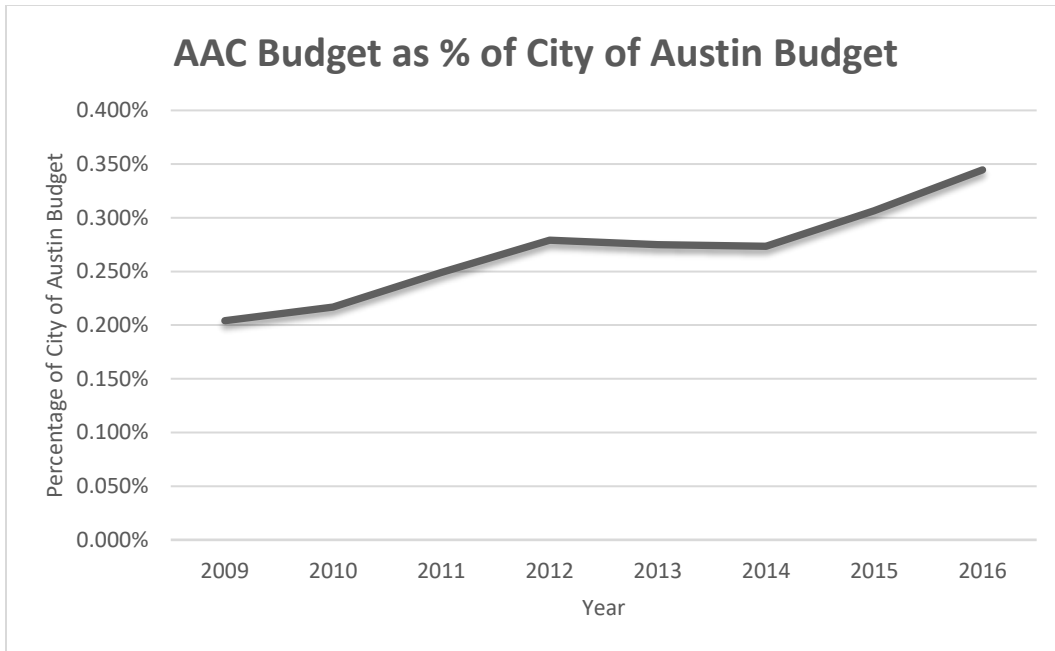


Figure 15. AAC budget as a percentage of the City of Austin budget from 2009 to 2016.

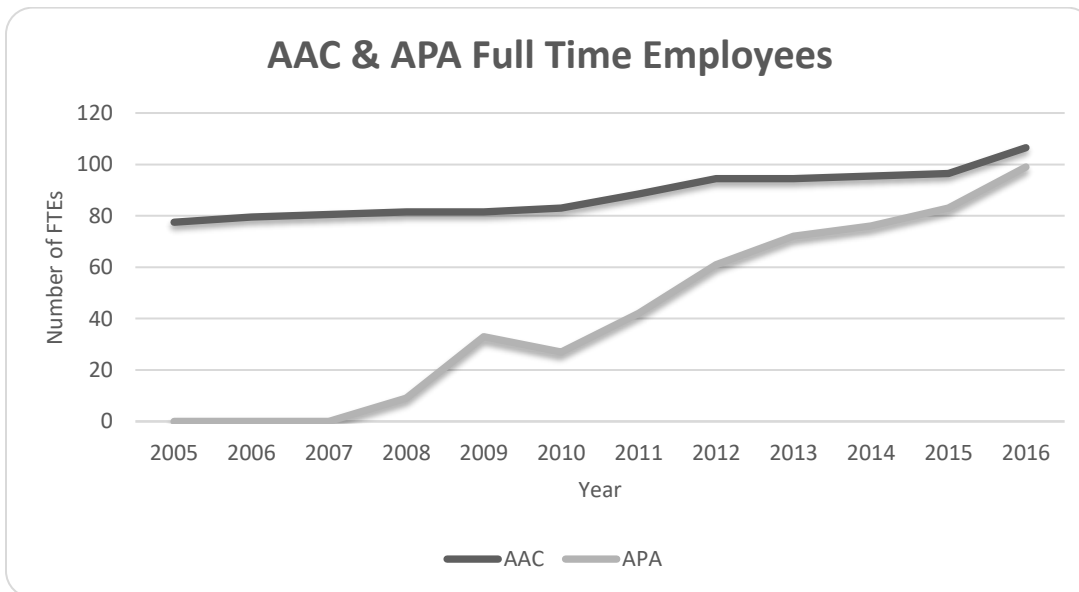


Figure 16. Full-time employment increases following Resolution 20091105-040.

The additional costs per animal taken in by AAC required to implement Resolution 20091105-040 – referred to here as the “No Kill Premium” – was estimated using two approaches. First, the average cost per animal that was taken into the municipal shelter was calculated for each year between 2005 and 2016 (the “before/after” method) (Appendix H). The 2005-2009 average cost per intake was then subtracted from the 2010-2016 average to calculate the increase in average cost per intake since the implementation of the Resolution (the “premium”). This resulted in the first estimation of the “No Kill Premium” at \$265 per animal, which ultimately translates

into a total additional cost of \$34 million when multiplied by the total intake of 128,325 animals cared for by AAC following the implementation of Resolution 20091105-040.

In the second approach to estimate the cost of the Resolution within the municipal budget, AAC's cost per intake in 2016 was calculated by dividing AAC's budget by the total intake during that year (the "cross-sectional" method). In 2016, AAC spent an average of \$715 per animal that came into the shelter. Note that this contrasts with the calculated average spending of \$278 per animal on average in 2009, prior to the implementation of the Resolution. The 2016 average was then compared to the average cost per animal in five other major U.S. cities (Chicago, IL; Los Angeles, CA; Miami, FL; Dallas, TX; and Denver, CO⁷⁷). The average cost per animal in 2016 for those housed in the municipal facility of these five major cities was \$507 (Table 2). The \$208 difference in AAC's 2016 cost per intake compared to these other cities represents a second calculation of the "No Kill Premium", and translates into a total additional cost of \$26.7 million when multiplied by the total intake of 128,325 animals cared for by AAC since the Resolution.

The average of the two "No Kill Premium" calculations is \$237 per intake, which translates into a total additional cost of \$30.4 million within the city budget for implementing the Resolution between 2010 and 2016⁷⁸. This represents an average of \$4.3 million per year in the municipal budget. Note that even if the entire \$187.8 million in positive economic impact calculated below resulted in revenue through the city sales tax, less than 10% of the "No Kill Premium" expenditure would directly return to the City of Austin⁷⁹. This level of increased cost per animal is in contrast to previous arguments that articulate "No Kill" shelter management as a "low-cost" or "cost-effective" approach⁸⁰. Furthermore, more data is needed to understand the relationship between increasing the cost per animal and objective measures of sheltered animals' quality of life.

⁷⁷ These cities were selected based on the criteria of 1) access to the city's Animal Services budget, and 2) publicly available intake and outcome numbers for the municipal shelter run under that Animal Services budget. These cities do not have legislation that specifically governs their municipal shelter operations in terms of LRR.

⁷⁸ While the range from \$265 to \$208/intake is presented here, the \$237/intake premium is suggested as the best possible conservative estimation of the additional cost per animal accrued when operating under the parameters set by the "No Kill" Resolution insofar as it accounts for the increasing average cost over the entire study period from 2005-2016 in Austin and includes consideration of the average cost allocated for sheltering in five major U.S. cities in 2016.

⁷⁹ <https://comptroller.texas.gov/taxes/sales/city.php>

⁸⁰ <http://www.nathanwinograd.com/no-kill-quick-facts/>

City	Year	Annual Budget	Animal Intake	Cost/Intake
Austin ⁸¹	2016	\$12,061,551	16,858	\$715
Chicago ^{82,83}	2016	\$5,590,000	13,653	\$409
LA ^{84, 85}	2016-17	\$23,982,367	45,607	\$526
Miami (Miami Dade) ⁸⁶	2016-17	\$21,067,000	31,000	\$680
Dallas ⁸⁷	2016	\$10,200,000	30,000	\$340
Denver ⁸⁸	2016	\$3,936,655	7,500	\$525
Estimated Average Spend Per Intake: Rest of the Cities				\$507
Estimated Austin Resolution 20091105-040 Related Spend Per Intake				\$208

Table 2. Comparison of annual animal shelter budgets and cost per animal for Austin, Texas and five other U.S. cities.

Shelter Operations

As discussed in the Methodology section, the economic impacts from AAC and APA’s Resolution-related operations (3.9% and 100% of total, respectively) occur in three distinct areas. Each of these economic impacts was calculated using standard microeconomic and macroeconomic models. Together the three areas result in a total economic impact per additional animal “saved” since the Resolution. First, the additional staffing, payroll, and operations of AAC following the Resolution represent new economic activity in the region (the direct effect of the Resolution). From 2010-2016, the impact of the direct effect of shelter operations attributable to Resolution 20091105-040 was \$22 million. Second, the increase in shelter operations also required purchases of materials and services from regional suppliers (the indirect effect of the Resolution). From 2010-2016, the impact of the indirect effect of shelter operations attributable to Resolution 20091105-040 was \$6.7 million. Third, shelter operations require labor services providing household income, a portion of which will be spent in the local economy, offering additional economic impacts (the induced effect of the Resolution). From 2010-2016, the impact of the induced effect of shelter operations attributable to Resolution 20091105-040 was \$12.2 million. Therefore, the total calculated economic impact of AAC and APA operations from 2010-2016 attributable to Resolution 20091105-040 was \$41 million (Table 3).

⁸¹ AAC Budget

⁸² <http://www.chicagotribune.com/news/local/breaking/ct-no-kill-city-animal-shelters-met-20160401-story.html>

⁸³ https://www.cityofchicago.org/content/dam/city/depts/cacc/PDFFiles/OldPDFs/2016_Annual_Stats.pdf

⁸⁴ http://cao.lacity.org/budget16-17/2016-17Budget_Summary.pdf

⁸⁵ <http://www.laanimalservices.com/pdf/reports/CatNDogIntakeNOutcomes.pdf>

⁸⁶ <https://www.miamidade.gov/budget/FY2016-17/proposed/library/animal-services.pdf>

⁸⁷ Boston Consulting Group DAS Report and <https://www.dallasnews.com/news/news/2016/03/24/dallas-animal-services-saved-more-pets-than-it-euthanized-last-year>

⁸⁸ https://www.denvergov.org/content/dam/denvergov/Portals/344/documents/Budget/2016/Mayors_2016_Budget.pdf

	Labor Income ⁸⁹	Value Added ⁹⁰	Output ⁹¹
Direct Effect	\$16,214,641	\$16,214,641	\$22,045,868
Indirect Effect	\$2,129,594	\$3,790,903	\$6,683,198
Induced Effect	\$4,215,656	\$7,300,235	\$12,209,499
TOTAL	\$22,559,891	\$27,305,779	\$40,938,565

Table 3. Economic outputs from IMPLAN modeling for direct, indirect, and induced effects of AAC & APA operations from 2010 to 2016. An annual breakdown of these calculations is available in Appendix I.

Veterinary Care and Pet Services

While Texas ranks 21st among other states in terms of pet-keeping rates⁹², Austin’s pet-keeping ranks 3rd among the 25 Metropolitan Statistical Areas in the nation (as of 2013)⁹³. This higher ownership rate is reflected in economic variables such as pet-related expenditures. For example, with increased pet-keeping, there is an increase in pet-care related expenditures such as dog-walking, grooming, or boarding. According to an American Pet Products Association study, overall, each animal in the community represents a \$12,357 contribution to the local economy over its lifetime in the form of retail, veterinary, and other pet-care related services⁹⁴. To capture the amount of economic impact that can be associated with Resolution 20091105-040, pet-related expenditures in Travis County were compared to the rest of Texas. The Resolution was an important driver of the rate of pet-keeping in Austin, however it is acknowledged that some of the animals in Austin would have been acquired before the Resolution and/or through means other than adoptions from AAC or APA. While animals acquired through other methods would also accrue similar economic benefits, the following calculations represent an attempt to capture the peripheral economic benefits of each additional animal that has been adopted since the Resolution.

Using County Business Patterns Surveys (CBP) conducted from 2005 through 2015, data were collected for three pet related industries: (a) pet and pet supplies stores (NAICS-453910)⁹⁵, (b) veterinary services (NAICS-541940), and (c) pet care (except veterinary) services ((NAICS 812910), in both Travis County and Texas. While annual payroll by industry was available annually, sales data were only available for 2007 and 2012 for these industries in Travis County and Texas. Using 2007 and 2012 sales to annual payroll ratios, annual sales by veterinary services and other pet care services

⁸⁹ Within IMPLAN analysis, labor income is defined as all forms of employment income, including employee compensation (wages and benefits) and proprietor income. For the purposes of the analysis in the following table, there was no proprietor income calculated because it is not applicable for government and non-profit entities.

⁹⁰ Value added was defined as the difference between the industry’s total output and the cost of its intermediate inputs.

⁹¹ Net output represents the value of the industry’s production, which are calculated within the IMPLAN software from annual production estimates.

⁹² <https://www.avma.org/KB/Resources/Statistics/Pages/Market-research-statistics-US-pet-ownership.aspx>

⁹³ https://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=AHS_2013_S06AO&prodType

⁹⁴ American Pet Products Association Study - retrieved from Dallas Animal Shelter presentation. July 17, 2015

⁹⁵ This item excluded from the calculations since this is an industry allowing for online orders (increasingly) which could have biased the results (portion of sales by shipping area unknown)

were first estimated from 2005 to 2016⁹⁶. Next, the estimated sales were normalized by population to capture per capita sales (as a proxy for per capita expenditures) in these two industries, so that population growth differences could be accounted for (Figure 17).

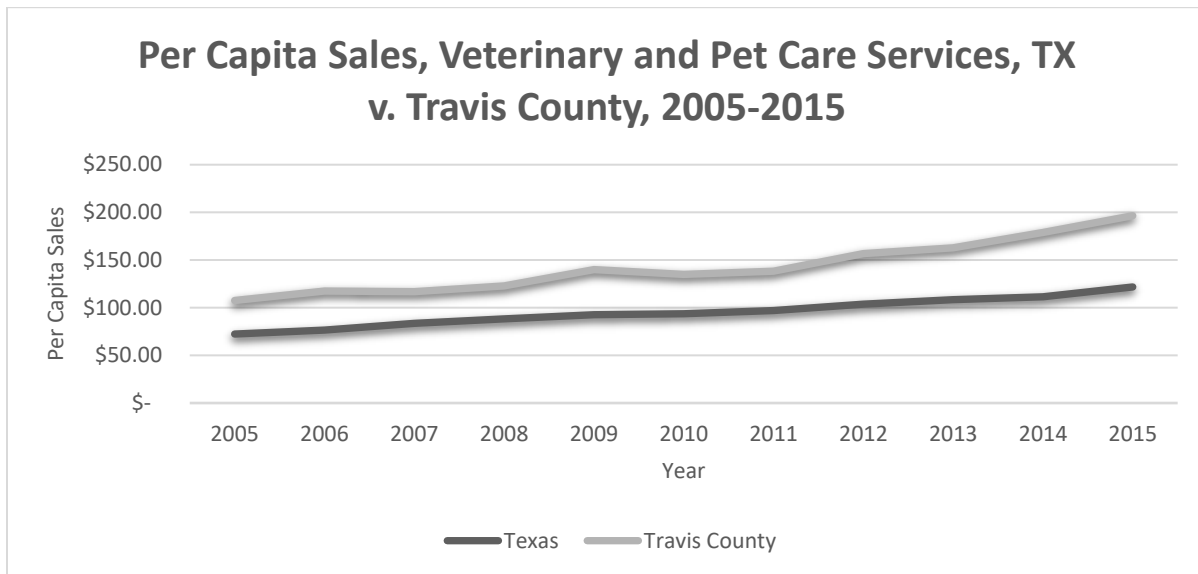


Figure 17. Per capita veterinary and pet care services spending in Texas versus Travis County

Year	Veterinary and Pet Care Services - Per Capita Sales		Veterinary and Pet Care Services - Year to Year Annual Growth ⁹⁷	
	Texas	Travis County	Texas	Travis County
2005	\$72.3	\$107.6	n/a	n/a
2006	\$76.6	\$117.5	6%	9%
2007	\$83.7	\$116.7	9%	-1%
2008	\$88.2	\$122.9	5%	5%
2009	\$92.6	\$140.1	5%	14%
2010	\$93.7	\$135.1	1%	-4%
2011	\$97.2	\$138.3	4%	2%
2012	\$103.9	\$156.7	7%	13%
2013	\$108.3	\$162.7	4%	4%
2014	\$111.5	\$179.0	3%	10%
2015	\$121.8	\$196.5	9%	10%

Table 4. Estimated sales normalized by population to capture per capita sales (as a proxy for per capita expenditures) in the veterinary services and pet care services industries.

⁹⁶ Sales and annual payroll for 2016 were extrapolated, as CBP has only been measured through 2015 at the time of this study.

⁹⁷ Despite limited sample size, a t-test for the post-2010 growth rates in Texas vs Travis County resulted in a p-value of 0.33, i.e. the probability that the post 2010 growth rates are not statistically different from each other.

As the next step in estimating the increased use of veterinary and pet care services, pre-2010 average per capita spending levels were calculated and compared to post-2010 average per capita spending levels both in Travis County and state-wide in Texas, in order to capture the overall trends in per capita spending in each average per capita spending increased by 33.4% in Travis County while it only increased by 28.2% statewide (Table 4). In order to control for any potential national and state specific factors that could have caused the observed increase in per capita spending levels in Travis County, the percentage increase of post-Resolution versus pre-Resolution spending levels (i.e. 28.2%) was used to re-calculate how much the pre-capita spending (the “but-for” level) would have increased in Texas if it only increased at a rate parallel to the rest of the state (Table 5). The but-for per-capita spending level (\$155.10) was then subtracted from the observed post-2010 average (\$161.39) to calculate the annual surplus per capita spending that occurred in Travis County that could be attributed to Resolution 20091105-040 (\$6.29). The total surplus spending on veterinary and other pet care services from 2010 through 2016 was then calculated to be \$49.3 million by multiplying the per capita surplus spending (\$6.29) by the annual Travis County population levels. Lastly, the total surplus per capita annual spending (\$6.29) is calculated to be 3.9% of the overall \$161.39 per capita annual spending in Travis County, during 2010-2016. In other words, the estimated relative impact of Resolution 20091105-040 on Travis County’s per capita spending on veterinary and pet care services is 3.9%.

Veterinary and Pet Care Services	Texas	Travis County
Avg. pre-2010 per capita spending	\$82.69	\$120.95
Avg. post-2010 per capita spending	\$106.03	\$161.39
Growth % of avg. post-2010 to pre-2010 spending	28.2%	33.4%
Avg. but-for post-2010 per capita spending	n/a	\$155.10
Avg. annual surplus per capita spending	n/a	\$6.29
2010-2016 Total Surplus Spending	n/a	\$49,300,160
% of Surplus Spending in Travis County, 2010-2016	n/a	3.9%

Table 5. Estimation of the percentage of veterinary and pet care services spending attributable to Resolution 20091105-040.

Pet Retail

The type of pet related expenses that are not captured by veterinary and other pet care services were also estimated (Table 6). Those expenses are categorized into food, treats, and toys. Since expenditures for consumables (food, treats, and toys) were not reported by CBP data, the surplus Travis County expenditures for these items were estimated using the annual breakdown of pet related expenditures obtained from the American Pet Products Association Study (Appendix J). On average, annual expenditures for food, treats, and toys are 34% of total pet related expenditures, whereas the remaining 66% are within the previously estimated veterinary and other pet care expenses (Table 6). Note that the initial point for this estimation is the \$49.3 million as discussed in Table 5 above, which was already scaled down to only represent

Resolution-related expenditures in Travis County. Using the ratio of each expense group to each other, \$25.3 million in food, toy, and treat related surplus spending was estimated in Travis County when compared to the rest of Texas. It was estimated that per capita pet related expenditures have been growing faster than the rest of the Texas since 2010.

Average Annual Spent Per Animal								
Pets	Veterinary and Other Pet Care Expenses			Food and Toys Related Expenses			Veterinary and Pet Care - % of Pet-Related Total Spend	Pet-Related Retail - % of Total Pet-Related Spend
	Vet Care	Grooming	Boarding/Pet-sitting	Food	Treats	Toys		
Cats	\$193	\$20	\$337	\$203	\$36	\$23	68%	32%
Dogs	\$239	\$61	\$327	\$231	\$65	\$41	65%	35%
Total	\$432	\$81	\$664	\$434	\$101	\$64	66%	34%
Estimated Resolution 20091105-040 Related Expenditures, Travis County 2010-2016							\$49,300,160	\$25,333,237

Table 6. The veterinary services, pet care services, and pet-related retail spending in Travis County attributable to Resolution 20091105-040 from 2010-2016.

City of Austin Brand Equity

Beyond the direct economic impacts of the shelter operations and the more indirect impacts on the city budget, the Resolution may have also indirectly impacted the city of Austin’s brand equity. City branding is emerging as an internationally recognized research domain that is characterized by a “high degree of interdisciplinary collaboration and an evolving theoretical foundation.”⁹⁸ The importance of city branding in the context of City of Austin’s Resolution 20091105-040 is emphasized by the fact that “almost 64% of college-educated 25- to 34-year-olds said they looked for a job only after they’d chosen the city where they wanted to live.”⁹⁹ The Humane City signals social awareness to a key labor demographic (the young, mobile, highly-educated, and innovative professional) and could serve as a catalyst for economic and public health improvements. Google Tower, located at 500 West 2nd Street in downtown Austin, is an example of how a Humane City may contribute to the overall brand equity of a city and therefore its ability to attract the millennial workforce¹⁰⁰. When interviewed on the decision to build in Austin, a Google representative was quoted as saying, the city was “attractive to company executives because it is attractive to a young, vibrant, pet-loving workforce.” In other words, creating a pet friendly environment can affect a city’s ability to attract new residents.

⁹⁸ Lucarelli, Andrea, and Per Olof Berg. "City branding: a state-of-the-art review of the research domain." *Journal of place management and development* 4.1 (2011): 9-27.

⁹⁹ <https://hbr.org/2010/05/back-to-the-city>

¹⁰⁰ <http://www.512tech.com/technology/google-new-downtown-tower-home-reaches-full-height/Bn3D2bznoskEVKh2hpAuaL/>

This observation is further supported by the data obtained by Google trends service¹⁰¹. The following three search terms on Google were analyzed over the last five years in the U.S.: “moving companies”, “pet friendly” and “apartments for rent” (Figure 18)¹⁰². The seasonal characteristics of the search frequencies for all three series highly correlate (Table 7), which indicate the importance of pet friendly environment for moving decisions of residents, and therefore, its relevance to a city’s long-term ability to be economically successful.

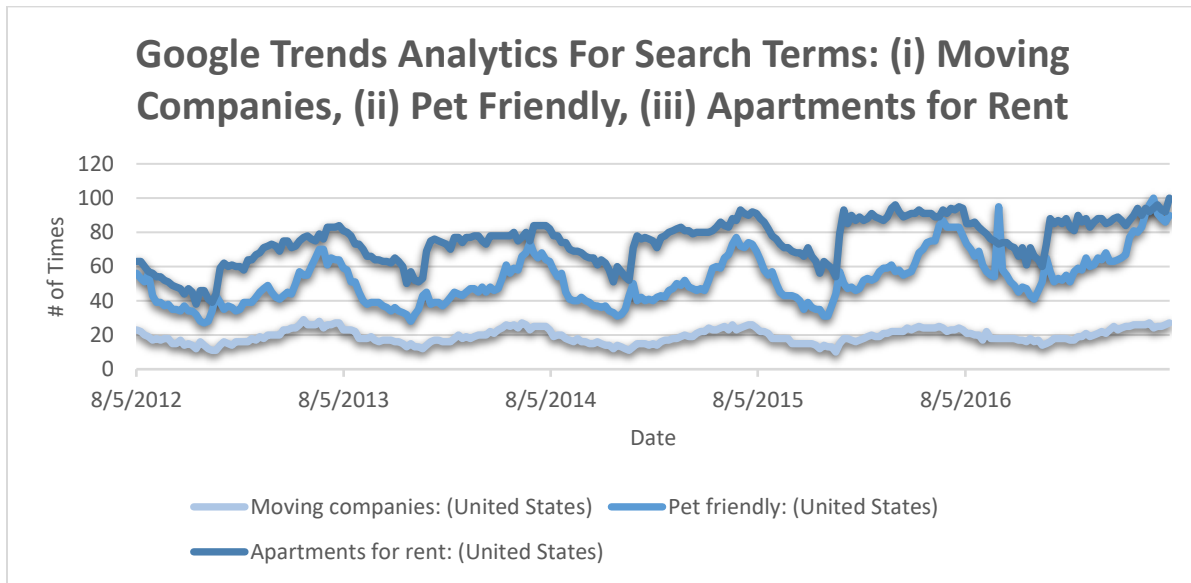


Figure 18. Google trends for ‘Moving Companies’, ‘Pet Friendly’, and ‘Apartments for Rent’ from 2012-2017

<i>Search Term Correlation Matrix</i>	<i>Moving companies:</i>	<i>Pet friendly:</i>	<i>Apartments for rent:</i>
<i>Moving companies:</i>	100%		
<i>Pet friendly:</i>	77%	100%	
<i>Apartments for rent:</i>	72%	77%	100%

Table 7. Google Search Term Trends Correlation matrix

Since 2010, Travis County’s population has increased by 17.1%¹⁰³. This may be indicative, at least in some form, of the brand equity afforded the city as a result of Resolution 20091105-040 and other policies in Austin that contribute to it as a Humane City. These Google trends analyses on new resident priorities are supported through Austin’s higher than average rate of available pet-friendly rental housing. On average,

¹⁰¹ <https://trends.google.com/trends/>

¹⁰² <https://trends.google.com/trends/explore?date=today%205-y&geo=US&q=apartments%20for%20rent,pet%20friendly,moving%20companies>

¹⁰³ <https://www.census.gov/quickfacts/fact/table/traviscountytexas,austincitytexas/PST045216>

46% of available Austin rentals report being pet-friendly. This is higher than two of four other major U.S. cities (Nashville, TN; Raleigh, NC) that were analyzed for trends in pet-friendly rental properties (Figure 19). This is relevant insofar as it underscores the point that a Humane City will adopt an integrated system of policies all working towards similar humane outcomes. While the Resolution can be attributed for a percentage of the new residents in Austin, the support of pet-friendly initiatives through other institutions such as housing, enables the residents to enact humane attitudes in a variety of contexts, thereby fortifying the social impacts of Austin’s city branding.

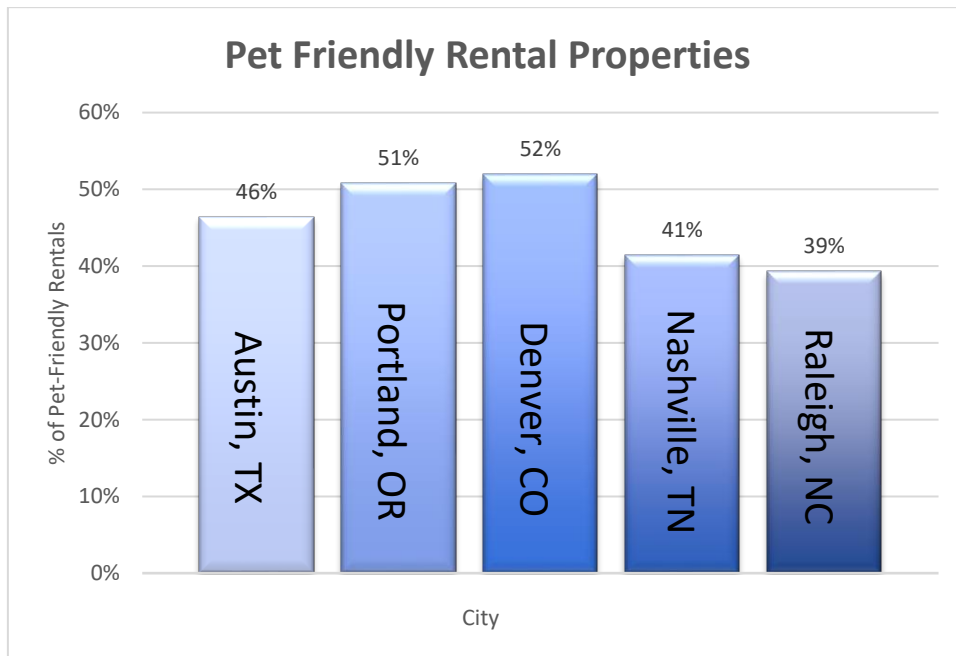


Figure 19. Percentage of available rental properties that are pet-friendly¹⁰⁴. Data provided in Appendix K.

The economic impact of Resolution 20091105-040 on Austin’s city branding was estimated by first comparing the population in Travis County to the total MSA level population in the state of Texas for 2005-2016. The Travis County population growth during 2010-2016 was then detrended using the Texas MSA population as a control variable¹⁰⁵, resulting in an estimate that the Travis County population outgrew the rest of the Texas MSAs by 195,386 people (“surplus” population). Using the Census-reported median income of \$61,451¹⁰⁶, and multiplying with the estimated surplus population since 2010, the total income generated by the surplus population was estimated to be approximately \$12 billion, \$4.9 billion of which was spent in the local economy¹⁰⁷. As noted in the Census conducted Current Population Survey¹⁰⁸, people move due to family-related, housing-related, job-related and other reasons. There is no reason to believe that the surplus population in Travis County can be attributed to family reasons

¹⁰⁴ Zillow and Trulia, April 2017-May 2017

¹⁰⁵ By comparing growth of population in pre-2010 to post-2010 segments.

¹⁰⁶ <https://www.census.gov/quickfacts/table/PST045125/48453>

¹⁰⁷ <http://www.pewtrusts.org/en/research-and-analysis/issue-briefs/2016/03/household-expenditures-and-income>

¹⁰⁸ U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplement.

(when compared to the rest of Texas), since those movers would be equally reflected in the control variable, the Texas MSA population¹⁰⁹. Additionally, housing price indices indicate that Travis County has consistently been more expensive than the rest of Texas¹¹⁰. In other words, the surplus population cannot be attributed to housing reasons as well. Controlling for those two factors, uncategorized other reasons, which is inferred to include the implementation of the Resolution, accounted for 9.8% of all mover related reasons.

Finally, a survey of Austin residents conducted as part of this study found that 15% of the 750 respondents¹¹¹ reported that a city's pet friendliness would affect their decision about moving to that city or not. In other words, it is estimated that 15% of the 9.8% ("other uncategorized reason" movers) of Travis county population surplus can be attributable to the Resolution, yielding \$72.3 million local economic impact attributable to the implementation of Resolution 20091105-040. (Appendix L, Appendix M).

Potential Additional Impacts

While not included as part of the total economic impact calculated in this report, several potential public health and social impacts are considered here. These effects are additional benefits potentially accrued by Austin as result of Resolution 20091105-040 and by other Humane Cities.

Public Health

The Resolution legislated significant operational changes at the municipal shelter with the intent of improving animal welfare outcomes for Austin's unhoused companion animals. However, by supporting improvements to animal welfare, Humane Cities may also experience improvements in human welfare and public health. Increasing the LRR of a city shelter requires both increased rates of adoption and/or transfer partnerships. In particular, increases in the rate of adoption can be connected to increased rates of pet-keeping in the community and increases in transfers can result in increased numbers of animal available for adoption in other communities that are seeking to increase pet-keeping rates.

Across communities, companion animals have been correlated with changes to individuals' and families' holistic wellness, including their physical, mental, and social health^{112,113,114}. Several studies have identified pet-keeping as a protective mechanism

¹⁰⁹ Otherwise, we would impose that Travis County have higher parenthood / family ties than the rest of Texas

¹¹⁰ <https://fred.stlouisfed.org/series/ATNHPIUS48453A> and <https://fred.stlouisfed.org/series/TXSTHPI>

¹¹¹ Originally 17.2% responded, adjusted down to 15% in order to control for the selection bias, by comparing the pet ownership rates in the survey to average pet ownership rate in Austin area.

¹¹² Hodgson, K., Barton, L., Darling, M., Antao, V., Kim, F. A., & Monavvari, A. (2015). Pets' impact on your patients' health: Leveraging benefits and mitigating risk. *The Journal of the American Board of Family Medicine*, 28(4), 526-534

¹¹³ Wzu, Y., Luben, R., Jones, A. (2017). Dog ownership supports the maintenance of physical activity during poor weather in older English adults: cross-sectional results from the EPIC Norfolk cohort. *Journal of Epidemiology and Community Health*. DOI: 10.1136/jech-2017-208987

¹¹⁴ Connolly, J.J.; Svendsen, E.S.; Fisher, D.R.; Campbell, L.K. (2014). Networked governance and the management of ecosystem services: The case of urban environmental stewardship in New York City. *Ecosystem Services*. 10: 187-194.

for cardiovascular health^{115,116}. Pets may also serve as important sources of attachment that can result in improved psychosocial outcomes for humans^{117,118}. In this way, emphasizing the value of companion animal lives may also result in benefits to the human population.

Pets in homes may result in a variety of different cost-related benefits, including health-related expenditure savings. A study in Australia indicates that pet-related health benefits could translate to significant public health savings, with one estimate for decreased annual health expenditures at \$3.86 billion (7.2%), if pet-keepers visited a doctor as often as non-pet-keepers¹¹⁹. At the time of this report these expenditures could not be estimated for Austin using existing data. According to the Texas Veterinary Medical Association, Austin has 365 veterinarians - the highest number of veterinarians per capita in the state and not far behind the city's estimated 400 to 450 pediatricians¹²⁰. This ratio of veterinarians to pediatricians may be an indicator of the increasing relevance of pet-keeping in Austin. Further study is needed in this area to understand how pet-keeping may influence human pet-keepers' health decisions for themselves and for their families.

Previous research indicated that there may be some negative implications for expanded opportunities for pet-keeping which include those incidences primarily managed through animal protection or animal control services. In 1986, dog bites were identified as among the top 12 causes of non-fatal injury in the U.S.¹²¹, while another study identified animal control issues as the most common complaint city officials receive from their constituents¹²². A more recent study in 2002 estimated that there are roughly 1.5 to 4.5 animal control complaints per 1,000 people in major U.S. cities¹²³.

In this way, as a municipal facility, AAC has a duty to "protect" the public from any risk that may occur as a result of increased pet-keeping in communities. Dog bite data from Austin Animal Services indicate that although there has been an increase in dog bites since the implementation of the Resolution in 2010, the upward trend in dog bites began in Austin as early as 2003 (Appendix N)¹²⁴. A t-test analysis of severe dog bites shows that severe dog bites from 2005 to 2009 (M=39, SD=16) did not vary significantly from severe dog bites from 2010 to 2015 (M=70, SD=72) ($P=0.349$). The same analysis on moderate dog bites found that moderate dog bites from 2005 to 2009 (M=218, SD=52) did not vary significantly from moderate dog bites from 2010 to 2015 (M=464, SD=340) ($P=0.138$). It is important to note that the 2012 year of reporting may

¹¹⁵ Arhant-Sudhir, K., Arhant-Sudhir, R. Sudhir, K. (2011). Pet ownership and cardiovascular risk reduction: supporting evidence, conflicting data and underlying mechanisms. *Clinical and Experimental Pharmacology and Physiology*, 38, 734-738.

¹¹⁶ Levine, G., Allen, K., Braun, L., Christian, H., Friedmann, E., Taubert, K., Thomas, S., Wells, D., & Lange, R. (2013). Pet ownership and cardiovascular risk: A scientific statement from the American Heart Association. 127, 2353-2363.

¹¹⁷ Kurdek, L.A. (2009). Pet dogs as attachment figures for adult owners. *Journal of Family Psychology*, 23, 439-446.

¹¹⁸ Holt-Lunstad, J., Smith, T. B., Layton, J. B. (2010). Social relationships and mortality risk: A meta-analytic review. *PLoS Medicine* 7(7): e1000316.

¹¹⁹ Heady, B., Grabka, M., Kelley, J., Reddy, P., & Tseng, Y. (2002). Pet ownership is good for your health and saves public expenditure too: Australian and German longitudinal evidence. *Australian Social Monitor*, 5(4), 93-99.

¹²⁰ <http://www.statesman.com/lifestyles/pets/welcome-dogtown-aka-austin-texas/GXzyLzZSKTCvnBV40IIcWl/>

¹²¹ Sosin, D.M., Sacks, J.J., Sattin, R.W. (1986). Causes of nonfatal injuries in the United States. *Accident Analysis and Prevention* 24, 658-957.

¹²² Bancroft, R.L. (1974). America's mayors and councilmen: their problems and frustrations. *Nation's Cities* 12. 14-22.

¹²³ Clifton, M. (2002). Animal control is people control. *Animal People* 11 (5).

¹²⁴ http://www.austintexas.gov/sites/default/files/files/Animal_Services/Response_8_14.pdf

be considered an outlier for all categories of dog bites (moderate bites = 1,147, severe bites = 211) and may have skewed the mean and standard deviations. When excluding the data reported in 2012 for the t-test analysis, severe dog bites from 2005 to 2009 (M=39, SD=16) still did not vary significantly from severe dog bites from 2010 to 2015 (excluding 2012) (M=42, SD=22) ($P=0.833$). However, moderate dog bites from 2005 to 2009 (M=218, SD=52) did vary significantly from moderate dog bites from 2010 to 2015 (excluding 2012) (M=327, SD=64) ($P=0.019$). These data indicate that the Resolution may have coincided with an increased reporting and/or incidence of dog bites, however the upward trend also coincides with an increase in human population within Travis County as well as with an increase in total number of animals in Austin and therefore the increased trend in dog bites cannot be attributed exclusively to the Resolution.

The City of Austin manages the reporting of animal welfare concerns like cruelty and neglect citations utilizing a web-based platform in which real-time updates can be recorded and viewed by community members. One such example of this is the “Dangerous Dog” map where community members can view the locations of any dogs who have received citations but are able to remain in their homes under a set of restrictions, including a special identification tag that must remain visible¹²⁵. The presence of publicly available data on animal welfare concerns is one example of how a city can enhance community education and safety by remaining transparent on both the positive and negative state of the city’s animal welfare.

Social Capital

Resolution 20091105-040 represents a significant social effort to prioritize animal welfare within Austin’s city governance. According to social science research, the driver behind this effort is most likely rooted in the perception that the change could then result in improvements in human individual’s personal welfare or utility¹²⁶. This is important to note insofar as, at present, economic arguments and political agendas do not appear to serve as sufficient incentive for valuing the lives of companion animals¹²⁷. In this way, there are factors beyond the economic and operational components of the Resolution that have motivated the citizens of Austin to move towards a Humane City and that inform the more indirect impacts of the legislation in Austin.

The overall increase in pet-keeping that may have resulted from the Resolution may serve as a mechanism for shifting Austin to a more humane and compassionate city. Studies indicate that pet-keeping is positively associated with some forms of social contact and interaction (civic engagement) and with perceptions of neighborhood friendliness. For example, pets can inform the exchange of favors that can be symbolic of trust¹²⁸. Therefore, pet-keeping may be emerging in Austin as an important driver of pro-social behavior and other mechanisms of social capital.

¹²⁵ <https://data.austintexas.gov/Public-Safety/Statesman-Dangerous-Dog-Map/w2sb-hd72>

¹²⁶ Paavola, J., Adger, W.N. (2005). Institutional ecological economics. *Ecological Economics*. 53. 353-368.

¹²⁷ Farber, S. (1991). Local and global incentives for sustainability: failures in economic systems. In *Ecological Economics: the science and management of sustainability*, ed. R. Costanza, 344-354. Columbia University Press, New York.

¹²⁸ Wood, L. (2000). Social capital, physical environments, and health: study funded by Healthway starter grant. Perth: The University of Western Australia.

Furthermore, social capital is associated with increases in reciprocity-based networks¹²⁹ that can be an increasing driver of an individual or family's ability to care for their pets. In this way, policies that build upon and result in an increase in social capital and these reciprocity-based networks can assist in building measures of coping and resilience that may be important to decreasing negative human and animal welfare outcomes¹³⁰.

An important factor for whether or not communities can utilize social capital as a mechanism for caring for their animals is the degree to which the formal institutions of the city support means of connection¹³¹. By connecting community members together, either by necessity to achieve operational effectiveness at the shelter or informally through the increased social connectivity that results from an increased number of companion animals in a community, "humane" oriented policies like Resolution 20091105-040 can contribute to the social and civil health of the city as a whole.

Community Engagement

The degree to which animal welfare is protected in a city goes beyond shelter management and is increasingly informed by larger community measures of compassionate engagement and responsible pet-keeping. The effectiveness of humane policies such as "No Kill" animal sheltering may be evaluated based on its impacts on animal welfare outcomes outside those specifically addressed through shelter operations. Animal cruelty citations are one such indicator of whether Resolution 20091105-040's emphasis on shelter operations had any peripheral impacts on Austin's or Travis County's greater animal welfare. Data obtained by public information requests¹³² indicate that reporting of animal cruelty went up immediately following the implementation of the Resolution in 2010, but have since decreased since 2012 (Figure 20). This increase is mostly likely due to an overall increase in reporting that may have resulted from increased awareness of animal welfare-related concerns and/or increased effectiveness of animal protection officers' field services, including the efficiency of Animal Services' reporting processes. The decrease following 2012 could indicate that the community engagement was high with the topics of animal welfare brought to attention by the Resolution and then may have resulted in changes to negative behaviors that previously resulted in animal cruelty offenses. It is important to note that one finding of the 2015 City of Austin audit discussed previously was that animal protection officer response time had decreased. No conclusions can be drawn based on the available data regarding how this initial increase followed by decrease in cruelty citations may have been informed by animal protection officer response time. More data are needed in this area to draw firm conclusions on how the Resolution has impacted the more negative animal welfare outcomes like incidence of cruelty citations.

¹²⁹ Paavola, J., Adger, W.N. (2005). Institutional ecological economics. *Ecological Economics*. 53. 353-368.

¹³⁰ Ibid.

¹³¹ Woolcock, M. & Narayan, D. (2000) Social capital: implications for developmental theory, research and policy. *World Bank Reserve Obs.* 15, p. 234.

¹³² Public Information Request - Austin Police Department

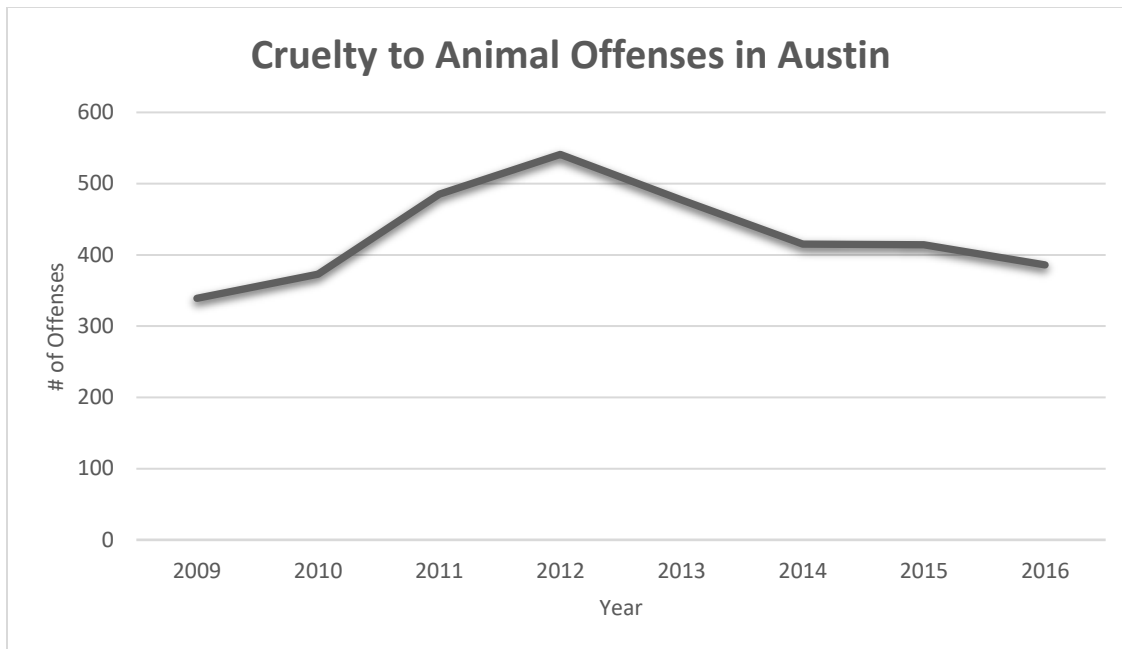


Figure 20. Annual numbers of City of Austin Cruelty to Animal Cases from 2010 to 2016. Data provided in Appendix O.

While animal cruelty offenses may serve as an indicator of community awareness of the issue of the humane treatment of animals, community engagement is another measure of the impact of the Resolution on the greater city of Austin and Travis County. Donations to animal welfare organizations are one strong indicator of community support for humane policies. A study as early as 1992 indicated that 10-15 million Americans had a membership of some form with an animal welfare group, with 20% of Americans reporting that they contributed money to an animal welfare organization¹³³. APA, as a private, non-profit organization, runs most of its operations from community donations. In this way, many of the positive outcomes that have resulted from the partnership between AAC and APA are optimized through community engagement by way of donations. APA reported having collected a total of \$16.5 million in donations since 2010 (Figure 21) with about 50% of all monetary donations coming from individual contributions¹³⁴ (Appendix P).

¹³³ Jasper, J.M., & Nelkin, D. (1992). *The Animal Rights Crusade: the growth of moral protest*. The Free Press, New York.

¹³⁴ Ibid.

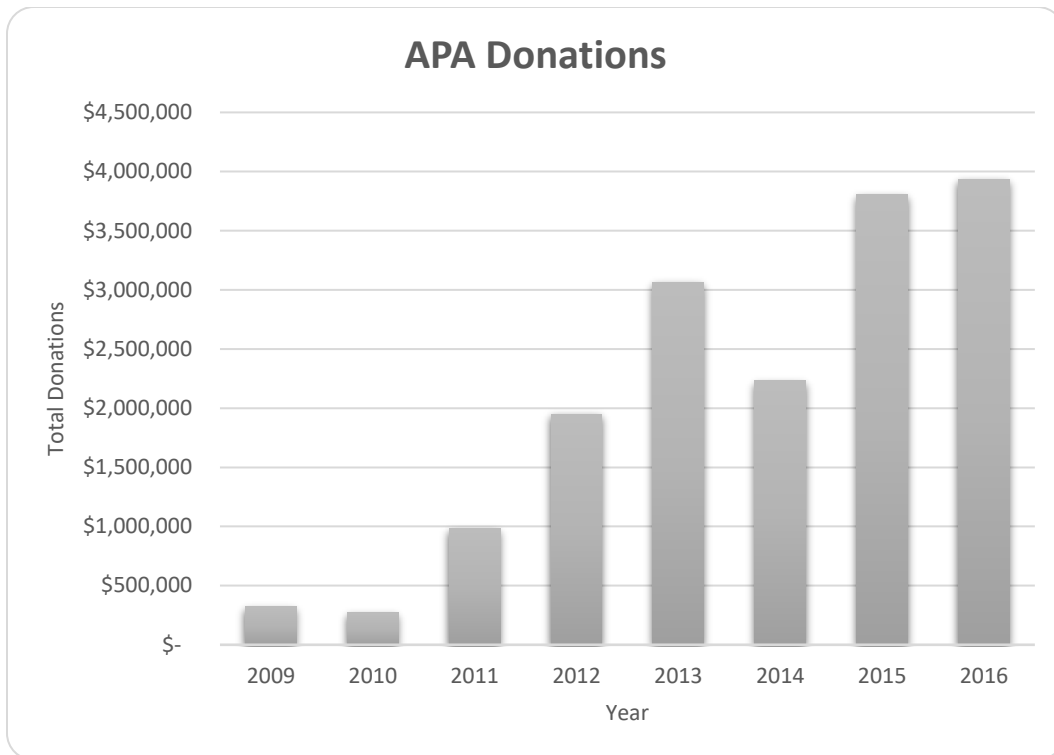


Figure 21. APA year to year donation growth¹³⁵. Individual donation data provided in Appendix P.

Social engagement is another indicator of the Austin community’s support of humane initiatives. For example, Ride Austin, the local ride-hailing service similar to Uber and Lyft, offers riders the option to donate to a chosen local charity campaign. As of July 2017, APA has raised \$38,930.58 - the most of any non-profit participating in Ride Austin fundraising¹³⁶. Amplify Austin Day is the city's annual community-wide day of online giving to local nonprofits. In 2017, Amplify Austin Day raised \$9.8 million for nearly 700 Central Texas nonprofits¹³⁷, with APA receiving a \$1,000 match for having the most donors in one hour and the \$5,000 grand prize for most individual fundraisers. In total, APA received 1,893 donations on Amplify Austin Day, the most across all categories of participants, and was 12th in total dollars raised at \$135,851.26¹³⁸.

Foster and volunteer data also indicate that the Austin community supports APA and AAC year-round, not just on special days and in emergencies. As previously discussed in this report, there are over 2,900 approved foster homes between the two organizations, representing one of the most extensive foster networks in the country. In addition to foster homes, the most recent volunteer data indicates that APA had 2,629 volunteers who contributed 114,955 hours in 2016¹³⁹ while AAC volunteers donated 49,000 hours¹⁴⁰.

¹³⁵ APA Abila donor database

¹³⁶ Diamante, R. (2017, Jun 07). Ride-hailing companies react to Uber and Lyft’s return. Spectrum News. Retrieved from: <http://www.twcnews.com/tx/austin/news/2017/06/07/ride-hailing-companies-react-to-uber-lyft-s-return.html>

¹³⁷ <https://amplifyatx.ilivehereigivehere.org/content/whatsAmplify>

¹³⁸ APA Amplify Austin donation data

¹³⁹ APA Volunteer Tracking

¹⁴⁰ <https://www.givepulse.com/event/3495-Volunteer-opportunities-at-Austin-Animal-Center>

Limitations and Implications

This report represents the first attempt to comprehensively document the impacts of Resolution 20091105-040 on the social, economic, and health-related areas of the city of Austin, greater Travis County, and surrounding communities. Assessing data across such a variety of industries and sources required a high-level of attention to detail and nuance. Central to the conclusions presented in this report is the assumption that the data provided by the various agencies was done so in a complete and truthful manner.

Overall, limitations in the data were addressed by using the most conservative sources and findings available, and by using standard economic analyses and models to account for microeconomic and macroeconomic trends. In instances where data was not available to support or refute a conclusion, that information as indicated. The absence of publicly-available or otherwise accessible data was the primary limitation encountered throughout this study.

Data obtained from APA and AAC may be limited insofar as there have been changes to both databases and individuals collecting the data throughout the study period from 2005 to 2016 that impacted the categories of data the research team was able to collect. For example, length of stay is a metric that is not available within AAC's database and therefore it was not feasible for the organization to report on this consideration for the shelter's outcome data. In particular, the "other" outcome category varies between the two organizations (transfer is included in "other" for APA while it is its own category for AAC). Efforts were made to standardize the inclusion definition for each field included in this report.

Speak Up Austin and the Young Chamber of Commerce supported the research team by distributing the survey on Austin pet-keeping to their constituents. Data collected within the survey of Austin residents are subject to response bias. However, participants who took the survey did so of their own volition, and were not incentivized in any manner by the research team.

Conclusion

This study represents the most comprehensive analysis conducted to date of the impacts of the City of Austin Resolution 20091105-040. The study utilized standard microeconomic and macroeconomic analyses, along with emerging impact assessment methodologies, to produce conservative estimations of both the costs and economic benefits of implementing the Resolution. Ultimately, the feasibility of implementing the Resolution is a community's financial and ethical decision on how much cost per animal can be supported as well as how welfare will be defined within sheltering. However, many of the findings are generalizable to other municipalities in the U.S. For example, the increased shelter staffing required to implement the legislation and the veterinary and pet-related retail services required to support any increased number of adopted dogs and cats in the community would have similar direct and indirect economic impacts across any local economy.

The study found that a high LRR is achievable at a municipal level. However, in Austin it has required extensive additions to animal sheltering resources (as measured

by both the increase in the city budget for the municipal shelter and the average cost per animal served by the shelter compared to that in several other U.S. cities) paired with broad and active community support (as measured by the number of supportive donors, volunteers, foster homes, and non-profit transfer partner organizations). In addition, the ethics of the extended lengths of stay experienced by some of the animals, whether in shelters or foster care, remains an issue that requires further study and discussion by the animal welfare profession.

The costs associated with implementing the Resolution appear to have been more than offset by a series of economic benefits to the community. The majority of the positive economic impacts result from increased employment within animal services as well as the increased use of pet care and pet retail services. An additional benefit appears to be the positive contribution of Austin's progressive animal welfare policies to its brand equity. This impact is important as municipalities compete with each other to attract employee demographics that in turn draw new business and new economic growth to their area. Although not included in the final economic impact calculation, the potential impacts of progressive animal welfare policies on larger social and environmental outcomes, including public health, social capital, and community engagement, have important implications for Austin's ability to promote and sustain the health and well-being of both its human and animal residents.

The implementation of Resolution 20091105-040 demonstrates that components of creating a Humane City can be legislated. Like other public policy making, legislating animal welfare policies should include extensive community input and planning to be successful over the long term. In the case of implementing humane policies within shelter operations, a balance point between the financial costs and benefits identified in this study must be integrated into the ethical considerations associated with how companion animal quality of life is defined. Appropriate infrastructure should be developed alongside existing community resources to ensure an effective and sustainable model is established to implement the policy change. Above all, a community's companion animal lifesaving goals, and its commitment to deploying the resources required to achieve them, must come from an open, honest, and ongoing conversation around benefits and tradeoffs. As more communities commit to substantially improving their animal shelter outcomes, best practices can be established across systems to avoid implementation pitfalls, optimize resources, and maximize impacts on both the animals and the community at large. We hope that this study contributes to the honest dialog and open debate necessary to identify the best practices for improving animal welfare within the context of creating Humane Cities.

Acknowledgements

The authors thank Austin Animal Center and Austin Pets Alive! for providing access to their data, and to Speak Up Austin and Young Chamber of Commerce for distributing the survey for additional data collection on Austin residents. This study was funded in full by WaterShed Animal Fund.

APPENDICIES

Appendix A: Pet Ownership Estimates by State (AVMA¹⁴¹)

Percentage of households that owned pets and number of pet-owning households				
Rank	Region	Number of Households (in 1,000)	Percentage of Owners	Number of Pet Households
	United States	118,682	56%	66,449
1	Vermont	265	71%	188
2	New Mexico	773	68%	523
3	South Dakota	333	66%	219
4	Oregon	1,505	64%	957
5	Maine	548	63%	345
6	Washington	2,632	63%	1,649
7	Arkansas	1,148	62%	716
8	West Virginia	765	62%	475
9	Wyoming	221	62%	137
10	Idaho	568	62%	352
11	Kentucky	1,777	62%	1,094
12	Missouri	2,498	61%	1,534
13	Colorado	1,986	61%	1,217
14	Montana	410	61%	251
15	Kansas	1,133	61%	691
16	Indiana	2,478	60%	1,484
17	Tennessee	2,583	60%	1,540
18	Arizona	2,515	60%	1,497
19	Alabama	1,828	60%	1,088
20	Oklahoma	1,479	59%	872
21	Texas	9,002	58%	5,265

¹⁴¹ <https://www.avma.org/KB/Resources/Statistics/Pages/Market-research-statistics-US-pet-ownership.aspx>

22	Wisconsin	2,350	58%	1,352
23	Ohio	4,661	57%	2,677
24	New Hampshire	508	57%	289
25	Pennsylvania	5,172	57%	2,942
26	Delaware	334	57%	189
27	North Carolina	3,701	56%	2,089
28	Mississippi	1,115	56%	629
29	Nevada	986	56%	548
30	Michigan	3,804	55%	2,108
31	Georgia	3,798	55%	2,093
32	Louisiana	1,702	55%	937
33	Connecticut	1,337	54%	728
34	Florida	7,609	54%	4,138
35	South Carolina	1,759	54%	951
36	North Dakota	272	54%	147
37	Iowa	1,219	54%	654
38	Virginia	3,017	53%	1,611
39	Rhode Island	434	53%	230
40	Minnesota	2,163	53%	1,146
41	California	12,974	53%	6,865
42	Maryland	2,169	52%	1,134
43	Illinois	5,026	52%	2,602
44	Nebraska	710	51%	364
45	Utah	930	51%	476
46	New Jersey	3,177	51%	1,611
47	New York	7,512	51%	3,802
48	Massachusetts	2,618	50%	1,318
49	D.C.	287	22%	63

Appendix B: Pet Ownership Estimates by MSA (American Housing Survey)

2013 American Housing Survey, Selected MSA Level (Units in thousands)				
Rank	Geography	Total Occupied Units	Total Occupied Units- Pets present	% Occupied Units with Pets
1	Tucson, AZ AHS Area	372.8	218.3	59%
2	Oklahoma City, OK AHS Area	488	275.3	56%
3	Austin-Round Rock, TX AHS Area	669.6	367.4	55%
4	San Antonio, TX AHS Area	777.6	420.7	54%
5	Louisville, KY-IN AHS Area	517.2	279	54%
6	Nashville-Davidson-Murfreesboro, TN AHS Area	622.1	334.9	54%
7	Rochester, NY AHS Area	414.4	210.8	51%
8	Seattle-Tacoma-Everett, WA AHS Area	1375.9	690.1	50%
9	Tampa-St. Petersburg, FL AHS Area	1085.5	532.7	49%
10	Orlando, FL AHS Area	813.2	391.8	48%
11	Minneapolis-St. Paul, MN-WI AHS Area	1301.7	617.1	47%
12	Richmond, VA AHS Area	487.5	230.6	47%
13	Houston, TX AHS Area	2152.4	994.4	46%
14	Hartford, CT AHS Area	426.5	193	45%
15	Philadelphia, PA-NJ AHS Area	1965.7	880.4	45%
16	Baltimore, MD AHS Area	1018.1	453	44%
17	Jacksonville, FL AHS Area	510.4	223.9	44%
18	Detroit, MI AHS Area	1722.4	755.3	44%
19	Las Vegas-Paradise, NV AHS Area	692.9	302.4	44%
20	Miami-Ft. Lauderdale-Hollywood, FL AHS Area	1978.8	772.5	39%
21	Washington-Arlington, DC-VA-MD-WV AHS Area	2114	790.8	37%
22	Chicago, IL AHS Area	2901	1074.2	37%
23	Northern New Jersey, NJ AHS Area	2284.7	845	37%
24	Boston, MA AHS Area	1139.3	402.5	35%
25	New York, NY AHS Area	4304.8	1062.8	25%
	MSA total	32,136.5	13,318.9	41%
	USA (including non-MSA areas)¹⁴²	115,852	56,097	48%

¹⁴² Calculated using the non-MSA version of the American Housing Survey 2013 survey

Appendix C: Austin Animal Center Intake

Year	Owner Surrender: Cats	Owner Surrender: Dogs	Stray: Cats	Stray: Dogs	Total Intake: Cats	Total Intake: Dogs
2005	2967	3355	6299	8979	9678	13423
2006	3194	3385	4488	8799	8125	13367
2007	3830	3646	5369	9013	9902	13842
2008	3279	3229	4987	8020	8790	12461
2009	2540	3295	3975	7815	6992	12300
2010	3122	3418	5494	7816	9187	12382
2011	2504	2698	3723	6779	6590	10661
2012	2210	2733	5228	7466	7614	11166
2013	1965	2369	5667	7430	7806	10852
2014	1305	2016	5297	7601	6835	10613
2015	1208	2000	5980	7447	7331	10430
2016	1448	1892	5155	7299	6793	10065

Appendix D: Travis County Dead Animal Pick Up

	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Cats	178	569	531	705	672	711	678	757	405	625	659	589	489
Dogs	93	326	309	349	311	487	361	307	205	270	277	230	182
Total	271	895	840	1054	983	1198	1039	1064	610	895	936	819	671

Appendix E: PASS Intake @ Austin Pets Alive!

Year	Dogs	Cats
2008	66	3
2009	30	64
2010	113	28
2011	169	282
2012	95	67
2013	453	195
2014	563	391
2015	467	333
2016	734	740

Appendix F: AAC and APA Outcome Data

	<u>2005</u>	<u>2006</u>	<u>2007</u>	<u>2008</u>	<u>2009</u>	<u>2010</u>	<u>2011</u>	<u>2012</u>	<u>2013</u>	<u>2014</u>	<u>2015</u>	<u>2016</u>
<i>Cat Outcomes</i>												
AAC												
Adopted	1807	1679	1883	2100	2096	2833	3067	2827	3146	2658	4532	3120
Return To Owner	212	172	253	299	335	496	384	307	337	315	337	304
Non APA Transfer	536	818	957	931	791	771	950	667	1733	1447	1407	1309
Euthanized	7009	5385	6692	5341	2805	3117	956	593	620	419	495	256
Other	115	64	98	91	97	205	104	101	81	80	104	127
AAC Total	9679	8118	9883	8762	6124	7422	5461	4495	5917	4919	6875	5116
APA												
Adopted	0	0	0	23	701	1471	2097	2989	2539	3090	3539	3450
Return to Owner	0	0	0	0	1	3	0	0	0	6	0	0
Euthanized	0	0	0	0	6	22	22	21	23	28	40	64
Other	0	0	0	0	69	133	207	799	168	190	204	215
APA Total	0	0	0	23	777	1629	2326	3809	2898	3314	3783	3729
<i>Dog Outcomes</i>												
AAC												
Adopted	2535	2444	2442	2322	2792	3381	4398	4718	4275	4532	4554	4669
Return To Owner	2658	2765	2928	2895	2929	2968	2797	2691	2999	2923	3018	3084
Non APA Transfer	1542	1821	2026	1873	1899	1761	1129	1175	1257	1086	1093	881
Euthanized	6585	6186	6343	4587	3342	2862	1034	777	767	632	541	194
Other	137	147	107	106	137	104	70	31	41	34	43	41
AAC Total	13457	13363	13846	11783	11099	11076	9428	9392	9339	9207	9249	8869
APA												
Adopted	0	0	0	697	1304	1610	2868	3483	3188	3591	3450	3531
Return to Owner	0	0	0	0	0	5	7	4	22	18	9	10
Euthanized	0	0	0	2	14	12	28	20	36	40	48	89
Other	0	0	0	0	59	61	123	156	117	140	153	139
APA Total	0	0	0	699	1377	1688	3026	3663	3363	3789	3660	3769

Appendix G: APA Length of Stay Data for a random sample of 145 dogs in APA's care in 2016

Total LOS	Ave. Days Available for Adoption	Ave. Days Not Available for Adoption
0-60 days	20	36
60-120 days	91	1
120-180 days	150	31
180-240 days	208	7
240-300 days	264	9
300-360 days	306	58
>360 days	534	75

Appendix H: AAC Budget

	2009	2010	2011	2012	2013	2014	2015	2016
AAC Budget	\$5,368,265	\$5,959,503	\$6,975,362	\$7,813,733	\$8,522,794	\$9,021,282	\$10,729,203	\$12,061,551
City of Austin Budget ¹⁴³	\$2.63B	\$2.75B	\$2.8B	\$2.8B	\$3.1B	\$3.3B	\$3.5B	\$3.5B
AC budget as % of City Budget	0.204%	0.217%	0.249%	0.279%	0.275%	0.273%	0.307%	0.345%

¹⁴³ https://austintexas.gov/financeonline/finance/financial_docs.cfm?ws=1&pg=1

Appendix I: IMPLAN Data

2010			
	Labor Income	Value Added	Output
Direct Effect	\$835,629.75	\$835,629.75	\$1,391,411.62
Indirect Effect	\$32,912.61	\$59,250.78	\$112,911.90
Induced Effect	\$200,971.89	\$365,547.32	\$611,825.89
TOTAL	\$1,069,514.68	\$1,260,428.00	\$2,116,149.19

2011			
	Labor Income	Value Added	Output
Direct Effect	\$1,180,098.60	\$1,180,098.60	\$1,904,480.12
Indirect Effect	\$270,417.46	\$481,162.96	\$866,168.40
Induced Effect	\$292,839.62	\$516,312.22	\$871,498.42
TOTAL	\$1,743,355.69	\$2,177,573.14	\$3,642,147.04

2012			
	Labor Income	Value Added	Output
Direct Effect	\$1,984,692.95	\$1,984,692.95	\$2,572,250.59
Indirect Effect	\$218,320.18	\$386,598.77	\$708,475.24
Induced Effect	\$424,597.17	\$744,743.74	\$1,261,020.62
TOTAL	\$2,627,610.29	\$3,116,035.46	\$4,541,746.46

2013			
	Labor Income	Value Added	Output
Direct Effect	\$2,330,031.36	\$2,330,031.36	\$3,099,788.97
Indirect Effect	\$299,128.03	\$567,300.85	\$1,003,782.62
Induced Effect	\$621,117.82	\$1,064,692.37	\$1,781,838.70
TOTAL	\$3,250,277.21	\$3,962,024.58	\$5,885,410.29

2014			
	Labor Income	Value Added	Output
Direct Effect	\$2,647,035.30	\$2,647,035.30	\$3,582,467.00
Indirect Effect	\$382,765.97	\$695,237.59	\$1,224,643.88
Induced Effect	\$697,722.49	\$1,219,847.78	\$2,034,480.57
TOTAL	\$3,727,523.75	\$4,562,120.67	\$6,841,591.44

2015			
	Labor Income	Value Added	Output
Direct Effect	\$3,326,707.05	\$3,326,707.05	\$4,394,010.92
Indirect Effect	\$439,444.88	\$759,870.85	\$1,313,038.73
Induced Effect	\$915,474.86	\$1,568,252.86	\$2,613,909.53
TOTAL	\$4,681,626.80	\$5,654,830.76	\$8,320,959.18

2016			
	Labor Income	Value Added	Output
Direct Effect	\$3,910,445.82	\$3,910,445.82	\$5,101,458.49
Indirect Effect	\$486,605.78	\$841,481.00	\$1,454,177.79
Induced Effect	\$1,062,931.29	\$1,820,838.62	\$3,034,924.65

Total			
	Labor Income	Value Added	Output
Direct Effect	\$16,214,640.83	\$16,214,640.83	\$22,045,867.69
Indirect Effect	\$2,129,594.90	\$3,790,902.81	\$6,683,198.55
Induced Effect	\$4,215,655.14	\$7,300,234.90	\$12,209,498.38
TOTAL	\$22,559,890.87	\$27,305,778.54	\$40,938,564.63

Appendix J: Lifetime Animal Spend (based on the National Pet Products Association Study)

Average Lifespan in Years	
Cats	15
Dogs	12.8
Annual Spend	
Medical Care	
Cats	\$193
Dogs	\$239
Licensing	
Cats	\$7
Dogs	\$7
Food	
Cats	\$203
Dogs	\$231
Treats	
Cats	\$36
Dogs	\$65
Toys	
Cats	\$23
Dogs	\$41
Grooming	
Cats	\$20
Dogs	\$61
Boarding/Pet-sitting	
Cats	\$337
Dogs	\$327
TOTAL	
Cats	\$819
Dogs	\$971

Average lifetime spend per animal = $((\$819 \times 15) + (\$971 \times 12.8)) / 2 = \$12,357$

Appendix K: Pet-friendly Rental Housing Comparison

	Austin		Portland		Denver		Nashville		Raleigh	
	Trulia	Zillow	Trulia	Zillow	Trulia	Zillow	Trulia	Zillow	Trulia	Zillow
4/7/17										
Total # of Rentals	2682	2096	1483	1109	2740	1686	865	956	892	756
Pet friendly	1201	1021	749	594	1347	893	349	399	351	310
% pet friendly	45%	49%	51%	54%	49%	53%	40%	42%	39%	41%
4/14/17										
Total # of Rentals	2722	2134	1462	1096	2711	1683	863	950	899	768
Pet friendly	1204	1031	735	571	1327	891	337	387	340	300
% pet friendly	44%	48%	50%	52%	49%	53%	39%	41%	38%	39%
4/24/17										
Total # of Rentals	2750	2138	1461	1089	2703	1683	859	917	873	740
Pet friendly	1185	1009	734	569	1353	898	342	381	343	302
% pet friendly	43%	47%	50%	52%	50%	53%	40%	42%	39%	41%
5/3/17										
Total # of Rentals	2823	2198	1457	1069	2703	1655	854	933	868	744
Pet friendly	1217	1040	713	534	1371	905	350	406	329	296
% pet friendly	43%	47%	49%	50%	51%	55%	41%	44%	38%	40%
5/10/17										
Total # of Rentals	3062	2350	1484	1082	2721	1678	911	1000	852	736
Pet friendly	1175	1006	731	549	1383	929	381	446	326	294
% pet friendly	38%	43%	49%	51%	51%	55%	42%	45%	38%	40%

Appendix L: Reasons for Moving (Current Population Survey, Annual Social and Economic Supplement, 2010-2016)

	Mobility Period	2010-2016 Total	2010-2016 %
	Total Movers	249,662	100.0%
Family Related	Change in marital status	13,548	5.4%
	To establish own household	26,556	10.6%
	Other family reason	32,441	13.0%
Job Related	New job or job transfer	23,468	9.4%
	To look for work or lost job	5,101	2.0%
	Easier commute	14,181	5.7%
	Retired	1,531	0.6%
	Other job related reason	4,587	1.8%
Housing Related	Wanted own home, not rent	12,875	5.2%
	Wanted new or better home/ apartment	39,819	15.9%
	Wanted better neighborhood /less crime	8,309	3.3%
	Wanted cheaper housing	22,565	9.0%
	Foreclosure/eviction	3,324	1.3%
	Other housing reason	28,564	11.4%
Other Reasons	To attend or leave college	3,621	1.5%
	Change of climate	700	0.3%
	Health reasons	2,228	0.9%
	Natural disaster	156	0.1%
	Other uncategorized reasons	6,089	2.4%
Total non-family, non-housing related reason movers		61,662	24.7%
"Other uncategorized reasons" movers % of non-family non-housing related movers		6,089	9.87%

Appendix M: Summary of Brand Equity Calculations

City Branding Related No-Kill Impact Estimation		
Category	Statistic	Source
Total Surplus (compared to all MSA, TX) In-migrating Population in Travis County, 2010-2016	195,386	https://www.dshs.texas.gov/chs/popdat/default.shtm
Median Income (2011-2015) - Travis County	\$61,451.00	https://www.census.gov/quickfacts/table/PST045125/48453
Total Income by Surplus In-migrating population 2010-2016	\$12,006,643,463	Calculation
Local spending % (housing + entertainment + food)	40.7%	http://www.pewtrusts.org/en/research-and-analysis/issue-briefs/2016/03/household-expenditures-and-income
Local Expenditure by Surplus In-migrating population 2010-2016	\$4,883,823,723	Calculation
% of Movers due to "Other" Reasons (Excluding non-family and non-housing)*	9.87%	https://www.census.gov/prod/2014pubs/p20-574.pdf
Adjusted No-Kill Related Moving % (From our survey results)	15.0%	Survey Results
Local Expenditure by Surplus In-migrating population due to No-Kill Related Movers, 2010-2016	\$72,252,686	Calculation
<p>*Family factor cannot explain why Travis county has more in-migration compared to rest of Texas MSA. Housing prices went up faster in Travis County compared to rest of Texas. https://fred.stlouisfed.org/series/ATNHPIUS48453A and https://fred.stlouisfed.org/series/TXSTHPI)</p>		

Appendix N: Austin Animal Services Bite Data

Year	Minor	Moderate	Severe	Unknown	Total
2000	610	218	47	34	909
2001	689	188	39	31	947
2002	607	167	49	35	858
2003	599	113	15	37	764
2004	583	138	22	33	776
2005	603	133	15	27	778
2006	687	207	52	49	995
2007	708	228	32	47	1015
2008	682	260	52	71	1065
2009	711	260	44	59	1074
2010	732	350	45	95	1222
2011	873	402	62	112	1449
2012	4602	1147	211	389	6349
2013	1010	363	46	141	1560
2014	1232	260	50	52	1594
2015	1273	259	5	111	1648

Appendix O: City of Austin Cruelty to Animals Cases



Planning Unit

Data provided by:	Austin Police Department: Planning Unit
Date delivered:	05/16/2017
Requested by:	Katy Loughney
Compiled by:	Carrie Dickerson
Data requested:	Number of Cruelty to Animal offenses by year for 2009-2016.
Notes:	Provided all results by year reported.
Sources used:	Versadex

AUSTIN POLICE DEPARTMENT DATA DISCLAIMER

1. The data provided are for informational use only and may differ from official APD crime data.
2. APD's crime database is continuously updated, so reports run at different times may produce different results. Care should be taken when comparing against other reports as different data collection methods and different data sources may have been used.
3. The Austin Police Department does not assume any liability for any decision made or action taken or not taken by the recipient in reliance upon any information or data provided.

Year Reported	# Cruelty to Animal cases
2009	339
2010	373
2011	485
2012	541
2013	477
2014	415
2015	414
2016	386

Appendix P: APA Donations

Year	Individual	Total
2009	\$151,247	\$322,053
2010	\$212,787	\$268,868
2011	\$731,808	\$981,706
2012	\$1,220,313	\$1,949,377
2013	\$1,146,922	\$3,062,190
2014	\$1,344,337	\$2,231,750
2015	\$1,747,776	\$3,802,294
2016	\$1,765,388	\$3,934,280
Total	\$8,320,579	\$16,552,516