MIXED METHODS STUDY EXAMINING ORGANIZATIONAL AND SOCIOECONOMIC FACTORS AFFECTING MANAGEMENT OF PET POPULATIONS IN SHELTERS

By

Sean P. Andrews
Doctor of Management Non-Profit Management Fellow

Submitted in Partial Fulfillment of the Requirements for the Integrative Paper
in the Doctor of Management Program
at the Weatherhead School of Management

Advisors:
Kalle Lyytinen, Ph.D.
Philip A. Cola, Ph.D.

CASE WESTERN RESERVE UNIVERSITY

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ABSTRACT

The companion pet overpopulation is mainly a social and organizational problem. Improvements achieved over the past twenty years by United States (U.S.) animal welfare organizations (AWO), including subsidized pet sterilization, foster pet programs, community engagement, and marketing innovation, are commendable. Despite progress, companion pet overpopulation persists, especially on a regional level. Research acknowledges human and companion pet attachment, but a paradox of adoption failures remains, and shelter pet inflows never abate. This mixed-methods research examines socioeconomic factors influencing the pet adoption process and pet retention, pet fostering and shelter collaboration. This is a novel and exploratory study involving qualitative interviews of 26 adapters and shelter/AWO leaders to examine drivers of pet adoption and retention. A quantitative study among 3,700 shelters is conducted to understand the role and impact of poverty, shelter type, shelter size, and receipt of transferred pets on live release rates for sheltered canines and felines. Together, these studies address the overarching research question: What socioeconomic and organizational factors affect and to what extent shelter live release rates?

Keywords: pet overpopulation; collaboration; poverty; private/public shelter; shelter size; geographic classification (rural/urban)

INTRODUCTION

Passionate and herculean efforts by animal welfare organization (AWO) practitioners are often insufficient for the intake of 6.5 million seized, relinquished, or abandoned companion cats and dogs (ASPCA, 2018; PetPoint, 2017). In companion pet context, relinquishment is returning a pet to a shelter for pet behavior, health, or familial financial or relationship reasons. Annually in the United States, 700,000 shelter pets are reunited with their owner, 1.5 million are euthanized, 400,000 pets are transported to another shelter, and 500,000 are adopted by new owners (ASPCA, 2018; Shelter Animals Count, 2016). Over the last three decades, progress has been made in subsidized sterilizations, shelter enrichment programs, adoption marketing, and community engagement (Rowan & Williams, 1987). Despite these efforts, significant overpopulation persists: euthanasia rates have remained stubbornly at 25% due to overpopulation, pet health, and pet behavior aspects.

"Ecosystem" and "AWO ecosystem" are common terms used in addressing the overpopulation problem because multiple actors participate or have an effect on pet intake (returned, abandoned, and seized), pet-keeping, and placement. Actors include employees and volunteers with public and private shelters. Volunteer fosterers, pet transporters, private breeders, veterinarians, and nonprofit advocacy firms represent additional critical actors. The resources used by AWOs for the intake, housing, and placement of companion pets account for less than one percent of the $92 billion spent annually on companion pets by U.S. households (BLS, 2017; PetPoint, 2017; Weiss, Patronek, Slater, Garrison, & Medicus, 2013). This cost asymmetry between consumer spending and AWO resources evidences a contradiction between private and public spending to address pet problem and overpopulation as a form of externality of the buoyant pet market. Household resources

directed towards resident pet basic care evidence deep investment and attachment, $1,300 annually per pet (APPA, 2019), but result in paradoxical high shelter inflows of 6.5 million pets. Public and private shelters then need to work together to manage shelter pet populations. However, actual and perceived violations of trust between the actors can strain or eliminate cooperation and influence pet management. Violations of trust span from the exchange of virus-infected animals to significant differences in managing and enforcing microchip policy. Ultimately, pet shelter animal flows resemble an emptying sink with the faucet still running. The outflow, historically, is to adopt out or euthanize. Historically, the inflow came from collecting strays or abandoned and relinquished pets. Now, many are outcomes of careless pet adoption and lack of commitment (social, emotional) to keep pets. Successful outcomes with adoption in this situation face never-ending inflows. Socioeconomic factors also influence sheltering success and population management outcomes from inviting new taxes and/or community fundraising. Not surprisingly, municipal shelters exist predominantly in higher poverty communities.

This study seeks to address practical questions: "What behaviors within a pet shelter ecosystem can contribute toward higher live release rates (LRR)?" and "To what extent do local socioeconomic factors and rural-urban communities affect LRR?" This dissertation addresses these questions from theoretical and practical points of view by conducting an integrated mixed methods-based study of the above questions and associated lines of inquiry. This introductory chapter provides a summary of motivation, design, and conduct of research with pertinent research findings. I also triangulate qualitative and quantitative findings and synthesize them. The chapter ends with a discussion of the study's limitations and potential for future research.

PRACTICAL AND THEORETICAL MOTIVATIONS

The initial theoretical framework of the study draws on institution theory, collaboration theory, socioeconomic factors and analyzes public/private shelters, shelter size, and rural or urban shelters using such lenses. Institutional theory provides an understanding of types of pet shelters—private, public, or hybrid—as specific types of institutions driven by different norms, beliefs, and goals. Such institutions also reflect differences in the surrounding geography and its socioeconomic and cultural conditions. As institutions, different shelters exhibit different policies and stakeholder accountabilities with variations in pet sheltering activities. Shelters also collaborate to maximize LRR across types and geographies. Private and public shelter collaboration dyads demonstrate that wholes are greater than the parts. Poverty is used as the primary socioeconomic measure of available economic resources that affect inflow and the extent to which LRR can be locally managed.

Research on pet sheltering varies significantly in approaches. Some researchers have focused on shelter statistics (Kay, Coe, Pearl, & Young, 2017; Rowan, 1992), while others have focused on pet health and comfort (Gunter, Feuerbacher, Gilchrist, & Wynne, 2019; Hoy-Gerlach, Delgado, Sloane, & Arkow, 2018). However, comparisons across shelters and their outcomes can be frustrating at best or often impossible due to institutional and contextual differences.

Research also recognizes the role of human and social factors in shelter pet management outcomes (Frank, 2004; Sable, 2013). Research has recognized the statistics puzzle and vociferates for consistency (Lambert, Coe, Niel, Dewey, & Sargeant, 2015). Realities with data quality do not dissuade current research from diagnosing the "why" for companion animal relinquishment (Coe et al., 2014). The overall research efforts attempt to

connect actions across an AWO network to establish why LRR is higher, why the numbers

may vary, and what factors most influence these phenomena in these particular contexts..

FIGURE 1
Theory Considerations

Theory of Interest	Title	Research connection	Author(s)/Citation
Collaboration	Community partnering as a tool for improving live release rate in animal shelters in the United States	Community collaboration positively affects pet adoption and retention, better LRR.	(Weiss et al., 2013).
	Dog population & dog sheltering trends in the United States of America. *Animals*	Baseline statistics over time	(Rowan & Kartal, 2018).
	Dogs on the move: factors impacting animal shelter and rescue organizations' decisions to accept dogs from distant locations	Shelter pet transport effects on LRR	(Simmons & Hoffman, 2016)
Socioeconomic	A scoping review of published research on the relinquishment of companion animals	Research on shelter pet inflow activity and why	(Coe et al., 2014)

	Fostering the human-animal bond for older adults:
	    Challenges and opportunities
	    Human-Animal Bond Research
	    Institute
		Retention and relinquishment of pets	(Anderson, Lord, Hill, & McCune, 2015; Human Animal Bond Research Institute, 2019)

	Socioeconomic Influences on Reports of Canine Welfare Concerns to the Royal Society for the Prevention of Cruelty to Animals (RSPCA) in Queensland, Australia	Poverty and pet welfare	(Shih, Paterson, & Phillips, 2019)
	Underdogs: Pets, People, and Poverty	Poverty and pets	(Arluke & Rowan, 2020)

FIGURE 2
Flow From Qual Construct/Theory Outcomes to Quant Focus

Qualitative String

Focus/Tune
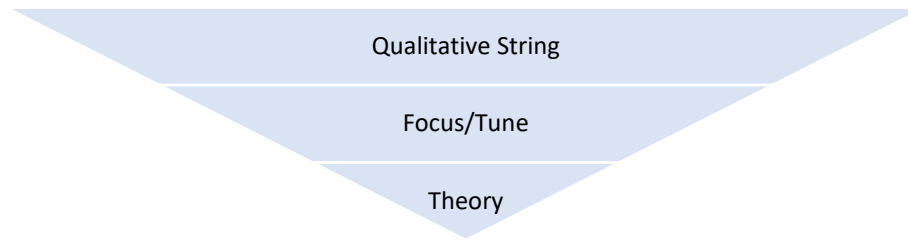
Theory

Quantitative Theories Tested		
Socioeconomic	**Institutional**	**Collaboration**
Poverty	Shelter Type Shelter Size Shelter Geography	Transport

The institutional theory addresses over the long term the issue of how organizations come to function and organize in increasingly homogenous ways based on shelter type. Specifically, public shelters follow duty and safety-based ethical frameworks, while private shelter actions reflect consequentialist choices and specific value or community-based preferences, which often have philanthropic motivations. Reasons for variation point to the presence of commonplace practices in pet management and the potential absence of challengers and disruptors in dealing with overpopulations. Concepts with coordination and control show up within scholarly research noting control driven by bureaucracy and personal and group position and influence (Gupta, Dirsmith, & Fogarty, 1994). Other research focuses on capitalism-centered institutions but brings in government organizations given long-time trends of states recognizing market forces (DiMaggio & Powell, 1983). Other research has taken positions on a publicly supported nonprofit (NPO) as a legitimate player (Euske & Euske, 1991). As such, AWOs exist as municipal and nonprofit institutions, often operating simultaneously inside the same county or city.

Existing research has addressed private and public partnerships (Gazley & Brudney, 2007) but not in the context of companion pet welfare. To address this gap, this research will detect interactions between poverty, exclusively a human condition, and companion pet sheltering to evidence its impact on LRR.

Collaboration of shelters is important at a dyadic, inter-firm, or intergroup level (Colbry, Hurwitz, & Adair, 2014). This research engages in collaboration between private and public organizations. Collaboration has broadened with the contemporary involvement of for-profit private business actors. In particular, we seek to understand the role of public, private nonprofit, and private for-profit collaborations on LRR (Austin, 2000). Research recognizes the positions and roles of different actors in a companion pet shelter ecosystem but attends less to the relationships between these organizations and individual agents and actors (such as pet owners). These stakeholders show sustained and episodic partnerships, which often come with latent friction. Friction can manifest in social, goal, and/or funding conflicts. Relational capacity between these actors can therefore be instrumental for the success of an AWO ecosystem, such as efficiency in managing physician-scientist relationships in an academic medical center (Cola, 2015; Cola & Wang, 2017).

RESEARCH QUESTIONS

Shelter intake and outflow actions result in practitioner and volunteer emotional and physical stress. Private and public pet shelters resemble, as noted, nearly full bathtubs with water running through intakes and the drain more or less open through adoptions, transport, fostering, euthanasia. In the long run, emptying speed, pet outflows must at least be equal and preferably exceed pet inflows. To do so, shelter pet ecosystems exert a diverse set of human and financial resources to ameliorate affected animal circumstances, including

minimizing euthanasia. This study used mixed methods to address the research question with a research flow depicted in Figure 2. The study covers the following strands:

1. Qualitative Strand: A qualitative inquiry is conducted involving semi-structured interviews among adopters and AWO leaders. Social media posts are also investigated for triangulation. This particular research focuses on the following question: *What factors within the companion pet shelter ecosystem contribute to effectively managing pet populations?*

2. Quantitative Strand: Secondary data obtained mainly from a national database managed by Shelter Animals Count (SAC) is analyzed. SAC collects monthly data from 3,700 shelters that report their inflow and outflow activity using SAC's standardized template. The research question addressed is: *What factors within a pet shelter ecosystem, such as shelter type, size, and poverty, contribute toward higher live release rates (LRR)?*

RESEARCH DESIGN

This research follows the sequential QUAL → QUANT design (Teddlie & Tashakkori, 2011). This affords the opportunity to develop a problem-focused model and complementary data from initial qualitative research findings for a more synthesized understanding of the problem. Quantitative research uses in the design the qualitative findings to inform the formulation of hypothesized model. This method gives equal priority to both qualitative and quantitative research and utilizes where the quantitative method is informed or redirected by the qualitative findings (Creswell & Plano Clark, 2011). Qualitative research results in a phenomenological concept map of key constructs of the stakeholders affecting their behaviors (Figure 3). Quantitative results capture effects of

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shelter actions (type, collaboration), context (poverty, location) given the inflow towards its

LRR results.

FIGURE 3
Study Design and Theoretical Flow
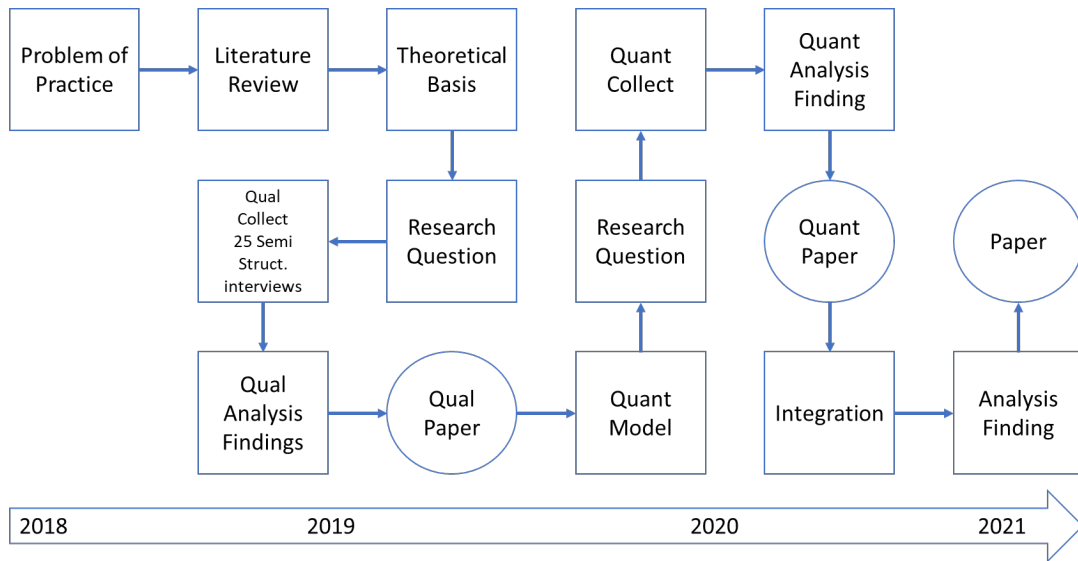
Below in Figure 3 is a depiction of a community or micro-level shelter ecosystem (AWO1),

which incorporates inflows from abandoned, returned, or seized than resulting in either

adoption or euthanize.   The qualitative study found shelter pet LRR with transport and

fostering. Fosterers may adopt out the pet under shelter guidelines. Transport options use

external service to transport pets to other shelters, AWO 2. Social media offers a mode for

practitioners, volunteers, and adopters to communicate. Fostering emerged as an important

contemporary variable that impacts sheltering and adoption differently today than in the past.

FIGURE 4
Shelter Animal Ecosystem
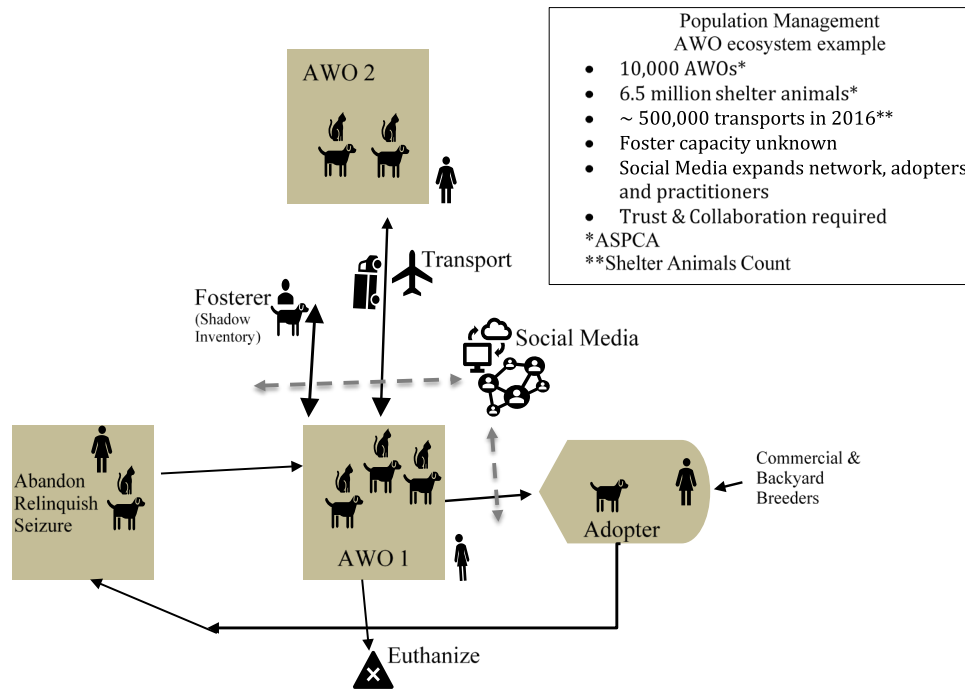
AWO 1 & 2 reflect shelter type and size. AWO Transport evidence cooperation.

The first qualitative strand used a non-random snowballed sample of 26 six one-hour interviews (Table 1). The quantitative study involved 2,895 feline shelters and 3,325 canine shelters over six years (Table 2). The data set was augmented with U.S. census data. The qualitative study included an inductive semi-structured interview approach to develop an emergent grounded theory (Corbin & Strauss, 2008) of what factors within and around an animal welfare organization (AWO) ecosystem contribute to managing companion pet shelter populations. The quantitative study examined secondary data from Shelter Animals Count (2016). Data reflect inflow and outflow actions taken by shelters over six years. This approach builds on the validity of qualitative findings (Figure 2).

TABLE 1
Detailed Sampling Information

Criteria	Characteristic	Participants
Role Function	Public Municipal AWO Leader	4
	Private Non-profit AWO Leader	4
	Adopters	13
	Adopters That Returned a Pet	5
	Total Interviews	**26**
Interview Type	Face-to-Face	6
	Zoom or Phone	20
	Total Interviews	**26**

TABLE 2
Pet Shelter Demographics

Number # or Percent % of Total Sample*

		Number or Percent of Total Population*			
Shelter Type Category	% Shelter Type Mix	Mix Dog / Cat # Average*	% Live Release Rate Dog / Cat Average	% Poverty Rate Average	% Urban
Government Animal Services	13	81 / 80	89 / 41	13	63
Rescue Government Contract	1	25 / 30	95 / 46	13	67
Rescue, Private	54	23 / 26	94 / 47	10	76
Shelter Government Contract	11	76 / 118	92 / 44	11	52
Shelter, Private	20	46 / 78	95 / 47	11	63

SUMMARY OF FINDINGS

Qualitative

The qualitative strand found the significance of (1) shelter to shelter collaboration

resulting in shelter pet transport activity, (2) existence of and growing cooperation with

transport intermediaries, and (3) growing use of shelter pet fostering—volunteers bring

shelter pets into their residents to offer enrichment, surgery recovery support, and higher

touch behavioral training toward higher adaptability and more resilient pets.

TABLE 3
Summary of Qualitative Findings

Finding #	Finding
1	Collaboration and Transport – Animal Welfare Organizations (AWOs) exhibiting collaborative behaviors across multiple partners leverage animal transport capabilities toward better shelter pet population management
2	Transport Intermediaries Increase Placements – Recent growth and reach of shelter pet transport intermediaries, air and ground, extend live release
3	Existence of Foster Inventory (Fostered Pets) and Foster Lite (increased attention) – This shadow inventory demonstrates significant system connectivity and expands, long/short-term, physical shelter capacity. Foster pets adopted show lower relinquishment, greater adoption resilience. Fostering "lite" (see Appendix B) was detected within the practitioner and volunteer social media interactions, adding population management maneuvers at lower volunteer commitment.
4	Social Media Impacts on Pet Adoption – The use of social media's closed and open groups serve to functionally enable a collaboration platform, Facebook, across functional intermediary actors, transport services, and fosterers toward live release outcomes. AWO practitioners, volunteers, and adopters communicate through the platform to enable shelter population management.

Quantitative

The quantitative study found evidence of the effect of poverty on LRR. The study

also showed significant impacts of shelter type and shelter size in influencing LRR. Impacts

from shelter pet transfers into the shelter were also found to be statistically significant.

Overall, the total impact from the variables of interest on LRR was found to explain 6.5% of

the variance in LRR.

FIGURE 5
Canine Model

Poverty (POV)

$R^2 = 0.01$***

Rural or Urban (RU)

$R^2 = 0.00$

Shelter Size (SS)
Ending Inventory Canine or Feline

$R^2 = 0.02$**

Shelter Type (ST)

$R^2 = 0.06$**

Pet transport into shelter (TI)

$R^2 = 0.26$***

Live Release Rate (LRR) $R^2 = 0.07$***

Control Species

FIGURE 6
Feline Model

Poverty (POV)

$R^2 = 0.01$***

Rural or Urban (RU)

$R^2 = 0.00$

Shelter Size (SS)
Ending Inventory Canine or Feline

$R^2 = 0.01$***

Shelter Type (ST)

$R^2 = 0.01$ns

Pet transport into shelter (TI)

$R^2 = 0.05$***

Live Release Rate (LRR) $R^2 = 0.07$***

Control Species

DISCUSSION AND CONTRIBUTIONS

Discussion

Qualitative resting provided awareness of shelter types and quantitative inquiry took it further with shelter size. Findings established statistical importance on both. Shelter behaviors supported meaningful collaboration with transport activities. Poverty proved to be an ultimate arbitrator to LRR success and explores pet keeping attitudes in communities (Arluke & Rowan, 2020).

Contribution to Practice

Practice implications from the study are significant for how to organize and change behaviors in the AWO ecosystem, including shelter practitioners, municipal government officials, private advocacy organizations, and volunteers. Shelter leadership must see collaboration as paramount for weekly population management but also as a network insurance over the long term. A wide and nurtured network offers options to shelters when local relationships fracture or specific shelter priorities shift. Choices on shelter type and governance affect shelter pet population management success. National advocacy practitioners can build off these empirical results to chart a path toward improved national shelter pet transport as it affects LRR. Government actors need to seek new options from collaborative arrangements with pet advocates and private shelters toward considerations on how to address differences in LRR between shelter types. Resources used for population management depend on shelter type choice. Public shelters rely predominately on local tax revenue. Private shelters predominantly use donations. Hybrid types allow combination of both resulting in diverse funding. Diversification opens up new potential for LRR.

Shelter leadership of any shelter type needs to recognize the benefits of using technology platforms to increase LRR. Integration of platforms to facilitate communication, collaboration, transparency, and governance benefits all stakeholders. Social media intimately connects citizen adopters with practitioners and each other toward adoption resilience.

Contribution to Theory

Scholars can learn from collaborations across actors and shelter types and new forms of networks that are being forged. Institutional theorists can recognize the impact of multiple varying stakeholder networks in shaping shelter behaviors and their effects. Practitioners can benefit from examples of shelter population management with higher LRR. Practitioners can also learn from examples of using social media communications between adopters, practitioners, and volunteers. Social scientists can recognize the implications of using social media and how to build relational capacity to increase the likelihood of success regardless of sector or discipline (Cola, 2015). Finally, my study shows that poverty matters even with pets and their livelihood (Arluke & Rowan, 2020). However, in the future, deeper connections of other social factors toward LRR outcomes need to be investigated. Poverty and animal welfare affects pet keeping choices and pet health outcomes, but community resources ultimately affect how LRR rates are shaped.

The findings related to fostering were not directly integrated with the quantitative research relative to the archival data used for the second study. Shelter actions involved situational information that would require additional survey items to resolve potential validity or reliability issues. This study did not include data from municipal governments and

their representatives, and future research can qualitatively include these stakeholders. Finally,

a study of the experience of national advocate organization advocates is warranted.

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**EXAMINING FACTORS WITHIN A COMPANION PET SHELTER
ECOSYSTEM THAT CONTRIBUTE TO MANAGING PET POPULATIONS
THROUGH MULTI-STAKEHOLDER COLLABORATION**

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Advisors:
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ABSTRACT

The modern-day companion pet population situation is a human-driven problem. Improvements achieved over the past twenty years by U.S. Animal Welfare Organizations (AWO) are commendable and supported by sterilization programs, foster programs, community engagement, and marketing innovation. Despite progress, companion pet overpopulation persists, contemporaneously, on a regional level. Research acknowledges human and companion pet attachment, but a paradox of adoption failures remains while shelter pet inflows never abate. Thus, an examination of factors influencing the pet adoption process, pet foster factors supporting adoption retention, and human social networks are pursued in this work. Since this is novel and exploratory research, inductive approaches were utilized. A qualitative interview study of 26 adopters and shelter/AWO leaders using semi-structured interviews revealed shelter population management success when expanding collaborations, the growth of new and existing networks, and appropriate approaches to exists. These findings of what factors drive success foreshadow national possibilities and threats with practical implications around national shelter pet transport systems with controls to manage disease. Theoretical implications with collaboration reduce euthanasia and support social network effect on adoption, fostering, and shelter animal transport, uncovering agency theory. Social networking delivers paths for increasing relational capacity toward positive agency relationships.

Keywords: overpopulation; relational capacity; stakeholder collaboration; social network; shelter pet transport; fostering

INTRODUCTION

Passionate and herculean efforts by animal welfare organization (AWO) practitioners and volunteers can result in fatigue (Fiery, 2016) and often, are insufficient for the intake of 6.5 million seized, relinquished, and abandoned companion pets, cats and dogs (ASPCA, 2018; PetPoint, 2017). Relinquishment, in companion pet context, is returning a pet to a shelter for pet behavior or health and family financial or familial relationship reasons. Annually in the United States, 700,000 pets are reunited with their owner, 1.5 million are euthanized, over 400,000 pets are transported to another shelter, and 500,000 are adopted out to new owners (American Society for the Prevention of Cruelty to Animals, 2018; Shelter Animals Count, 2016). Progress from subsidized sterilization, shelter enrichment, adoption marketing, and community engagement has been made over three decades (Rowan & Williams, 1987), but overpopulation persists. Overpopulation often results in 20%–25% of annual intake being destroyed.

Ecosystem and AWO ecosystem are terms used in the context of this research that include various actors, geographically defined, that perform intake (returned, abandoned, and seized), housing, and placement of companion pets. Actors include employees and volunteers from municipal and private nonprofit shelters. Fosterers, pet transporters, breeders, veterinarians, and nonprofit pet wellness centers make up actors outside of the shelter. The resources used by AWOs for the intake, care, and placement of companion pets account for less than one percent of the $92 billion spent on companion pets by U.S. households (BLS, 2017; PetPoint, 2017; Weiss et al., 2013). This cost asymmetry between consumer spending and AWO resources evidences a contradiction between private and public spending. Household resources directed towards resident pet basic care evidences attachment, annual

$1,300 per pet (APPA, 2019), but is paradoxical to shelter inflows of 6.5 million pets, human decisions. Community shelters, municipal and private, work together to manage shelter pet populations, but actual and perceived violations of trust can strain or eliminate cooperation. Violations of trust examples spanned from the exchange of virus-infected animals to differences in microchip policy. Some researchers refute shelter overpopulation (Winograd, 2007) or engage in shaming companion pet attachment (Nast, 2006). Pet shelter animal flows resemble an emptying sink with the faucet still running. The outflow, historically, is adopt out or euthanize. The inflow, historically, came from collecting strays or abandoned and relinquished pets. Successful outcomes with adoption face never-ending inflows.

Research is abundant on reasons for pet adoption failures (Coe et al., 2014; Weng & Hart, 2012). The annual 6.5 million, cats and dogs, intake into shelters brings attention to human and companion animal attachment and relationship break (Albert & Bulcroft, 1988; Harter, 2019; Hawkins & Williams, 2017). Academics have focused on adoption decision making (Vink, Dijkstra, & Epstude, 2019), adopter education (Jalongo, 2018), and informal/AWO networks (Antonacopoulos & Pychyl, 2010a). The prior "emptying sink" metaphor frames the system and challenge most appropriately. Crisis looms when shelter capacity results in the destruction of unwanted pets. This research asks the following question: What factors within the companion pet shelter ecosystem contribute to managing pet populations?

Adopter interviews illuminate adoption hopes, expectations, success, and failures. AWO leaders' adoption familiarity offers an additional perspective, and a variety of partnerships reveals curious tactical outcomes. This study found differences between AWO

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leaders/practitioners and adopters. Shelter practitioners' adoption experience is transactional due to frequency and process, while adopter experiences are more emotional and reflect attachment. The adoption experience shows layers, before and after the adoption moment, that deserve attention. The existence of volunteer fostering showed elements of agency theory that continue implications upon cooperation but also had practical implications on shelter animal retention, once adopted.

To address this phenomenological gap, we conducted a qualitative inquiry involving semi-structured interviews with adopters and AWO leaders. We also investigated social media posts. Adopter interviews illuminate adoption hopes, expectations, success, and failures. AWO leaders' adoption familiarity offers an additional perspective, and a variety of partnerships reveals curious tactical outcomes. Adopters move into nearly continuous exposure to the pet, while AWO practitioners' experiences move from periodic to none. The important shift is that the individual with less knowledge and training is eventually the one navigating continuous interaction with the pet. Social media adds richness to the adoption but it clouds expectations. Social Network Theory weaves AWO actor interactions and public connectedness into a social network. Animal transport services and foster programs contribute positively to AWO network goals and population management.

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

The initial theoretical framework supporting the research draws from three key management theories: institution theory, collaboration theory, and attachment theory. Research on pet sheltering varies in approach, with some focusing on shelter statistics, while others focus on pet health and comfort. Comparisons across shelters can be frustrating at best or often impossible. Some research recognizes this and vociferates for consistency (Lambert

et al., 2015). Realities with data quality do not dissuade current research from diagnosing the "why" for companion animal relinquishment (Coe et al., 2014). Companion pet retention program research evidences not only some small economic benefits, but also great social benefit from companionship—reduced isolation and increased physical activity (Anderson et al., 2015; Scarlett, 2008)

These pet retention, and pet wellness centers are part of the AWO ecosystem at points where the retention outcomes, shelter inflows, are from the highest socio-economic risk pet-owning households, influencing population management. The study developed further understanding of human, companion pet, and organization connections. We sought to illuminate existing and new networks between human and animal welfare outcomes (Melson, 2001). We better understand how AWO leaders organize and collaborate with the more than 5,400 United States pet shelters (Shelter Animals Count, 2020a) to manage shelter populations. An objective of this research is to understand how human-centric programs complement and augment the efficacy of traditional AWO models. AWO stakeholders share beliefs in the importance of community engagement as evidence by any shelter's mission statement. Recent research highlights the benefits of proactive and reactive efforts that keep pets in homes (Thorn, Templeton, Van Winkle, & Castillo, 2006). Other research asserts national statistics on U.S population, demand for pets, and net shelter inflows and outflows show that overpopulation is a misnomer (Winograd, 2007). There is proof that overpopulation does not exist in every state (Shelter Animals Count, 2016). AWO efforts recognize resource scarcity and focus on data from low- to moderate-income neighborhoods (Melson, 2001). Existing research delves into reasons for companion pet relinquishment, but conclusions are muted by a lack of data (Coe et al., 2014; Weng & Hart, 2012). Thus, we

found it important to first look at the structure of AWOs through a lens of municipal and non-profit firms in the context of this research.

Institutional Theory

Institutional theory addresses over the long term the issue of how organizations come to function and organize in increasingly homogenous ways. Reasons point to commonplace practices as well as the absence of challengers and disruptors. Concepts with coordination and control show up within scholarly research noting control sourced from bureaucracy, personal, and groups (Gupta et al., 1994). Other research focuses on capitalist-centered institutions but brings in government organizations given long time trends of states recognizing market forces (DiMaggio & Powell, 1983). Other research has taken positions on a publicly supported non-profit (NPO) as a legitimate player within institutional theory (Euske & Euske, 1991). AWOs exist as municipal and nonprofit institutions, often existing simultaneously inside a county or city. The AWOs in the U.S. have adopted risk-averse operating models. This risk aversion shows up in legislation such as breed-specific legislation (BSL) that ban animals or require their destruction instead of comprehensive pet ownership laws. Breed-specific legislation is experiencing widespread change, but laws still exist. Partnership development beyond AWO organizations has mainly been with commercial retail organizations versus other public institutions. Specific partnerships were noted with PetSmart Charities (2019).

Existing research addresses civil and nonprofit partnerships (Gazley & Brudney, 2007) but not any that are specific to companion pet welfare. The gap exists with human welfare agencies, public and private, and companion pet services. Where either provider is the initial point of contact with the companion pet owner household, a referral to the other

could be considered. Primary services rendered would benefit by additional pet or human services. This research will detect interactions between human and animal service providers, but will focus on companion pet sheltering.

As this concept paper began, a conversation with a VP at PetPoint was conducted. This leader noted, "There is not an overpopulation of dogs when dogs are being flown across country for adoption." He noted that overpopulation conclusions differ in different regions of the U.S. Lastly, he said, "Even where regions are struggling, it is a breed overpopulation issue." It is from these considerations of how nonprofit organizations apply this particular brand of institutional theory that leads us to think about the types of pets, breeds, and other social factors that influence this issue. Therefore, next, we cover the idea of attachment theory.

Attachment Theory

Attachment theory is centered on human-to-human relationships at different levels, including dyads, and communities within society. Research squares up on attachment theory across the basic needs of an infant to expanded adult relationships, romantic partners through friends and family. Scholars have recently pulled pet relationships into focus using adapted human to human relationship surveys (Beck & Madresh, 2008). Concepts include insecurity and coping as well as convincing evidence that companion animals have positive effects on psychological and physical well-being, helping shape how people regulate their emotions, deal with stress or trauma, and relate to others through stages of life (Sable, 2013). Research delves into the "hurt" experienced when a relationship severs. Attachment theory is often cited concerning child-parent relationships (Bowlby, 2018). Companion pet research often bridges attachment theory with the concept of pets as family members (HABRI, 2019).

Significant research has positioned pet attachment as a critical source of health for older adults and anyone disenfranchised (Hawkins & Williams, 2017; Jalongo, 2018). The role of a pet in the family unit can episodically increase in times of stress in a family (Sable, 1995). Research points to a unique companion pet role during childhood and elder years (Melson, 2001). If companion pet attachment is a recognized phenomenon, then the act of relinquishment vexes scholars and practitioners. Research has cited significant family trauma, financial or relationship, as leading reasons. Here, ideas that tie back to retention intervention are relevant. The family development theory's base tenet is that families are not fixed units. Families can change on multiple levels and can change their structure in response to external and internal phenomena. Examples include divorce, death of family member, job loss, and loneliness. Research links the companion pet to the family unit through the family life cycle (Albert & Bulcroft, 1988). This link sees the pet as a metaphorical life preserver in times of change.

Other research positions are not positive and come from a post-industrial hyper commodification of pets' position (Nast, 2006). These perspectives center on a "throw away culture" and the opportunity costs from not dealing with specific human issues. Nast (2006) describes the present-day hyper-commodification and anthropomorphizing of companion pets at a time when high geographic mobility can result in giving away. This sets the stage for factors, abandonment of pets, that society must deal with, and shelter overpopulation. We then transition from attachment between humans and animals to human interrelations. Thus, one way to manage societal issues across ecosystems is to determine the way people build relational capacity (Cola & Wang, 2017). Relational capacity is the ability to develop deep and meaningful bi-directional relationships. Establishing and nourishing these collaborative

partnerships among individuals or groups contributes meaningfully to shelter pet population management.

Collaboration Theory

Collaboration is important at a dyadic, interfirm, or intergroup level (Colbry et al., 2014) with shared goals absent asymmetrical power dynamics. In our context, research points to collaboration from a probability perspective, sources of funding (Jang & Feiock, 2007). Our research engages both types of organizations, municipal and private. Concepts on collaboration broaden with the recency of for-profit private business actors. Research now takes effort to understand the intersections of municipal, private nonprofit, and private for-profit collaboration, and why (Austin, 2000). Research consistently notes the different actors in a companion pet shelter ecosystem, but dives into the relationship between organizations more and individual agents or actors less. Stakeholders show instances of sustained and episodic partnerships with latent friction. Friction can manifest from social, goal, and/or funding conflicts. Conceptualization of relational capacity may take on a unique position in the success of an AWO ecosystem as they do in other management settings such as managing physician-scientist roles in an academic medical center (Cola, 2015; Cola & Wang, 2017).

Collaboration has recently reached new heights, literally, as nonprofits, such as Pittsburgh Animal Aviation Rescue Team (PAART), use planes to shuttle shelter animals in response to disasters (PAART, n.d.). PAART is a newer service that enables the cross-state exchange of shelter animals. In order to more thoroughly investigate theoretical implications from collaboration, social networking, agency, and relational capacity, we designed an exploratory inductive research study that attempts to address the factors that impact the confluence of these theoretical perspectives.

RESEARCH DESIGN

Methodology

We conducted a qualitative study using an inductive semi-structured interview approach to develop emergent grounded theory (Corbin & Strauss, 2008) along with exploring a base understanding of what factors within and around an animal welfare organization (AWO) ecosystem contribute to managing companion pet shelter populations. Grounded theory is an explorative, iterative, and cumulative way of building theory (Glaser & Strauss, 1977). The main features of this approach involve constant comparison of data and theoretical sampling (Corbin & Strauss, 2008). Constant comparison is a rigorous method of analysis that involves intensive interaction with the data (Maxwell, 2005) to contrast emerging with already emergent ideas and themes. The method provides "simultaneous collection and processing of data" (Lincoln & Guba, 1985: 335), which, in turn, leads to the generation of ideas for emergent theory. We chose grounded theory as the preferred inductive methodology because this method helps capture practitioner and adopter recollections of their lived experience and expertise toward a question of what factors contribute to managing shelter pet populations. The theoretical sampling refers to ongoing decisions about whom to interview next and how (Charmaz, 2014). As the constant comparison of data yielded insights about our phenomena of interest, research modifications were made to gain broader comparative and deeper personal narratives regarding adoption experiences, and the sample was adjusted in response to emerging ideas and themes. The approach was not exhaustive, but instead intended to illuminate new knowledge and to identify where future research is needed.

Sample

Overall, the sample consisted of 26 interviews, and sampling characteristics are provided in Table 1. The sample consists of eight interviews with AWO leaders across shelter facilities, municipal and private nonprofit, and an animal transport organization. Eighteen interviews with companion pet, cat or dog, adopters were conducted. All AWO leaders were female, and 78% of adopters were also female. Interviewees' ages ranged from 30 to 60 years old. Four adoption interviews were for cats. We talked to 14 participants on dog adoption. Some people shared adoption experiences for multiple dogs and/or cats; hence the number of cats and dogs discussed does not fully align with the number of people interviewed.

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TABLE 1
Detailed Sampling Information

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Criteria	Characteristic	Participants
Role Function	Municipal AWO* Leader	4
	Private Non-Profit AWO Leader	4
	Adopters	13
	Adopters That Returned Dog	5
	Total Interviews	**26**
Type of Species	Cats	4
	Dogs	14
	Total	18
Interview Modality	Face-to-Face	6
	Zoom or Phone	20
	Total Interviews	**26**

Sampling across dogs and cats was conducted as participants came from shelters that sheltered both cats and dogs. Cat and dog adopter experiences were expected to be similar with the process and shopping or looking, with possible differences between canine or feline to human attachment. Interviews included five returned/relinquished pets to the shelter, and

one question to adopters included, "Why was there relinquishment?" Sampling included municipal and private shelters. The co-investigator joined a closed social media group on Facebook to observe volunteer and practitioner posts. Social media posts were collected and analyzed, using value codes. Values coding is the application of codes to qualitative data that reflect a participant's values, attitudes, and beliefs, representing his or her perspectives or worldview (Saldaña, 2015). Posts used were anonymized. Secondary data was collected to offer clarity on primary research using national data and are presented later in the findings with source citations (Shelter Animals Count, 2016).

Data Collection

The data collection process occurred during the period from May 2019 to September 2019. Open-ended questions were used to gather lived experience data via an Institutional Review Board (IRB) approved interview protocol presented in Appendix A. On Average, interviews lasted approximately 60 minutes. All interviews were face-to-face or via Zoom and recorded for professional and confidential transcription. Adoption experience questions did not differ across cat or dog except for perspective, observed (shelter leader) or experienced (adopter). Probing questions differed slightly between cat and dog owners to detect differences between the processes and adopter thinking and expectations. Adopter questions covered the adoption process: thinking, preparing, looking, adopting, and homing. Shelter leader questions mainly focused on partnerships, processes, and policies. Interviewees were asked to sign a consent form agreeing to the interview and digital audio recording, but also informed about their right to terminate the interview at any time. The research was conducted in accordance with the principles outlined in the Belmont Report (United States Commission for the Protection of Human Subjects of Biomedical and

Behavioral Research, 1978), with prior research approval from the Institutional Review Board of Case Western Reserve University. Consent for recording was obtained, and interviewees assured of the strict confidentiality of any data acquired. Interviews were digitally recorded and transferred to a computer with a secure space that is only available to the research team. A commercial transcription service was engaged and fully compliant by their policies and procedures with the parameters and rules of human subject research.

Data Analysis

Consistent with a grounded theory approach, data analysis commenced simultaneously with data collection. The audio recordings of each interview were listened to several times, and the transcripts of each interview read repeatedly. Analytic memos were written on multiple interviews that showed high levels of emotion. Three stages of coding then ensued. First, we engaged in "open-coding" all transcripts, a process that involves identifying every fragment of data with potential interest (commonly called "codable moments" (CMs) (Boyatzis, 1998). Open coding, which can be compared to a brainstorming process for the analysis of data (Corbin & Strauss, 2008), requires detailed line-by-line readings of each transcript. Each transcript was read three times to ensure the capture of all CMs. We used NVivo Software, version 12.6, to code, write memos, and label groupings. Themes were developed using Word documents along with NVivo 12. We identified and labeled 998 such words, phrases, or longer sections of text in the twenty-six interviews (Saldaña, 2015). Using sorting game tools (Gray, Brown, & Macanufom, 2010) the "CMs" were assigned to pre-existing or new categories that included similar excerpts from other interviews. In the second phase of coding ("axial coding"), these categories were further refined as we compared and contrasted them. Coded instances of working with or together,

along with descriptions of how people felt, were grouped in ideas of "cooperation." Coded

instances that mentioned working between different shelters were grouped into

"collaboration." Instances of collaboration with new actors were noted as a different type of

collaboration. We reduced the number of categories to six. Finally, in the third phase of the

coding process, we focused on key categories that generated the findings. The selective

coding process resulted in a reduction in the number of categories from six to four major

categories and captured 998 of the total "CMs." Where codable moments showed

collaboration with unknown actors, these were categorized with agency ideas. The discovery

of fosterers and private transport services evidenced cooperation with new agency contexts.

Practitioner jargon was separately noted, and definitions developed and presented herein as

Appendix B.

FINDINGS

Our findings are summarized and diagrammed in Figure 1. This figure will allow us

to visually see the results or outcomes of our inquiry, and it provides the framework from

where our findings are subsequently detailed.

FIGURE 1
Shelter Animal Ecosystem

AWO 2

Population Management
AWO ecosystem example
- 10,000 AWOs*
- 6.5 million shelter animals*
- ~ 500,000 transports in 2016**
- Foster capacity unknown
- Social Media expands network, adopters and practitioners
- Trust & Collaboration required

*ASPCA
**Shelter Animals Count

Transport

Fosterer
(Shadow Inventory)

Social Media

Abandon
Relinquish
Seizure

AWO 1

Adopter

Commercial & Backyard Breeders

Euthanize

Figure 1 depicts a community or micro-level shelter ecosystem (AWO1), which incorporates inflows from abandoned, returned, or seized than resulting in either adoption or euthanization. I found novel interpretations and oscillating flows with transport and fostering. Fosterers may adopt out the pet under the shelter guidelines. Fosterers might return the pet to be adopted out by the shelter. Transport options use an external service to transport pets to interstate or intrastate shelters, AWO2. Social media offers a mode for both newer actors and fosters to communicate with shelter practitioners and volunteers. Social media opens connections with adopters to view and learn about available pets.

Finding 1: Collaboration and Transport – Animal Welfare Organizations (AWOs) exhibiting collaborative behaviors across multiple partners leverage animal transport capabilities toward better shelter pet population management.

Evidence supported the existence of relationships between AWOs that consistently transport animals, cats and dogs, between shelter facilities. Phone and digital exchanges resembled the NYSE trading floor. Phrases such as, "I can take one Pit for every non-Pit" were expressed. Sometimes, a response would be, "I only have Pits" with a response, "I have five open cages; send me any five dogs," as shown in Figure 2. Moments of truth emerge where cage vacancy is low and partners' animal transfer requests wane without communication on why trust has been damaged. Frequency and number of transfers over time build partner expectations. Shelter inflow and pressure on capacity can be seasonal and episodic. Animal Control Officers (ACO) pick up more strays in months following adoption discount events. ACOs handle animal hoarding, cats and dogs, and dog fighting ring calls, yielding dozens of animals. Transfers are mostly from municipal shelters to private shelters. Private shelters transfer animals in and out. Partner beliefs on latent health issues with transferable animals, challenges trust, reduces transfer demand. One leader of a transport service noted:

> The other thing is, there's just a lot of disease, really based on volume, and people down there not vaccinating. So, state X, if we have a case of distemper, everyone knows about it. It's tragic. We lost 27 dogs at the H society because of a dog with distemper in the kennel. It's horrible. You have to be careful about disease. AWOTRANLEADER

Changes in levels of transfer cooperation lead to unspoken relationship erosion issues in both directions. Another AWO leader explained, "They stopped pulling dogs in May of 2018 and did not pull again until like February of this year because five dogs they got from us died. On our side, there was no clear connection between any of those dogs, and none of the dogs that

we still had were dying like that." Data showed AWOs developing broad multi-state

collaborative relationships in order to diversify transfer frequency and severity risk. A shelter

leader explained:

> Because last year when it happened and it fell out, I had probably half the
> transfer partners that I do now. The people that I could go to rely on... I didn't
> have as many of them. I was trying to do the groundwork, Okay, now I need to
> reach out to all these people and try to build a relationship with these people
> quickly to get them to take some dogs. AWOLeader1

Pet transfer collaboration manifested in breed/type, quantity, and inbound/outbound modes.

AWO ecosystem actors communicated weekly by phone and/or digitally, email/social media.

FIGURE 2
Evidence of Shelter Collaboration Toward Better Shelter Population Management
Using Pet Transport Services

Animals are getting moved around a lot. Every day. Weekends, legs, many people on different legs of transport moving dogs all over the place. And it's making the euthanasia numbers go way down, which is great. AWOTRANLEADER
Will still be kind of the same. We'll still take straight from B. We're not obligated anymore to take them. But the surrounding communities will also have the opportunity to bring their dogs to us on set falls. AWO Leader4
I've had people ask me to take dogs from Florida and it's not that I am against it. I just ... We have so many dogs here and it goes both ways. I've had people reach out to us about a dog that's for adoption and they live in Wyoming or they live in a different state. Again, the mentality that has evolved with me is I now understand that the availability of dogs in certain areas are not there. My parents live in New Hampshire and if they Google or do Petfinder or whatever adoptable dog of X type of breed or X type of age, there might not be any within 400 miles. AWO LeaderPrivate

Finding 2: Transport Intermediaries Increase Placements – Recent growth and reach of shelter pet transport intermediaries, air and ground, extend live release (see Appendix D) or placements across the country. These intermediaries transport shelter pets toward open capacity adding value as agents of municipal and private shelters.

Expansion of practitioner network builds new partnerships, expanding and

diversifying collaboration as shown by participants' discussion in Figures 3 and 4. These

partnerships can be tapped when transfer requests chaotically oscillate. These newer actors

are nonprofits that transport, ground or air, shelter pets from shelter to shelter. They originated from natural disaster animal rescue missions. They serve as agents for the shelter, transferring out animals. Transferring shelters retain legal ownership of the animal until delivery. An AWO leader in transport services notes,

> We pick up the cost entirely, whether it's ground or air. I know for some who charge it's become pretty profitable, but I have concerns about how safely it's being done and then is it being done legally, Certificate Vet Inspection- rabies or age appropriate, etc.

Interviewees shared the importance placed on shelter metrics, live release rate (LRR) (see Appendix B). Transfer/transport out contribute positively to LR. Pet transport services can easily take an important role for a pet shelter.

FIGURE 3
Evidence of Widening Transport With New Intermediaries

how many dogs we transferred out of state this year with new partners. The E SPCA or SPCA serving E County in New York. All of a sudden, they came, they started helping. I want to say in like November, December. They've been fantastic. AWO Leader 1
Then you get to southern O. That's where they're getting their dogs, from southern United States. The northeast, you know, Maine, New Hampshire, Massachusetts, Connecticut, they're constantly looking for adoptable dogs. There's shelters up there that reach out constantly looking for adoptable dogs. It's sad for Pit Bulls, most people will say, 'we can't take in any Pit Bulls,' because, the fact is, they sit in the shelters longer than anybody. So, you have northeastern United States where you don't have dogs, and southern Canada. AWOTRANLEADER

Finding 3: Existence of Foster Inventory (Fostered Pets) and Foster Lite (increased attention) – This shadow inventory demonstrates significant system connectivity and expands, long/short-term, shelter physical capacity. Foster pets adopted show lower relinquishment, greater adoption resilience. Fostering "lite" (see Appendix B) was detected within practitioner and volunteer social media interactions, adding population management maneuvers at lower volunteer commitment.

Foster programs create "shadow" inventory (see Appendix B) where pets in foster care are part of shelter animal inventory, but animals physically reside with volunteer fosterers, as shown by participants' responses in Figure 4. Fostering enables decompression

of the shelter animal, enrichment from human proximity, and lived household experiences.

Fostered shelter pets parallel "certified used cars," since they receive more care/enrichment.

Overall welfare of fostered pets is improved (Gunter et al., 2019). Participants in this study

did not return/relinquish any known fostered animals. One individual that adopted a fostered

dog said:

> Yeah. I think that's exactly right. And we sort of stumbled into this. I don't think we purposely came out and chose a foster situation, but having now talked to the foster family and the foundation and met the dog, I think that this kind of thing is ideal because we've seen videos of him around their kids., and met him once and we'll meet him again, and for some reason things just don't work out he's going to go back to the foster family until they find something. ARADOPTER

None of the five participants that did return/relinquish a pet had adopted from a foster

scenario. Private shelters or dog rescue groups with small or no shelter facilities extensively

use fostering as the following practitioner notes,

> One of the things that I like about foster-based rescue versus shelter is there is a keeping track of it. If I place 500 dogs this year that, yes, I can say I have 500 dogs adopted but what is the quality of those adoptions? They all could be good homes but maybe one dog is kenneled for 10 hours a day and should have been or could have been more ideally placed. AWOLEADERAS

Lower resource AWOs showed abilities to develop prison-based foster programs as

evidenced by participants' answers in Figure 4. Foster networks show a high level of

collaboration to enable foster coverage when a fosterer must travel. Foster networks use

social media to share encouragement and celebrate adoptions. Foster can result in stronger

attachment between humans and the animal and often results in a "foster fail" (see Appendix

B). Foster fail is where a fosterer adopts the animal they fostered, as one fosterer writes in a

closed FB group,

After almost five months of fostering V through heartworm, pneumonia, kennel cough, happy tail, eye infections, mystery growths in her paws, and a spay she was finally ready for adoption...and I couldn't let her go. FOSTER FAIL! Meet my dog, M.

This is celebrated by the foster network, but often the foster family must step back from future fostering due to the new resident animal. See Figure 4 for evidence of failed fosters.

FIGURE 4
Evidence of Fostering Across Volunteers, Prison Inmates

And we work with a prison program, Dogs in state x work with the Eastern state correctional center, and the dogs are chosen, most of them are under-socialized. So, they're sent to the prison, they live in the pods with the prisoners for six weeks. And there's a training program, so the prisoners learn how to train, basic commands mostly, txt...txt, txt...txt... that they have taught the dogs. And then, also, I was there txt... when the prisoners brought their dogs back to the shelter, and you see these big guys in orange suits crying, txt... So, it's a wonderful program in trying to rehabilitate people also. AWOTRANLEADER
After a bit of time...I started to foster some dogs through the kennel just not long-term foster's just overnight foster's. Your medical kind of stuff to just a little bit chance to give the dogs some bit of a break from the, from the kennel and txt... It just kind of warmed myself to the sense that I really wanted a dog in my household in in my life. And one day met My little girl. She was really, really sick dog at the time. So, we wanted to bring her home and help get her back to health out of kennel environment txt...txt...She just blossomed into such an amazing little creature. VolunteerDG
Foster Fail by Volunteers
Well, another foster fail. We adopted Zoinks today!. Volunteer A Post
The secret has slowly been leaked over the past few days, but today we made it official. Rushmore has become our first foster fail. He is now known as Porter, and we couldn't be happier to welcome him into our family. Volunteer B Post

Corroborating data source, social media for a closed Facebook (FB) group, revealed a new foster innovation, the Foster Champion (FC), as shown in Figure 5. Facebook posts note the FC tactic was learned at a sheltering conference that encouraged collaboration. FCs dedicate a couple hours a week on a particular shelter dog with long walks, enrichment play, and cage breaks. Cage breaks are time taken to take an animal outside the shelter for car rides or home visits. These actions create additional and new stimuli. Candidate dogs for FC program are long term residents that show stress and growing behavior issues, leash biting and aggression.

FIGURE 5
Evidence of Fostering Champion From Volunteer and Practitioner Facebook Posts

Basically, you would be this dog's advocate in a personalized way, but they still live at the kennel. Right now, we are looking for Champions for our five longest term dogs not currently in foster homes: Cocoa Pebbles, Milo, Nibbles, Bingo, Tick Tock. This would be ideally suited to someone who already knows the dog moderately well… Volunteer D Post

Finding 4: Social Media Impacts on Pet Adoption – Use of social media's closed and open groups serve to functionally enable a collaboration platform, Facebook, across functional intermediary actors, transport services and fosterers, toward live release outcomes. AWO practitioners, volunteers, and adopters communicate through the platform to enable shelter population management.

The engaged network learns of each AWO's need to place animals and an AWO's ability to receive animals, as shown from participants' answers in Figure 6. Transfers needed due to medical issues are sent to shelters that have on-site veterinarians. As stated by AWOLeaderPrivate, "There are very specific cases that I cannot, just my rescue, but of a dog who has special needs that the funding isn't there, the resources aren't there, the understanding medically isn't there and so that dog gets transported to X state to X rescue that has all of those amenities."

FIGURE 6
Evidence of Practitioner Use of Social Media to Gain Commitments on Transfers

There are always dogs coming in, and so we really need our partners to pull dogs from us. City County has probably been one of the big leaders in that. Also, FIFO has been another, but City County has been, they're here, we call them, 'We don't have any space can you come out?' And they do, and sometimes they can only pull small dogs, but it doesn't matter. It all helps us. That's been lifesaving for these dogs. PRAWOLeader

There are very specific cases that I cannot just my rescue but of a dog who has special needs that the funding isn't there, the resources aren't there, the understanding medically isn't there and so that dog gets transported to X state to X rescue that has all of those amenities. AWOLeaderPrivate

Social media websites and sites such as Pet Tango and Petfinder are used extensively by AWOs to market available animals and by adopters to dream, compare, share, and begin

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attachment. Social media influences AWO practitioners and adopters. One respondent said, "Tinder for Pets, yes." Points of thinking and looking are when adopters engage social media. The ability to share potential adoptees only feeds attachment and expectations as the Facebook "likes" follow. Evidence builds when shelter websites list adoptable companion pet availability and shelter proximity, as shown in Figure 7 ☺. One practitioner noted social media benefits for lost pets, "Sam The Parrot is a great lost and found dog Facebook page." Some people prefer social media, and others do not. The latter group displays the following characteristics and indicates decisions should be based on live interactions, as shown from the words of the study participants provided in Figure 7 ☹. Proclivity towards live interactions reflect generally accepted views on live human interactions, authentic and vibrant.

FIGURE 7
Evidence of Social Media/Online for Selecting Pets, Positive/Negative

☺ *So, I found a dog on Petfinder that I just loved. I don't even know, I just loved it first sight. I loved her smile and her body, and the things that they said about her, I was just, 'Wow, she's great.'* ALgypsy
☺ *Okay, so yeah. I think it must have been Petfinder. I know she wanted a young cat, so I they set the search parameters within a certain distance and within a certain age, probably less than a year or something. I guess she just picked it on appearance or something.* BCCatDog
☹ *There's a whole other side of the dog you don't know, which is behavior, sociology, how they get along with other dogs. And so, looking at an app and picking dogs, I'm kind of not really into right now. Like, they're not digging it, and I don't think it'll ever get there.* AustGW
☹ *The fact we that realized that the beauty of Petfinder is the wide selection of dogs. But the downside is that those dogs could be anywhere we just didn't ever want to deal with that again.* ARAdopter

DISCUSSION

The research found that population management is found and sustained where shelters engage in collaboration with a wide network of shelters and intermediaries. Consistent communication using social media connects practitioners, volunteers, fosterers, and adopters to facilitate population management while enabling relationships. Where this is done aggressively, populations can be managed. The advent of transport services can help regions with greater populations challenges as regions demanding pets can now have access.

Our findings revealed surprises and pointed to new practical and theoretical considerations. New theories were Agency Theory and Social Networking Theory. Population management success is inconsistent and appears to resiliently exist when collaborative networks are large, and agents with transport and fostering are leveraged. The question of what factors within the companion pet shelter ecosystem contribute to managing pet populations was asked. Pet shelters are fundamentally systems. There are flows of animals in and out governed by varied municipal and private institution policies. Many shelters face unfortunate realities with euthanization when capacity is at maximum.

Informed adopters create visible outflows that are marketed to entice more adoptions. Some shelter leaders engage in broad collaboration in concert with private transport services and private fosterers to enable more live release outflows, managing population. Collaboration is pervasive through shelter to shelter negotiations with mutual goals on getting a pet adopted. Use of transport providers and fosterers results in some delegation of authority, agency (Shapiro, 2005). Shelters engaging transport and fosterer services are taking measured risk as outcomes, agent driven or random, create liability since legal ownership resides with the sending shelter/principal (Gupta et al., 1994). Social networking

findings show amongst other findings as the network allows various interactions amongst an AWO network. This network contains strong and weak ties with connecting and, at times, divisive outcomes (Tajfel, 1974; Thorn et al., 2006) Our evidence exhibited connecting ties as one AWO Leader reached out to many shelters to develop demand for transfers. This connecting behavior was driven by divisiveness within smaller developed networks, broken trust from disease.

New Actors Create Shifts in Agency

Figure 1 depicts relationship elements amongst AWO actors. Collaboration between shelters (practitioner and volunteer), transport services, fosterers, and adopters enable population management outcomes. These outcomes are benefited by the use of social networking manifesting through live and digital communication. A deeper dive into literature yielded articles facing social networking benefits and analogies, "Grooming" and "Gossiping" (Donath, 2007; Reese & Ye, 2017). The researcher collaboration triggers new phenomena with agency theory. Agency at a high level, managerial and economic, is a management and economic theory that attempts to explain relationships and self-interest in business organizations. It describes the relationship between principals/agents and delegation of control. It explains how best to organize relationships in which one party (principal) determines the work and which another party (agent) performs or makes decisions on behalf of the principal (Jensen & Meckling, 1976). Not discussed in the initial literature review, agency shows up throughout the AWO ecosystem with fosterers and third-party pet transporters. Literature is abundant on this topic with general economic position with agency (Ross, 1973), more relatable sociologic view (Shapiro, 2005), and specific agency concepts with unwanted shelter pets (Irvine, 2003). The basic concepts can apply to shelter ecosystem

actors, private and public. New and emergent actors appear to strengthen networks, but also introduce new risks. Contractarianism indicates the transfer of custodianship to a fosterer or transport actor while legal ownership remains with an AWO shelter principal. Acceptance and implementation of noted tactics and behaviors at thousands of meso-level points could go far toward population management. This, however, pushes an alternative recommendation on a macro-level scale. A national transport system governed by practitioners and federal/state governments could achieve similar outcomes with less reliance on micro-level relationship maintenance. A national system would require fewer resources at increased complexity. Appendix C depicts about half the number of AWO shelter organizations in the United States. A national approach would yield a robust network resilient to points of failure.

The Role of Transfers and Fosterers in Collaboration

The level of shelter and individual collaboration is sizable and subject to human realism of trust and communication. AWO actors can resemble a menagerie with shared objectives, but also susceptible to human relationship frailties. Collaboration amongst damaged relationships will lack efficacy. The data illuminates a growth trend in shelter pet transport as a demonstrated approach to population management. Transport or transfer tactics put shelter pets in motion to open cages. Geographic coverage is expanding to more states and regions. Transport can include air and/or ground and is conducted by AWO practitioners or volunteers. Air transport capabilities are emerging as a connector for long distances across multiple shelters and lead by a newer actor in the AWO ecosystem. Data vacillates on animal transport issues, disease, and legality. Practitioners engaging in transport may find needs to manage new relationships and new agency risks. Here, agency expands into international

importation of animals. Concomitant asymmetrical information risk, inherent in agency/principal interactions, increases.
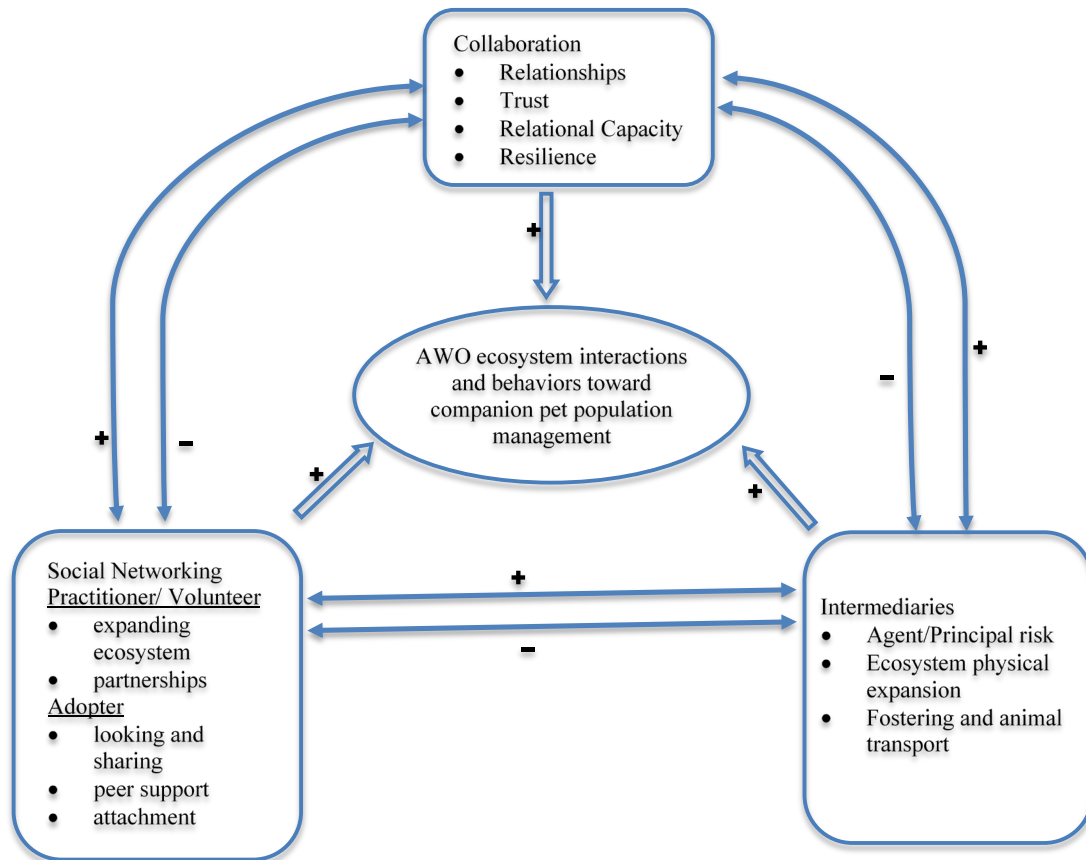
Transfers and fostering address outflows of shelter pets. Collaborative actions amongst these actors facilitate more or less animals into transport or fostering. Presence and maintenance of social networks connects the system with the actors. Network connectedness evidences shared objectives, but possibly divergent shelter policies on animal training (Yin, 2007).

Fosterers are volunteers, citizens, or prison inmates. Citizen fosterers facilitate adoption outcomes individually as agents of municipal or private shelters. These volunteers execute marketing, meet and greets, animal enrichment, and responses to potential adopter questions. Medical procedure recovery is often a trigger for fostering. Volunteer fosterers receive training and financial support from the related AWO. Prison programs offer low cost and high touch alternative to citizen fostering. Contemporaneous research focuses on human-animal bonds, development, and sustainment (Anderson et al., 2015). Other research, important support for fostering, lingers on physiologic impacts from placing animals in foster care (Gunter et al., 2019). This research notes the effects of fostering on resiliency. Other literature takes a legal and technical view in order to consider implications with the agent and principal relationship and placement of an animal outside legal custodianship (Wagman, 2016). Finally, literature looks at reasons for relinquishment, and often behavior is noted as a top reason such as aggression, inappropriate elimination, and barking. Value can be found in research on reasons that adopters maintain an adoption and noting the effect on resiliency and attachment from fostering (Gunter et al., 2019).

Numerous connections yield low and high strength network connections that benefit from transport repetition. Relationship fragility emerges when communication is transactional, and transport animals harbor contagious diseases. Destination shelters scramble to contain the damage, while trust with source shelter is suspect. Our findings point to communicable disease instances, and shelters should increase risk management. Originating shelters should offer certificates of veterinary inspections.

CONCEPTUAL MODEL

FIGURE 8
Conceptual Model

Collaboration
- Relationships
- Trust
- Relational Capacity
- Resilience

+

AWO ecosystem interactions and behaviors toward companion pet population management

−

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+

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Social Networking
Practitioner/ Volunteer
- expanding ecosystem
- partnerships

Adopter
- looking and sharing
- peer support
- attachment

+

−

Intermediaries
- Agent/Principal risk
- Ecosystem physical expansion
- Fostering and animal transport

Note: Plus sign denotes more and a minus indicates less.

The AWO ecosystem is a menagerie of actors who engage in improving companion pet outcomes by collaborating, social networking, and through agency (Figure 8). A model emerges that is mostly about relationships: informal, contractual, and coopetition laden. Coopetition exists when shelters work together toward common goals but individually compete for donations and grants. Funding comes from taxpayers and donations. Collaboration within the AWO ecosystem is based on mutually shared objectives and contractual obligations; however, public views into notions of a live release rate can perverse practitioner actions. Aspirations toward marketing labels as "no kill" can narrow focus at relationship costs. Newer stakeholders with different objectives and low cooperation exist in the system. National and local governments are likely new bedfellows with enabling controls and rules with interstate and international transport of shelter pets.

LIMITATIONS

The findings presented in this paper are considered in light of limitations that may impact their transferability. An example in industry, services, or manufacturing, is the use of trade groups to engage like practitioners on market challenges and opportunities. These for-profit areas are limited on levels of collaboration due to laws protecting consumers. Our sample of AWO and adopters was relatively small (N=26), even for exploratory inductive work, and not randomly selected. The sample included only two municipal shelters, but six private shelters maintained contractual relationships with local municipalities. A broader geographic sample and one including more municipal shelters may have yielded different findings. Our sample did not include commercial or backyard breeders. These sources could be affecting companion pet populations in ways this study did not detect. Although particular attention is given to the potential risks of researcher bias, it is essential to state that any

positionality is mitigated by access to AWO leadership and adopters. Great effort was made to remain self-reflective about these risks (Corbin & Strauss, 2008) by using open-ended questions to elicit rich, unstructured narratives of participants' experiences (Maxwell, 2005: 22), interpretations and understanding of companion pet shelter populations.

IMPLICATIONS FOR PRACTICE AND FUTURE RESEARCH

The existence and growing relevance of animal transport networks are unquestionable. These systems point to a potential nationalization of a shelter pet network, practical implications. Theoretical considerations are revealed with agency and social network theory. Concepts such as relational capacity (Cola, 2015) offer tuning implications to ubiquitous nonprofit collaboration. Evidence shows that wide-ranging use of animal transport services with more success seen in an established vast network. Dedicated transport services create, spoke like, connections between private and municipal shelter hubs. A national system requires state and federal institution involvement. Private nonprofit institutions can manage but do so under collaborative state/federal rules. Transport efficacy is dependent on positive relationships across geography and AWO.

The evidence is promoting adoption resiliency where fostering occurs and points to opportunities to expand fostering plus better reporting on this "shadow" inventory. Fostered companion pets show lower cortisone levels, more limited stress because they are living outside the shelter cacophony (Coppola, Enns, & Grandin, 2006). Fostering requires the most substantial level of volunteer time and attention. Findings support further research on the impacts of fostering on adoption resiliency. Investigation of marketability of shelter pets offers empirical evidence on adopter search, selection, and resilience. Adoption resiliency from fostering begs inquiry and would highlight outflow/live placement improvements.

Exploration of large foster networks is needed to empirically understand cost/benefit

tradeoffs juxtaposed against contemporaneous decisions to build more/bigger municipal

shelters. Companion pet transport systems need a broader and more in-depth investigation to

understand the impacts of disease with transported animals. Transparency by resource

stakeholders is currently not understood and has significant impacts on any expansion or

persistence of shelter transport networks.

Thousands of shelter and rescue organizations require substantive fixed and variable

costs: build and maintain. Research on collaboration between analogous human and animal

services could find multiplier effects (Anderson et al., 2015; Antonacopoulos & Pychyl,

2010b; Beetz, Uvnäs-Moberg, Julius, & Kotrschal, 2012; Harter, 2019; Hawkins & Williams,

2017; Weiss et al., 2013).

APPENDIX A
Interview Protocol

1st Step: Introduction (AWO LEADERS AND ADOPTORS)

Introduction (Interviewer): *"Hello, (interviewee's name). I want to thank you for taking the time to meet with me today. Before I start, there are a couple of things I would like to explain."*

Purpose of the Interview (Interviewer): *"To explain the purpose, I intend to understand the companion pet welfare ecosystem better within a private or municipal government shelter intake and outcomes context."*

Confidentiality (Interviewer): *"Anything you share with me in this interview will be kept in the strictest confidence, and your comments will be transcribed anonymously—omitting your name and anyone else's you refer to in this interview as well as the names of your current and past institutions. Your interview responses will be included with all of the other interviews I conduct."*

Audio Recording (Interviewer): *"To help me capture your responses accurately without being distracted by taking notes, I would like to record our conversation with your permission. Again, your responses will be kept confidential. At any time, you may ask me to stop recording if you wish to."*

"Do you have any questions before we start?"

2nd Step: Opening Interviewer: "Tell me about yourself."

Adopter
1) Tell me about your most recent adoption experience?
    a. Probe—Please share the steps and experiences that lead to your decision to adopt
    b. Probe—Tell me about the people and the conversations you had related to your decision to adopt
    c. Probe—Tell me about the interactions you've had since you adopted.
    d. Probe—Tell me about your life after you adopted; what's different?
    e. Probe—Tell me about the pet's relationships with family members early on and over-time?
    f. Probe— Tell me about this adoption relative to any other, or how it affects thoughts on adopting in the future?
2) Tell me about your favorite part of pet ownership?
3) (*If the pet is no longer with the adopter*) Tell me about the reasons and experiences with giving up or replacing your pet?

Last Step: Closing Interviewer: "Thank you very much for sharing this information with me. May I contact you in the near future for any clarification or extra information that I might need? Again, Thanks for the time spent."

Municipal Shelter Leader INTERVIEW PROTOCOL

2nd Step: Opening Interviewer: "Ok, before we begin, I would like to learn more about you. Can you please give me a brief background about yourself?

Municipal Shelter Leader
1) Tell me about your background and current role.
2) Tell me about a program that you really felt had an impact?
3) Tell me about a time when a community partner let you down.
4) Tell me about an adoption experience that went well and one that did not go well?
    a. Probe-Tell me about an AWO partner with whom you enjoy working.
    b. Probe-Tell me about your team and the work they do.

Last Step: Closing
Interview: "Thank you very much for sharing this information with me. May I contact you in the near future for any clarification or extra information that I might need? Again, thank you for your time."

Non-Profit Leader INTERVIEW PROTOCOL

1) Tell me about your background.
2) Tell me about an AWO partner experience that went well and one that did not go well?
3) Tell me about an adoption that went well.
4) Tell me about an adoption that did not go well?
5) Tell me about the biggest impacts and outcomes you've been a part of.

Last Step: Closing
Interviewer: "Thank you very much for sharing this information with me. May I contact you in the near future for any clarification or extra information that I might need? Again, thanks for the time spent."

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ORGANIZATIONAL AND SOCIOECONOMIC FACTORS THAT AFFECT MANAGEMENT OF PET POPULATIONS IN SHELTERS

By

Sean Andrews

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Advisors:
Kalle Lyytinen, Ph.D.
Phil Cola, Ph.D.

CASE WESTERN RESERVE UNIVERSITY

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ABSTRACT

The last decade created actors in pet shelter field- shelter pet advocates that blend profit and nonprofit goals to influence higher live release rates (LRR). Energetic adoption promotion and increased shelter collaboration have been shown to improve shelter pet population management and lower LRR. But there are other factors that also influence pet shelter LRR. In this study, I examine especially the impact of socioeconomic factors on canine and feline LRR across US pet shelter populations. I investigate to what extent LRR is influenced by shelter type (private or public), shelter size, local poverty, and rural or urban shelter location. I use hierarchical linear regression to analyze six years of US shelter pet outcomes combined with U.S. Census data to understand whether these factors affect LRR. Analysis reveals that socioeconomic factors (poverty and rural/urban), shelter size, shelter type, and shelter pet transport all significantly correlate with LRR levels. Post hoc analysis considers implications of the Covid-19 pandemic on LRR. Finally, managerial implications and future research ideas are considered.

INTRODUCTION

Consummate efforts by animal welfare organizations (AWO) and volunteers tend to result in compassion fatigue (Fiery, 2016) and are insufficient alone to manage the fate of the annual intake of 6.5 million pets, felines, and canines to shelters (ASPCA, 2018; PetPoint, 2017). Annually, 700,000 pets located in shelters are reunited with their owners, emblematic of the level dog catchers collect at-large pets. One and a half million are euthanized due to health, behavior, or space. At the same time, over 400,000 pets are transported to or from other shelters/rescues, and 500,000 are adopted out to new owners (ASPCA, 2018; Shelter Animals Count, 2016). The resources used by AWOs for the intake, care, and placement of pets account for less than one percent of the $92 billion spent annually on pets by U.S. households (Bureau of Labor Statistics, 2017; PetPoint, 2017; Weiss et al., 2013). This cost asymmetry remains a puzzle. At the same time, progress in handling the volume of pets and their release rates has been made, because of access to low-cost sterilization, shelter pet enrichment, improved shelter pet marketing through the internet, and community education (Rowan & Williams, 1987). However, overpopulation persists, and rates of killed pets remain too high. The overpopulation has been estimated to result in 20%–25% of annual intake being euthanized solely due to space or health of the pets.

Socioeconomic factors are likely to influence these negative outcomes. Poverty levels around shelters are at 11.6% and 240 basis points higher than the U.S. average. There are also issues whether such release rates vary between rural and urban shelters, because pet keeping is affected by culture, environmental conditions, and access to settings where keeping pets is easier. These cultures are affected by socioeconomic factors (Arluke & Rowan, 2020).

Recent qualitative research (Andrews, 2019) identified factors that support managing shelter pet populations. Adoptees, practitioners, and volunteers embraced digital platforms to collaborate, develop relationships, and connect adopters with companion pets. Shelters used pet transport assets to receive and ship pets directly and through intermediaries to move pets between shelters. Despite this effort shelters still euthanize millions of shelter pets annually, and LRR is often less than 90%. An LRR above 90% gives a shelter credibility to say they are a no-kill shelter. Concomitant investments in shelter pet adoption marketing fail to justify annual euthanasia rates. The lack of human and economic investment to reduce LRRs, and persistent high levels of euthanasia induced this quantitative study to ask the following research questions using secondary data: What factors within a pet shelter ecosystem such as shelter type and size, contribute toward higher live release rates (LRR)? To what extent do socioeconomic factors, poverty, affect LRR?

THEORETICAL FRAMEWORK AND HYPOTHESES

Several studies investigate collaboration amongst pet shelters, animal welfare groups, and local communities (Weiss et al., 2013). Other studies note that addressing the LRR problem requires improving transparency that enables a deeper understanding of pet intake and outcome numbers (Rowan & Kartal, 2018). Some have focused on functional networks at the meso level where shelter partnerships and communities, private and public, engage in fundraising, education (see Table 1: Research, Theory Matrix). Scholars have also asked "why relinquishment" is so common among pet owners and examined specific reasons for placing a pet into a shelter (Coe et al., 2014). These studies generally examine the limits and failures of human and animal bonding(Anderson et al., 2015; Human Animal Bond Research Institute, 2019).

The inflow of animals into shelters has been shown to be affected by multiple factors: owner surrender/relinquishment and Animal Control Officer (ACO) seizure. Seizure results from hoarding, abandonment, and criminal activity (Coe et al., 2014). This elevates pressure on available shelter space and triggers difficult euthanasia decisions when pet shelter capacity is reached. Public policy also requires shelter pet keeping contemplate euthanasia when it maintains community health and safety.

This research focuses less on factors that shape the inputs to the shelter system (shelter pet inflows) and more on what influences the output ratios of the shelter system measured as LRR or non-living outcomes (euthanasia). I use a nationwide data repository created collaboratively among a large set of shelters to report their inflow and output numbers annually for canines and felines. The repository uses standardized data format to capture the intake/inflow and outcome variables. I posit that poverty and shelter location (rural/urban) influence LRR. Motivations for shelter location impact on LRRs and the role of surrounding community poverty and culture are drawn from the book, *Underdogs: Pets, People, and Poverty* (Arluke & Rowan, 2020). Poverty's impact on owners' ability to attach and fully accept the benefit of preventive care for a companion animal is posited. I examine the reality of low-income household choices related to owning pets. Poverty stereotypes—the blame of poverty on the poor—are illuminated to understand how owners in financial stress attach but struggle to express attachment to their pets due to harsh human priorities.

LRR includes live outcomes. Variables affecting live outcomes are numerous- pet adoptions, return to owner, transport to another shelter are among most impactful variables. We recognize these as mechanical influencers on LRR.   This study's framework draws from a previously unpublished study (Andrews, 2019).   Andrews' study investigates collaboration

between shelters and the phenomena of pet transport into a shelter. Successful shelters

develop relational capacity(Cola, 2015) behaviors to establish consistent flows of shelters

pets into open cages at shelters near and far.

TABLE 1
Relevant Research

Theory of Interest	Title	Research connection	Author(s)/Citation
Collaboration	Community partnering as a tool for improving live release rate in animal shelters in the United States	Community collaboration positively affects pet adoption and retention, better LRR	(Weiss et al., 2013).
	Dog population & dog sheltering trends in the United States of America. *Animals*	Baseline statistics over time	(Rowan & Kartal, 2018).
	Dogs on the move: factors impacting animal shelter and rescue organizations' decisions to accept dogs from distant locations	Shelter pet transport effects on LRR	(Simmons & Hoffman, 2016)
Socioeconomic	A scoping review of published research on the relinquishment of companion animals	Research on shelter pet inflow activity and why	(Coe et al., 2014)
	Fostering the human-animal bond for older adults: Challenges and opportunities Human Animal Bond Research Institute	Retention and relinquishment of pets	(Anderson et al., 2015; Human Animal Bond Research Institute, 2019)
	Socioeconomic Influences on Reports of Canine Welfare Concerns to the Royal Society for the Prevention of Cruelty to Animals (RSPCA) in Queensland, Australia	Poverty and pet welfare	(Shih et al., 2019)
	Underdogs: Pets, People, and Poverty	Poverty and pets	(Arluke & Rowan, 2020)

Hypotheses Development

I formulate a research model around four constructs (Figure 1). Independent variables

(IV) are Poverty (POV), Shelter Type (ST), Rural or Urban Shelters, Shelter size (SS), and

shelter pets transferred in (TI). The dependent variable is live release rates (LRR). I posit direct effects, i.e., whether the chosen independent variables significantly affect LRR. Additionally, the effect of shelter location in urban or rural geography is stated to more significantly affect higher LRR.

Live Release Rate (LRR)

Live release rate (LRR) is the dependent variable of interest. LRR is broadly used to provide all U.S. shelters, public or private, a common and comparable metric for discussing shelter animal success or opportunity (Asilomar Accords, 2004). Success is achieved when the inflow of pets is either returned to the original owner, adopted by a new owner, or relocated to another shelter (to be adopted later). All these are treated as live outcomes. LRR is calculated as the number of live outcomes divided by all other outcomes. Typically aspired LRRs are higher and expected to be over 90%. An interesting issue is whether chosen socioeconomic factors contribute to LRR smaller or greater than 90%. Understandably, a 100% LRR aspiration is noble, but unreachable, because some proportion of placed pets inevitably carries physiological and refractory behavioral problems (Kass, New, Scarlett, & Salman, 2001). One reason for higher LRR is the trauma that goes with how to humanely euthanize cats and dogs. More heartbreaking is euthanizing due to lack of space. Pet shelters pursue pet keeping and shelter pet outcomes that are also humanely positive.

Socioeconomic Factor: Poverty

Poverty (POV) in the United States is near 10%, and shelters and rescues generally reside in zip codes with a poverty level of 10%–13% (U.S. Census Bureau, 2014-2018). This incremental poverty rate from the U.S. average of up to 300 basis points signals the presence of several socioeconomic stressors in close proximity to pet shelters and pet rescues.

Impoverished households uniquely benefit from pets. Household pets' benefits, function, and purpose are physical affection, emotional support, and animal-to-human attachment. All these are as valuable, if not more so, in socioeconomically distressed environments. These effects are also different for each family member, as a family changes through the family life cycle (Albert & Bulcroft, 1988). Such dynamism is also much higher in economically distressed environments. At the same time, the pet-keeping capacities of such households are more fragile. Socioeconomic stressors curb easy access to affordable pet sterilization, vaccination, medical procedures, and pet food. All these jointly drive excess animal intake volumes for shelters (Arluke & Rowan, 2020). Economically distressed households must often prioritize human necessities over beloved pet needs. Companion pets may be more easily surrendered or expulsed only to end up at a shelter in the same zip code. Impoverished households are also less accepting of AWO education and resource support, exacerbating avoidance of acute medical procedures that lead to relinquishing household pets due to cost. Overall, we posit a direct negative effect of higher poverty on shelter LRR. Thus:

Hypothesis 1. Poverty rate has a negative impact on LRR.

Rural and Urban Shelters (RU)

Human-centric support organizations exist and function across both urban and rural divides. Contemporaneously, urban and rural differences across politics, social values, and health care also affect human and companion pet outcomes. For example, studies have observed that rural households spend 48% more on pets than urban households. In rural areas, there is also easier access to feasible living conditions for pets such as space, outside environment, or food. Paradoxically, the total average live release rate for urban shelters is 1% lower for canines and 1% higher for felines. Research is substantive on urban human-

animal bonds (Sable, 1995). Generally, the shelter type mix for urban geographies shows a higher private shelter mix and a higher public mix for rural geographies. Thus:

Hypothesis 2. Urban shelters have higher LRR than rural shelters.

Shelter Type

U.S. companion pet shelter types reflect policy, governance, and species on shelter pet outcomes. The U.S. has 14,000 shelters and rescues; 3,500 are physical shelters. Many operate as networks of shelter pet foster homes. This study focuses on physical and home based for 3,742 shelters (Shelter Animals Count, 2020). A summary of shelter type mix is depicted in Table 2. Governance within public shelters is influenced by taxpayers as these shelters are publicly funded, taxation. These shelters operate under public safety and health-related mandates and are regulated by local laws related to human and animal safety. Private shelter policies and operations reflect volunteer and nonprofit leadership values on humane treatment, companion pet sovereignty. Private shelters rely on specific constituents that vote with their donations.

Public or government animal service shelters are known as "open-door" shelters. Open door shelters take all animals gathered by animal control officers (ACO) (Arluke, 2003); animal's behavior and physical issues are not considered. Private shelters and rescues reflect "no-kill" shelter status because they do not euthanize due to space limitations. Private shelters and rescues control what animals they accept- this policy avoids "open door" monikers (Arluke, 2003; Butts, 2003; DiGiacomo, Arluke, & Patronek, 1998). The debate among shelter pet welfare advocates, private or public, is vociferous and persistent. Mission consistencies on policy and tactics enable only fragile collaboration. Ethical considerations arrive into the fray as private shelter leaders pursue consequential and virtue-based outcomes

while public shelter leaders act on duty-based safety outcomes (Bonde et al., 2013). Shelter types reflect differences in governance, policy, and tactics; municipal or public shelters infrequently transport pets in from other shelters. Private shelters engage other shelters, private and public, to transport shelter pets in and out. This menagerie of shelter/rescue types often reflects localized dyads of cooperative organizations focused on maximum LRR. Hybrid shelters straddle public and private models. This shelter type manifests as a private operation contractually serving a municipality- tax payer funded with a blend of safety, health, and shelter pet advocacy governance. This final shelter model best reflects the closest to perfect LRR outcome scenario. Thus:

> *Hypothesis 3. Private Shelter types have the largest positive direct effect on*
> *LRR, and public shelters have the lowest LRR.*

Shelter Size (SS)

Shelter size in this research context is the average month ending count of canine or feline shelter pets in shelter care. Shelters can range dramatically in the number of animals that reside in shelter care. Daily maintenance (food, housing, and enrichment) is at the heart of any operational model. Repetition with inflow and outflow of shelter pets hones volunteer and employee skills with moving shelter pets, ideally, from shelter pet keeping to adoption. Bigger and more is better as it impacts LRR due to seasoned practitionership and better resources and visibility. Thus;

> *Hypothesis 4. Shelter size measured as the number of housed canines or*
> *felines directly and positively relates to LRR.*

Pet Transport Into a shelter (TI)

The frequency and quantity of animal transfers between shelters is a form of collaboration to improve the likelihood of a positive live outcome for a placed pet. This is

one means of literally generating a live outcome for each shelter pet taken in as the local market for placing such pet can be limited. The movement of pets between shelters requires agency resources, including vehicles, volunteers, and shelter employees. Engaging and getting the participation of such actors outside a specific shelter creates several principal problems. Third-party transports, when selected, act contractually or as an intermediary agent for the originating shelter to move companion pets to another shelter. A shelter pet's legal ownership and liability are retained by the shelter of origin until a full delivery to the destination shelter.

This collaboration is evidenced by the receiving agency approving the transfer and related ownership transfer. Receiving shelters may cover transport costs but require documented health on transferred pets (Dykstra, 2019; Gunter et al., 2019; Reese, Skidmore, Dyar, & Rosebrook, 2017). Observed quantity and frequency of shelter pet transport provide evidence of continued collaboration between shelters. Shelter pet transport (SPT) per the SAC database in 2019 reached 600,000 pets, or an average of 223 per shelter on the Shelter Animals Count (SAC) platform. Transfer reasons include shelter capacity balancing, medical, or behavior. Different shelters offer unique medical and behavior capabilities, and this affects the supply of transfer pets. Modern-day consumer-facing technology platforms also help expose shelter pets to would-be-adopters regardless of geography, further stimulating transfer demand. These factors of supply and demand significantly drive positive LRR. Thus:

> *Hypothesis 5. Shelter Pet Transport In (TI) has a positive effect on Live Release Rates (LRR).*

Controls

Species**.** Cats and dogs reflect species and are treated as a control. The literature recognizes the human-animal bond differences between cats and dogs (Albert & Bulcroft, 1988; Human Animal Bond Research Institute, 2019). This study accepts the differences and thus controls for them.

TABLE 2
Pet Shelter Demographics for Entire 3,742 Shelter/Rescue Population

Number or Percent of Total Population*					
Shelter Type Category	% Shelter Type Mix	Mix Dog / Cat Number Average*	% Live Release Rate Dog / Cat Average	% Poverty Rate Average	% Urban
Government Animal Services	13	81 / 80	89 / 41	13	63
Rescue Government Contract **	1	25 / 30	95 / 46	13	67
Rescue, Private	54	23 / 26	94 / 47	10	76
76	11	76 / 118	92 / 44	11	52
Shelter, Private	20	46 / 78	95 / 47	11	63

FIGURE 1
**Hypothesized Model**
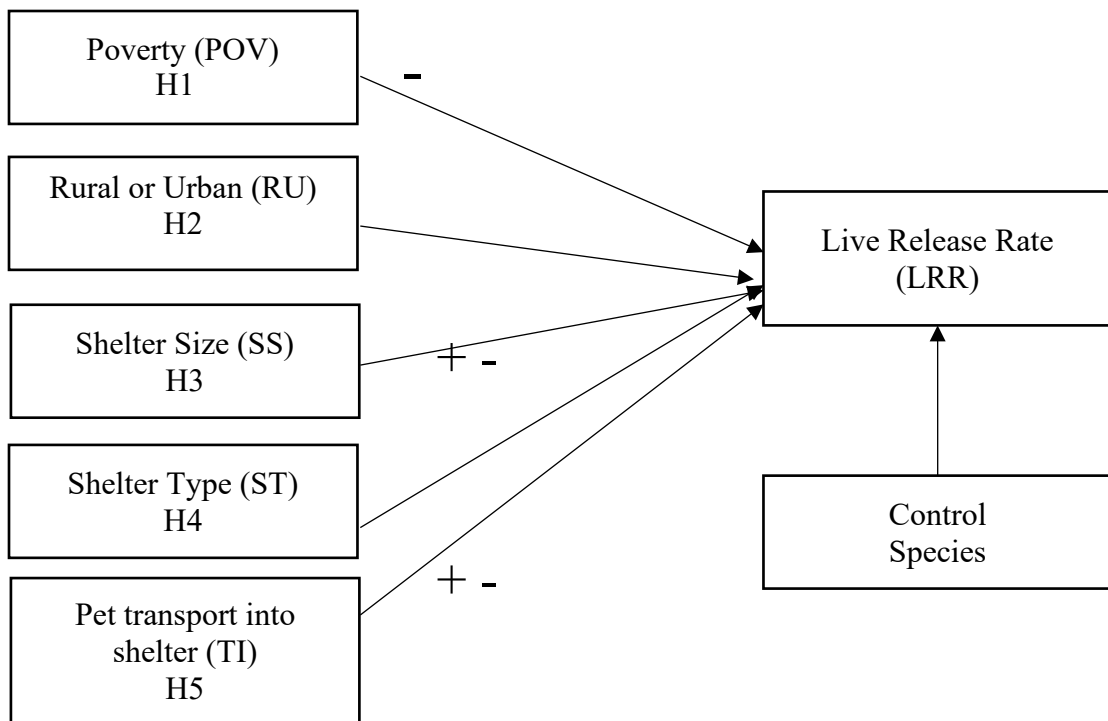
RESEARCH DESIGN AND METHODS

Overview

A national self-reported database was used in this study. The repository records monthly shelter intake and outcome data. The company that owns and runs the database service is Shelter Animals Count (SAC). Participating shelters load intake and outcome actions for felines and canines monthly based on a SAC template, ensuring consistency and comparability for monthly and annual reporting. A full 2018 SAC (Shelter Animals Count, 2018) annual report summary is analyzed. Pet shelters are a mix of private, public, and hybrid organizations. The secondary data source employed for this study, SAC, provides six years of data across 3,742 shelters/rescues. This provided over 22,000 observations. Specific

shelter observations were averaged to arrive at 3,742 items. My hypothesis considers differences between shelter types and geographies. I further expect shelter types to incur different results with live release rate (LRR). My theories expect socioeconomic variables, downloaded from federal social welfare statistics from Sage Stats, to affect shelter activities and LRRs. Socioeconomic data originates from the U.S. Census. The data population is split into multiple samples to enable repeatable test results. Random samples are iteratively drawn to obtain similar sample sizes for each shelter type, but no less than 150. Each shelter type with a sample size near 150 offers statistical power.

FIGURE 2
Shelter Type and Count

Pie Shelter Type and count
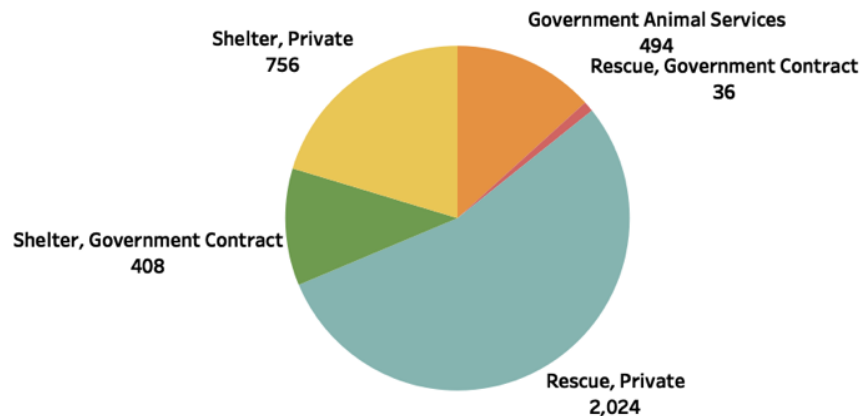
Construct Operationalization

 All measures were converted from continuous to normal across shelter action data and federal socioeconomic data. Excel was used to convert continuous data into normalized data using Templeton's (2011) methods.

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Dependent Variable

Live release rate (LRR) is the dependent variable of interest. LRR calculation originates from the Asilomar Accords (2004) and provides a uniform method for collecting and reporting shelter data. SAC provides a data matrix modeled from the Asilomar Accords, ASPCA, National Federation of Humane Societies, American Humane, UC Davis, Maddie's Fund, PetSmart Charities, HSUS, and Shelter Animals Count. Consistency of data reporting enables comparability and generalizability. The Asilomar Accords emphasize the importance of transparency for animal sheltering. It is important to recognize that condition definitions only define a status at a specific point in time (generally at the time of admissions). The definitions do NOT define the outcome. A healthy animal may be euthanized; an unhealthy/untreatable animal may be rehomed. The dependent variable LRR is calculated using the procured secondary data as follows: All <u>live</u> outcomes divided by all outcomes. The transport of a shelter pet is treated as a live outcome.

Independent Variables

Variables of interest include shelter type, shelter pet transport (SPT), and poverty (POV) for 3,742 shelters through 2012–2018. Selected statistics on socioeconomic data for poverty (POV) were gathered at zip code levels matched to corresponding pet shelters or rescues in the sample (Table 3).

Control Variables

I identified species and shelter pet adoption (SPA) as control variables.

TABLE 3
Summary of Research Model Variables

| Variable Type	Variable Name	Definition
Independent	Shelter Type	• Government Animal Services (GAS); • Rescue, Government Contract; • Rescue Private (RP); • Shelter Government Contract (SGC); and • Shelter Private (SP)
	Shelter Pet Transport In (TI)	Transferred out of the agency's possession to another entity & An admission from another agency, for adoption, large-scale seizure support, etc.
	Poverty (POV)	as collected by the U.S. census at zip code level matched to individual shelter zip code
	Rural or Urban (RU)	Shelter zip code flag per U.S Rural or Urban designation
	Shelter Size (SS)	Ending Inventory of Canine or Felines
Dependent	Live Release Rate (LRR)	Calculated by total live outcomes divided by total outcomes
Control		
	Species- Cat or Dog	Cat/Feline or Dog/Canine

Shelter type shows RP as the dominant type at 54% of all types in the population. GAS shelters reside in zip codes with poverty rates 200–300 basis points above other shelter types (Table 4).

TABLE 4
Unit of Analysis Demographics for 3,742 Population

| Shelter Type Category	Shelter Type #/%	Mix Dog / Cat Average*	% Poverty Rate Average
Government Animal Services	13%	81 / 80	13%
Rescue, Private	54%	23 / 26	10%
Shelter Government Contract	11%	76 / 118	11%
Shelter, Private	20%	46 / 78	11%

FIGURE 3
Average Poverty for Shelter Zip Codes by State
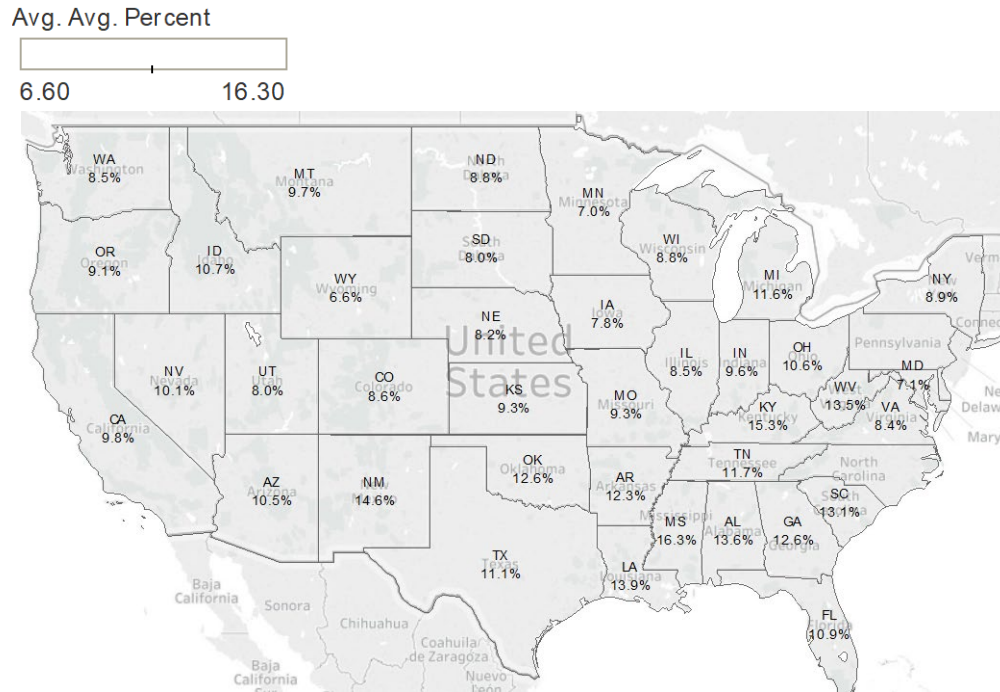
Rural and Urban Shelter Population Mix

The shelter population spans the United States, with 69% of our unit of analysis population residing in urban zip codes (Figure 2). A sample of 1579 was selected and tested for urban and rural shelters for canines and felines. I first created a dummy variable with all urban shelters being assigned a 1 and all rural shelters getting a 0.

FIGURE 4
Rural and Urban % Shelter Mix With Poverty
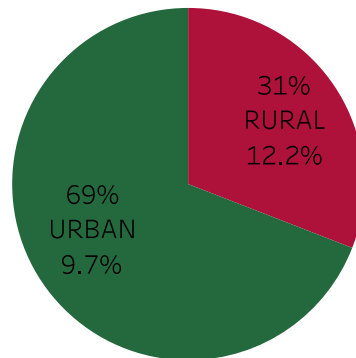
STATISTICAL ANALYSIS

Data Screening

Data were analyzed using SPSS. Given a unit of analysis of pet shelters within the U.S., I collected self-reported shelter actions across inflow and outcomes over five years. There were no missing values. Control variables showed no outliers. The data set was purchased from Shelter Animals Count (SAC). Data represents intake and outcome activity for Cats and Dogs from 2012 to 2019. Variables selected have been averaged to account for seasonal monthly volatility. Responses were examined for normality, skewness, and kurtosis. Sample data collected were continuous and, as expected, displayed non-normality with a measure of skewness and kurtosis. Data was treated using a two-step technique described in (Templeton, 2011). Templeton's instructions follow;

Step (1) Percentile Rank = 1 – [Rank(Xi) / n] Where, Rank(Xi) = rank of value Xi and n = sample size.

Step (2) $p = \mu + 2^{1/2} \sigma \, erf^{-1}(-1+2Pr)$. Where,

p= z-score resulting from Step 2
μ= mean of p (recommendation is 0 for standardized z-scores)

σ= standard deviation of p (recommendation is 1 for standardized z-scores)

erf $^{-1}$ = inverse error function

Pr = probability that is the result of Step 1 (Abramowitz & Stegun, 1964)

The results are shown in Table 5. Measures of skewness and kurtosis never exceeded 2.0 (Kim, 2013). Data population was examined for missing values for the variables of interest. There were 684 shelters with an average ending feline inventory of less than or equal to zero. I eliminated these shelters from all feline tests. I did the exact same assessment of zero average counts of ending canines and excluded those shelters from any canine statistical models.

TABLE 5
Descriptive Statistics

Descriptive Statistics

	Range	M	SD	Skewness	Kurtosis
POV	7.44	-0.10	1.00	-.039	0.048
LRRCanine	4.75	-0.29	135	-1.53	1.68
LRR Feline	4.85	-0.59	1.75	-1.02	-.523
Canine SS	7.44	-.004	1.00	-.040	.064
Feline SS	7.43	-.006	1.00	-.083	.205
TI Canine	7.44	-0.89	2.09	-.451	-1.46
TI Feline	7.44	-1.27	2.25	-.073	-1.80
Feline N = 2895 Canine N = 3325					

The presence of multicollinearity was tested using SPSS for the variables of interest. Multicollinearity was not detected. Variance Inflation Factors (VIF) showed < 2.

METHODS

SPSS version 27 and hierarchical multiple regression (HMR) or hierarchical linear modeling (HLM) were used to assess the effects of POV, RU, SS, ST, and TI on LRR after controlling for species. Shelters with less than zero end-of-month count of average Felines or Canines were excluded from the model. This resulted in 2,874 shelters in our sample for Canines. The Feline sample, filtered identically, resulted in 2,882 shelters. HLM was run for canine and feline. Dummy variables were created for Shelter Type and rural or urban shelter. Variables were introduced over five models or blocks; (1) POV, (2) RU, (3) SS, (4) ST, and (5) TI. The method selection was left at the default setting of "Enter." The USDA Economic Research Service posts data sets that offer zip code-level coding that designates rural and urban classifications. I appended this data to the shelter data by zip codes.

RESULTS

Prior to conducting a hierarchical multiple regression, the relevant assumptions of this statistical analysis were tested. A sample size of 2,874 canine and 2,882 feline shelters were deemed adequate, given five independent variables to be included in the analysis (Tabachnick & Fidell, 2001).

Canine

The overall model predicted 6.2% of variance in LRR for canines. ANOVA results support statistical significance at $p < .001$. POV predicted 1.10% of the variance with LRR at $p < .001$. RU showed 0% impact on LRR variance at $p = .575$. SS showed a 2.2% impact on LRR variance with $p < .001$. ST showed a 0.6% impact on LRR variance with $p < .001$. TI showed a 2.6% impact on LRR variance at $< .001$ significance. A unit increase in POV negatively affects LRR by 7.6% standard deviation. RU did not statistically significantly

affect LRR. Increase by one unit of SS negatively impacts LRR by 25.4% of a standard

deviation. Private Rescue compared to Gov't Animal Shelters showed a 24.6% higher

standard deviation for LRR with statistical significance, p < .001. Government contract

shelters showed an 18% standard deviation higher LRR versus Gov't Animal Shelters.

Private Shelters effect on LRR were 19% higher standard deviation for LRR than Gov't

Animal Shelters with statistical significance of p<001. Regression results for Canines are

shown in Table 6.

TABLE 6
**R^2 Change and Beta Influence With Significance: <u>Canine</u> Regression
Analysis on Impact To LRR**

Variable	Cumulative				Standardized		
	R^2	ΔR^2	ΔF	p	B	t	p
Step 1							
POV	.011	.011	31.32	***	-.076	-4.174	***
Step 2							
RU	.011	.000	.31		.004	.199	
Step 3							
SS	.033	.022	64.32	***	-.254	-11.889	***
Step 4							
ST	.038	.006	5.73	**			
Shelter Private					.191	3.255	**
Shelter Gov't Contract					.177	3.683	***
Rescue Private					.246	3.734	***
Step 5							
TI	.065	.026	80.87	***	.190	8.993	***

**p<.01 ***p< .001   n=2874

Feline

The overall model predicted 6.9% of variance in LRR for felines. ANOVA results

support statistical significance at <.001. POV predicted 1.3% of variance with LRR at

p < .001. RU showed zero explanation of the variance in LRR. SS predicted .9% of the variance with LRR with statistical significance, p < .001. Shelter type showed .1% at < .01 statistical significance explanation in LRR change. A unit increase with POV does statistically significantly impact LRR by 7.7% of a standard deviation. Shelter size increase by 1 standard deviation impacts LRR negatively by 20% of a standard deviation. Neither shelter type nor urban or rural shelters statistically significantly impact LRR. TI one standard deviation increase affects LRR by 20% of a standard deviation increase with statistical significance, p < .001. The R^2 change and B coefficients are in Table 7.

TABLE 7
<u>Feline</u> Regression Analysis as Predictors of LRR

Variable	Cumulative				Standardized		
	R^2	$\triangle R^2$	$\triangle F$	p	B	t	p
Step 1							
POV	.013	.013	39.18	***	-.077	-4.238	***
Step 2							
RU	.013	.000	.028	ns	-.001	-.053	ns
Step 3							
SS	.022	.009	26.57	***	-.202	-10.03	***
Step 4							
ST	.024	.001	1.177	ns			
Rescue Private					-.029	-1.06	ns
Shelter Private					.003	.116	ns
Shelter Gov't Contract					-.024	-1.02	ns
Step 5							
TI	.069	.046	140.64	***	.240	11.86	***

**p<.01 ***p< .001   n=2882

ns = not significant

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FIGURE 5
Canine Model

Poverty (POV)

$R^2= 1.1\%$***

Rural or Urban (RU)

$R^2= 0\%$

Shelter Size (SS)
Ending Inventory Canine or Feline

$R^2= 2.2\%$***

Live Release Rate
(LRR) R2= 6.5%***

Shelter Type (ST)

$R^2= 0.6\%$**

Pet transport into
shelter (TI)

$R^2=2.6\%$***

Control
Species

FIGURE 6
Feline Model

Poverty (POV)

$R^2= 1.3$***

Rural or Urban (RU)

$R^2= 0\%$

Shelter Size (SS)
Ending Inventory Canine or Feline

$R^2= .9\%$***

Live Release Rate
(LRR) R2= 6.9%***

Shelter Type (ST)

$R^2= 0.1\%$ns

Pet transport into
shelter (TI)

$R^2=4.6\%$***

Control
Species

83
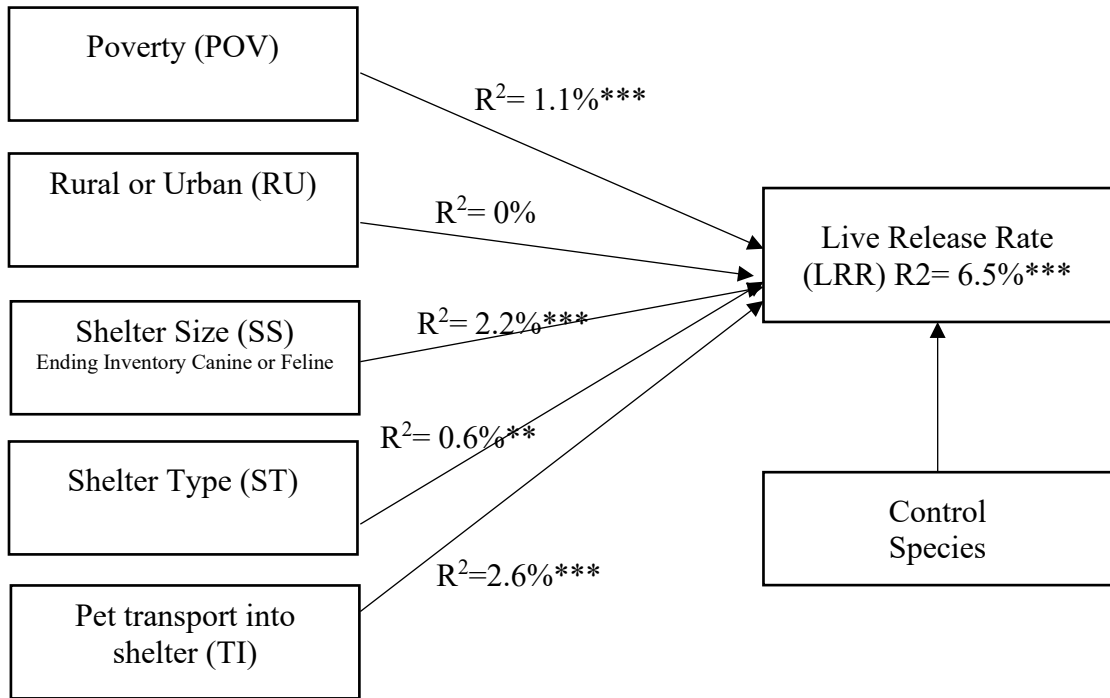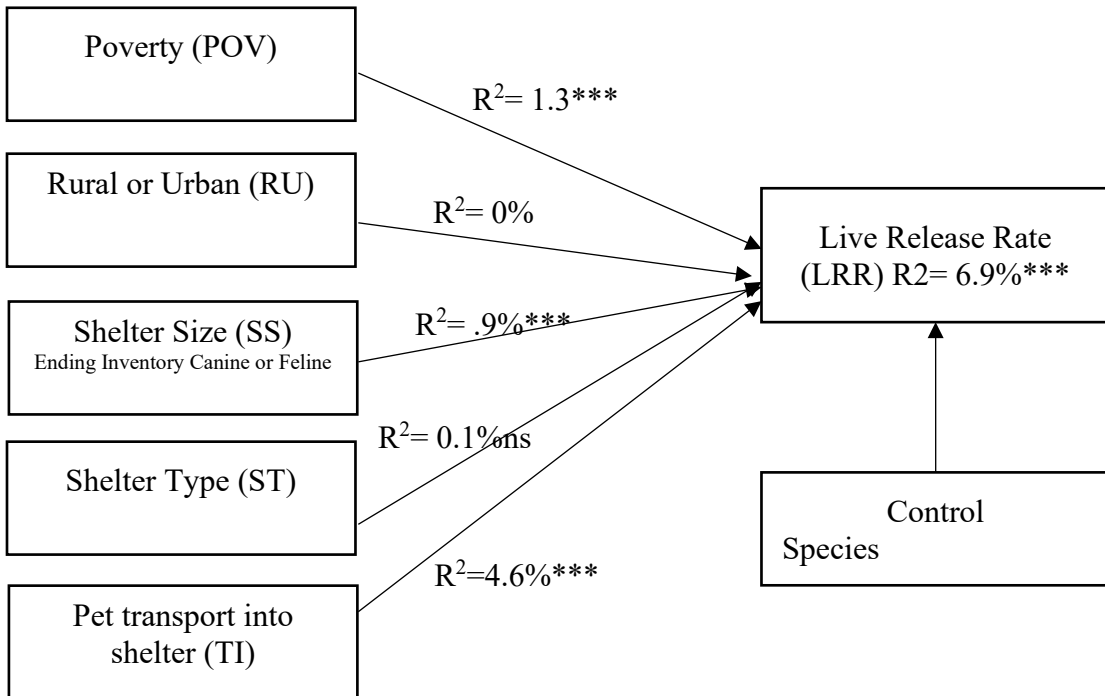
TABLE 8
Direct Relationship Hypotheses

Direct Relationship Hypotheses	Standardized Regression Weight Canine / Feline	Outcome Canine / Feline
H1: POV effect on LRR	-.076*** / -.007***	supported / supported
H2: RU effect on LRR	.004 ns / -.001 ns	ns / ns
H3: SS effect on LRR	-.254*** / -.202***	ns / ns
H4: ST effect on LRR	PR: SGC: PS:	supported
H5: TI effect on LRR	.190*** / .240***	supported / supported
Controls		
Species to LRR		

** p<.01; *** p<.001; ns= not supported

DISCUSSION

POV, RU, SS, ST, and TI were hypothesized to predict LRR while controlling for species. The ANOVA output supported overall model statistical significance with p < .001. POV was a statistically significant predictor of LRR for canines and felines. Shelter Type was tested for Private Shelter, Private Rescue, and Gov't Contract Shelter t relative to a public Gov't Animal Services Shelter. The three private shelter types statistically significantly, P < 0.001, showed better LRR from pet-keeping activities than public Gov't Animal Service Shelter. Felines shared in shelter type explanatory power of the variance in LRR at R^2 change of 13% with p < .01.

SPT for canines and felines effect on LRR was statistically significant, and the hypothesis was supported. Private shelter and rescues are not beholden to municipal rules and municipal stakeholders. Their results can be expected, but conclusions on the best shelter

models cannot be claimed. Theoretical research positioned socioeconomic factors to support a positive impact on shelter pet LRR. Empirical results supported this for certain shelter types and species.

The impact with POV was anticipated. However, shelters serve communities beyond their micro geography, and this introduces greater complexity with sources and uses of funding. Shelter-driven live outcomes exist within socioeconomic impacts of a surrounding community, and that community influences LRR.

RP types reflect less volatility on Tables 3–5 due to the selectivity of companion pets to accept and control over adopter approval. Transport activity differs across shelter types. SGC facilities participate in similar TI and TO while GAS is limited by policy to mainly TO.

Post Hoc

Global Pandemic

The Covid-19 pandemic had interesting impacts on shelter intake and outcomes. Figure 6 shows a full-year comparison of 2019 with 2020. My model used data from 2012 to 2018 to avoid data noise in 2019 and 2020. Anecdotal evidence from pandemic-induced quarantines showed shelter pet inventory at half of the pre-pandemic levels. Media outlets reported high for dog SPA and retail companion pet sales (Kavin, 2020). Media also highlighted the benefits of companion animals on pandemic stressors (May, 2021). Pet supply demand increased with pet supply stores Petco and Chewy.com. Newly acclimated household pets were showered with treats and toys to increase quarantine enjoyment possibilities (Schwartzel, 2021).

Pandemic-inspired new companion pet owners spent 2020 quarantine time to develop human-animal bonds and preferred pet behaviors (Fuchs et al., 2021), which enhanced U.S.

petkeeping outcomes. The frequency and duration of walking and playing increased. I observed that enhancements to human-pet bonds and better pet behaviors led to 23% less owner relinquishment and 27% fewer strays taken in 2020 over 2019 (Figure 7) (Shelter Animals Count, 2020a). Early 2021 revealed many pet owners were moving back to the workplace. Concerns on pet separation anxiety and changes to household routines can upset the gains made with fewer pets in shelters- less relinquishment or expulsion.

FIGURE 7
Covid-19 Impact Dashboard
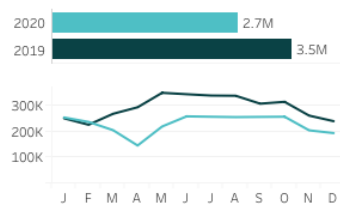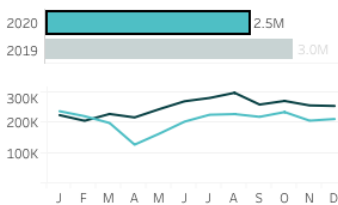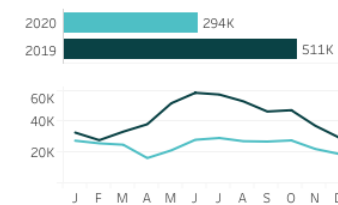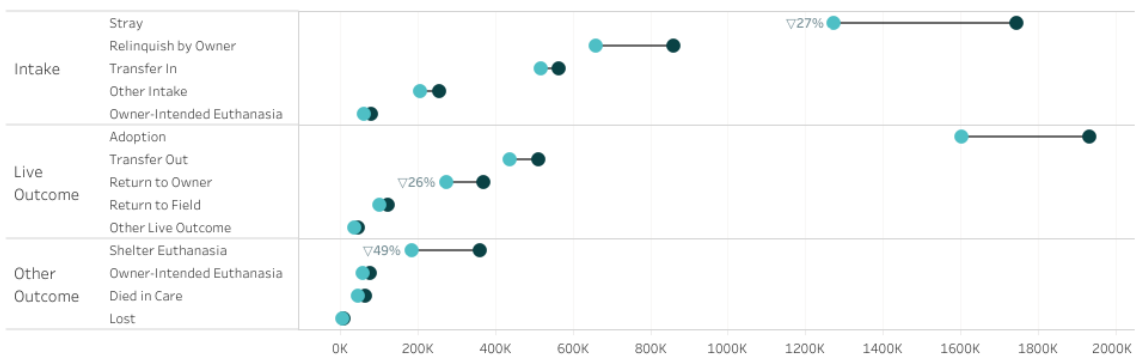
IMPLICATIONS FOR FUTURE RESEARCH

Economic forces with human family units, and their bonds with pets, offer theoretical views, and we found some expected empirical support. POV and shelter LRR show complexity across economic and human constructs. Although post hoc analysis with NFHH, rural, and urban showed greater predictive power or complexity with LRR, a more profound research need emerges on human-pet bond understanding. Winston Churchill said, "never let a good crisis go to waste," and the research into companion pets and the Covid-19 pandemic will not disappoint. Research into post-pandemic shelter pet populations should continue. Simultaneous factors requiring attention include research into more socioeconomic factors and pet keeping and the core or beginning factors that result in unwanted and eventual sheltered pets. Further research should focus on pet fostering and the effects on adoption efficacy.

Reasons for euthanasia beyond physical space limits should be explored to understand behavioral reasons: pet abandonment, expulsion, and relinquishment. Beyond pet behavior, familial fractures leading to pets in shelters offer research opportunities into human reasons for shelter pets. The paradox on benefits to a family and choices to abandon, relinquish, or abuse a companion pet beckon inquire.

LIMITATIONS

The major limitation of this work was likely the formative construct of fostering. I took steps toward integrating economic and social constructs into practical shelter actions. However, qualitative work on foster efficacy is not reliably measured. Measurement of length and frequency of fostering is likely available but not currently collected by national

self-report databases. My study focused on the boundaries of zip codes that contain shelters. This left out many influences and support outside any zip code.

My qualitative study found dyads of municipal shelter and private nonprofit shelter collaboration- SPT actions were frequent, and mutual respect was present. Transferred pets are reported as a live outcome, but this is penultimate as the destination shelter outcome could alter ultimate LRR. LRR studies that link shelter transfers and outcomes can improve accuracy. Finally, shelter type mix for rural and urban shelters are different and limits the statistical comparability of LRR.

CONCLUSION

Shelter type matters in pursuits for > 90% LRR. Specifically, hybrid shelters show the most predictive power for LRR. Hybrid shelters can benefit from greater autonomy while still supporting municipal safety and health requirements. Hybrid shelters exist in the liminal space between government-funded and controlled and nonprofit donor-funded. Ethical decision models shift from duty-centric to a blend of virtue and consequentialist. Hybrid shelters exercise pet transport in both directions.

Pandemic-induced quarantine revealed significant decreases with shelter pet inflow and some increase in shelter pet adoptions. Pet relinquishment diminished in tandem with increased time invested in petkeeping, pet enrichment, dog walk frequency, and resultant human-pet bonding. July 2021 news cited increased shelter pet populations as pet owners returned to pre-pandemic work routines and relinquished more pets due to unwanted behaviors.

Shelter pet transport actions continue beckoning for a national transport model concomitant with connecting national technology platforms. This path will reduce AWO frictions and connect the national supply and demand of sheltered companion pets.

APPENDIX A
Construct Definition Table

Construct/ Dimension	Definition	Items	Source
Live Release Rate	Live outcomes / Total outcomes	Live outcomes: SPAs, Return to Owner, Transports	SAC data matrix
		1.	
Euthanize Rate	Non-Living Outcomes / Total outcomes	2.	
		3.	
	Opens possibility for mutual goal obtainment via collaboration.	1. Shelter partners engage often regardless of need.	(Gazley & Brudney, 2007; Weiss et al., 2013)
	Collaboration amongst shelter practitioners and volunteers.		
	Collaboration between two shelters		
	Collaboration amongst new third parties (animal transport)		
Agency	Contractual use of third parties and some contractual engagement of fosterers/volunteers		(Gunter et al., 2019; Wagman, 2016)
Shelter Animals Count Basic Data Matrix			
This basic matrix was designed to serve as a tool for basic data collection. It is a simple matrix containing what many (including Asilomar, ASPCA, National Federation of Humane Societies, American Humane, UC Davis, Maddie's Fund, PetSmart Charities, HSUS and Shelter Animals Count) have agreed are the minimum data points			
This basic matrix was designed to serve as a tool for data collection. It is a simple matrix containing what many have agreed are the minimum data points an organization should consider gathering. By agreeing to this basic matrix - we hope organizations will gather AT LEAST this data, or if an organization already gathers a great deal of data, that they will consider rolling up their data into this format to help facilitate (if individual agencies are interested) data collection at a local, regional or national level, which would allow participating agencies to benchmark their work against similar agencies around their region or the nation. This matrix does not reflect any preference for the variety of live release rates used in animal sheltering and welfare. Most rates, other than full Asilomar which requires a conditions matrix, should be able to be calculated from the data points included			
Species	Cat or Dog/ Adult or Up to 5 months	1. Beginning Balance/# each month	
Live Intake	2. **Stray or At Large -** stated to be unowned or free-roaming. 3. **Owner Relinquish -** all returned SPAs	All items are self-reported by the participating agency	(Shelter Animals Count, 2020b)

	4. **Owner Intended Euthanasia** - Limited to this definition: Admission of pets whose owner brought the pet to the shelter with the INTENT of requesting euthanasia. 5. **Transferred in from other agency** - Limited to this definition: Admission of pets whose owner brought the pet to the shelter with the INTENT of requesting euthanasia. 6. **Other Intakes -** Impounds for cruelty cases & protective custody. Also, pets born while in care, and other types of admission not captured above.		
Outcome	LIVE 1. **SPA** - Final SPAs only, having permanently left the agency's possession. For example, it does NOT include animals placed in foster care or on overnight 'trial' stays. 2. **Returned to owner** - Stray or Owner Relinquished animals returned to their owner. 3. **Transferred to another agency** - Transferred out of the agency's possession to another entity. 4. **Returned to field -** Animals included in intake, altered and returned to stray capture location to be released (this is not TNR, see TNR/ RTF in definitions). 5. **Other live outcome -** Barn cat programs, etc. **OTHER** 1. **Died in Care -** Animals who die, unassisted, while sheltered. 2. **Lost in Care** - Animals whose outcome is unknown (may have escaped the shelter, outcome was not recorded and unknown). 3. **Shelter Euthanasia** - All euthanasia other than that performed by the definition below as owner intended euthanasia. 4. **Owner Intended Euthanasia -** Limited to this definition:		

	Euthanasia of pets whose owner brought the pet to the shelter with the INTENT of utilizing euthanasia services.		
Euthanize rate or Live Release rate	The Annual Live Release Rate is calculated by dividing total live outcomes (SPAs, outgoing transfers, and return to owner/guardian) by total outcomes (total live outcomes plus euthanasia not including owner/guardian requested euthanasia or died/lost in shelter/care).		
Beginning Animal Count & Date	Should include animals in shelter and animals admitted but currently in foster care or other offsite facility.		
Ending Animal Count & Date	Should include animals in shelter and animals admitted but currently in foster care or other offsite facility.		
Poverty	Percent of Impoverished Household by zip code		
Household Makeup	Percent Non-Family Households, Percent of White Households by zip code		

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