- 1 Tag! You're Home! Reunification of Pet Cats with Their Owners
- 2 Using a Community Engagement Approach: A Community Case
- 3 **Report**

5 AM Dalrymple<sup>1</sup>, NE Stively<sup>2</sup>, RE Kreisler<sup>3</sup>

6

- <sup>1</sup>Shelter Veterinary Care Consulting LLC, 841 Worcester St, Suite E-114,
- 8 Natick, MA, USA, amddvm@gmail.com
- 9 <sup>2</sup>Loudoun County Animal Services, Leesburg, VA, USA
- 10 <sup>3</sup>Midwestern University College of Veterinary Medicine, Glendale, AZ, USA

11

#### 12 **Abstract**

- 13 Return to Owner (RTO) rates for cats are reported as low as 2%. However,
- 14 the percentage of recovered pet cats found within their own neighborhoods
- 15 ranges from 66-75%. Loudoun County Animal Services, an open-admission
- shelter with an annual intake of 2,300 animals (46% cats), developed the
- 17 Tag! You're Home! Program (TYHP). TYHP encourages finders to return un-
- 18 microchipped healthy social adult cats to their neighborhoods with a collar
- 19 containing the shelter's contact information. Finders can return them for
- 20 intake after five days. Between 7/1/2022 and 12/31/2023, 476 stray cats
- 21 were admitted, 253 (53%) of which were adults. Of 32 cats enrolled in TYHP
- 22 as an alternative to intake, 31% were confirmed RTO via owner contact,
- 23 31% did not require additional services, 19% were brought back for intake,

24 13% were kept by finders, and 6% were rehomed by finders. For the cats 25 admitted, the adult RTO rate was 28%. Cats RTOed through the shelter were found a median of 0.27km (IQR 0.07-2.5), or approximately 2.7 city 26 27 blocks, from home. Over 80% of TYHP cats did not require shelter intake, with a 31% confirmed RTO rate. The TYHP reduced intake of adult stray 28 cats by 9% while maintaining similar RTO rates. 29 30 31 **Keywords** lost cat; stray cat; microchip; identification; managed intake; 32 33 Return to Owner; community engagement, Return to Home 34 35

#### Introduction

36 Reunification of lost pets with their owners is a key function of United States animal shelters, but reported Return to Owner (RTO) rates are as low 37 as 1.8%-7% for cats. a,1,2 Few owners contact animal shelters about their 38 39 missing pet cats, and those that do tend to wait 3 days or more. Many jurisdictions do not have mandated stray hold periods for cats, b so this delay 40 in reunification increases the risk of an outcome other than the desired 41 42 reunification of the pet cats with their families. In other communities, these 43 cats may linger in the shelter environment experiencing high stress and increased risk of disease.3,4 44

Surveys of United States pet owners reported that lost pet cats were most commonly recovered by searching within their own neighborhoods (7-59%) or by simply waiting for them to come home (30-66%). 1,5 Given these circumstances, free-roaming pet cats without any identification seem more likely to find their way home within their own neighborhoods than by intake to the shelter, and shelters may better serve their communities by leaving healthy cats in place and helping finders reunite them with their owners.<sup>6</sup> This approach could operate in concert with other options for healthy freeroaming cats, such as trap-neuter-return (TNR) programs in jurisdictions where such programs are legal. The purpose of this community case study was to measure the impact of a program designed to reunite pet cats with their owners by returning them to their neighborhoods without intake. The primary research objective was to assess the RTO rate for the new program compared to the RTO rate after intake to the shelter (traditional RTO), with the secondary objective of mapping the distance lost pet cats were found from their homes.

62

63

65

66

67

68

61

46

47

48

49

50

51

52

53

54

55

56

57

58

59

60

# **Background**

64 The shelter

Loudoun County Animal Services (LCAS) is a municipal open-admission animal shelter with an annual (2023 data) intake of 2,300 animals (46% cats). Loudoun County is located in the metropolitan Washington DC area and the Department of Animal Services is the sole provider of public animal

69	sheltering and humane law enforcement services for approximately 430,000
70	residents. In 2021, LCAS relocated from an aging animal shelter in rural
71	Waterford, Virginia to a newly constructed 23,000-square-foot facility in
72	centrally-located Leesburg, Virginia. LCAS is staffed by 48 full-time
73	employees, including 13 sworn humane law enforcement officers, and two
74	veterinarians. The veterinary team primarily serves in-shelter animals, but
75	also hosts monthly low-cost clinics for public-owned animals for
76	vaccinations, and spay/neuter for outdoor cats. While the agency is able to
77	provide sterilization services for individual owners of outdoor cats and
78	rescues working to TNR these cats, they are unable to offer TNR directly,
79	per the Virginia Attorney General's 2013 opinion,8 which indicates that TNR
80	performed by a public animal shelter constitutes unlawful abandonment.
81	
82	The community
83	Loudoun County routinely tops national "highest income" lists due in part to
84	technology, data, government, and consulting professions, and features a
85	combination of urban and rural landscapes over 521 square miles. Nearly
86	65% of residents hold a bachelor's degree or higher, and approximately
87	36% speak a language other than English at home. $^{\rm c}$ The community is
88	supportive of and engaged with LCAS and other local humane groups.
89	

Traditional RTO efforts

Stray animals, including cats, are held for five days, per County ordinance.9 91 92 After this stray hold, they are dispositioned, either through adoption, transfer to partner agency, or euthanasia. While reclaim fees are listed (\$35) 93 94 for impound, \$10 per day), the staff will routinely work to assist pet owners to ensure that fees are not a barrier to sterilization or reclaim. LCAS has 95 historically utilized an aggressive approach to reunifying lost cats and dogs 96 97 with owners, including social media searches, networking with local lost pet advocates, immediately posting photos of found pets on the website, and 98 99 hanging signs in the area where an animal was found. Animal control 100 officers scan for microchips in the field and, if possible, reunite animals with 101 their owners without physical intake to the shelter. In addition, LCAS works 102 proactively to promote high rates of dog licensing, free microchipping for county residents, free microchipping on reclaim or closure of a lost pet 103 104 report and has a longstanding message to the community that promotes calling the agency as soon as a pet is lost. 105

106

107

# Tag!You're Home! Program

LCAS discourages shelter intake of healthy free-roaming adult cats in recognition that lost cats are less frequently reunited with their owners through the shelter than alternatives such as returning home on their own. There is no mandate to intake free-roaming cats. However, finders of freeroaming cats often believe that the best way to help social, healthy, freeroaming cats is to bring them to the shelter, and are frequently dissatisfied with the recommendation to simply return the cats to where they were found. LCAS implemented the Tag!You're Home! Program (TYHP) in July 2022 to provide greater support to finders of free-roaming cats while preventing the intake of cats that do not require assistance.

118

114

115

116

117

Front desk staff evaluate cats presented by finders for inclusion in the 119 120 TYHP. Cats must be social, as defined by the finder's ability to handle them, 121 over 6 months, healthy, not visibly pregnant, without a registered 122 microchip, and not found in an unsafe environment. Finders who consent to 123 TYHP enrollment are advised to place the cat back where it was found and not provide food. Finders are offered flyers to post in the neighborhood 124 125 and/or a yard sign with the shelter's contact information. If the cat is still present after 5 days and an owner has not called the shelter, the finder can 126 127 bring the cat back for intake. Cats enrolled in the TYHP are photographed, profiled as "found" in Chameleon with the found address, if provided, and 128 collared with a breakaway collar<sup>d</sup> (Supplementary material 1). The collar 129 buckle has the intake number and a bracket stating "Am I your cat? If so, 130 131 call..." with a text-enabled cell phone number provided. Staff use a series of 132 public-friendly flowcharts in English and Spanish, and pop-up guidance in 133 the shelter database to provide consistent directions to finders. Program costs include the collars (approximately \$15 per cat), and printing costs for 134 135 posters and yard signs (from \$3 to \$30 per cat.)

#### Methods

Records of cat intakes with an intake type of stray between 1/1/2016 and 12/31/2023 were exported from the shelter's database (Chameleon), with records from 7/1/2022 through 12/30/2023 constituting the TYHP study period. Cats with outcome or intake subtypes that could not include lost cats or were unable to indicate an outcome of RTO were excluded. Specific exclusion factors included outcome subtype of disposal or died enroute to shelter and intake subtypes of abandonment, eviction, and community services (such as holds for victims of domestic violence).

The records included ID, intake date, intake subtype, outcome date, outcome subtype, estimated date of birth (DOB), sex, neuter status, Asilomar rating, location found address, and the owner's address for outcome type of RTO. Age was calculated by subtracting the date of birth from the intake date, and length of stay (LOS) by subtracting the intake date from the outcome date. Adult cats were defined as cats >6 months of age or missing a DOB. The traditional RTO rate was calculated by dividing the number of intakes with an outcome type of RTO by the number of intakes that could potentially have an outcome of RTO. RTO via TYHP was defined as an owner contacting the shelter to confirm ownership and the TYHP RTO rate the number of enrolled cats with an outcome of RTO divided by the number of cats enrolled in the TYHP.

#### 160 Statistical methods

Descriptive statistics were used to summarize the shelter data, with the median and interquartile range (IQR), reported as (Q1, Q3) to describe the skew of the data. Intake and outcome addresses were geocoded using 163 Geocodio. Only addresses with accuracy of rooftop (a specific address), 164 nearest rooftop match, range interpolation (specific address between two 165 166 addresses), or intersection were analyzed. Addresses that did not resolve with satisfactory accuracy with Geocodio but appeared to be in a legitimate 167 format had the longitude and latitude determined via Google Maps. 168 Geocoded data were analyzed using Tableau 2024.1 to generate maps and calculate the Euclidean distance from found to home address. 170

171

172

169

161

162

#### Results

173 Study period 7/1/2022 and 12/31/2023

Between 7/1/2022 and 12/31/2023, there were 1,584 total intakes of cats to 174 175 the shelter, 500 of which had an intake type of stray. Five intakes were 176 excluded based on outcome type and 19 based on intake subtype, for a total 177 of 476 intakes with a potential outcome of RTO. Two cats had two intake 178 records each during the study period, resulting in 474 unique cats for the 476 intakes. Of these 476 cat intakes, there were 109 with an intake 179 180 subtype of field, 365 over the counter, and 2 unspecified. Slightly over half (53%) were adults (253/476), including 9 that did not have a DOB specified. 181 Adults had a median age of 30 months (IQR 12 to 60), median LOS of 8 days 182

(IQR 1 to 15), and 34% (86/253) had an Asilomar status of healthy. Forty adult intakes had an Asilomar status other than healthy for behavioral reasons, which included fearful (14), feral cat >8 weeks (22), high-arousal (3), and reactive to same species (1). There were 15 intakes assigned an Asilomar status other than healthy due to geriatric age.

188

189

183

184

185

186

187

#### Traditional RTO outcomes

Of the 476 stray cat intakes with the potential for an outcome of RTO, 79 190 191 (17%) had an outcome of RTO (Table 1). Of these 79 intakes, 76 (96%) were 192 adults and 3 (4%) were juveniles. For the subset of adult cat intakes, 30% (76/253) had an outcome of RTO. When considering just healthy adult cats, 193 194 27% (23/86) had an outcome of RTO. The most common outcome subtypes (Table 2) for cats RTOed through the shelter were owner called/visited 195 196 (22%), microchip (32%), or microchip scanned in field (15%). Two cats 197 contributed 2 intakes, with 1 of these cats having an outcome of RTO for 198 both intakes (only one intake had a found address), and the other an outcome of adoption for the first intake and RTO for the second. This 199 200 resulted in 78 unique cats having an outcome of RTO. Of these, 14% (11/78) 201 had a spay/neuter surgery scheduled after being offered the procedure at 202 low or no-cost at the time of owner contact, with 2 being juveniles and 9 being adult. 203

204

205

#### TYHP outcomes

206 There were 32 cats enrolled in the TYHP as an initial alternative to intake, 207 with a median age of 18 months (IQR 12 to 24). Of these 32 cats, 10 (31%; 95%CI 16% to 50%) were RTO, 10 (31%; 95%CI 16% to 50%) did not 208 209 require additional services (not brought back by finder), 6 (19%; 95%CI 7% to 36%) were brought back by the finder after 5 days for intake, 4 (13%; 210 211 95%CI 4% to 29%) were kept by the finder, and 2 (6%; 95%CI 1% to 21%) 212 were rehomed by the finder. Of the 6 cats brought back to the shelter for intake, 1 had an outcome of RTO through the shelter, and 5 had an outcome 213 214 of adoption. LOS for this RTOed cat and the adopted cats was 7 and 8 days 215 (IQR 8 to 10), respectively. Of the 10 cats returned to owner via the TYHP, 9 were already altered, and the intact cat was scheduled for a no-cost 216 217 sterilization surgery through the public clinic, where it also received a microchip. Two previously sterilized cats received a no-cost microchip at 218 219 the walk-in public clinic. Twenty-six cats of the cats enrolled in the TYHP did not require intake, representing 9% (26/279) of potential adult stray cat intake (253 adult stray

220

221 222 223 cat intakes+26 TYHP cats not requiring intake), 5% (26/502) of overall 224 potential stray cat intakes (476 stray cat intakes +26), and 23% of the 112 225 potential intakes of healthy adult cats (86 healthy adult stray cat intakes+26). The 32 cats enrolled in the TYHP would have accounted for 226 227 28% of healthy adult cat intake had they been intaked (32/(32 + 86)).

228

229 Period 2016 through 2023 230 There were 7,763 feline intakes between 2016 and 2023, 2,775 of which had an intake type of stray. Of these, 112 were excluded, leaving 2,663 231 232 stray cat intakes, 322 of which had an outcome type of RTO. 233 234 Distance from intake address to home address Of the 322 included stray cat intakes, 310 had a home address that was 235 accurate to rooftop (301), range interpolation (5), nearest rooftop match (1), 236 237 or resolved using Google Maps (3). For location found addresses, 208 were 238 accurate to rooftop (199), range interpolation (3), nearest rooftop (2), intersection, or resolved using Google Maps (3). There were 198 records 239 240 with accurate locations for both home and found address, representing 61% of the 322 stray cat intakes. Cats RTOed through traditional RTO methods 241 242 were found a median of 0.27 km (IQR 0.07-2.5; range 0-2,275), or 243 approximately 2.7 city blocks, from home (Figure 1). The distance between 244 the found and home address was not different by outcome subtype (Table 3), P = 0.878. Four cats had a home address in another state. The 50 cats 245 246 with accurate locations during the TYHP study time period were found a median of 0.4 km (IQR 0.06-4.05; range 0-130), or approximately 4 city 247 248 blocks, from the found address. The cat initially enrolled in the TYHP with subsequent intake and outcome of RTO was found 0.08 km from home. 249 250

251 Change in intake and proportion of RTO over time

Between 2016 and 2023, the proportion of stray cats admitted to the shelter with an outcome of RTO was a median of 13% (IQR 12 to 17). The proportion of RTO through traditional means was highest in year 2023 (22%) and third-highest in 2022 (16%), suggesting that the TYHP did not decrease the traditional RTO rate (Figure 2).

# Program feedback

All owners who contacted the shelter after discovering the TYHP collar on their cat did so within 3 days and texted rather than phoned. Anecdotally, owners exhibited confusion as to why their cats were collared, but once the program was explained, the response was overwhelmingly positive. One cat had two separate residences claim ownership. No collar injuries were reported.

#### Discussion

The TYHP diverted more than 80% of stray healthy adult cats without intake to the LCAS municipal animal shelter, decreasing shelter intake of adult stray cats by 9% after the program was introduced. Nearly one-third of these cats were confirmed to be successfully reunited with their families. LCAS enjoys an enviable baseline 17% RTO rate for all cats, much higher than the reported current national average of 3%. The nature of cat lifestyles and lack of identification are two factors that may contribute to the generally low RTO rate for cats nationally. 

Cat lifestyles

First, outdoor cats may not be considered lost. Cats' lifestyles include indoor-only, outdoor-only, or a combination of both environments (indoor-outdoor), with each option having attendant risks and benefits. 10 Therefore, pet cats may be seen outdoors along with stray, abandoned, and free-roaming cats. 11 A 2021 survey of North American cat owners showed that 21% allowed their cat uncontrolled outdoor access. 12 LCAS shelter staff educate the public about these differing cat lifestyles and recommend that healthy adult free-roaming cats remain in their neighborhood.

#### Identification

Physical forms of identification such as microchips, collars, and tags can distinguish these pet cats and facilitate their return to home, <sup>2,13,14</sup> but are not commonly provided by cat owners. <sup>1,5,12</sup> Microchips provide reliable and permanent identification if the ownership information is properly registered. <sup>2,14</sup> Scanning in the field is a recommended practice for the quickest reunification of lost pets with their families. <sup>e,f</sup> LCAS actively promotes microchipping pet cats and educates owners about maintaining current contact information. Presumed stray animals are scanned in the field, at intake to shelter, and at the time of microchip implant. Collars are well-retained and tolerated by most cats; <sup>13,14</sup> the risk of serious injury or death is rare and less likely than other hazards of the outdoor cat lifestyle,

such as animal conflicts and traffic accidents. <sup>14-16</sup> No collar injuries were reported during the study period.

#### Distance from home

This study, to the authors' knowledge, is the first to use United States animal shelter RTO data to map lost and found locations for cats. The median distance from home was fairly close by—-less than 3 city blocks—congruent with previously reported distances for lost pet cats internationally (average 50 m) $^{17}$  and for lost pet dogs in Dallas, Texas (70% less than 1 mile.) $^{18}$ 

### Community relations

Given that most cats were found relatively close to home, checking with neighbors would likely be a good first step to finding a pet cat's owner. Posting neighborhood signs has been reported to have the highest success rate of any search method used to find a lost cat. However, the TYHP experience demonstrates that concerned finders often seek help from the animal shelter. Americans do not know their neighbors as well now as they did in the past, <sup>19</sup> which may explain the reticence in approaching their neighbors directly. With programs such as TYHP, the animal shelter can serve as a point of connection to keep animals in an environment where they are safe and cared for, and ensure that pet owners and concerned finders have access to the resources needed to reduce unnecessary shelter 

intakes. In implementing such a program, municipalities should also be mindful of public opposition, potentially from groups or individuals who oppose free-roaming cats on principle. Pre-launch efforts to develop consistent messaging and data-based public information campaigns will likely support the success of the program, even when faced with opposition.

326

327

328

329

330

331

332

333

334

335

336

337

338

339

340

341

342

343

321

322

323

324

325

### Community cat management

TYHP addresses a specific subpopulation of adult cats presented to LCAS, namely healthy, free-roaming, socialized, un-microchipped adult cats with engaged finders. This program operates in concert with the low-cost spay/neuter services for outdoor cats offered to the general public, and to Loudoun-based community cat partner agencies. Due to the legal definition of abandonment in this jurisdiction, 8 LCAS cannot return free-roaming cats to their community after spay/neuter surgery as practiced in trap-neuterreturn programs for community cats in other areas of the United States. Most cats (9/10) returned to owner via TYHP were already sterilized. The return of a free-roaming cat to the outdoors without sterilization first may be controversial from the larger perspective of population control, but for the individual cat that fits the specific TYHP parameters, that risk is outweighed by the benefit of a quick reunification without stressful and unnecessary intake to the shelter. This program allows the animal shelter to discuss spay/neuter and microchipping services with the owner, as LCAS cannot legally sterilize an animal without the owner's permission. The

owner of the single intact cat returned via TYHP brought the cat back to the shelter for sterilization surgery and a microchip.

#### Cost savings

TYHP saved LCAS costs associated with intake, housing, and care of cats, which can range from \$15 to \$80 per day. Even the maximum \$45 expense of involvement in the TYHP costs less than the lowest estimate of \$15/day involved with caring for a cat over the mandated 5-day stray hold period (\$75). Keeping healthy free-roaming cats out of the shelter also reduces overcrowding and the risk of contagious disease, which, at LCAS, costs an average of between \$40 and \$200 per cat to treat, including staff labor. Depending on their mandated stray hold period and shelter metrics, many shelters could realize similar cost savings.

#### Limitations

This is a community case study involving a single shelter with a relatively small intake of cats, located in a relatively small and high socioeconomic status community, that has an unusually high RTO rate for cats. However, given that traditional RTO rates did not decrease as compared to the six years prior to program implementation, the TYHP may serve a different population of cats that may be less likely to be rehomed via traditional RTO methods employed by LCAS which rely heavily on the presence of a microchip and owners who proactively call the shelter. Comparison to years

prior to 2021 is complicated by a change in the physical location of the shelter. The number of finders who were offered enrollment into the program was not tracked, so the acceptability of the program to finders cannot be determined, although given that the 32 TYHP cats would have accounted for 28% of the healthy adult stray cat intake the program may be estimated to be acceptable to nearly a third of finders. The outcome of the 10 cats (31%) that required no further services (no owner contact, no finder followup) is not known. Twenty-four cat intakes with an intake type of stray were excluded on the basis of outcome and intake subtype based on the fact that those cats either could not have had an outcome of RTO or would not include potentially lost cats. This may complicate the comparison of RTO rates between this and other shelters. However, less than 5% of the stray cat intakes were excluded, which would have a negligible effect on RTO rates (for example, the overall RTO rate was 17% with a denominator of 476 and 16% with a denominator of 500). Finally, due largely to incomplete data on found address, only 61% of found to home distances could be determined.

384

385

386

387

388

389

383

367

368

369

370

371

372

373

374

375

376

377

378

379

380

381

382

#### Conclusion

Over 80% of cats enrolled in the TYHP did not require intake to the shelter, and over 30% had a confirmed RTO outcome through the TYHP. While this was very similar to the 30% RTO rate reported during the same period for adult cats with intake to the shelter, the TYHP provided a valuable tool to

390	RTO	cats that do not have registered microchips without reducing RTO
391	rates	through traditional means. Shelter intake of adult stray cats was
392	reduc	ced by 9%. Cats with an outcome of RTO were found very close to
393	home	e, typically less than 3 city blocks.
394		
395	Note	es s
396	a.	2023 Annual Analysis. Published online 2024. Accessed June 18, 2024.
397		https://www.shelteranimalscount.org/sac-releases-2023-annual-
398		analysis
399	b.	State Holding Period Laws for Impounded Animals   Animal Legal &
400		Historical Center. Accessed June 18, 2024.
401		https://www.animallaw.info/topic/state-holding-period-laws-
402		<u>impounded-animals</u>
403	C.	United States Census Bureau, Loudoun County, Virginia. Accessed
404		Aug 22, 2024.
405		https://data.census.gov/profile/Loudoun_County,_Virginia?
406		g=050XX00US51107
407	d.	Custom-made collar, <a href="https://www.etsy.com/shop/yoyofly">https://www.etsy.com/shop/yoyofly</a>
408	e.	Alley Cat Allies, Plan to Scan. Accessed Aug 23, 2024.
409		https://www.alleycat.org/take-action/plan-to-scan/
410	f.	Best Friends Network Partners. Field Return to Home (Owner)
411		Training Playbook. Accessed Aug 23, 2024.

- https://network.bestfriends.org/education/manuals-handbooks-playbooks/field-return-home-owner-training-playbook

  g.
- 415

#### 416 References

417

- 1. Lord LK, Wittum TE, Ferketich AK, Funk JA, Rajala-Schultz PJ. Search and identification methods that owners use to find a lost cat. Published online January 15, 2007. doi:10.2460/javma.230.2.217
- 421 2. Lord LK, Ingwersen W, Gray JL, Wintz DJ. Characterization of animals with
   422 microchips entering animal shelters. Published online July 15, 2009.
   423 doi:10.2460/javma.235.2.160
- 3. Tanaka A, Wagner DC, Kass PH, Hurley KF. Associations among weight loss, stress, and upper respiratory tract infection in shelter cats. *J Am Vet Med Assoc.* 2012;240(5):570-576. doi:10.2460/javma.240.5.570
- 427 4. Dinnage JD, Scarlett JM, Richards JR. Descriptive epidemiology of feline upper respiratory tract disease in an animal shelter. *J Feline Med Surg*. 2009;11(10):816-825. doi:10.1016/j.jfms.2009.03.001
- 5. Weiss E, Slater M, Lord L. Frequency of Lost Dogs and Cats in the United States
  and the Methods Used to Locate Them. *Anim Open Access J MDPI*.
  2012;2(2):301-315. doi:10.3390/ani2020301
- 433 6. Hurley KF, Levy JK. Rethinking the Animal Shelter's Role in Free-Roaming Cat 434 Management. *Front Vet Sci.* 2022;9. doi:10.3389/fvets.2022.847081
- 7. Veterinarians TA of S. The Guidelines for Standards of Care in Animal Shelters:
   Second Edition. *J Shelter Med Community Anim Health*. 2022;1(S1):1-76.
   doi:10.56771/ASVguidelines.2022
- 438 8. Cuccinelli Kenneth T, II, Attorney General. Official advisory opinion in 439 accordance with § 2.2-505 of the Code of Virginia. Published online July 12, 440 2013. https://www.oag.state.va.us/files/Opinions/2013/12-100\_Napier.pdf
- 9. Confinement and Disposition of Stray Animals. Vol 612.16.
   https://codelibrary.amlegal.com/codes/loudouncounty/latest/loudounco\_va/0-0-0-2331#ID 612.16
- 444 10. 2024 AAFP indoor/outdoor lifestyle position statement. *J Feline Med Surg*. 445 2024;26(2):1098612X241227827. doi:10.1177/1098612X241227827
- Halls V, Bessant C. Managing Cat Populations Based on an Understanding of
   Cat Lifestyle and Population Dynamics. J Shelter Med Community Anim Health.
   2023;2(S2). doi:10.56771/jsmcah.v2.58
- Tan SML, Jajou S, Stellato AC, Niel L. Perspectives of Canadian and
   American Cat Owners on Provision of Uncontrolled Outdoor Access for Owned
   Domestic Cats. Front Vet Sci. 2021;8:742245. doi:10.3389/fvets.2021.742245
- 452 13. Weiss E, Slater MR, Lord LK. Retention of provided identification for dogs 453 and cats seen in veterinary clinics and adopted from shelters in Oklahoma City,

- 454 OK, USA. *Prev Vet Med*. 2011;101(3):265-269.
- 455 doi:10.1016/j.prevetmed.2011.05.008
- 456 14. Lord LK, Griffin B, Slater MR, Levy JK. Evaluation of Collars and Microchips for Visual and Permanent Identification of Pet Cats. Published online August 15,
- 458 2010. doi:10.2460/javma.237.4.387
- 459 15. Arhant C, Heizmann V, Schauberger G, Windschnurer I. Risks and benefits of collar use in cats (*Felis catus*); a literature review. *J Vet Behav.* 2022;55-461 56:35-47. doi:10.1016/j.iveb.2022.07.012
- 16. Calver MC, Adams G, Clark W, Pollock KH. Assessing the safety of collars used to attach predation deterrent devices and ID tags to pet cats. *Anim Welf.* 2013;22(1):95-105. doi:10.7120/09627286.22.1.095
- Huang L, Coradini M, Rand J, et al. Search Methods Used to Locate Missing
   Cats and Locations Where Missing Cats Are Found. *Animals*. 2018;8(1):5.
   doi:10.3390/ani8010005
- 468 18. Kremer T. A New Web-Based Tool for RTO-Focused Animal Shelter Data 469 Analysis. *Front Vet Sci.* 2021;8. doi:10.3389/fvets.2021.669428
- 470 19. Parker LD and K. A half-century after 'Mister Rogers' debut, 5 facts about 471 neighbors in the U.S. Pew Research Center. August 15, 2019. Accessed June 18, 472 2024. https://www.pewresearch.org/short-reads/2019/08/15/facts-about-473 neighbors-in-u-s/

475

- 476 Author contributions
- 477 **Aimee Dalrymple:** Conceptualization, Investigation, Supervision,
- 478 Visualization, Writing-original draft, Writing-review and editing; **Nina**
- 479 **Stively:** Conceptualization, Data Curation, Investigation, Project
- 480 administration, Writing-original draft, Writing-review and editing; Rachael
- 481 **Kreisler:** Conceptualization, Data Curation, Formal Analysis, Methodology,
- 482 Investigation, Supervision, Visualization, Writing-original draft, Writing-
- 483 review and editing.

484

485

- Acknowledgments
- 486 The authors would like to thank Loudoun County Animal Services for
- 487 sharing their data and experience in returning cats to home.

488	
489	Conflict of interest and funding
490	The authors declare no potential conflicts of interest.
491	
492	Author notes
493	Previous abstract presentations:
494	1. American Board of Veterinary Practitioners Symposium, New Orleans
495	LA, April 26, 2024.
496	2. The Humane Society of the United States Animal Care Expo, "The
497	Right Outcome for Every Cat: Implementing the Cat Superhighway,"
498	San Antonio TX, May 15, 2024.
499	
500	Previous abstract publication:
501	Dalrymple, A., Stively, N., & Kreisler, R. (2024). Tag! You're Home!
502	Reunification of Pet Cats with their Owners Using a Community
503	Engagement Approach. Journal of Shelter Medicine and Community Animal
504	Health, 3(S1). https://doi.org/10.56771/jsmcah.v3.98
505	
506	Upcoming abstract presentations:
507	1. The Community Cats Podcast, online, Sept 30, 2024.
508	2. American Society for the Prevention of Cruelty to Animals/The
509	Association for Animal Welfare Advancement Research Forum, online
510	Oct 30, 2024.

3. University of Florida Online Shelter Medicine Program Grand Rounds, online, Feb 19, 2025.

514 Tables

	All (n = 476)	Adult (n = 253)	Healthy adult (n = 86)
Adoption	330 (69%)	134 (53%)	61 (71%)
Return to Owner	79 (17%)	76 (30%)	23 (27%)
Transfer	5 (1%)	5 (2%)	2 (2%)
Died	10 (2%)	3 (1%)	
Euthanasia	52 (11%)	35 (14%)	

Table 1 Outcomes for cat intakes with the potential for an outcome of return to owner during the study period of 7/1/2022 and 12/31/2023 for the entire population, subset of adult population and subset of healthy adult population, n (%).

	Juvenile (n = 3)			n = 76)	All (n = 79)	
Found poster						
or sign	0	0%	4	5%	4	5%
Known to staff						
or AC	0	0%	11	14%	11	14%

Lost report	0	0%	3	4%	3	4%
Microchip	1	33%	24	32%	25	32%
Microchip						
(field)	0	0%	12	16%	12	15%
Missing	1	33%	2	3%	3	4%
Other	0	0%	1	1%	1	1%
Owner call or						
visit	1	33%	16	21%	17	22%
Staff research	0	0%	3	4%	3	4%
Total	3		76		79	

Table 2 Outcome subtype for cats with an outcome of return to owner
during the study period of 7/1/2022 and 12/31/2023, including all cats and
the subsets of juvenile and adult cats, n (%).

526	
527	

	n	Medi an	IQ R		Rang e	
External ID	2	0.23			0.04	0.42
Found poster or sign	4	0.16	0.0	10.0 5	0.03	19.94
Known to staff or AC	9	0.00	0.0	9.92	0.00	23.49
Lost report	4	0.56	0.2	2.22	0.11	3.62
Microchip	2 6	0.49	0.1 6	2.1	0.00	148.37
Microchip (field)	1 0	0.30	0.0	2.02	0.01	57.00

Missing	7 2	0.27	0.1	3.35	0.00	1479.0 0
Other	2 0	0.37	0.0	2.15	0.00	74.91
Owner call or visit	4 7	0.27	0.0 5	1.86	0.00	2274.9
Staff research	4	0.22	0.1	0.19	0.06	0.24

Table 3 Distance between found and owner address for outcome subtypes of cat intakes with an outcome type of return to owner.

# 532 Figures

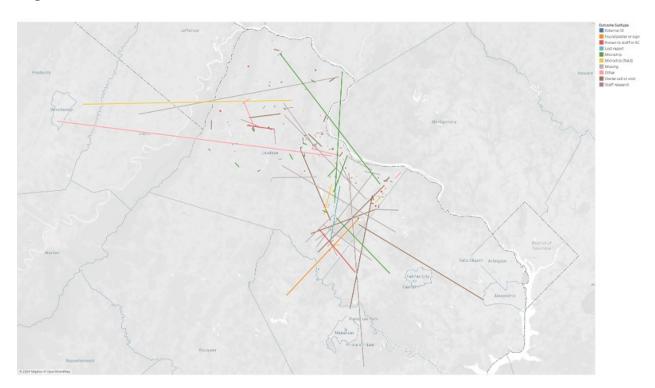


Figure 1 Origin-destination map of paths between found and home address during the period of 2016 to 2023. Six paths over 75 km excluded for readability.

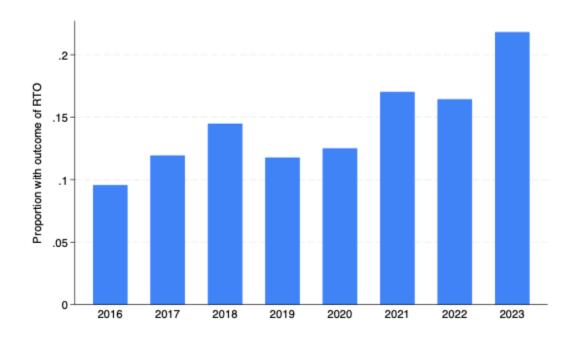


Figure 2 Proportion of intakes with an outcome of return to owner (RTO) from years 2016 to 2023.

# 542 Supplementary File

