

Outcome of Cats Adopted From a Biomedical Research Program

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Adoption of companion animals retired from biomedical research projects can provide an alternative, humane method for their disposition. For more than a decade, the University of Florida College of Veterinary Medicine has allowed investigators to arrange for the adoption of nonhuman animals used in their research. This report directed a survey to caregivers (owners) of 458 cats adopted over a 6-year period. The survey determined (a) retention rate of adopted cats in their original homes, (b) characteristics of adopters and cats, (c) adopters' initial expectations and subsequent experiences with the cats, (d) quality of the human–animal bond, and (e) adopters' perceptions of the adoption process. Completed surveys totaled 275 (60.0% response rate) with a median follow-up interval of 38 months. Of cats surveyed, 91.3% were still in their original homes, 91.0% had seen a veterinarian following adoption, and 80.4% were highly valued family members. The procedures followed to place cats in appropriate homes satisfied the vast majority of adopters surveyed. These results suggest that adoption into private homes is a viable alternative for cats who have completed research studies.

The use of cats for research and teaching purposes is regulated by the U.S. Department of Agriculture (USDA) under the Animal Welfare Act. The Act provides guidelines for the housing and care of cats as well as the procedures involved in the research itself. Oversight of regulatory compliance is usually carried out by Institutional Animal Care and Use Committees (IACUC) with intermittent inspection by the USDA. According to the 2002 Animal Welfare Enforcement Report published by the USDA, there were 24,222 cats used at 1,087 facilities in the United States, 532 of whom were used in facilities in the state of

Florida (USDA, 2002). Although the use of cats in research and teaching is regulated, the disposition of such cats is not, other than to assure that they are disposed of humanely with avoidance of biohazard risks.

Some research protocols, such as invasive studies performed under anesthesia or for collection of multiple tissues, require the sacrifice of cats to reach study objectives. However, the objectives of many studies can be fulfilled without sacrifice, and the outcome of cats completing such projects is largely unknown. Potential outcomes include transfer to other research projects, sacrifice, retirement at the facility, or adoption as companion animals. Assuming IACUC standards of care are met, all of these options are considered acceptable within the scientific community.

Although there are no statistics available for the outcomes of cats used in research, adoption is known to take place at several institutions. At those institutions, adoption generally requires a signed release. However, little else is known about the adoption processes, including (a) the selection of cats made available for adoption, (b) methods for promoting adoption, (c) selection of adoptive homes, and (d) the success of the adoptions.

This report surveyed the outcome of an adoption program for retired research cats at the College of Veterinary Medicine at the University of Florida. Successful adoptions were defined as cats remaining in the original adoptive homes at the time the survey was conducted.

EXPERIMENTAL DESIGN AND METHOD

The University of Florida has a written policy regarding the adoption of research cats, dogs, and horses. As long as adoption complies with University policy, the investigator can decide whether adoption is appropriate and, if so, assumes responsibility for preparation of animals for adoption and location of potential homes. Standard Operating Procedure 36 describes the procedures to be used for adoption of animals used in research (see the Appendix).

Adoption of cats, dogs, horses, and several other species is primarily offered by researchers at the College of Veterinary Medicine, but laboratories at a few other units of the University of Florida also occasionally adopt out research animals. A standard adoption contract required by the University of Florida is completed for all adoptions; otherwise, the procedures for arranging adoptions vary considerably among laboratories.

We maintain a colony of specific-pathogen-free domestic cats for biomedical research intended to enhance feline health and welfare. Studies include developing and validating diagnostic tests; optimizing vaccination protocols; and enhancing large-scale cat anesthesia and sterilization, drug pharmacokinetics, and nonsurgical contraception. At the completion of their projects, most cats are made immediately available for adoption. A few cats are transferred first to other research projects or reside for up to 2 years in colonies of cats who support veterinary

blood banks before being adopted into pet homes. In addition to adopting cats directly to the public, some cats are transferred to local pet rescue organizations for adoption according to the organizations' own policies. No cats are sacrificed either for research purposes or for disposal.

The availability of cats for adoption is advertised on an online pet adoption Web site (www.petfinder.com), in newspaper classified ads, and in fliers placed in veterinary offices and public locations. Adoptable cats are sometimes displayed in the waiting room of a local cat clinic and at cat shows to increase their visibility to the public. Email announcements are regularly sent through local listservs indicating the availability of cats for adoption. Cats are prepared for adoption by (a) physical examination, (b) routine vaccination (panleukopenia, rhinotracheitis, calicivirus, feline leukemia virus [FeLV], rabies), (c) tests for FeLV and feline immunodeficiency virus (FIV), (d) implantation of an identification microchip, (e) application of a flea and heartworm preventative, and (f) surgical sterilization.

Adoption Process

Using the standard University of Florida adoption contract, ownership of the cats is initially transferred from the university to a "virtual" holding organization named Feline Friends. This allows for a more detailed final adoption contract between Feline Friends and the new owner and for the collection of an adoption fee. Potential adopters are given an opportunity to meet with those cats available for adoption and are asked to complete a 17-question application. The application is designed to assess the anticipated lifestyle the cat will have in the home and the expectations of the adopter. It also is to ensure that the adopter has carefully considered the addition of the pet to his or her family. If the applications are approved, adopters sign a contract stating they

1. Are at least 18 years old, are a homeowner, or have written permission from their landlord.
2. Will keep the cat indoors at all times.
3. Will license and maintain the cat according to county regulations.
4. Will provide veterinary care.
5. Will notify Feline Friends should they no longer wish to keep the cat.

Most adopters pay a \$50 adoption fee, but there are occasional promotional discounts to encourage the adoption of multiple cats or to facilitate the adoption of "special needs" cats.

Study Population

From its inception in 1997 through the end of 2003, Feline Friends retired 560 cats from the research colony. Of these, 458 (81.8%) were placed directly into

358 homes as pets, 84 (15%) were transferred to local pet adoption agencies, and 18 (3.2%) were transferred to other research projects or to veterinary blood banks prior to their eventual adoption. The sample population for this study includes the 458 cats adopted by 358 individuals.

Retrospective Evaluation of Adoption Applications

The initial adoption applications and contracts for all 458 cats were reviewed to characterize the demographics, motivations, and expectations of applicants at the time of the adoption. The characteristics of the adopted cats were also summarized. These findings were compared with those who responded to the postadoption follow-up survey (responses) and those who did not respond (nonresponses) to determine if there were any significant differences between the two groups that might bias the conclusions drawn from the survey results.

Prospective Survey of Adoption Outcomes

The 16 survey questions were designed to evaluate the following major topics:

1. The adopter's initial expectations of the cat (four questions).
2. The adopter's initial experiences with the cat (two questions).
3. The current status of the cat (two questions).
4. The strength of the human–animal bond (two questions).
5. The human members of the adopter's household (two questions).
6. The adoption process as a whole (four questions).

To facilitate data analysis, all questions had a list of restricted responses with the exception of two that asked about the adoption process as a whole. When possible, the survey responses were compared to information provided on the initial adoption application.

The adopters were initially contacted to complete the survey by telephone using phone numbers supplied on the adoption application. When the adopter could not be contacted, attempts were made to locate new numbers via directories, the Internet, veterinary offices, colleges, and employers. If adopters could not be reached by phone, surveys were emailed to addresses provided on the application. Adopters contacted by email submitted their responses to a return email address. Lastly, letters containing the survey were mailed to the last known address for adopters who were not reachable by phone or email. A preaddressed, stamped envelope was included for return of the completed survey.

Statistical Analysis

Data collected from the applications were compared for cat adoptions from which surveys were completed (responses) and from adoptions without surveys (nonresponses). Data were also compared for adoptions defined as successful and failed. Differences in proportions were compared using the chi-square test (EpiInfo, Version 3.2.2, www.cdc.gov, Atlanta, GA). Nonparametric data were compared using the Mann–Whitney Rank Sum test (SigmaStat 3.0, SPSS Inc., Chicago). *p* values of less than .05 were considered statistically significant. The proportion of cats remaining in their adoptive homes as a function of time and the mean duration of ownership were described using the Kaplan–Meier survival curve method (SigmaStat 3.0). Data were censored for cats still in the home at the time of the survey.

RESULTS

Characteristics, Motivations, and Expectations of Adopters at the Time of Adoption

Characteristics of adopters were summarized from the adoption applications for all 358 adopters of 458 cats (see Table 1). More cats were adopted by homeowners (49.6%) than renters (31.7%). There was a significantly lower survey response rate for cats adopted by renters (22.5%) compared to cats adopted by homeowners (61.5%). This likely reflects a higher rate of address changes for the renters, making it more difficult to locate them for the survey. Aside from the type of housing in which the adopter lived, there were only minor differences between the group of adopters who completed the survey and those who did not. College students accounted for 19.4% of the adoptions, which is less than their proportion of the county population (24%). Most cats were adopted by families of two adults (59.2%) and no children (67.0%). Adopters learned about the Feline Friends adoption program from a variety of sources, including referrals from the local cat clinic (24.7%), newspaper articles and advertisements (18.6%), friends or family (12.7%), and the College of Veterinary Medicine (5.5%).

The majority of cats (58.5%) were adopted as companions for the adopters or their family members (see Table 2). In most cases (67.9%), the adopter indicated that there was no valid reason to give up a pet. Adopters expected a healthy, well-cared-for cat to live for 10 to 20 years. Estimated annual costs for cat care ranged from less than \$201 to more than \$600, but the most frequent estimation was from \$201 to \$400. Almost half of cats (45.4%) were adopted by families

TABLE 1
 Characteristics of Adopters at the Time of Cat Adoption

<i>Adopter Characteristics</i>		<i>Responses^a</i>		<i>Nonresponses^b</i>		<i>Total^c</i>	
		<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Sex	Male	50	18.2	46	25.1	96	21.0
	Female	222	80.7	134	73.2	356	77.7
	No response	3	1.1	3	1.6	6	1.3
Occupation	Students	48	17.5	41	22.4	89	19.4
	Small business	11	4.0	15	8.2	26	5.7
	Health professionals	18	6.5	14	7.7	32	7.0
	Teachers ^d	23	8.4	5	2.7	28	6.1
	Clerical	24	8.7	15	8.2	39	8.5
	Other	151	54.9	93	50.8	244	53.3
Housing	Homeowners ^d	169	61.5	58	31.7	227	49.6
	Renters ^d	62	22.5	83	45.4	145	31.7
	No response	44	16.0	42	23.0	86	18.8
Adoptive family	One adult	72	26.2	41	22.4	113	24.7
	Two adults	180	65.5	91	49.7	271	59.2
	Three adults ^d	16	5.8	21	11.5	37	8.1
	Other ^d	7	2.5	30	16.4	37	8.1
	No children	185	67.3	122	66.7	307	67.0
	One child	25	9.1	18	9.8	43	9.4
	Two children ^d	45	16.4	15	8.2	60	13.1
How adopters learned of feline friends	Other ^d	20	7.3	28	15.3	48	10.5
	Cat clinic	67	24.4	46	25.1	113	24.7
	Newspaper	45	16.4	40	21.9	85	18.6
	Friends/family ^d	43	15.6	15	8.2	58	12.7
	College of Veterinary Medicine	17	6.2	8	4.4	25	5.5
	Other	103	37.5	74	40.4	177	38.6

^a*n* = 275. ^b*n* = 183. ^c*N* = 458. ^dSignificant differences between responses and nonresponses (*p* < .05).

who stated they would not put a limit on the amount of money required for emergency care.

Characteristics of Cats at the Time of Adoption

A majority of cats (67.9%) were adopted alone. Female (50.4%) and male (49.6%) cats were similarly represented. The vast majority of cats (85.4%) were less than 1 year old at the time of adoption (see Table 3).

Prospective Survey of Adoption Outcomes

The survey was conducted a median of 37 months after the date of adoption (range = 1 to 75 months; see Figure 1). A total of 226 (63.1%) of the 358 adopt-

ers representing 290 (63.3%) of the 458 adopted cats were contacted. Of the 226 adopters contacted, 213 (94.2%) completed the survey accounting for 275 (94.8%) of the 290 cats. Most of the adopters were contacted by phone (164, 72.6%). The remaining adopters were reached by mail (48, 21.2%) or email (14, 6.2%).

Surveys received for the 275 cats were counted as responses, whereas surveys not received for the 183 cats who were not located or whose owners were unwilling or unable to complete the survey were counted as nonresponses. There was no significant difference in the follow-up interval between responses ($Mdn = 35$ months; range = 1 to 74 months) and nonresponses ($Mdn = 38$ months; range = 1 to 75 months, $p = .05$).

TABLE 2
Motivations and Expectations of Adopters at the Time of Cat Adoption

<i>Adopter Motivations and Expectations</i>		<i>Responses^a</i>		<i>Nonresponses^b</i>		<i>Total^c</i>	
		<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Initial reason for adoption	For self/family only	161	58.5	107	58.5	268	58.5
	For self/family/pets	71	25.8	34	18.6	105	22.9
	For other pets only ^d	5	1.8	14	7.7	19	4.1
	Other	38	13.8	28	15.3	66	14.4
Valid reasons to give away a pet	None	195	70.9	116	63.4	311	67.9
	Owners' allergies/illness	13	4.7	8	4.4	21	4.6
	Having a baby ^d	8	2.9	20	10.9	28	6.1
	Found new apartment	7	2.5	5	2.7	12	2.6
Expected life span	Other	52	18.9	34	18.6	86	18.8
	< 10 years	1	0.4	2	1.1	3	0.7
	10 to 15 years	113	41.1	77	42.1	190	41.5
	16 to 20 years	117	42.5	74	40.4	191	41.7
Expected yearly cost	> 20 years	4	1.5	3	1.6	7	1.5
	Other	40	14.5	27	14.8	67	14.6
	< \$201	34	12.4	25	13.7	59	12.9
	\$201 to 400	87	31.6	48	26.2	135	29.5
	\$401 to 600	57	20.7	36	19.7	93	20.3
Amount willing to spend in an emergency	> \$600	29	10.5	23	12.6	52	11.4
	Other	68	24.7	51	27.9	119	26.0
	Any amount	116	42.2	92	50.3	208	45.4
	Depends on prognosis	18	6.5	10	5.5	28	6.1
	< \$201	11	4.0	5	2.7	16	3.5
	\$201 to 400	16	5.8	6	3.3	22	4.8
Amount willing to spend in an emergency	\$401 to 600	22	8.0	9	4.9	31	6.8
	> \$600	34	12.4	23	12.6	57	12.4
	Other	58	21.1	38	20.8	96	21.0

^a $n = 275$. ^b $n = 183$. ^c $N = 458$. ^dSignificant differences between responses and nonresponses ($p < .05$).

TABLE 3
Characteristics of Cats at the Time of Adoption

Cat Characteristics		Responses ^a		Nonresponses ^b		Total ^c	
		n	%	n	%	n	%
No. of cats adopted	1	180	65.5	131	71.6	311	67.9
	2	85	30.9	43	23.5	128	27.9
	3	9	3.3	6	3.3	15	3.3
	4	1	0.4	3	1.6	4	0.9
Sex of cat	Male	135	49.1	92	50.3	227	49.6
	Female	140	50.9	91	49.7	231	50.4
Age of cat	< 1 year	227	82.5	164	89.6	391	85.4
	1 to 3 years	34	12.4	12	6.6	46	10.0
	3 to 5 years	9	3.3	7	3.8	16	3.5
	> 5 years	5	1.8	0	0.0	5	1.1

^an = 275. ^bn = 183. ^cN = 458.

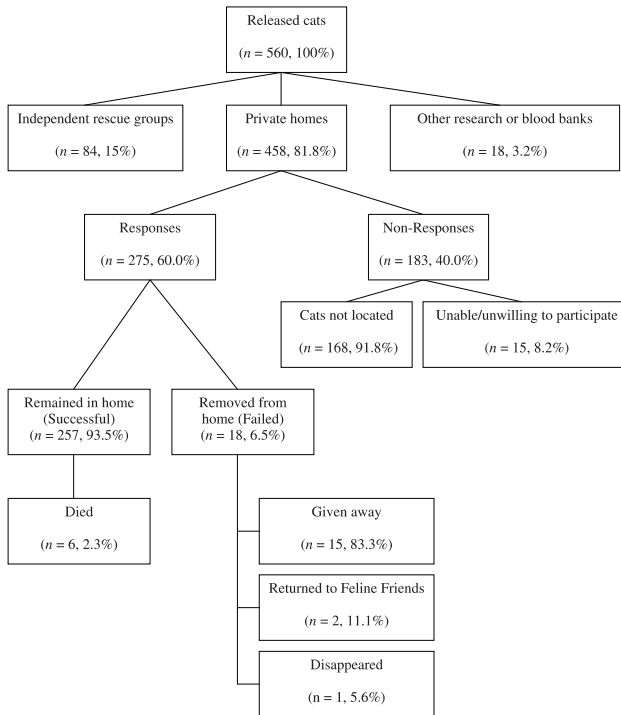
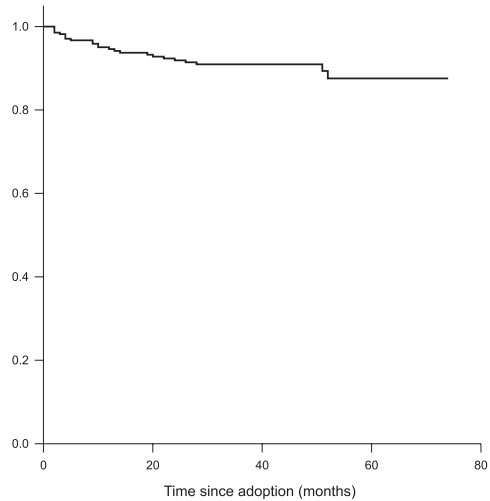


FIGURE 1 Outcome of 560 specific-pathogen-free cats retired from a biomedical research colony.

FIGURE 2 Proportion of cats that remained in their adoptive homes as a function of time since adoption. Of 275 cats available for follow-up, 251 were still in their homes, 17 were relinquished, 1 disappeared, and 6 died. Average time in the home was 67.6 ± 1.3 months ($M \pm SE$; 95% confidence interval = 65.1 to 70.1 months).



A successful adoption was defined as a placement in which the cat had not been relinquished from the home at the time of the survey. Of the 275 cats for whom survey information was available, 251 (91.3%) were still living with their original adopters (see Figure 2). Average time in the home was 67.6 ± 1.3 months ($M \pm SE$; 95% confidence interval = 65.1 to 70.1 months). The owners of 6 of those cats had at some point considered giving away their cat. Of the 24 cats who were not in their original home, 15 were given away, 6 died, 2 were returned to Feline Friends, and 1 disappeared. The 18 cats (6.5% of adoptions) who were relinquished or who disappeared were counted as failed adoptions. The top three reasons cited for relinquishment were not getting along with other pets (4 cats), the owner's development of allergies (3 cats), and inappropriate urination (3 cats). Eight cats (44.4%) were relinquished after remaining in the home for more than 1 year. The postadoption survey indicated that 2 of the relinquished cats were adopted as gifts for others, whereas the initial adoption application stated the cats were desired as companions for the adopters themselves.

Most responses (96.4%) indicated the adopters felt they were adequately educated by Feline Friends to care for their new pet. Among the qualities of the adoption program most appreciated were (a) the ease, speed, convenience, and flexibility of the process; (b) the helpfulness and courtesy of the staff; (c) the fact that the cats were already neutered and vaccinated; and (d) the quality of care the cats received while with Feline Friends. The initial adoption application (length, specific questions, and strictness), having to wait to get the cat, and the cat housing facility were qualities cited as least appreciated.

TABLE 4
 Characteristics of Adopters After Adoption

<i>Adopter Characteristics</i>		<i>Successful^a</i>		<i>Failed^b</i>		<i>Total^c</i>	
		<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Sex	Male	49	19.1	1	5.6	50	18.2
	Female	207	80.5	16	88.9	223	81.1
	No response ^d	1	0.4	1	5.6	2	0.7
Age	< 21 years	32	12.5	4	22.2	36	13.1
	21 to 30 years	62	24.1	4	22.2	66	24.0
	31 to 40 years	49	19.1	5	27.8	54	19.6
	41 to 50 years	60	23.3	3	16.7	63	22.9
	> 50 years	38	14.8	1	5.6	39	14.2
	No response	16	6.2	1	5.6	17	6.2
Education	Elementary	5	1.9	1	5.6	6	2.2
	High school	23	8.9	1	5.6	24	8.7
	College	122	47.5	10	55.6	132	48.0
	Graduate/professional	103	40.1	5	27.8	108	39.3
	Other	4	1.6	1	5.6	5	1.8
Occupation	Students	44	17.1	4	22.2	48	17.4
	Business professionals	21	8.2	2	11.1	23	8.4
	Health professionals ^d	15	5.8	5	27.8	20	7.3
	Teachers	21	8.2	2	11.1	23	8.4
	Clerical	23	8.9	1	5.6	24	8.7
	Other	133	51.8	4	22.2	137	49.8
Housing	Homeowners	155	60.3	15	83.3	170	61.8
	Renters	59	23.0	2	11.1	61	22.2
	No response	43	16.7	1	5.6	44	16.0
Adoptive family	One adult	67	26.1	4	22.2	71	25.8
	Two adults	168	65.4	13	72.2	181	65.8
	Three adults	17	6.6	0	0.0	17	6.2
	Other	5	1.9	1	5.6	6	2.2
	No children	177	68.9	8	44.4	185	67.3
	One child	21	8.2	4	22.2	25	9.1
	Two children	42	16.3	3	16.7	45	16.4
Other	17	6.6	3	16.7	20	7.3	
How adopters learned of feline friends	Cat clinic	59	23.0	3	16.7	62	22.5
	Newspaper	43	16.7	1	5.6	45	16.4
	Friends/family	41	16.0	4	22.2	45	16.4
	College of Veterinary Medicine	16	6.2	0	0.0	16	5.8
	Other	98	38.1	10	55.6	108	39.3
Adoption location	Cat clinic	98	38.1	9	50.0	107	38.9
	College of Veterinary Medicine	155	60.3	7	38.9	162	58.9
	Cat show ^d	3	1.2	2	11.1	5	1.8
	Other	1	0.4	0	0.0	1	0.4

(continued)

TABLE 4 Continued

<i>Adopter Characteristics</i>		<i>Successful^a</i>		<i>Failed^b</i>		<i>Total^c</i>	
		<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Previous cat owner	Yes	213	82.9	13	72.2	226	82.2
	No	43	16.7	4	22.2	47	17.1
	No response ^d	1	0.4	1	5.6	2	0.7
Other pets at time of adoption	Yes	145	56.4	11	61.1	156	56.7
	No	111	43.2	6	33.3	117	42.5
	No response ^d	1	0.4	1	5.6	2	0.7

^a*n* = 257. ^b*n* = 18. ^c*n* = 275. ^dSignificant differences between successful and failed adoptions (*p* < .05).

Characteristics, Motivations, and Expectations of Adopters After Adoption

Responding adopters indicated that most cats (58.9%) were adopted directly from the College of Veterinary Medicine, followed by the local cat clinic (38.9%) and cat shows or other events (2.2%). Most cats were adopted by people who had previously owned a cat (82.2%), who said that living with their cat was as they had expected (85.5%), and who had other pets at the time of adoption (56.7%; see Table 4). Among those who said living with their cat was not as expected (12%), equal numbers said their cats were either more affectionate or less affectionate than expected. Most cats were described as “family members” (42.9%) or “like a child” (37.5%) (identified as a stronger bond than that of family member).

There were no substantial differences in demographics, motivations, expectations, method of learning about Feline Friends, previous cat ownership, or current ownership of other pets among adopters who participated in successful versus failed adoptions. Health professionals, those who adopted at a cat show, and those who stated that the development of allergies to cats was a valid reason to give up a pet were slightly overrepresented in failed adoptions (see Table 5). Three of the adopters in failed adoptions (16.7%) reported little or no bond with the cat they selected compared with four of the adopters in successful adoptions (1.6%).

Characteristics of Cats After Adoption

Respondents indicated that the largest proportion of cats (49.5%) were selected for adoption because of their personalities, followed by their color (12.4%). Most cats had been to a veterinarian after adoption (91.0%), and the purpose of those visits was usually for vaccinations or well care (66.2%).

TABLE 5
 Motivations and Expectations of Adopters After Adoption

<i>Adopter Motivations and Expectations</i>		<i>Successful^a</i>		<i>Failed^b</i>		<i>Total^c</i>	
		<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Initial reason for adoption	For self/family only	145	56.4	16	88.9	161	58.5
	For self/family/pets	69	26.8	2	11.1	71	25.8
	For other pets only	5	1.9	0	0.0	5	1.8
	Other	38	14.8	0	0.0	38	13.8
Valid reasons to give away a pet	None	183	71.2	12	66.7	195	70.9
	Owners' allergies/illness ^d	11	4.3	3	16.7	14	5.1
	Found new apartment	7	2.7	0	0.0	7	2.5
	Other	56	21.8	3	16.7	59	21.5
Expected life span	< 10 years	1	0.4	0	0.0	1	0.4
	10 to 15 years	101	39.3	9	50.0	110	40.0
	16 to 20 years	112	43.6	7	38.9	119	43.3
	> 20 years	3	1.2	1	5.6	4	1.5
	Other	40	15.6	1	5.6	41	14.9
Expected yearly cost	< \$201	32	12.5	1	5.6	33	12.0
	\$201 to 400	82	31.9	5	27.8	87	31.6
	\$401 to 600	50	19.5	7	38.9	57	20.7
	> \$600	26	10.1	1	5.6	27	9.8
	Other	67	26.1	4	22.2	71	25.8
Amount willing to spend in an emergency	Any amount	108	42.0	9	50.0	117	42.5
	Depends on prognosis	17	6.6	1	5.6	18	6.5
	< \$201	10	3.9	2	11.1	12	4.4
	\$201 to 400	12	4.7	2	11.1	14	5.1
	\$401 to 600	21	8.2	0	0.0	21	7.6
	> \$600	32	12.5	2	11.1	34	12.4
Human-animal bond	Other	57	22.2	2	11.1	59	21.5
	Like a child	100	38.9	3	16.7	103	37.5
	Family member	114	44.4	4	22.2	118	42.9
	Companion	32	12.5	5	27.8	37	13.5
	Little/no bond ^d	4	1.6	3	16.7	7	2.5
	No response ^d	7	2.7	3	16.7	10	3.6
Living with cat was as expected	Yes	220	85.6	15	83.3	235	85.5
	No	31	12.1	2	11.1	33	12.0
	No response	6	2.3	1	5.6	7	2.5

^a*n* = 257, ^b*n* = 18, ^c*n* = 275. ^dSignificant differences between successful and failed adoptions (*p* < .05).

TABLE 6
 Characteristics of Cats After Adoption

<i>Cat Characteristics</i>		<i>Successful^a</i>		<i>Failed^b</i>		<i>Total^c</i>	
		<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>	<i>n</i>	<i>%</i>
Number of cats adopted	1	169	65.8	11	61.1	180	65.5
	2	79	30.7	6	33.3	85	30.9
	3	8	3.1	1	5.6	9	3.3
	4	1	0.4	0	0.0	1	0.4
Sex of cat	Male	129	50.2	6	33.3	135	49.1
	Female	128	49.8	12	66.7	140	30.9
Age of cat	< 1 year	212	82.5	15	83.3	227	82.5
	1 to 3 years	31	12.1	2	11.1	33	12.0
	3 to 5 years	9	3.5	0	0.0	9	3.3
	> 5 years	5	1.9	1	5.6	6	2.2
Reason for choosing particular cat	Personality only	129	50.2	7	38.9	136	49.5
	Color only	32	12.5	2	11.1	34	12.4
	Age only	11	4.3	2	11.1	13	4.7
	Felt sorry for them ^d	4	1.6	2	11.1	6	2.2
	Other	81	31.5	5	27.8	86	31.3
Veterinary care	Provided	236	91.8	14	77.8	250	91.0
	Not provided	19	17.4	3	16.7	22	8.0
	No response ^d	2	0.8	1	5.6	3	1.1
Primary reason for veterinary care	Vaccinations only	74	28.8	8	44.4	82	29.8
	Well visits only	57	22.2	2	11.1	59	21.5
	Vaccinations and well visits	38	14.8	3	16.7	41	14.9
	Other	88	34.2	5	27.8	93	33.8
Declaw status	Declawed	90	35.0	10	55.6	100	36.4
	Intact	166	64.6	7	38.9	173	62.9
	No response ^d	1	0.4	1	5.6	2	0.7
Health problems within first 6 months	Yes	29	11.3	0	0.0	29	10.5
	No	227	88.3	16	88.9	243	88.4
	No response ^d	1	0.4	2	11.1	3	1.1
Behavior problems within first 6 months	Yes	27	10.5	4	22.2	31	11.3
	No	228	88.7	14	77.7	242	88.0
	No response	2	0.8	0	0.0	2	0.7

^a*n* = 257. ^b*n* = 18. ^c*n* = 275. ^dSignificant differences between successful and failed adoptions (*p* < .05).

A total of 100 cats (36.4%) were declawed. Half of those cats were declawed prior to adoption, either to make them better candidates for adoption or at the request of the prospective owner; half were declawed after adoption, including two who were tendonectomized. There was no difference in reported rates of behavior problems or adoption success in cats who were or were not declawed (see Table 6).

Health problems developed within 6 months of adoption in 29 (10.5%) of the cats, the most common of which were (a) allergies to food and other

nonidentified causes (4 cats), (b) parasitism (4 cats), (c) dermatologic lesions (4 cats), (d) feline infectious peritonitis (3 cats), and (e) upper respiratory disease (3 cats). Informed owners adopted three cats with preexisting conditions: One cat was blind, one had hypertrophic cardiomyopathy, and one had nonprogressive generalized ataxia. Behavior problems were reported in 31 cats (11.3%) within 6 months of adoption. The most commonly reported behavior problems in this group were inappropriate urination (11 cats), scratching and biting (8 cats), and antisocial behavior (6 cats).

There were no substantial differences in the characteristics of the cats involved in successful versus failed adoptions. Cats who were adopted out of pity (6 cats) were slightly overrepresented in failed adoptions; however, because this was only a small number of cats, the true impact of this factor is unclear. Although declawed cats comprised a higher percentage of failed adoptions (10 cats, 55.6%) than successful adoptions (90 cats, 35.0%), the difference was not statistically significant.

Although survey responses were available for only 2 cats returned to Feline Friends, a total of 23 cats out of 458 (5.0%) adopted were returned to Feline Friends during the 6-year study period. Most (95.7%) of these cats were adopted out a second time (3 to local rescue groups, 19 to private homes); 1 remained available for adoption at the time of the survey. Six of those returned once were returned a second time, leading to a third adoption. In one case, 2 cats who were returned when the family left the country were readopted by the same family on their return. Almost half of the initial 23 adoptions of cats returned to Feline Friends lasted less than 1 month (11, 47.8%). Seven adoptions (30.4%) lasted between 2 and 12 months, three (13.0%) lasted more than 1 year, one lasted more than 3 years (4.3%), and duration was unknown for one cat. Among the 6 cats returned a second time, duration of the second adoption ranged from a few weeks to 1 year. Reasons given for the return of the cats included (a) inappropriate urination, (b) allergies or illness of the owner, (c) bringing home mice, (d) scratching children, (e) not being sociable, and (f) the owner moving to a new apartment or out of the country.

DISCUSSION

Experts on pet adoption gathered recently in an attempt to more clearly define a successful adoption (Moulton, 2003). Five essential qualities of successful adoptions were specified that focused on the care and lifestyle of the adopted pet. These included (a) matching individual pets and families; (b) providing appropriate veterinary care; (c) meeting the pet's social, behavioral, and companionship needs; and (d) maintaining the pet in a livable environment with appropriate food, water, and shelter. Finally, the fifth essential was that the pet would be respected and valued. The group did not include retention as an indicator of suc-

cess and stated that although a permanent home is ideal, one that results in attrition of the pet does not necessarily represent an unsuccessful adoption.

In the study reported here, cat owners who previously adopted cats retired from research were surveyed to determine the success of the adoption program. The survey examined several of the outcome measures of success suggested earlier, including appropriate matching of cats to families as reflected by retention in the home, provision of veterinary care, and the strength of the human–animal bond. Of the cat adoptions that were surveyed for this report, an overall retention rate of 93.5% was observed; a total of 91.0% of cats had seen a veterinarian following adoption, and 80.4% were considered to be valued as family members or as a child. In this study, relinquishment or disappearance of the cat was characterized as a failed adoption. Because only a few cats (18) were relinquished or disappeared, caution should be used when evaluating the significance of risk factors identified for adoption failure.

The characteristics of pets in failed adoptions have been described in previous studies and show great variation. The highest relinquishment rates were variously found among pets between 5 months and 3 years of age (Salman, New, Scarlett, & Kris, 1998), in cats less than 3 years old (New et al., 2000; New et al., 1999), and in cats less than 6 months old (Patronek, Glickamn, Beck, McCabe, & Ecker, 1996). In contrast, Neidhart and Boyd (2002) found that pets adopted at less than 1 year of age had a lower attrition rate than did older animals. The study reported here did not identify a significant effect of age on risk of relinquishment, but the vast majority of the cats were adopted at less than 1 year of age. The influence of a pet's sex on risk of relinquishment also varies in previous reports. In one study, female cats were more commonly relinquished to shelters than were males (Salman et al., 1998), whereas three other studies found no significant effect of sex on groups of relinquished cats (Patronek et al., 1996; Salman et al., 2000; Scarlett, Salman, New, & Kass, 1999), supporting the findings of this study.

Several owner characteristics have been shown to correlate inconsistently with increased risk of relinquishment of adopted pets. Two studies suggested that cat relinquishers were more likely to be male than female (New et al., 2000; Scarlett et al., 1999), whereas a third study reported that female adopters relinquished more pets than did males, and a fourth study found no association of adopter sex with relinquishment (New et al., 1999; Salman et al., 1998). Similar discrepancies exist in studies that attempt to correlate adopter education level with risk of relinquishment. One study reported that relinquishers were less likely to have a college education (New et al., 1999), whereas another study reported that relinquishers were usually educated past a high school level (New et al., 2000; Salman et al., 1998), and a third study found no association between education level of the adopter and relinquishment of pets (Salman et al., 2000).

Similar variation was found among studies reporting the ages of pet relinquishers (Kass, New, Scarlett, & Salman, 2001; Kidd, Kidd, & George, 1992;

New et al., 2000; New et al., 1999). Patronek et al. (1996) found an association between housing status and rate of relinquishment, with renters having a higher rate of pet relinquishment. In the study reported here, no association of adopter sex, education, age, or housing status with pet relinquishment was found. However, renters were less likely to respond to the survey than were homeowners, so it is possible that any effect of housing type on relinquishment rates was obscured.

The most common reasons for giving up an adopted cat have been more consistent among studies. Behavior problems (especially inappropriate urination and household destruction), aggressiveness toward other pets or people, owner allergies or illness, pet health problems, and moving are invariably among the top reasons cited by relinquishers in most studies (Kass et al., 2001; New et al., 1999; Patronek et al., 1996; Salman et al., 2000; Salman et al., 1998; Scarlett et al., 1999). The adopters in this study indicated similar reasons for relinquishment.

The literature on the effects of declawing on cat behavior and owner satisfaction is mixed (Patronek, 2001), and the proportions of declawed cats in successful versus failed adoptions were not significantly different in the study reported here. Even if the difference were more substantial, it would not be known if declawing contributed to the failed adoptions or if—to begin with—adopters who selected declawed cats were less tolerant adopters.

Although not correlated with adoption success, more than half of the adopters in this study substantially underestimated the yearly cost of caring for a cat. The American Society for the Prevention of Cruelty to Animals (2004) estimated the annual cost of care for a cat to be approximately \$575.

In a small study in which the temperament of research cats and their social interactions with humans were studied prior to adoption, 1 cat out of the 10 adopted was returned for excessive shyness. This cat was extremely shy throughout the 6-month study period in the laboratory, despite extensive positive interactions with the staff (Siegford, Walshaw, Brunner, & Zanella, 2003). Although excessive shyness was not found to be a substantial problem in this study, a handful of adopters cited it as a behavior problem experienced with their cat.

Millions of cats are adopted each year from private individuals, shelters, and rescue groups. Screening procedures and adoption fees span a wide range from nonexistent to extensive interviews, home visits, reference checks, waiting periods, and adoption fees exceeding several hundred dollars. Given this vast experience, it is remarkable that little has been published on what characteristics of pet adoption procedures increase or decrease the likelihood of pet retention (Patronek & Zawistowski, 2002). This is important because too lax a policy may result in poor retention rates and unfortunate outcomes for pets, whereas too strict a policy may unnecessarily exacerbate the imbalance between the number of homeless pets and the number of available homes.

In light of this, there has been increased interest in defining and comparing processes for matching homeless pets with adopting families. Balcom and

Arluke (2001) defined open and traditional adoption processes. Traditional adoption processes, such as that utilized by Feline Friends, tend to place the burden on the applicants to prove they are capable of caring for the new pet. In open adoptions, applications are often replaced by interviews in which objectionable responses are viewed as opportunities for education rather than criteria for denial. At this time, no data compare the outcomes of the two adoption processes. Although the studies reported here and a previous report (Neidhart & Boyd, 2002) begin to shed some light on the rate of adoption success, both studies were limited somewhat by the inability to contact a large percentage of adopters for long-term follow-up. The status of adoptions was known for only 60.0% of cats in this report and only 19.1% of pets in the previous one (Neidhart & Boyd, 2002). Studies involving owner surveys are also limited in that they rely on unverified information supplied by adopters who may hesitate to report problems, especially to the agency that provided the pet.

Although the procedures followed by Feline Friends for placing cats in new homes were typical for many traditional pet adoption programs, the source of the cats was unique. These cats were all retired from veterinary research studies and were not homeless due to abandonment or overpopulation. Certain issues unique to research facilities may pose hurdles for even the most motivated advocates of adoption. In many cases, university administrators are unfamiliar with the adoption option and may be reluctant to endorse policies that draw attention to the controversial use of cats in research. Security, safety, and biocontainment issues may make it difficult to allow visitors, especially children, into research facilities to view cats available for adoption. In addition, once a cat leaves the facility, it may not be possible for the cat to return, particularly if the colony is specific-pathogen-free or barrier raised. This makes it difficult to transport cats to public adoption venues or to take a cat back if the adoption fails. The cost and logistics of preparing cats for adoption, including provision of routine veterinary care and housing per diem fees pending adoption, may be additional barriers.

Many of these hurdles may be avoided by partnership of research institutions with outside cat adoption agencies. In such arrangements, ownership of cats can be transferred from the institution to the adoption agency. The adoption agency may have greater ability to accomplish the following:

1. Prepare cats for adoption.
2. Match cats with appropriate adopters.
3. Allow potential adopters to visit the cats.
4. Provide follow-up support after adoption.
5. Take the cats back if necessary.

Recommended procedures for both direct and indirect adoption of animals used in research have been described in detail (Ake, 1996; Carbone, 1997; Carbone,

Guanzini, & McDonald, 2003; Laboratory Animal Science Association, 2002; Wyrick, 1996).

Institutional policies on adoption of cats vary widely. At one extreme are rules that limit adoption to a few cats individually approved by the IACUC on a case-by-case basis, only approve adopters who are associated with the institution, and prohibit public promotions of adoption. At the other extreme are programs in which cat adoptions are encouraged by institutional policy and are widely promoted via press releases and the Internet.

We polled the 32 North American veterinary colleges and found that 30 institutions permit adoptions of cats and dogs retired from research or teaching. One (Western University) does not use animals for research but reported it would likely permit adoption if it did, and one (Tuskegee University) does not permit adoption under any circumstances. Although the vast majority of veterinary schools permit adoption of retired research cats, the actual percentage of cats made available for adoption is unknown. The process is largely driven by the interest and experience of individual investigators. Adoption of cats at veterinary schools, where research is often conducted by veterinarians for the purpose of improving feline health, appears to be more common than at institutions that study cats as a model for other species or by the commercial human and animal health care industry. One national survey reported that only 20% of IACUCs permitted adoption (Borkowski, Hunter, Field, & Sischo, 1997). However, adoption of cats is formalized at research facilities as diverse as universities without veterinary schools, private research foundations, and commercial enterprises such as a pet cloning company.

Several traditional private animal health foundations specifically discourage terminal research in the studies they fund. In addition, several national animal welfare agencies have recently entered the funding stream for veterinary biomedical research in support of studies that seek to improve the health and welfare of animals, particularly for the development of improved contraception and sterilization technology for cats and dogs. Together, these agencies control a large proportion of the funding available for companion animal health research. As such, they have the opportunity to enhance the welfare of animals by taking into consideration the outcomes of animals used in the research studies they select for funding. Carbone (1997) concluded,

If we defend animal research by claiming that we only use, harm, or kill research animals when necessary, then it follows that we will want to do our best to ensure good lives for those animals whose sacrifice is not required by our science.

Similar sentiments expressed in an editorial from a journal devoted to the use of animals in laboratories suggested that adoption may represent a form of “refinement” included in the USDA mandate to consider alternatives to the use of ani-

mals in laboratories, “including refinements, reductions, and replacements.” The editorial concluded that,

Not only can a program of this type be a huge morale boost for facility employees by allowing some research animals to live out their remaining years with a loving family, but a research animal adoption program can also be a public relations boon for a facility. Facilitating the adoption of dogs, cats, rabbits, and even some farm animals, rather than euthanizing them, is direct proof of an institution’s dedication to the full implementation of the “3 Rs.” (“Adoption: The Unrealized ‘R’?”, 2003, p. 7)

CONCLUSIONS

Of the retired research cats surveyed for this report, 91.3% were still in their original homes, 91.0% had seen a veterinarian following adoption, and 80.4% were considered to be highly valued family members. The vast majority of adopters surveyed were satisfied with the procedures followed to place cats in appropriate homes. These results suggest that adoption into private homes is a viable alternative for cats who have completed research studies.

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APPENDIX
University of Florida Animal Care Services Standard
Operating Procedure 36

Disposition of nonhuman animals used for research following their use is generally by euthanasia. In the case of certain animals who may be desired as companion animals (pets) such as dogs, cats, and horses, disposition by adoption or by return to previous owners will be subject to the following guidelines.

1. A form requesting release of an animal shall be made in writing to Animal Care Services.
2. The request shall be evaluated and approved or rejected by an Animal Care clinical veterinarian, the Director, and the principal investigator.
3. The following criteria are used in evaluating a request for disposition:
 - (a) Given the type of research conducted upon the animal, the release of the animal poses no risk of harm to the community;
 - (b) The animal is healthy, free of infectious or contagious diseases, and not derived by genetic engineering;
 - (c) The animal is no longer needed in current teaching or research programs, or the release of the animal will contribute to the research and teaching programs because of the potential for long-term follow-up;
 - (d) The recipient of the animal has assured the review board that the animal is being acquired as a pet and not for resale or for use in a profit-making venture;
 - (e) The recipient of the animal will provide proper and adequate care and facilities to the animal in its new surroundings; and
 - (f) There is no suggestion, actual or apparent, of any significant monetary gain to the recipient as the result of the acquisition.
4. If a request for release is approved, the clinical veterinarian shall prepare or obtain, prior to releasing the animal, the following documents:
 - (a) A certificate of health by a licensed Veterinarian that the animal is free of infectious or contagious disease and that the animal has received those inoculations required by law to be administered. The costs of the inoculation and examination (including applicable laboratory fees) shall be borne by the recipient or the principal investigator (PI) involved;
 - (b) Dogs and cats must be neutered, and the cost will be borne by the recipient or the PI involved. Neutering the animal will be documented on the health record prior to release;
 - (c) A form signed by the new owner releasing the University of Florida and Animal Care Services from liability for injury or damage caused by the animal; and
 - (d) USDA transfer form with pertinent information regarding new owner must be completed for dogs and cats (and all regulated animals).