

Health and behavior problems in dogs and cats one week and one month after adoption from animal shelters

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Objective—To characterize health and behavior problems in dogs and cats 1 week and 1 month after adoption from animal shelters and identify factors associated with the likelihood that owners of adopted animals would visit a veterinarian.

Design—Cross-sectional study.

Sample Population—2,766 (1 week) and 2,545 (1 month) individuals who had adopted an animal from a shelter.

Procedures—Internet and telephone survey responses were collected 1 week and 1 month after animal adoption.

Results—Overall, 1,361 of 2,624 (51.9%) dogs and cats had health problems 1 week after adoption, and 239 of 2,312 (10.3%) had a health problem 1 month after adoption. The most common health problem for dogs and cats was respiratory tract disease. A total of 1,630 of 2,689 (60.6%) respondents had taken their animal to a veterinarian within the first week after adoption and 1,865 of 2,460 (75.8%) had within the first month after adoption. Respondents were more likely to have visited a veterinarian if they had adopted a dog versus a cat or if the animal was young (≤ 1 year old), had ≥ 1 health problem, or had adjusted moderately to extremely well to its new home within the first month after adoption. Cats had fewer behavior problems than dogs. One week after adoption, the most commonly reported behavior problem was house training for dogs and chewing, digging, or scratching at objects for cats.

Conclusions and Clinical Relevance—Results suggested that improvements can be made in the percentage of new owners who visit a veterinarian after adopting an animal from a shelter. (*J Am Vet Med Assoc* 2008;233:1715–1722)

Despite the best efforts of animal shelters to find permanent homes for animals, a number of animals are returned shortly after adoption,^{1,2} with the most common reasons given for returning animals to a shelter involving health and behavior problems.¹ Previous studies^{1–4} have examined the postadoption experience in an attempt to identify behavior problems that can occur following adoption. One study⁴ concluded that behavior problems may be common in kittens during the first month after adoption, and other studies^{1,2} have reported destructiveness, excessive activity, house soiling, and fearfulness as common behavior problems in dogs that have been adopted. Most of these studies, however, have focused primarily on behavior problems, and little is known about the types of health problems that can occur shortly after animals are adopted or whether new owners routinely seek veterinary care for the animals they adopt. The purpose of the study reported here therefore was to characterize health and behavior problems in dogs and cats 1 week and

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ABBREVIATIONS

CI	Confidence interval
MHS	Michigan Humane Society
OR	Odds ratio

1 month after adoption from animal shelters and to identify factors associated with the likelihood that owners of adopted animals would visit a veterinarian. Because having some form of identification is important to whether stray animals are returned to their owners, we also examined whether new owners provided some means of visual or permanent identification for animals after adoption.

Materials and Methods

Study population—The target population consisted of all individuals who adopted an animal from the MHS between November 27, 2006, and November 26, 2007. At the time of the study, the MHS served the metropolitan Detroit area, including Wayne, Oakland, and Macomb counties, with a combined population of just over 4 million people.⁵ During 2007, the MHS sheltered 34,822 animals, primarily through its 3 animal care centers in Detroit, Westland, and Rochester Hills. The MHS operated a full-service veterinary clinic at each of its 3 animal care centers. Although the MHS encouraged individuals who adopted animals to visit a

veterinarian, they did not provide incentives for visiting an MHS clinic.

Study design—Individuals who adopted an animal from the MHS during the study period were asked by staff adoption counselors to provide an e-mail address at the time of adoption to facilitate distribution of a survey of their adoption experiences. Participants were informed that the e-mail address would be used only for survey purposes and would not be distributed, and individuals who provided an e-mail address could request to be removed from the survey list. Individuals who did not have a valid e-mail address and those unwilling to provide an e-mail address were asked to provide a telephone number so that the survey could be administered over the telephone.

Individuals who provided an e-mail address or telephone number were contacted 1 week and 1 month after adopting an animal. Those who had provided an e-mail address were sent an e-mail message directing them to a Web site, and survey responses were collected with a Web-based survey program.^a Those who had provided a telephone number were called and asked to provide an e-mail address so they could be directed to the Web-based survey. Alternatively, the survey was conducted over the telephone by trained volunteers from the MHS; survey responses were then entered into the Web-based survey program by the person conducting the telephone survey.

To encourage participation, owners were offered a \$10 coupon for veterinary services at any MHS clinic for completing the 1-week survey and a \$54 coupon for dog training classes at the MHS and animal disaster preparedness materials for completing the 1-month survey. Individuals who did not respond to the initial e-mail request to complete the 1-week survey were sent a reminder 1 week later, and individuals who did not respond to the initial e-mail request to complete the 1-month survey were sent 2 reminders 1 week apart. Individuals contacted by telephone were not sent a reminder.

Survey instrument—Participants were asked to answer a series of questions about their adoption experience.^b For both the 1-week and 1-month surveys, questions included the type of animal adopted (cat, dog, small mammal, rabbit, ferret, bird, or other), location where the animal was adopted, age of the animal at the time of adoption (< 4 months, 4 months to 1 year, or > 1 year), and whether the animal was still in the household. For the 1-week survey, participants were asked to indicate any types of health problems the animal was having, whether the animal was having any new health problems not identified at the time of adoption, and whether the animal was exhibiting any behavior problems. Participants were also asked to rank the animal's behavior (excellent, good, fair, poor, or terrible) and to indicate how well the animal was adjusting to the home (extremely well, moderately well, fair, poorly, or not at all). For the 1-month survey, participants were asked whether there were any unresolved health problems and whether the animal was exhibiting any behavior problems. In addition, participants were asked to rank the animal's behavior at the time it was first brought home (excellent, good, fair, poor, or terrible), to indicate whether the animal's behavior had changed in the month since adoption (greatly improved, somewhat improved, about the same,

or somewhat or much worse), to indicate how well the animal was adjusting to the home (extremely well, moderately well, fair, poorly, or not at all), whether the animal wore some type of visible identification (yes, sometimes, or no), what type of visible identification the animal wore (personal identification tag, rabies tag, license tag, or MHS tag), reasons the animal did not wear some type of visible identification (does not wear a collar, owner has not purchased a collar or tag yet, tag has been lost, owner does not consider visible identification to be important, animal is kept indoors, and other), whether the animal had been microchipped (yes or no), and reasons why the animal had not been microchipped (owner unfamiliar with microchips, too expensive, not important, plan to have animal microchipped in the future, animal kept indoors, and other). Finally, participants who had adopted a dog were asked whether they had enrolled the dog in a training class.

Pilot testing and survey revisions—Pilot versions of the 1-week and 1-month surveys were tested in October and November 2006 by 191 and 67 individuals, respectively, who had adopted an animal from the MHS. Survey results were reviewed and survey questions modified for clarification and ease of analysis. Modified surveys were then used for the study, with only minor wording changes over the study period. Beginning March 27, 2007, a version was used with slightly altered choices for health and behavior problem questions.

Statistical analysis—Because of the Web-based survey program used for data collection, it was not possible to link a given individual's responses to the 1-week survey with the same individual's responses to the 1-month survey. Thus, 1-week and 1-month surveys were treated as independent surveys for analysis.

Response rates were calculated for both surveys. Individuals who could not be reached (eg, invalid e-mail address or disconnected telephone number) were excluded from calculations of response rate. Also, individuals who did not provide an e-mail address were excluded from calculations of response rate if there were no MHS volunteers available to contact the individual by telephone.

Medians and ranges were calculated for responses that consisted of continuous data, and proportions were calculated for responses that consisted of categorical data. The denominator for each categorical response was determined on the basis of the number of respondents who answered that particular question because not every respondent answered every question. Specific comparisons to identify differences in responses between individuals who had adopted a cat and individuals who had adopted a dog were identified a priori. Categorical data were analyzed by use of the χ^2 test or the Fisher exact test if the expected value for any given cell was < 5. A Bonferroni correction was used if multiple comparisons were performed. For comparisons of responses to health and behavior questions and questions regarding identification methods, only surveys from individuals who had adopted a dog or cat were included in the analyses. For questions for which responses consisted of a ranking, mean scores were compared between individuals who had adopted a dog and individuals who had adopted a cat with the Kruskal-Wallis test.

Univariate logistic regression was used to identify factors potentially associated with whether respondents would take their dog or cat to a veterinarian; separate analyses were performed for responses from the 1-week and 1-month surveys. Variables with P values ≤ 0.25 in univariate analyses were subsequently included in multivariate logistic regression analyses. Variables were removed from the multivariate model on the basis of results of the likelihood ratio test. Biologically meaningful interactions between the main effect variables in the model were tested for inclusion in a similar manner. The goodness of fit of the final model was tested with the Hosmer-Lemeshow test.

For all analyses, values of $P \leq 0.05$ were considered significant. Standard statistical software was used.^c

Results

Survey respondents—There were 8,048 individuals who were eligible to participate in the 1-week survey and 6,410 individuals who were eligible to participate in the 1-month survey. The difference in number of eligible participants was mostly due to differences in the number of MHS volunteers available to make telephone calls at the time of the 1-month survey. Overall, 2,802 (34.8%) of the eligible participants completed the 1-week survey. Of those, 2,372 (84.7%) completed the survey electronically and 430 (15.3%) completed

the survey by telephone. Similarly, 2,575 (40.2%) of the eligible participants completed the 1-month survey. Of those, 2,487 (96.6%) completed the survey electronically and 88 (3.4%) completed the survey by telephone. Thirty-six (1.3%) participants who completed the 1-week survey and 30 (1.2%) participants who completed the 1-month survey provided only partial data, and these surveys were excluded from analyses.

Health and behavior problems 1 week after adoption—Of the 2,766 individuals who responded to the 1-week survey, 1,326 (47.9%) adopted cats, 1,298 (46.9%) adopted dogs, and 142 (5.1%) adopted another type of pet (small mammal, ferret, rabbit, bird, or other). Of the animals that were adopted, 891 (32.3%) were reported to be < 4 months old, 884 (32.1%) were reported to be between 4 months and 1 year old, and 983 (35.6%) were reported to be > 1 year old. The percentage of cats that were < 4 months old was significantly ($P < 0.001$) higher than the percentage of dogs that were < 4 months old. A total of 1,512 (54.7%) respondents reported that they owned ≥ 1 pet, with 816 (29.5%) owning cats, 690 (25.0%) owning dogs, and 445 (16.1%) owning another type of pet. Overall, 2,724 of the 2,766 (98.7%) respondents still had their new pet at the time of the survey.

Of the 2,624 dogs and cats whose owners responded to the 1-week survey, 1,361 (51.9%) had ≥ 1 health problem (Table 1). Among these dogs and cats with ≥ 1

Table 1—Health and behavior problems reported 1 week after adoption by individuals who adopted a dog or cat from the MHS.

Variable	No. (%) of dogs	No. (%) of cats	Total	P value*
Current health problems of adopted animal [†]				
1 or more problems (1,298 dogs and 1,326 cats)	678 (52.2)	683 (51.5)	1,361 (51.9)	NS
Sneezing, coughing, or running nose	420 (62.0)	490 (71.7)	910 (66.9)	< 0.001
Vomiting or diarrhea	60 (8.9)	46 (6.7)	106 (7.8)	NS
Not eating or lethargic	30 (4.4)	21 (3.1)	51 (3.8)	NS
Skin problems	52 (7.7)	10 (1.5)	62 (4.6)	< 0.001
Worms or intestinal parasites [‡]	67 (15.8)	50 (10.0)	117 (12.7)	NS
Ear problems [‡]	24 (5.7)	22 (4.4)	46 (5.0)	NS
Surgical complications [‡]	5 (1.2)	1 (0.2)	6 (0.7)	NS
Dental problems [‡]	16 (3.8)	6 (1.2)	22 (2.4)	NS
Other	164 (24.2)	109 (16.0)	273 (20.1)	< 0.001
Overall rating of animal behavior				< 0.001
Excellent	569 (45.2)	878 (67.3)	1,447 (56.5)	
Good	586 (46.6)	382 (29.3)	968 (37.8)	
Fair	100 (8.0)	38 (2.9)	138 (5.4)	
Poor or terrible	3 (0.2)	7 (0.5)	10 (0.4)	
Current behavior problems of adopted animal [†]				
1 or more problems (1,298 dogs and 1,326 cats)	819 (63.1)	509 (38.4)	1,328 (50.6)	< 0.001
House training or litter box training	288 (35.2)	41 (8.1)	329 (24.8)	< 0.001
Biting, growling, or snapping at people or animals	98 (12.0)	48 (9.4)	146 (11.0)	NS
Chewing, digging, or scratching at objects	209 (25.5)	128 (25.2)	337 (25.4)	NS
Running away or fence jumping	59 (7.2)	4 (0.8)	63 (4.7)	< 0.001
Noisy	26 (3.2)	19 (3.7)	45 (3.4)	NS
High energy level [‡]	63 (12.5)	50 (13.7)	113 (13.0)	NS
Shy, fearful, or hiding	53 (6.5)	65 (12.8)	118 (8.9)	< 0.001
Household manners [‡]	57 (11.3)	25 (6.9)	82 (9.4)	NS
Problem behavior when left alone	89 (10.9)	7 (1.4)	96 (7.2)	< 0.001
Other	188 (23.0)	110 (21.6)	298 (22.4)	NS
How well animal is adjusting to new home				< 0.001
Extremely well	900 (71.1)	1,057 (80.8)	1,957 (76.1)	
Moderately well	301 (23.8)	208 (15.9)	509 (19.8)	
Fair	61 (4.8)	36 (2.8)	97 (3.8)	
Poorly or not at all	4 (0.3)	6 (0.5)	10 (0.4)	

* P values refer to comparisons between dogs and cats. [†]Respondents could provide multiple answers. For individual health and behavior problems, percentages were calculated on the basis of number of animals with 1 or more problems. [‡]This option was available to only 943 respondents who adopted a dog and 795 who adopted a cat. Of those, 425 dogs and 499 cats had ≥ 1 health problem and 505 dogs and 364 cats had ≥ 1 behavior problem.
NS = Not significant ($P > 0.05$).

health problem, the most common health problem was respiratory tract disease, with 490 of the 683 (71.7%) cats with ≥ 1 health problem having sneezing, coughing, or a runny nose. This was significantly ($P < 0.001$) higher than the percentage of dogs with ≥ 1 health problem with respiratory tract disease (420/678 [62.0%]). There was no significant difference in the percentage of dogs (204/1,263 [16.2%]) versus the percentage of cats (217/1,308 [16.6%]) with a new health problem not reported at the time of adoption.

At the time of the 1-week survey, 1,630 of 2,689 (60.6%) respondents had taken their animal to a veterinarian, with 1,611 of the 2,552 (63.1%) respondents who had adopted a cat or dog having done so. In the multivariate logistic regression model, animal age, species, and health status (no health problems vs ≥ 1 health problem) were all significantly associated with whether respondents had taken their animals to a veterinarian. Individuals who had adopted a dog were 1.82 times as likely to have taken their animal to a veterinarian (95% CI, 1.54 to 2.15; $P < 0.001$) as were individuals who had adopted a cat, individuals who had adopted an animal ≤ 1 year old were 1.20 times as likely to have taken their animal to a veterinarian (95% CI, 1.01 to 1.43; $P = 0.037$) as were individuals who had adopted an animal > 1 year old, and individuals whose animal had a health problem were 2.10 times as likely to have taken their animal to a veterinarian (95% CI, 1.78 to 2.48; $P < 0.001$) as were individuals who reported that their animals did not have any health problems. How well the animal was adjusting to the home, whether the animal was exhibiting any behavior problems, and overall ranking of the animal's behavior were not significantly associated with whether owners had taken their animals to a veterinarian.

Overall, 1,328 of the 2,624 (50.6%) respondents who had adopted a cat or dog reported that the animal had a behavior problem. For those individuals who had adopted a dog and reported a behavior problem, the most common behavior problem was house training (288/819 [35.2%]), whereas only 41 of 509 (8.1%) respondents who had adopted a cat that had a behavior problem reported litter box training as a problem. For individuals who had adopted a cat and reported a behavior problem, the most common behavior problem was chewing, digging, or scratching at objects (128/509 [25.2%]). Similarly, 209 of 819 (25.5%) respondents who had adopted a dog reported that chewing, digging, or scratching at objects was a problem. Problems with house training in dogs and problems with chewing, digging, or scratching at objects in cats were significantly ($P < 0.001$) more common in animals ≤ 1 year old than in animals > 1 year old. Dogs with behavior problems when left alone were significantly ($P < 0.001$) more likely to have problems with chewing, digging, or scratching at objects than were dogs without behavior problems when left alone. In total, 2,415 of the 2,563 (94.3%) respondents who had adopted a cat or dog rated the behavior of their new pets as good or excellent (Table 1). The percentage of respondents who had adopted a cat (878/1,305 [67.3%]) that rated the behavior of their new pet as excellent was significantly ($P < 0.001$) higher than the percentage of respondents who

had adopted a dog that did so (569/1,258 [45.2%]). The percentage of respondents who had adopted a dog that indicated their dog had a new behavior problem not identified at the time of adoption (91/1,243 [7.3%]) was significantly ($P < 0.001$) higher than the percentage of respondents who had adopted a cat that did so (46/1,287 [3.6%]).

Most (2,466/2,573 [95.9%]) respondents indicated that their new dogs and cats were adjusting extremely or moderately well to their new homes (Table 1). The percentage of respondents who had adopted a cat that indicated the animal was adjusting extremely well (1,057/1,307 [80.8%]) was significantly ($P < 0.001$) higher than the percentage of respondents who had adopted a dog that indicated the animal was adjusting extremely well (900/1,266 [71.1%]). Animals with behavior problems were significantly ($P < 0.001$) less likely to be adjusting well to their new home than were animals with no behavior problems.

Health and behavior problems 1 month after adoption—Of the 2,545 individuals who responded to the 1-month survey, 1,210 (47.5%) adopted cats, 1,216 (47.8%) adopted dogs, and 119 (4.7%) adopted another type of pet (small mammal, ferret, rabbit, bird, or other). Of the animals that were adopted, 846 (33.4%) were reported to be < 4 months old at the time of adoption, 816 (32.2%) were between 4 months and 1 year old, and 873 (34.4%) were > 1 year old. The percentage of cats that were < 4 months old was significantly ($P < 0.001$) higher than the percentage of dogs that were < 4 months old. Most participants still had their new pet at the time of the survey (2,499/2,543 [98.3%]).

Overall, 239 of 2,312 (10.3%) dogs and cats reportedly still had unresolved health problems 1 month after adoption, with no significant difference between species. At the time of the 1-month survey, 1,865 of 2,460 (75.8%) respondents had taken their animal to a veterinarian, including 1,840 of 2,344 (78.5%) respondents who had adopted a cat or dog. In multivariate logistic regression analysis, animal age, species, whether the animal had an unresolved health problem, and degree of adjustment to the new home were all significantly associated with whether respondents had taken their animals to a veterinarian (Table 2). Respondents were less likely (OR, 0.44) to have taken the animal to a veterinarian if adjustment to the home was rated as fair, poor, or not at all than if it was rated as extremely or moderately well. Whether the animal was exhibiting any behavior problems and overall ranking of the animal's behavior were not significantly associated with whether owners had taken their animals to a veterinarian.

The percentage of respondents who had adopted a cat with ≥ 1 behavior problem was significantly lower than the percentage of respondents who had adopted a dog with ≥ 1 behavior problem (Table 3). Among dogs with ≥ 1 behavior problem, the most common behavior problem that was reported was chewing, digging, or scratching at objects (339/826 [41.0%]). Only 159 of 1,216 (13.1%) respondents reported that they had taken their dogs to a training class; 123 of the 159 (78.9%) dogs that had been taken to a training class were ≤ 1 year old when adopted, and 121 (76.1%)

Table 2—Adjusted ORs and 95% CIs for factors associated with whether individuals who had adopted a dog (n = 1,210) or cat (1,216) from the MHS had taken their animal to a veterinarian within the first month after adoption.

Variable	OR	95% CI	P value
Unresolved health problem			
No	Referent	NA	NA
Yes	1.72	1.17–2.52	0.006
Species			
Cat	Referent	NA	NA
Dog	2.02	1.63–2.49	< 0.001
Age			
> 1 y	Referent	NA	NA
≤ 1 y	1.60	1.30–1.98	< 0.001
How well animal is adjusting to new home			
Extremely well	Referent	NA	NA
Moderately well	0.96	0.72–1.28	0.768
Fair, poorly, or not at all	0.44	0.26–0.75	0.002

NA = Not applicable.

Table 3—Health and behavior problems reported 1 month after adoption by individuals who adopted a dog or cat from the MHS.

Variable	No. (%) of dogs	No. (%) of cats	Total	P value*
Animal's behavior when first brought home				< 0.001
Excellent	291 (24.9)	472 (40.7)	763 (32.8)	
Good	619 (53.0)	526 (45.3)	1,145 (49.2)	
Fair	212 (18.2)	133 (11.5)	345 (14.8)	
Poor or terrible	46 (3.9)	29 (2.5)	75 (3.2)	
Change in animal's behavior since adoption				< 0.001
Greatly improved	534 (45.7)	540 (46.6)	1,074 (46.1)	
Somewhat improved	379 (32.5)	232 (20.0)	611 (26.3)	
About the same	205 (17.6)	353 (30.4)	558 (24.0)	
Somewhat or much worse	50 (4.3)	35 (3.0)	85 (3.7)	
Current behavior problems of adopted animals				
1 or more problems (1,216 dogs and 1,210 cats)	826 (67.9)	417 (34.5)	1,243 (51.2)	< 0.001
House training or litter box training	244 (29.5)	20 (4.8)	264 (21.2)	< 0.001
Biting, growling, or snapping at people or animals	123 (14.9)	57 (13.7)	180 (14.5)	NS
Chewing, digging, or scratching at objects	339 (41.0)	117 (28.1)	456 (36.7)	< 0.001
Running away or fence jumping	68 (8.2)	11 (2.6)	79 (6.4)	< 0.001
Noisy	38 (4.6)	15 (3.6)	53 (4.3)	NS
High energy level§	105 (19.4)	91 (28.4)	196 (22.8)	0.002
Shy, fearful, or hiding	39 (4.7)	18 (4.3)	57 (4.6)	NS
Household manners§	62 (11.5)	23 (7.2)	85 (9.9)	NS
Problem behavior when left alone	133 (16.1)	4 (1.0)	137 (11.0)	< 0.001
Other	158 (19.1)	97 (23.2)	255 (20.5)	NS
How well animal is adjusting to new home				< 0.001
Extremely well	858 (72.5)	1,031 (87.5)	1,889 (80.0)	
Moderately well	277 (23.4)	121 (10.3)	398 (16.9)	
Fair	44 (3.7)	22 (1.9)	66 (2.8)	
Poorly or not at all	4 (0.3)	4 (0.3)	8 (0.3)	

§This option was available to only 882 respondents who adopted a dog and 792 who adopted a cat. Of those, 540 dogs and 320 cats had ≥ 1 behavior problem.
See Table 1 for remainder of key.

were reported to have ≥ 1 behavior problem. Dogs that had been taken to a training class were significantly ($P < 0.001$) more likely to have had ≥ 1 behavior problem than were dogs (705/1,057 [66.7%]) that had not been taken to a training class. For cats with ≥ 1 behavior problem, the 2 most common behavior problems were chewing, digging, or scratching at objects (117/417 [28.1%]) and high energy level (91/320 [28.4%]). For both dogs and cats, animals ≤ 1 year old were significantly ($P < 0.001$) more likely to have the most common behavior problems than were animals > 1 year old. Dogs with behavior problems when left alone were significantly ($P < 0.001$) more likely to have problems with chewing, digging, or scratching at objects than were dogs without behavior problems when left alone.

At the time of the 1-month survey, dogs were significantly ($P < 0.001$) more likely than cats to be wearing a collar and tag (Table 4). The most common types of identification tags worn by dogs and cats were a personal identification tag and a tag provided by MHS. The MHS tag was the sole source of visual identification for 190 of the 534 (35.6%) cats and 217 of the 1,106 (19.6%) dogs with identification. The most common reason given for why dogs were not wearing a collar and tag was that the owner had not purchased them yet; the most common reason for why cats were not wearing a collar and tag was that the animal was kept indoors. The percentage of dogs with a microchip (514/1,216 [42.3%]) was significantly ($P < 0.001$) higher than the percentage of cats with a microchip (136/1,210 [11.2%]). The most common reason why dogs did not

Table 4—Use of and barriers to the use of visual and permanent pet identification 1 month after adoption by individuals who adopted a dog or cat from the MHS.

Variable	No. (%) of dogs	No. (%) of cats	Total	P value*
Animal wears collar and tag				< 0.001
Yes	1,067 (90.4)	442 (38.2)	1,509 (64.6)	
Sometimes	39 (3.3)	92 (8.0)	131 (5.6)	
No	74 (6.3)	623 (53.9)	697 (29.8)	
Type of tag worn† (1,106 dogs and 534 cats)				
Personal tag	706 (63.8)	268 (50.2)	974 (59.4)	< 0.001
Rabies tag	186 (16.8)	24 (4.5)	210 (12.8)	< 0.001
License tag	337 (30.5)	26 (4.9)	363 (22.1)	< 0.001
MHS-provided tag	682 (61.7)	286 (53.6)	968 (59.0)	0.002
Reasons for not wearing a tag† (74 dogs and 623 cats)				
Animal does not wear a collar	9 (12.2)	114 (18.3)	123 (17.7)	NS
Have not purchased a collar or tag yet	37 (50.0)	54 (8.7)	91 (13.1)	< 0.001
Lost tag	2 (2.7)	2 (0.2)	3 (0.4)	0.002
Visible identification not important	1 (1.4)	6 (1.0)	7 (1.0)	NS
Animal kept indoors	30 (40.5)	552 (88.6)	582 (83.5)	< 0.001
Other	19 (25.7)	87 (14.0)	106 (15.2)	0.008
Animal has a microchip				< 0.001
Yes	514 (42.3)	136 (11.2)	650 (26.8)	
No	702 (57.7)	1,074 (88.8)	1,776 (73.2)	
Reasons animal does not have a microchip† (702 dogs and 1,074 cats)				
Owner unfamiliar with microchips	74 (10.5)	94 (8.8)	168 (9.5)	NS
Too expensive	132 (18.8)	138 (12.9)	270 (15.2)	0.001
Not important	153 (21.8)	145 (13.5)	298 (16.8)	< 0.001
Plan to do so in future	225 (32.1)	125 (11.7)	350 (19.7)	< 0.001
Animal kept indoors	128 (18.2)	763 (71.0)	891 (50.2)	< 0.001
Other	90 (12.8)	49 (4.6)	139 (7.8)	< 0.001

†Respondents could provide multiple answers.

have a microchip was that the owner was planning to have the dog microchipped in the future; the most common reason why cats did not have a microchip was that the animal was kept indoors.

Most respondents (2,287/2,361 [96.9%]) indicated that their new dogs or cats were adjusting extremely or moderately well to their new homes. The percentage of respondents who had adopted a cat that indicated the animal was adjusting extremely well (1,031/1,178 [87.5%]) was significantly ($P < 0.001$) higher than the percentage of respondents who had adopted a dog that indicated the animal was adjusting extremely well (858/1,183 [72.5%]).

Discussion

In the present study, 60.6% (1,630/2,689) of individuals who had adopted an animal from the MHS during the study period had visited a veterinarian within the first week after adoption and 75.8% (1,865/2,460) had visited a veterinarian within the first month after adoption. Respondents were more likely to have visited a veterinarian if they had adopted a dog versus a cat or if the animal was young (≤ 1 year old), the animal had ≥ 1 health problem, or the animal had adjusted moderately or extremely well to its new home within the first month after adoption. Whether the animal had behavior problems was not associated with the odds that the new owner had visited a veterinarian. These findings suggest that greater efforts should be made to encourage individuals who adopt an animal from a shelter, particularly those who adopt an older, healthy animal and those who adopt a cat, to visit a veterinarian in the immediate period after adoption and that veterinarians may not be the first option new owners consider when an animal they adopted has a behavior problem.

In the present study, health status of the animal did not explain why owners who had adopted a dog were more likely to visit a veterinarian after adoption than were owners who had adopted a cat, as the percentages of dogs and cats with health problems 1 week after adoption were similar. It is possible that new owners perceived dogs to be more in need of veterinary care or valued dogs more as family members than did cat owners. The latter is supported by a recent AVMA survey⁶ in which 82.7% of dog-owning households visited a veterinarian, compared with only 63.7% of cat-owning households. Regardless of the reason for this difference, adoption agencies may be able to improve the percentage of cats taken to a veterinarian by emphasizing the need with individuals who adopt a cat.

Most dogs and cats (239/2,312 [89.7%]) in the present study reportedly did not have any unresolved health problems 1 month after adoption, although 51.9% (1,361/2,624) had ≥ 1 health problem 1 week after adoption. Similarly, in a previous study,¹ approximately 40% of adopted animals had ≥ 1 health problem 2 weeks after adoption but only 10% had ≥ 1 health problem 6 months after adoption. In that study, approximately 25% of the animals had a health problem related to the respiratory tract 2 weeks after adoption, compared with 66.9% (910/1,361) of the dogs and cats in the present study that had respiratory tract disease 1 week after adoption. The higher percentage in the present study may be due to the acute nature of respiratory tract disease among animals in a shelter setting, such that signs would have resolved in some animals by 2 weeks after adoption. Overall, these findings support the suggestion that animals adopted from a shelter often have mild disease of short duration, but that most of these health problems have resolved by 1 month after

adoption. Veterinarians can use this information to encourage individuals who have adopted an animal with health problems to treat the new pet, knowing that in all likelihood, the health problems will resolve quickly and not become long-standing.

Problems with house training were the most frequently reported behavior problem for dogs 1 week after adoption. This likely was related to the fact that 70.7% (934/1,322) of the dogs that were adopted were \leq 1 year old. House training was not reported as a problem as often 1 month after adoption, which is consistent with findings of a previous study³ and likely is attributable to the fact that owners may have had more time to implement house training.

Elimination problems were less common for cats than for dogs in the present study. Cats have an innate tendency to eliminate on sandy, absorbable substrates that have a texture amenable to digging,^{7,8} and most cats will use a litter box if a proper substrate is provided and the box is placed in a proper location. Unlike the case in dogs, inappropriate elimination in cats is a problem more frequently reported in adult animals.⁷ Thus, the fact that most cats in the present study were young may have contributed to the low frequency of elimination problems reported by cat owners.

Chewing, digging, or scratching at objects was the most common behavior problem for cats 1 week and 1 month after adoption and the most common behavior problem for dogs 1 month after adoption. This was similar to findings of a previous study,² in which destructiveness was reported for 25% of dogs 1 month after adoption. This problem was more common in young animals in the present study and likely reflected the high energy levels of puppies and kittens and increased tendencies toward play and chewing behaviors. Chewing is common in young dogs, as mouthing is one of the first forms of play to develop in puppies.⁹ Thus, it is expected that puppies will engage in mouthing and chewing behaviors as a means of play and environmental exploration. Scratching is a normal behavior for cats, as they use it as a means of scent marking and claw maintenance,¹⁰ and young cats that scratch, climb, and chew objects are usually exhibiting play and exploratory behaviors.¹⁰ If owners do not provide appropriate exercise and stimulation and appropriate items for chewing or scratching, dogs and cats will use items in their current environment as an outlet for stimulation.

The high frequency of problems associated with chewing, digging, and scratching at objects among dogs in the present study may also have been related, in part, to anxiety. Previous studies have shown that dogs obtained from animal shelters are at an increased risk for separation anxiety,^d and separation anxiety often manifests as destructive chewing and scratching behaviors.¹¹ Although owners did not frequently report that their dogs had problems being left alone, we did find that dogs with problems being left alone were more likely to have problems with chewing, digging, or scratching at objects. Although the survey did not address the specific context of the destructive behaviors, our findings suggest these behaviors may have been anxiety driven in dogs with problems being left alone.

Our finding in the present study that dogs were more likely to have a behavior problem than cats was consistent

with results of a study¹ that evaluated behavior problems 1 year after adoption from a shelter. Most referral behavior services report a much higher caseload for dogs than for cats per year.^{12,13} This suggests that owners are less likely to report or pursue help for behavior problems in cats or that cats indeed have fewer perceivable behavior problems than dogs. It is also possible that owners accept problem behaviors from cats more than they will from dogs because the potential for damage and injury from canine behavior problems may be greater.

Most of the dogs in the present study that had been taken to a training class were \leq 1 year old when adopted (123/159 [78.9%]). Dogs \leq 1 year old at the time of adoption would have been less likely to have lived in a previous home for an extended period and therefore may have been less likely to have had previous obedience training. Young dogs are also at risk for unruly or destructive behaviors owing to their propensity for exploration of objects in their environment and social play that may involve biting, barking, chasing, and mounting.¹⁴

Overall, only 159 of 1,216 (13.1%) respondents in the present study who had adopted a dog reported having taken the dog to a training class 1 month after adoption. It is possible that owners who were not experiencing major behavior problems did not see the benefits of training classes, or it may have been too soon after adoption for owners to have had a chance to enroll their dogs in classes. We were concerned to find that owners sought the help of a trainer for behavior problems in their dogs but were not more likely to visit a veterinarian. This was also consistent with our finding that owners who rated adjustment to the home as fair, poor, or not at all were significantly less likely to have taken the animal to a veterinarian than were owners who rated the animal as adjusting extremely well. Thus, our results suggest that owners will take their pet to a veterinarian for evaluation of health problems but will not necessarily do so when experiencing behavior problems. An earlier study¹⁵ reported that owners visiting their veterinarian received less information in regard to behavior than they had expected. This may be due the fact that according to 1 study,¹⁶ most veterinarians do not routinely inquire about animal behavior and are often not confident in addressing behavior problems. Veterinarians need to market themselves as a resource for problem behaviors in pets and provide assistance for problem prevention and management, even if it means referring owners to a specialist in veterinary behavior.

In the present study, 42.3% (514/1,216) of dogs and 11.2% (136/1,210) of cats reportedly had been microchipped, which was substantially higher than the 3% to 8% of animals reported in previous studies.¹⁷⁻¹⁹ This may have been due in large part to the fact that MHS veterinarians provide microchips to individuals who adopt an animal at a discount, compared with the price they charge at their own veterinary clinics and the price charged by most veterinary clinics in the area. In a previous study,¹⁹ 16.4% of owners in Ohio reported they did not microchip their cats because of expense. Further research is needed to investigate price points that affect the willingness of owners to microchip their pets.

The percentage of animals with visual identification in the present study was also substantially higher

than previously reported percentages. In 1 study,¹⁷ for instance, only 43% of dogs were wearing some sort of visual identification, which was less than half of the 93.7% (1,106/1,180) of dogs in the present study that always or sometimes wore a collar and tag. In another study,¹⁹ 17.5% of cats in Ohio had visual identification, compared with 46.2% (534/1,157) of the cats in the present study that always or sometimes wore a collar and tag. The high percentages of dogs and cats in the present study that reportedly wore a collar and tag may have been due, in part, to the fact that the MHS provided an identification tag, although it did not provide a collar, when animals were adopted, and our findings suggest that other shelters should consider providing identification tags to adopted animals. In addition, veterinarians can provide personal identification tags that they place on the collar of animals during a new appointment. This simple educational tool can help to emphasize the importance of identification, increase compliance, and hopefully increase the number of lost pets reunited with their owners.

As with any study, there were important limitations to the present findings. No information on nonresponders was collected, making it impossible to assess the impact of nonresponder bias on the findings. Also, no information was collected on individuals who were not eligible to complete the survey because they did not provide an e-mail address and no volunteers were available to conduct the survey by telephone. Because the study was conducted in a single geographic area in the United States, care must be taken when extrapolating the results to other areas. Despite these limitations, the present findings provide important information on the health and behavior problems encountered in dogs and cats recently adopted from an animal shelter and on the factors associated with whether a new owner will seek veterinary care for their recently adopted pet.

- a. Survey Monkey, SurveyMonkey.com LLC, Portland, Ore. Available at: www.surveymonkey.com.
- b. Copies of the survey are available from the author on request.
- c. Stata, version 10.0, StataCorp, College Station, Tex.
- d. Jagoe A. *Behaviour problems in the domestic dog: a retrospective and prospective study to identify factors influencing their development*. PhD thesis. Department of Clinical Veterinary Medicine, St Catherine's College, University of Cambridge, Cambridge, England, 1994.

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