Associations among weight loss, stress, and upper respiratory tract infection in shelter cats

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Objective—To identify associations among change in body weight, behavioral stress score, food intake score, and development of upper respiratory tract infection (URI) among cats admitted to an animal shelter.

Design—Prospective cohort study.

Animals—60 adult cats admitted to an animal shelter.

Procedures—Body weight was measured on days 0 (intake), 7, 14, and 21. Behavioral stress and food intake were scored daily for the first 7 days; cats were monitored daily for URI.

Results—49 of the 60 (82%) cats lost weight during at least 1 week while in the shelter. Fifteen (25%) cats lost ≥ 10% of their body weight while in the shelter. Thirty-five of the 60 (58%) cats developed URI prior to exiting the shelter, and only 4 cats remained at least 21 days without developing URI. Cats with high stress scores during the first week were 5.6 times as likely to develop URI as were cats with low stress scores. Food intake and stress scores were negatively correlated ($r = -0.98$).

Conclusions and Clinical Relevance—Results indicated that cats admitted to an animal shelter were likely to lose weight while in the shelter and likely to develop URI, and that cats that had high stress scores were more likely to develop URI. (*J Am Vet Med Assoc* 2012;240:570–576)

The Humane Society of the United States estimates that > 3 million cats are cared for in animal shelters each year. Cats entering shelters can stay for days to months, with the current trend being longer lengths of stay, depending on the type of shelter, type of cat, housing facilities, and shelter resources. Regardless of the length of stay, cats need housing and care that supports their health and well-being.

It is common practice to house cats individually when they are taken into an animal shelter. Individual housing is important for monitoring health, controlling disease, and making initial behavior assessments. Recent studies[1–3] suggest that individual cat housing in US shelters often consists of small, single-compartment cages with < 6 sq ft of floor space. Small individual cages have been used for many years and date back to a time when the typical stay for shelter cats was only a few days and the anticipated outcome was often euthanasia.[4] Small cage housing is confining for cats and does not allow the expression of natural behaviors such as lying in a full stretch, walking more than a few steps, running, jumping, playing, and eating and drinking away from the litter area.[1,5] In addition, cats housed in small individual cages are often not provided with hiding places, scratching surfaces, or other forms of environmental enrichment. Shelter environments in which cats are housed are frequently loud,[6] and in some cases, cats are housed in the same area as barking dogs or barking dogs can be heard in the cat housing areas. This unfamiliar, confining, and loud environment likely causes fear and stress for many cats in shelters.[1,5,7]

Abbreviations

BCS	Body condition score
CI	Confidence interval
OR	Odds ratio
URI	Upper respiratory tract infection

Although acute stress may be a normal response for cats in new environments, ongoing or chronic stress can be problematic. Stress affects cats' well-being through inhibition of behaviors such as eating, grooming, elimination, exploration, and play.[5] As cats become more distressed, they increase the frequency and intensity with which they attempt to hide.[5,8] When cats are in an environment where they are deprived of the ability to hide, more severe stress results.[5,9,10] In shelter cats, behavioral changes associated with chronic stress may reduce adoptability and increase the risk of euthanasia.[1,11] Additionally, stress can suppress immune system function, putting cats at risk for newly acquired or reactivated infectious disease.[12] In particular, feline herpesvirus is directly reactivated by stress and is a common cause of URI in cats.[13,14] For these reasons, understanding the important role that stress plays in the life of shelter cats and being able to identify and mitigate stress whenever possible is critical for maintaining healthy shelter cat populations.

The present study was designed to determine whether change in body weight could be used as a practical, indirect measure of stress and general health in shelter cats. Specifically, the purpose of the study reported here was to identify associations among change

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in body weight, behavioral stress score, food intake, and development of URI among cats admitted to an animal shelter.

We hypothesized that cats admitted to a shelter would lose body weight as a result of low food intake related to stress, that change in body weight would be correlated with severity of stress, and that cats that lost weight would be more likely to develop URI.

Materials and Methods

Study site—The study was conducted at a single, open-intake municipal shelter built in 1992 and located in an urban environment. Approximate cat intake during the time of the study was 5,400 cats/y (mean, 446 cats/mon). All cats that entered the shelter were vaccinated at the time of intake with a modified-live vaccine[a] containing feline herpesvirus, calicivirus, and panleukopenia virus. The study was conducted during November and December 2007; in these months, the shelter took in 431 and 224 cats, respectively. Twelve designated animal caregivers were employed at the shelter, and cats were housed in 4 areas: adoption room, juvenile cat room, isolation area, and holding area. Housing in the juvenile cat room, isolation area, and holding area consisted of stainless steel cages with an open-barred front measuring 30 inches long, 28 inches deep, and 24 inches high. In the adoption area, cats were housed in slightly larger laminate cages with separate areas for resting and feeding and the litter box. There were 24 cages in the adoption room, 20 cages in the juvenile cat room, 17 cages in the isolation area, and 48 cages in the holding area. Cats were not provided with a place to hide in either the stainless steel or laminate cages, although the laminate cages provided cats with a separate small resting area. Generally, cats entering the shelter were housed in the holding area (adults > 6 months age) and juvenile cat room (juveniles ≤ 6 months) during the legal holding period (5 business days). After the holding period, adoptable cats were moved to the adoption room. Only cats in the adoption room were available to the public for adoption. Whenever cats developed signs of illness, they were either euthanized or transferred to the isolation area, where they received medical treatment.

Data collection—All study data, including BCS, stress scores, and food intake scores, were collected by a single individual (AT). Cats were monitored for the first 21 days after they were admitted to the shelter or until they were adopted, euthanized, transferred to another shelter, or returned to their owner.

Cats—Sixty healthy adult cats that entered the shelter between November 5 and December 20, 2007, were included in the study. All cats admitted during the study period that were > 12 months old and had no apparent illnesses or injuries were enrolled, unless they were too fractious to handle for weighing. Initially, enrolled cats were excluded if they left the shelter within the first week (prior to being reweighed). In addition, 2 cats that did not get weighed at the end of the first week were not included in the first week's weight data but were included in data for subsequent weeks because they were weighed later during their stay. One or more daily food intake or stress scores were missing for 7 of the 60 cats for which body weights were obtained. Analyses of relationships between food intake scores, stress scores, and body weight included only the 53 cats for which all data were obtained.

Body weight—The 21-day shelter stay was divided into three 1-week periods: week 1 (days 1 through 7), week 2 (days 8 through 14), and week 3 (days 15 through 21). Body weights were recorded with an electronic scale[b] (accuracy, ± 10 g) on days 0 (intake day), 7, 14, and 21 or, when possible, at the time of adoption, euthanasia, transfer, or return to the owner. Cats that did not lose or gain weight or that had only a negligible change in body weight (± 0.02 kg [0.044 lb]) were recorded for that time period as having no change in weight.

BCS—For all cats, a BCS was assigned at the time body weight was measured. Scoring was performed with a standard BCS system (**Appendix 1**),[15] with scores ranging from 1 to 9 and a score of 5 considered optimal.

Stress scores—Stress scores were assigned each morning for the first 7 days after cats entered the shelter (ie, days 1 through 7). Stress scores were assigned by use of the cat stress score system developed by Kessler and Turner (**Appendix 2**).[16] For this scoring system, cats were observed for approximately 3 minutes, then subjectively given a single numeric score according to where they appeared to fit into the stress scoring chart; stress scores could potentially range from 1 (fully relaxed) to 7 (terrorized). Scoring was performed at approximately the same time of day throughout the study.

Food intake—High-quality dry (approx 150 g/d; 610 kcal) and wet (approx 150 g/d; 493 kcal) foods[c] were offered once daily to each cat on a paper tray. A subjective assessment of food intake was made daily for each cat starting on day 1 and continuing through day 7. Assessments were made each morning after stress scores had been assigned but before food was offered to the cat that day. Food intake was scored as 0 = not eating, 1 = eating some, and 2 = eating normally.

URI—All cats were examined daily for URI. The URI case definition developed by Bannasch and Foley (**Appendix 3**)[14] was used to diagnose URI. If URI was diagnosed, the date was recorded.

Statistical analysis—Data were maintained with a spreadsheet software program[d] that was also used to generate descriptive statistics. Kaplan-Meier survival analysis and the log rank test were used to determine whether week 1 weight loss was associated with the rate of URI development. Logistic regression was used to determine whether the development of URI was related to intake BCS or daily stress scores; results are reported as ORs and 95% CIs.[e] The Fisher exact test was used to compare the proportion of cats that lost weight during the first week of stay by their intake BCS. The Jonckheere-Terpstra test was used to evaluate the ordinal relationship between stress scores and food intake scores.[f] Linear regression was used to compare per-

centage change in body weight, mean stress score, and food intake score. A value of $P < 0.05$ was considered significant.

Results

Mean time that cats stayed in the shelter was 15.4 days (range, 5 to 21 days). Of the 60 cats included in the study, 36 were females (3 spayed) and 24 were males (8 castrated). Forty-nine (82%) cats entered the shelter as strays; the remaining 11 (18%) were surrendered by their owners. Daily stress and food intake scores were obtained for 53 (88%) of the 60 cats. Mean time in the shelter for these 53 cats was 16.4 days (range, 5 to 21 days). Of these 53 cats, 33 (62%) were females (3 spayed) and 20 (38%) were males (7 castrated). Forty-three (81%) cats entered the shelter as strays, and 10 (19%) were surrendered by their owners.

Body weight—Weight losses were recorded for 49 of the 60 (82%) cats during at least 1 week while cats were in the shelter. During week 1, 34 of 58 (59%) cats lost weight (**Table 1**). During week 2, 24 of 39 (62%) cats lost weight (13 of these cats lost weight in 2 consecutive weeks). During week 3, 6 of 29 (21%) cats lost weight (one cat had lost weight the previous week, and another cat had lost weight each of the 2 previous weeks). For each of the 3 weeks, there was no significant difference in mean weight change between cats admitted as strays versus cats surrendered by their owners or between female versus male cats. Although the Kaplan-Meier analysis of days to development of URI suggested that there was a difference between cats that lost weight during week 1 and cats that did not, this difference was not significant ($P = 0.55$; **Figure 1**). A significant difference in body weight between cats that developed URI versus the cats that did not develop URI was not identified (**Figure 2**). Although most cats did not lose weight during week 3 (23/29 [79%]), 17 of 28 (61%) cats weighed less on day 21 than they did on the day of intake. When weight loss during the time that cats were in the shelter was calculated as a percentage of initial body weight, it was found that 34 of the 60 (57%) cats lost ≥ 5% of their body weight while in the shelter (**Figure 3**).

BCS—Median BCS for the 60 cats at intake was 5 (range, 3 to 7; mode, 4). Individual BCSs were examined from one week to the next and compared with weight changes. Because of the challenge of detecting changes in BCS with small weight changes, only cats that had a weight change ≥ 10% of their body weight were examined. During week 1, 9 cats had a ≥ 10% change (gain or loss) in body weight; of these, 2 had corresponding changes in BCS. During week 2, 8 cats had a 10% change in body weight, compared with body weight at the end of week 1; of these, 3 had corresponding changes in BCS. During week 3, 5 cats had a ≥ 10% change in body weight, compared with body weight at the end of week 2; none of these cats had a change in BCS. Overall, 12 cats had a ≥ 10% change (gain or loss) in body weight from day of intake to day 21 of shelter stay; 4 of the 12 had corresponding changes in BCS.

Cats were grouped on the basis of BCS at the time of intake as cats with initial BCS ≤ 4 (n = 27) and cats with initial BCS ≥ 5 (31). The percentage of cats with initial BCS ≤ 4 that lost weight during week 1 (12/27 [44%]) was significantly ($P = 0.01$) lower than the percentage of cats with initial BCS ≥ 5 that lost weight during week 1 (25/31 [81%]). In addition, cats with initial BCS ≥ 5 were significantly ($P = 0.02$) more likely to develop URI while in the shelter than were cats with initial BCS ≤ 4 (OR, 4.8; 95% CI, 1.35 to 17.09). However, mean weight loss while in the shelter did not differ significantly between groups.

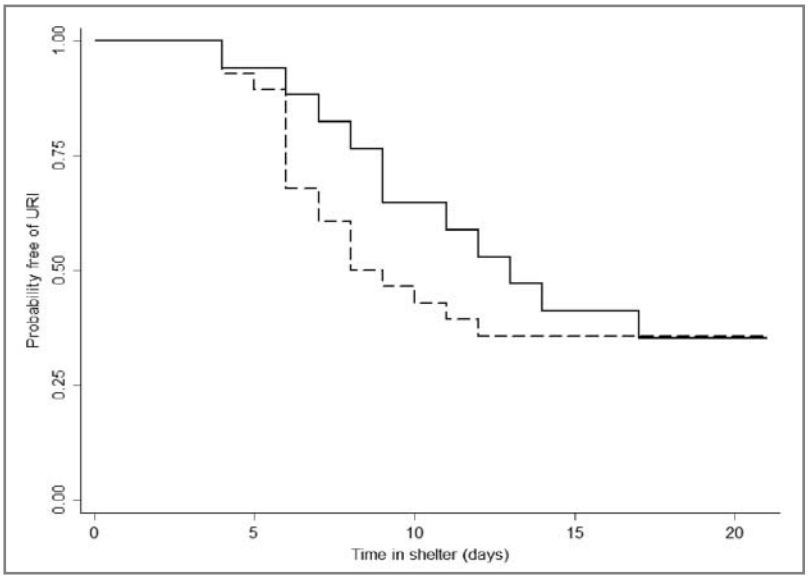

Figure 1—Kaplan-Meier survival curves of days to development of URI among adult cats that lost weight (n = 34; dashed line) or did not lose weight (24; solid line) during their first week of shelter stay. Curves are not significantly different.

Table 1—Changes in body weight and development of URI in 60 adult cats staying up to 21 days in an animal shelter.

		Cats that lost weight			Cats that gained weight or had no change in weight		
Week	No. of cats	No. of cats	Mean (range) weight loss (%)	No. that developed URI	No. of cats	Mean (range) weight gain (%)	No. that developed URI
1	58	34	–6.00 (–0.9 to –13.4)	12	24	6.37 (0.0 to 23.5)	6
2	39	24 (11)*	–6.80 (–1.1 to –15.6)	8	15 (2)*	2.30 (0.0 to 9.9)	7
3	29	6 (4)†	–4.60 (–1.3 to –9.2)	1	23 (17)†	5.70 (0.0 to 17.1)	1

*Number of cats in which URI was diagnosed during the previous week. †Number of cats in which URI was diagnosed during the previous 2 weeks.

Stress and food intake scores—For the 53 cats for which stress scores were assigned daily during week 1, stress scores ranged from 2 to 6. Mean score on day 1 was 4.4, and mean score on day 7 was 3.6. Overall, 42 of the 53 (79%) cats were assigned a stress score ≥ 4 on day 1 and 23 (43%) were assigned a stress score ≥ 4 on day 7 (**Table 2**).

Eighteen of the 53 (34%) cats did not eat on day 1 (food intake score, 0; **Figure 4**), and 15 of the 18 cats that did not eat on day 1 also did not eat on day 2. Six cats did not eat for 3 consecutive days during week 1, and 1 cat did not eat for 6 consecutive days during week 1. By day 4, 50 (94%) of the cats were recorded as eating at least some of their food.

Stress and food intake scores were negatively correlated (r = –0.98), with cats with higher stress scores having lower food intake scores (**Figure 5**). There were significant relationships between stress scores and food intake scores on days 1 ($P < 0.001$), 2 ($P = 0.001$), and 3 ($P = 0.006$); however, stress and food intake scores were not significantly related on days 4 ($P = 0.06$), 5 ($P = 0.08$), 6 ($P = 0.07$), and 7 ($P = 0.2$). When daily stress scores during week 1 were summed for each cat and cats were ranked from highest to lowest total

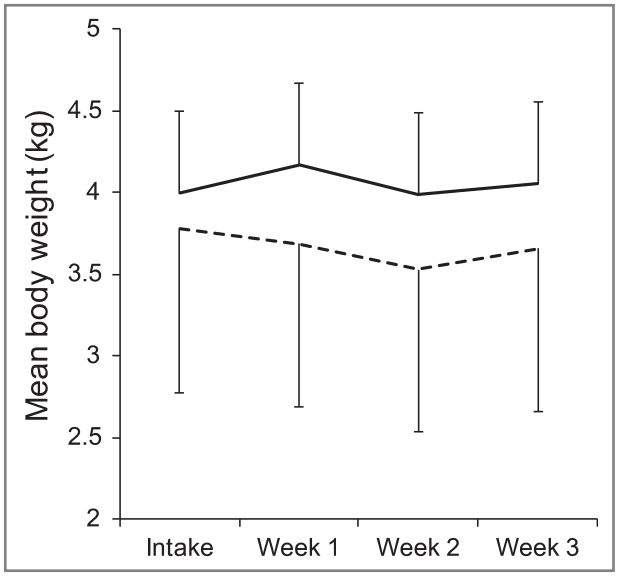

Figure 2—Mean changes in body weight in adult cats that were in an animal shelter from intake to day 21 (n = 26), for cats that developed URI (20; dashed line) and did not develop URI (6; solid line). Error bars represent SD, and differences between the 2 groups are not significant.

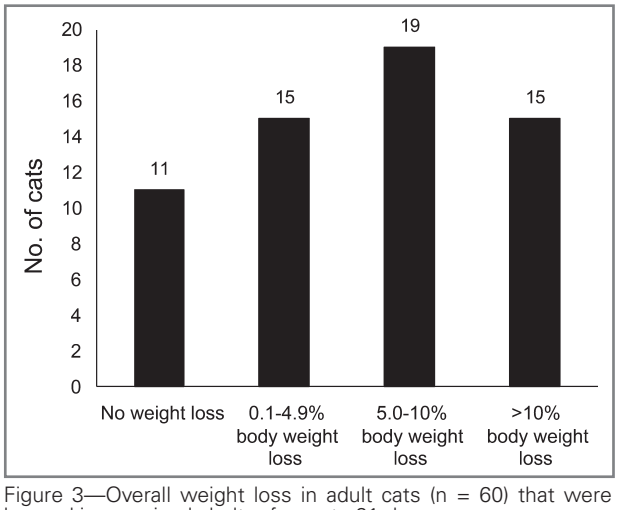

Figure 3—Overall weight loss in adult cats (n = 60) that were housed in an animal shelter for up to 21 days.

Table 2—Daily observed stress scores (individual and mean) for adult cats (n = 53) during their first week of shelter stay.

	Day in shelter						
Stress score	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1	0	0	0	0	0	0	0
2	4	6	5	5	5	5	5
3	7	9	14	18	18	21	25
4	18	14	17	12	18	18	15
5	12	12	10	15	10	6	5
6	12	12	7	3	2	3	3
7	0	0	0	0	0	0	0
Mean	4.4	4.3	4	3.9	3.7	3.6	3.6

Data are given as number of cats. Potential stress scores ranged from 1 (fully relaxed) to 7 (terrorized).

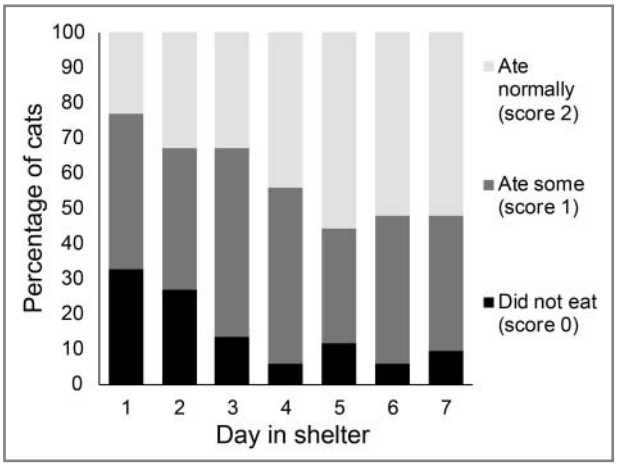

Figure 4—Food intake scores for adult cats (n = 53) during their first week of shelter stay, reported as the percentage of cats assigned each potential score.

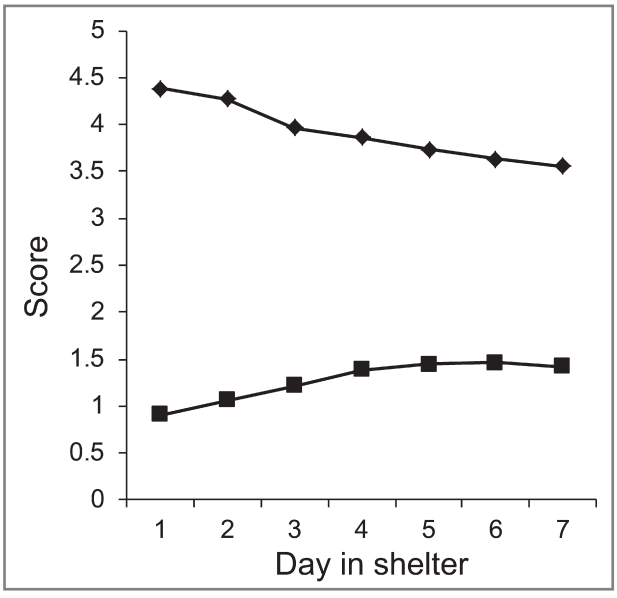

Figure 5—Mean daily stress (diamonds) and food intake (squares) scores for adult cats during their first week of shelter stay (n = 53). Potential daily stress scores ranged from 1 to 7; potential daily food intake scores ranged from 0 to 2.

Table 3—Incidence of URI over time among 60 adult cats staying up to 21 days in an animal shelter.

	Day in shelter																				
Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**
No. of cats censored (no URI)	0	0	0	0	1	1	5	4	1	0	2	0	3	1	0	0	0	0	1	1	1
No. of new cases of URI	0	0	0	3	2	9	4	4	3	1	3	2	1	1	1	0	1	0	0	0	0
No. of cat-days at risk for URI	60	60	60	57	54	44	35	27	23	22	17	15	11	9	8	8	7	7	6	5	4
Weekly URI rate*							4.9							12.1							4.4

Cats were censored if they were adopted, euthanized, or transferred out of the shelter.
*Calculated as number of new cases of URI/100 cat-days at risk.

scores, cats with the highest 25% of scores were significantly ($P = 0.017$) more likely to develop URI than were cats with the lowest 75% of scores (OR, 5.6; 95% CI, 1.36 to 23.06).

Mean food intake score during week 1 was calculated for each cat and compared with percentage change in body weight during week 1. There was a significant ($P = 0.03$) correlation between mean food intake score and percentage change in body weight, with cats with lower mean food intake scores losing more weight.

URI—Upper respiratory tract infection developed in 35 of the 60 cats within 21 days of shelter entry. Mean time to develop URI was 8.3 days. Eighteen cats developed URI during week 1 (mean time to develop URI, 5.7 days), 15 cats developed URI during week 2 (mean time to develop URI, 10.2 days), and 2 cats developed URI during week 3 (mean time to develop URI, 16 days). Only 4 cats remained in the shelter for 21 days and did not develop URI; the remaining 21 cats were censored between days 5 and 21 (**Table 3**).

Outcome—Forty-four cats were adopted (n = 22), euthanized (21), or transferred (1) before they had been in the shelter for 21 days. Twenty-three of these 44 cats (53%) developed URI before they left the shelter; for these cats, mean time in the shelter was 15.3 days (range, 5 to 20 days). The remaining 21 cats (47%) did not develop URI before they left the shelter; mean time in the shelter was 10.6 days (range, 5 to 21 days).

Discussion

The fact that all of the cats in the present study were overtly healthy at the time of intake and that most cats had low food intake scores during week 1, lost weight during weeks 1 and 2, and developed URI during week 1 or 2 would suggest that the environment in this shelter was not sufficient to maintain the health of these cats. The amount and quality of food appeared adequate; therefore, weight losses mostly likely were a result of low food intake associated with stress and, later, illness. Low food intake scores and high stress scores were recorded during week 1 for most cats in the present study. Food intake and stress scores were negatively correlated, consistent with what is known about stress and its effect on appetite in cats.[5] Food intake score and percentage change in body weight were also significantly correlated, indicating that cats that were not eating were also losing weight. Mean time to develop URI (35 cats) was 8.3 days. In 2 previous studies[13,14] of shelter cats, mean time to develop URI was 9 days, with most cats developing URI between 5 and 14 days after entering the shelter. Time to develop URI likely reflects the incubation periods of the viruses commonly associated with URI in cats. Reported incubation times are 2 to 6 days for herpesvirus[17] and 2 to 10 days for calicivirus,[18] and time for recrudescence of herpesvirus infection in carrier cats after exposure to stress has been reported to be 4 to 11 days.[19] In the present study, cats with the highest stress scores during week 1 were more likely (OR, 5.6) to develop URI than were cats with lower stress scores during week 1. In shelter cats, URI is a multifactorial disease, and stress appears to play a major role in its occurrence.[12,13,20,21] Stressors in the shelter involved in the present study that may be common to other shelters include high population density, use of small cages for housing, lack of hiding space, frequent movement of cats in and out of cages, and audible dog barking noise in the cat housing areas. Although weight loss was not significantly linked to URI in this study, this may have been a function of the relatively small sample size and the overall high rate of URI in cats remaining in the shelter for the study period. In a study[22] of cats that underwent acute starvation for 1 week, decreases in total lymphocyte number, percentage and proliferative capacity of lymphocytes, and lymphocyte CD4:CD8 ratio were identified, suggesting that starvation adversely affected immune function. In that study,[22] mean body weight loss after 4 days was 9.3% and after 7 days was 13.5%. In the present study, mean weight loss in cats that lost weight during week 1 was 6% (range, 0.9% to 13.4%). Although none of the cats in the present study were denied access to food, some of the individual body weight losses recorded during week 1 were similar to those reported in the acute starvation study. Body condition scoring indicated that cats with a BCS ≥ 5 at the time of shelter intake were more likely to lose weight during week 1 than were cats with lower BCS at the time of shelter intake and were more likely to develop URI while in the shelter. The reason for this was not known; however, cats with lower BCS may have been more driven to eat, compared with cats with higher BCS. Although BCS is considered useful in monitoring weight changes, it was not sensitive enough to detect acute weight changes in the present study and should not be used as the only method of monitoring cats for weight changes.

Limitations of the present study include the small sample size and the fact that data were collected from cats at a single shelter. It is difficult to know to what degree this study's findings can be generalized to other shelters; however, development of URI is common among cats in shelters in the United States and housing and management conditions in the shelter used in the

present study were not unusual. Another limitation was the selection of the study population. Only cats calm enough to be handled were included in the study. Thus, it is not known whether feral or fractious cats would respond similarly to shelter confinement. Additionally, some cats that initially met the enrollment criteria were euthanized before a second (postintake) body weight could be obtained. Cats euthanized soon after intake at this shelter were generally those considered less likely to be adopted for reasons of health or behavior and those with a condition that could not be managed in the shelter. Both feral and fractious cats and cats euthanized early after admission to the shelter may have had relatively more difficulty adapting to caged housing, which could have impacted variables measured in the present study.

Unplanned weight loss in otherwise healthy cats is a dramatic indicator of a decline in health, and in the present study, many of the cats that lost weight developed URI. Providing housing and an environment that supports cat well-being is critically important for maintaining feline health in shelters. The success of a shelter environment in providing these conditions should be routinely assessed. Body weight measurement and food intake scoring are noninvasive, inexpensive tools that provide objective health data. The use of these tools could provide individual animal and population health information to animal care providers at a critical time when detection and prevention of stress and weight loss could improve feline well-being and, possibly, prevent development of URI.

a. Fel-O-Guard Plus 3, Fort Dodge, Iowa.
b. My Weigh MBS baby scale, My Weigh, Phoenix, Ariz.
c. Hills Adult Cat Original, Hills Pet Nutrition Inc, Topeka, Kan.
d. Microsoft Excel 2003, Microsoft Corp, Redmond, Wash.
e. Egret, Cytel Software Corp, Cambridge, Mass.
f. StatXact, version 8.0, Cytel Software Corp, Cambridge, Mass.

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Appendix 1

Criteria for assigning BCS in cats.[15]

BCS	Description
1	Emaciated: ribs visible on shorthair cats; no palpable fat; severe abdominal tuck; lumbar vertebrae and wings of ilia easily palpated
2	Very thin: shared characteristics of BCS 1 and 3
3	Thin: ribs easily palpable with minimal fat covering; lumbar vertebrae obvious; obvious waist behind ribs; minimal abdominal fat
4	Underweight: shared characteristics of BCS 3 and 5
5	Ideal: well proportioned; waist observable behind ribs; ribs palpable with slight fat covering; abdominal fat pad visible
6	Overweight: shared characteristics of BCS 5 and 7
7	Heavy: ribs not easily palpated with moderate fat covering; waist poorly discernible; obvious rounding of abdomen; moderate abdominal fat pad
8	Obese: shared characteristics of BCS 7 and 9
9	Grossly obese: ribs not palpable under heavy fat cover; heavy fat deposits over lumbar area, face, and limbs; distention of abdomen with no waist; extensive abdominal fat deposits

Appendix 2

Criteria for assigning stress scores for cats housed in individual cages in an animal shelter.[16]

Score	Eyes	Pupils	Ears	Whiskers	Vocalization	Activity
1 (fully relaxed)	Closed or half opened; may be blinking slowly	Normal	Half back (normal)	Lateral (normal)	None	Sleeping or resting
2 (weakly relaxed)	Closed, half opened, or normally opened	Normal	Half back (normal) or erect and forward	Lateral (normal) or forward (normal)	None	Sleeping, resting, alert, or active; may be playing
3 (weakly tense)	Normally opened	Normal	Half back (normal), erect and forward, or moving backward and forward	Lateral (normal) or forward	Meowing or quiet	Resting, awake, or actively exploring
4 (very tense)	Widely opened or pressed together	Normal or partially dilated	Erect and forward or backward, or moving backward and forward	Lateral (normal) or forward	Meowing, plaintively meowing, or quiet	Cramped sleeping, resting, or alert; may be actively exploring or trying to escape
5 (fearful)	Widely opened	Dilated	Partially flattened back on head	Lateral (normal), forward, or back	Plaintively meowing, yowling, growling, or quiet	Alert; may be actively trying to escape
6 (very fearful)	Fully opened	Fully dilated	Fully flattened back on head	Back	Plaintively meowing, yowling, growling, or quiet	Motionless but alert or actively prowling
7 (terrorized)	Fully opened	Fully dilated	Fully flattened back on head	Back	Plaintively meowing, yowling, growling, or quiet	Motionless but alert

Appendix 3

Criteria for diagnosing URI in cats.[14]

Interpretation	Criteria
No URI	No clinical signs, mild serous ocular or nasal discharge without any other signs, or mild clinical signs involving a single site (eyes, nose, or oropharynx)
Mild URI	Mild clinical signs involving $>$ 1 site (eyes, nose, or oropharynx), mild purulent ocular or nasal discharge without any other signs, or severe clinical signs involving a single site
Moderate to severe URI	Severe clinical signs involving $>$ 1 site (eyes, nose, or oropharynx), severe clinical signs involving 1 site in addition to purulent ocular or nasal discharge, or mild clinical signs involving $\geq$ 1 site and sneezing during examination