



# AAFP and ISFM Guidelines for Diagnosing and Solving House-Soiling Behavior in Cats



**Rationale:** These Guidelines have been developed by the American Association of Feline Practitioners (AAFP) and the International Society of Feline Medicine (ISFM) as a resource for veterinary practitioners who want to better understand and manage the important clinical condition of house-soiling in their feline patients. The Guidelines offer straightforward, practical solutions that, in most cases, will help veterinarians and cat owners prevent, manage or entirely remediate feline house-soiling behavior.

**Evidence base:** The Guidelines include scientifically documented information when it is available. However, because research is often lacking, some recommendations reflect the accumulated clinical experience of the authors.

## PURPOSE OF THE GUIDELINES

We often hear the statistics: house-soiling is one of the most common feline behavior problems reported by cat owners and a major reason why owners relinquish cats to animal shelters.<sup>1</sup> According to the National Council on Pet Population Study and Policy, shelters in the US euthanize 72% of relinquished cats,<sup>2</sup> many because of house-soiling behavior. If 4–9 million cats are euthanized every year, this could be more than 10,000 cats each day. Veterinarians can decrease this number by helping to correct this commonplace problem. With this goal in mind, we have developed the AAFP and ISFM Guidelines for Diagnosing and Solving House-Soiling Behavior in Cats (hereafter referred to as the Guidelines).

The Guidelines provide clinicians with basic tools for educating cat owners about the prevention of house-soiling behavior. The Guidelines also apply the principles of the previously published AAFP and ISFM Feline Environmental Needs Guidelines,<sup>3</sup> which describe the physical setting where a cat can thrive. Importantly, these current Guidelines elaborate on elimination behavior, describe and illustrate the cat's ideal litter box (also known as a litter tray), and discuss how it should be managed.

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See page 592 for resources available online as Supplementary Material.



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The AAFP and ISFM welcome endorsement of these guidelines by the American Animal Hospital Association (AAHA).

## Definition of terms used in the Guidelines

<b>House-soiling</b>	Deposition of urine or feces on objects or on vertical or horizontal surfaces in locations unacceptable to the owner
<b>Eliminating, toileting</b>	Physiological micturition or defecation
<b>Urine marking, urine spraying</b>	Deposition of normal urine, usually on vertical surfaces outside the litter box or tray, for purposes of communication among cats
<b>Fecal marking, middening</b>	Deposition of normal feces outside the litter box or tray for purposes of communication among cats
<b>Feline idiopathic cystitis (FIC)</b>	A multifactorial condition characterized by one or more lower urinary tract signs (see definition of feline lower urinary tract disease) for which a single underlying cause cannot be determined; also known as idiopathic feline lower urinary tract disease
<b>Feline lower urinary tract disease (FLUTD)</b>	Non-specific term for any of several urinary tract conditions, manifested by signs that may include hematuria, pollakiuria, periuria, stranguria, dysuria, or a combination of these signs
<b>Social group</b>	Two or more cats, either related or familiar to each other, that share a territory and exhibit behaviors that promote social cohesion, such as allogrooming, allorubbing, and playing or resting together

While prevention of house-soiling is ideal, practitioners see many cats with pre-existing house-soiling behavior. The Guidelines explain that, even though the pathophysiology and behavioral etiology of house-soiling is often multifactorial, a thorough chronological history and a systematic diagnostic approach to this problem can be the key to developing an effective treatment plan.

The Guidelines offer straightforward, practical solutions for practitioners and cat owners to implement, but are not intended to be a comprehensive treatise on feline behavior. The Guidelines' authors recognize that feline house-soiling can be a complex problem. Although many cases are straightforward, individual cases can be challenging, sometimes frustrating, and occasionally beyond the expertise or experience of the general, primary care practitioner. In cases where an acceptable response does not occur within a time-frame mutually agreed upon by the veterinarian and client, consultation with a qualified behaviorist or internist is advisable.

In most cases, the Guidelines will help veterinarians and cat owners prevent, manage or entirely remediate feline house-soiling behavior. Effectively managing this common behavioral problem can reinforce veterinarian–client–patient relationships, improve the welfare of cats, and enhance the human–feline bond. These outcomes will ultimately help reduce the number of cats that owners abandon, relinquish or euthanize because of this challenging and emotionally charged issue.



**Effectively managing the common behavior problem of house-soiling can reinforce veterinarian–client–patient relationships, improve the welfare of cats, and enhance the human–feline bond.**

## ASSESSING THE CAT THAT DISPLAYS HOUSE-SOILING BEHAVIOR

### 1 Use the patient's history, determine that a house-soiling problem is present and consider possible causes

A house-soiling questionnaire will capture relevant information for the patient's medical record (see Appendix 1, pages 595–596; and Supplementary Material listed on page 592). For clients who schedule an appointment for a house-soiling complaint, offer to send the questionnaire in advance or ask them to arrive early to complete the form. Some clients may not be aware that a problem exists and others may be embarrassed to discuss it, so ask *every* client specific questions at *every* examination in order to identify unapparent house-soiling cases. The most important question to ask is, 'Has your cat urinated or defecated somewhere in the house other than in the litter box?' If the answer is 'yes' then obtain a more detailed history in the examination room or send the questionnaire home with the client and schedule a follow-up appointment.

When reviewing the history, pay particular attention to the timeline of the problem's onset and how it progressed. Use the owner's house floor plan diagram (requested as part of the questionnaire) to evaluate the extent and location of the feces or urine deposition. Also note whether the majority of incidents involve litter box management or are associated with issues regarding interactions among cats or between cats and people.

### 2 Perform a thorough physical examination (including a basic orthopedic and neurologic assessment) on every house-soiling cat

Basic findings such as a mild hair loss in the prepubic area may suggest bladder pain, while inflexible joints may limit a cat's ability to access its litter box.

**3 Perform additional tests or procedures as needed based on history and physical examination findings**

For specific recommendations, see discussion on medial etiologies within the ‘Diagnosis of the four basic causes of house-soiling’ section (page 582).

**4 Make a diagnosis**

For the purposes of simplifying the diagnostic categorization of house-soiling cases, we recommend the following designations:

- ✦ Medical etiologies (including urolithiasis, chronic kidney disease, urinary tract infections, diabetes mellitus, hyperthyroidism, arthritis, orthopedic etiologies and neoplasia).
- ✦ Feline idiopathic cystitis (FIC).
- ✦ Marking behavior.
- ✦ Elimination related to primary environmental or social factors.

**5 Formulate a treatment plan**

First discuss the importance of an optimal litter box and fulfilling the five pillars of a healthy feline environment (see pages 585–587), even if the cat has a contributing or concurrent medical condition. Next formu-

The most important question to ask your clients is: ‘Has your cat urinated or defecated somewhere in the house other than in the litter box?’



late specific therapies as discussed in later sections.

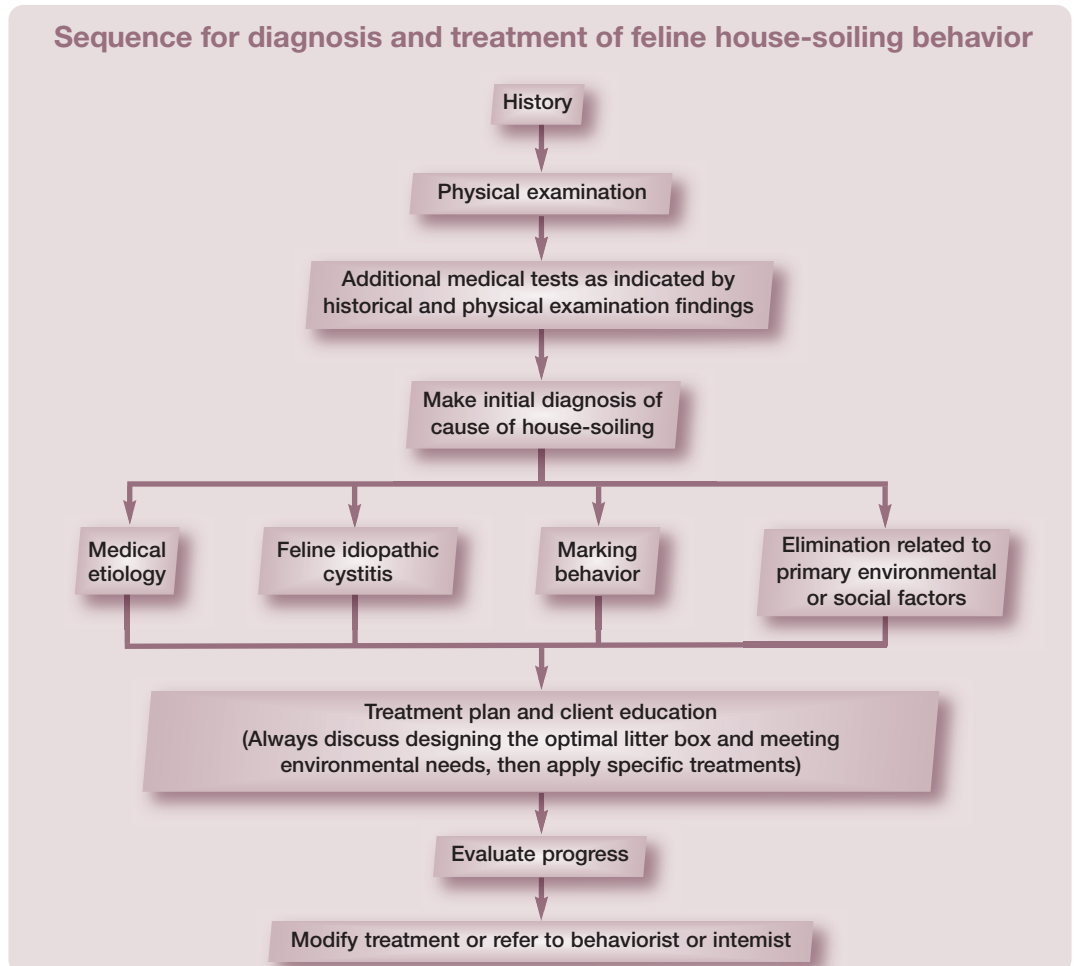
**6 Follow-up**

Contact the owner on a routine basis to answer any questions that emerge. A phone call or e-mail within 2 weeks of the initial diagnosis can encourage an owner to work with the cat and the veterinarian to solve the house-soiling problem.

**7 Evaluate progress, fine-tune your treatment plan, and refer the case for further management if necessary**

In many cases, there may be more than one of the four house-soiling diagnostic categories (listed above under step 4) involved. Treating underlying medical conditions may not completely resolve house-soiling if it occurs as a result of adverse behavioral conditioning. The limitations of medical treatment in correcting house-soiling underscore the importance of non-medical interventions, especially maintaining optimal litter box facilities and addressing environmental and social factors that affect both marking and elimination behaviors. In select cases, rehoming to a more suitable environment should also be considered if environmental or social stressors cannot be removed or reduced sufficiently.

A stepwise approach will optimize the chances of successful management of house-soiling cases. We suggest the sequence depicted in the algorithm on the right and detailed in the numbered paragraphs on pages 580 and 581.



## DIAGNOSIS OF THE FOUR BASIC CAUSES OF HOUSE-SOILING

This section discusses diagnostic recognition of what are considered the four basic causes of feline house-soiling: medical etiologies, FIC, aberrant marking behavior, and elimination related to primary environmental or social factors. Because these causative factors sometimes coexist, they should all be considered in managing a house-soiling cat.

### Medical etiologies

Any cat that is ill may exhibit behavioral changes, including house-soiling. If senior or geriatric cats present for house-soiling and have no history of this behavior, testing beyond the basics listed below, such as with chest radiographs or gastrointestinal profiles, may be of benefit.

#### Medical evaluation of urinary house-soiling

The following tests are components of an optimum diagnostic approach for cats that present for house-soiling with urine:

❖ **Urinalysis, including urine sediment examination** Analyze the urine sample within 30–60 mins of collection to obtain the most reliable, accurate results, particularly when evaluating urine sediment.<sup>4</sup>

❖ **Urine culture (cystocentesis required)** If the urine of any cat is consistently dilute (specific gravity <1.030), evaluate a complete blood count (CBC) and biochemistry profile. For a mature patient (>8 years), also evaluate a thyroxine (T4) sample.<sup>5</sup>

❖ **Abdominal radiographs (to include the entire lower urinary tract)** In many studies, cystic calculi are diagnosed more often than bacterial cystitis,<sup>6</sup> so abdominal radiography is advisable.

❖ **Abdominal ultrasound (to include the entire lower urinary tract).**<sup>7</sup>

The above diagnostic baseline usually eliminates or confirms the presence of the following conditions:

- ❖ Bacterial cystitis.
- ❖ Urinary incontinence.
- ❖ Radiopaque uroliths (struvite and calcium oxalate). Approximately 20% of cats with feline lower urinary tract disease (FLUTD) will have cystic calculi.<sup>6</sup>
- ❖ Polyuria or polydipsia.
- ❖ Radiolucent uroliths and neoplasia.<sup>7</sup>

If all diagnostic data are within normal limits, medical causes of house-soiling are unlikely. However, the patient could still have FIC because no diagnostic test is currently available for this condition.

House-soiling medical etiologies include urolithiasis, chronic kidney disease, urinary tract infections, diabetes mellitus, hyperthyroidism, arthritis, orthopedic etiologies and neoplasia.



### Medical evaluation of fecal house-soiling

For cats presenting with a history of defecation outside a designated location, diagnostic testing will consider lifestyle factors, physical examination findings, and the duration and severity of clinical signs. The clinician should also determine whether the cat has chronic or acute constipation or diarrhea.

The following diagnostic tests are appropriate for cats that exhibit house-soiling by defecation:

❖ **Fecal examination** Refer to the Companion Animal Parasite Council General Guidelines.<sup>8</sup> If fecal elimination is abnormal (eg, diarrhea or constipation), perform additional diagnostic evaluation (eg, feline pancreatic lipase immunoreactivity, vitamin B<sub>12</sub>/folate assays, abdominal imaging and/or endoscopic evaluation).

❖ **Digital rectal examination** We strongly recommend using sedation or anesthesia for patient comfort and improved diagnostic accuracy.

❖ **CBC and biochemical profile ± T4.**

The above diagnostic baseline may help to confirm or exclude the following diagnoses:

- ❖ Intestinal parasites.
- ❖ Arthritis, spondylosis.
- ❖ Impacted anal glands.
- ❖ Rectal strictures.
- ❖ Organic causes of small- and large-bowel disease.
- ❖ Some causes of fecal incontinence.

Additional blood work and imaging studies may be warranted in cases of constipation or diarrhea to evaluate the cat for underlying conditions such as kidney disease, hyperthyroidism and conformational abnormalities of the pelvis.

As with house-soiling involving urination, if all diagnostic values are within normal limits, aberrant marking behavior or elimination related to primary environmental or social factors are the most likely causes of house-soiling with stool.

### Feline idiopathic cystitis

Pain or discomfort associated with FIC may cause a cat to exhibit house-soiling behavior (Figure 1). Cats are diagnosed with FIC when they have one or several episodes of FLUTD and a thorough diagnostic work-up finds no single etiology (ie, no stones, urinary tract infection, tumor or other physiologic causation).<sup>9</sup> Researchers are now looking beyond the bladder and considering the whole individual when evaluating these cases.<sup>10</sup> Currently, no single specific diagnostic test or marker will confirm FIC.<sup>11</sup>



**Figure 1** Blood-tinged urine deposited by a cat with FIC in a urine-marking incident. Courtesy of Hazel Carney

FIC can be obstructive or non-obstructive in its presentation. It can also occur as a chronic disease. Urethral obstruction is more common in younger, overweight cats and in male cats, with no difference in prevalence for intact versus castrated males.<sup>12</sup> Excessive bodyweight, decreased activity, multiple cat households and indoor housing may increase the risk for FIC.<sup>13,14</sup>

Various forms of FIC exist. The disease may be self-limiting, wax and wane, or be chronic and persistent in some cats.<sup>15</sup> Problems associated with the bladder,<sup>16–18</sup> nervous system,<sup>19</sup> endocrine system<sup>20</sup> and various other comorbid disorders may occur concurrently.<sup>21</sup> Behavioral abnormalities such as increased startle responses, nervousness and excessive over- or under-attachment to owners may also be present.<sup>22</sup> It is hypothesized that some cats with FIC may have had adverse experiences early in life, sometimes in utero.<sup>23</sup>

Treatment options for FIC are discussed on pages 586–589.

## Marking behavior

A diagnosis of marking as the cause of house-soiling requires exclusion of medical etiologies, FIC, and elimination related to primary environmental and social factors. It also requires an understanding of why the cat marks. A house floor plan diagram that identifies doors and windows, resources, cat-to-cat interaction locations and areas of marking can be very useful in identifying sites where the house-soiling cat feels the need to leave evidence of its presence.

Cats in general avoid confrontation, so they communicate with other cats about when they were last at a given location by using olfactory and visual clues. A stressful environment often exacerbates marking behavior as well as FIC.<sup>21</sup> Reducing fear and anxiety decreases urine marking behavior and inter-cat aggression, as well as other negative results of chronic

Confident and anxious cats alike will exhibit marking behavior.



**Figure 2** The cat displays urine marking behavior by depositing a small amount of urine on a vertical surface while standing with a raised tail. Courtesy of Hazel Carney

stress.<sup>24</sup> Cats mark in a variety of ways which owners may find objectionable (see box below).

### Feline urine marking behavior

Urine spraying is a normal part of feline behavior. Typical characteristics of urine marking behavior include:

- ✦ **Posture** From a standing position with the tail up and twitching, the cat deposits small amounts of urine on vertical surfaces (Figure 2). The cat may have a fixed stare or vacant facial expression. Some cats may occasionally squat and mark on horizontal surfaces as well.
- ✦ **Frequency** It varies greatly and generally does not correspond with normal voiding intervals.
- ✦ **Volume** Urine volume produced in marking varies but typically is small. The cat may continue to void normal amounts of urine in the litter box at normal intervals while marking outside of it.

## Types of marking behavior

### Scratching

Scratching is a visual and olfactory marking behavior. The cat deposits scent from glands at the base of its foot pads and leaves visible marks on objects.

### Rubbing

The cat uses glands on its cheeks and chin to deposit scent onto other individuals in its social group (which may include cats, humans and other pets), as well as onto furniture, walls and other inanimate objects.

### Urine spraying

Urine spraying (Figure 2) is usually the most objectionable form of house-soiling, but one that can often be avoided if owners understand the cat's motivations for marking.

### Middening

Middening is the deposition of feces, usually in strategic and conspicuous open areas within feline territories. Middening is the least common form of feline marking. Assessment and therapy for this behavior are similar to that for urine marking.

Urine spraying is either a sexual (associated with reproductive function) or a reactional behavior.<sup>25</sup> Intact male and female cats both exhibit sexual marking to advertise their presence and availability. Vocalization often accompanies sexual marking. Neutering intact animals dramatically reduces sexually related marking. However, approximately 10% of neutered male cats without lower urinary tract disease will persist in marking behavior,<sup>26</sup> and 4% of female neutered cats may continue to mark as well.<sup>27</sup>

Reactional or anxiety-related marking occurs in response to a change in the cat's environment, especially its core area where it eats, sleeps and plays. The cat marks to leave its own scent. Confident and anxious cats alike will exhibit marking behavior. Anxious cats mark to reduce their anxiety by making the affected area smell like themselves, which helps increase their confidence. Cats with FIC may urine mark, sometimes with bloody urine (Figure 1).<sup>28,29</sup>

Confident cats mark as a 'calling card' to denote their presence, but there is no evidence that the mark is intended to be threatening to other cats. Cats do not normally mark to cover another cat's scent and will sniff the other cat's mark without becoming agitated or fearful. They may then show a flehmen response. Within feline social groups, including human households, cats detect and identify a collective odor.<sup>30</sup> The collective odor is made up of all the scents, including those expressed by feline and human individuals, and by inanimate objects such as furniture and carpeting. Introduction of another pet, person, or new furniture or other objects into this environment changes the collective odor to some degree and can stress some cats enough to induce urine marking behavior.

Cats will frequently mark the same areas repeatedly. The urine odor changes with time and frequent marking keeps the odor more consistent. Frequently marked areas involve travel routes throughout the core home environment. Items that change in temperature, such as stoves, toasters and electronic equipment, are frequent marking targets. Articles accompanied by new scents, such as suitcases, backpacks and shoes, may also be marked. Marking behavior that starts at windows and doors usually suggests the perceived threat is coming from outside the home. Initial marking in stairways, hallways, doorways leading into rooms and the centers of rooms usually indicates stressors originating from within the household. Cat doors or flaps can sometimes trigger urine marking at those sites due to the perceived or actual threat of other cats entering into the household cat's core environment.

## Normal feline elimination behavior

Kittens learn voluntary elimination at about 4 weeks of age, and by 3–5 weeks of age they start exploring litter substrates and may lie down in open litter boxes.<sup>31</sup> At 5–7 weeks, kittens start to eliminate in the litter box and may or may not cover the stool or urine. Covering urine and feces is innate feline behavior, and usually starts at 7 weeks of age, although some cats will leave their urine and feces exposed.<sup>32</sup>

Cats typically squat to urinate or adopt a slightly raised squat to defecate. Most cats prefer to eliminate in secluded or private locations at the edge of their core territory.<sup>33</sup> Normal feline elimination usually occurs away from feeding and resting areas. Because cats typically eliminate several times a day, the capacity of the litter box can easily be exceeded. Cats typically prefer separate elimination sites for urine and feces, and favor soft, porous substrates such as sand or soil, although some cats have other distinct preferences.

## Elimination related to primary environmental or social factors

A diagnosis of elimination related to primary environmental or social factors as the cause of house-soiling requires exclusion of medical etiologies, FIC and marking behavior. It also requires an understanding of normal feline elimination behavior (see box above). A house floor plan diagram that identifies litter box locations as well as house-soiling sites in relation to potential areas of cat-to-cat conflict, high traffic or noise can be very useful in diagnosing elimination due to environmental or social factors.

### Overcrowding, social competition and adverse human interventions

In a multi-cat household, overcrowding or the presence of a 'despot' cat that monopolizes litter box resources may cause less confident cats to seek out inappropriate places for elimination.<sup>24,34</sup> Some cats may avoid using a litter box that is placed in proximity to high traffic areas or near cat doors or flaps that are accessed by other cats. In general, cats need to be able to reach litter boxes without having to encounter other cats. Most cats prefer private places to eliminate rather than busy locations, and may need different locations for urinating and defecating. In some households, an insecure cat feels safest on the owner's bed and may eliminate there instead of going to the litter box.

Litter box aversion can also be caused by counterproductive or inattentive human behavior. Examples include using the litter box as a site for administering medications, locating toileting areas near noisy appliances, and allowing children to trap a cat in the litter box for any reason. A cat may avoid the litter box if it associates toileting with any adverse stimuli or experiences. A soiled litter box may cause litter box aversion.



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## TREATMENT AND MANAGEMENT CONSIDERATIONS FOR ALL HOUSE-SOILING CASES

Optimizing the litter boxes and fulfilling the five pillars of a healthy feline environment (see pages 586 and 587) will improve the interaction of cats within their environment, decrease potential sources of stress and, as a result, should prevent or decrease the frequency of house-soiling.

### Designing the optimal litter box

The average cat eliminates approximately three to five times a day.<sup>1</sup> The design and management of the litter box are critical for encouraging acceptable toileting habits. When house-soiling occurs, always evaluate the litter box.

#### Litter box number and location

Households with a single cat should have two litter boxes in two separate locations. In multi-cat households, the historical rule of thumb is to have at least one more litter box than the total number of cats, although this is not an absolute requirement. Socially affiliated cats may be more willing to share litter boxes. Cats which are not socially affiliated should have separate litter stations. More litter boxes may be needed depending on the number of social groups and unaffiliated cats. At least one litter box should be placed at each level of a multi-level home. Consequently the guiding principle is to provide a sufficient number of litter boxes in multiple locations around the house so that each social group has an adequate number of toileting sites in different places.

Avoid placing food and water close to the litter box, as this discourages elimination in that location. Cats perceive litter boxes located adjacent to each other as one large box. Openings of adjacent litter boxes should not be facing each other, but should be positioned at right angles or around the corner from each other. This arrangement allows cats to exit the box and avoid an approaching cat.



The guiding principle is to provide sufficient litter boxes in multiple locations around the house so that each social group has an adequate number of toileting sites in different places.

If a litter box goes unused, the owner can remove it if other boxes are available and being used. If a cat is toileting away from its litter box, try placing the litter box at a new site until the situation is remedied. After the cat begins using its litter box, leave it in the same place for at least 2 weeks, even if the location is inconvenient for the client. After litter box utilization has become consistent, it may be possible to gradually move the box (several inches a day) to a location preferred by the human occupants of the house.

#### Litter box size

Research suggests that size of the litter box is as important as the number of boxes. In general, bigger is better. Unless the owner is able to inspect and remove soiled litter on a regular basis (at least once every 2 h to avoid odor build up), many commercial litter boxes prove to be too small. We recommend a rectangular litter box that is 1.5 times the length of the cat from nose to base of tail; in one study, adult cats preferred a box that was 34 x 15 inches (86 x 39 cm) over a smaller one.<sup>35</sup> If a large enough litter box is not available at the pet store, a home improvement store or department store can provide suitable alternatives. Examples include concrete mixing trays, sweater boxes and under-bed storage containers (Figures 3–5). The lids from the containers can be placed upright behind the litter box to protect the wall.

#### Covered versus open litter boxes

Research has shown that cats are equally divided in their preference for large, covered litter boxes versus uncovered boxes.<sup>36</sup> The cat's preference may be influenced more by regular cleaning than by whether the litter box is covered. Consequently, open boxes are recommended whenever possible to facilitate owner monitoring and frequent scooping. Small covered boxes may make it difficult for larger cats to posture normally for the purposes of elimination. Cats may avoid a covered box when it contains a scent or odor, but resume use once it is cleaned and has a neutral



**Figure 3** This litter box is of adequate size and depth for an adult cat. The high back helps protect the wall. *Courtesy of Vicky Halls*



**Figure 4** A storage container with the side cut down for easy entry makes a good litter box. The low entry will facilitate use by an older cat or one with degenerative joint disease. Note placement of the lid behind the box to protect the wall. *Courtesy of Kari Mundschen*



**Figure 5** A concrete mixing tray available at a local hardware store makes a good litter box. This one is made of heavy plastic, with a smooth surface and adequate depth and size (24 x 36 x 8 inches). *Courtesy of Kari Mundschen*

odor. An open box avoids trapping odors inside. A high-sided box provides some security and is effective at collecting urine for those cats that stand while urinating.

Regardless of design, the litter box opening should allow easy access. In multi-cat households, despot cats may prevent timid cats from accessing or exiting the litter box.

### Litter

Cat litter is marketed to people, not to cats. Marketers appeal to cat owners by using product descriptions such as 'less tracking', 'multi-cat', 'scented', 'organic' and 'natural'. Consequently, litter may have descriptions or attributes that appeal to humans but not to their feline companions. For example, cats often find aromatic litter and litter deodorizers offensive. No product reduces or removes the need to regularly clean and maintain litter boxes. Balancing on the edges of litter boxes with only one or two feet inside the box may indicate an aversion to the litter substrate or soiled litter. Cats without house-soiling problems tend to dig in the litter box before eliminating to a greater extent than house-soiling cats.<sup>37</sup> Cats vary in their preferences for litter depth. In most cases, the litter should consist of a fine, sand-like, non-scented, clumping material to a depth of at least 1.25 inches (3 cm). Avoid liners, slotted grills or deodorizing powders. For preference evaluation, provide multiple boxes with different litters and variable litter depths (Figure 6).

Cats may prefer to use the same toileting substrate indoors that they use outdoors, namely soil or sand. You can gradually add the litter substrate of choice to the indoor litter box.

A cat that experiences discomfort in its paws due to a surgical procedure or other causes may develop a preference for certain types of litter. Try different litters until the cat indicates its preference.

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### Managing the litter box

Remove waste a minimum of once a day and add litter as needed. Wash the litter box every 1–4 weeks. Some behaviorists feel that weekly washing and replacing the litter is optimal. Others find that every 2–4 weeks does not compromise the cat's response and is more readily accepted by owners. Rarely, because of a particularly difficult to control urinary tract infection, daily washing of the litter box may be recommended. Use soap and hot water only; avoid strong chemicals or any ammonia-based products.



No product reduces or removes the need to regularly clean and maintain litter boxes.



**Figure 6** A litter box test can determine which type the cat prefers. Variable litters, depths of litter and sizes of boxes are available for selection by the cat. Courtesy of Kari Mundschenk

## Fulfilling the five pillars of a healthy feline environment

The AAFF and ISFM Feline Environmental Needs Guidelines describe in detail the 'five pillars' of a healthy feline environment that support the cat's physical health, emotional wellbeing, and interaction with its human companions and with other animals.<sup>3</sup> Fulfilling all five feline environmental pillars is a fundamental strategy for preventing or correcting house-soiling behavior. The key elements of each of the environmental pillars, and how they can affect feline elimination behavior, are described on page 587.

## TREATMENTS FOR SPECIFIC CAUSES OF HOUSE-SOILING

### Medical etiologies

Address any medical condition you diagnose. Optimize the cat's litter boxes and fulfill its environmental needs, which may change in response to its disease. For example, cats with degenerative joint disease may require a litter box with a very shallow opening (Figure 4). Because pain or weakness in convalescent cats may limit access to their favorite litter box, provide an alternative box closer to their recovery area. Debilitating conditions such as arthritis, muscle weakness and impaired vision can impede the ability of elderly cats to reach litter boxes that are located in basements or far from the cat's core territory. In such cases, owners should be instructed to place litter boxes in more easily accessed areas. Placement of night lights and additional litter boxes close to sleeping areas will help minimize anxiety in older cats.

### Feline idiopathic cystitis

The following modalities are commonly used to treat FIC:

- ❖ **Analgesics** Narcotics such as oral buprenorphine (oral transmucosal) or a fentanyl patch may be effective. Note that butorphanol is usually not recommended for feline analgesia due to its short duration of effect. The choice of drug should be based on the severity of clinical signs.
- ❖ **Alpha antagonists** Alpha antagonists (eg, prazosin or phenoxybenzamine) can be considered in male cats with obstructive FIC.
- ❖ **Meeting the cat's environmental needs** (See the AAFF and ISFM Feline Environmental Needs Guidelines.<sup>3</sup>) A subset of these guidelines known as multimodal environmental modification (MEMO) therapy has been documented to significantly decrease clinical signs and increase the



## Five pillars of a healthy feline environment<sup>3</sup>

### Pillar 1 Provide a safe place

A cat's sense of safety is enhanced by access to isolated or secluded areas where it feels protected from what it perceives to be potential threats. Examples of a safe retreat are raised locations such as a perch and enclosures where a cat can conceal itself. An individualized, secure location allows a cat

to 'avoid and evade' strange smells, noises, or unfamiliar objects, people or other cats. Giving a cat the option of withdrawing increases its sense of control and security. Using the tips for improving a cat's territorial security (see page 590) will help you provide this safe place.

### Pillar 2 Provide multiple and separated key environmental resources: food, water, toileting areas, scratching areas, play areas, and resting or sleeping areas

Cats need access to environmental resources without being challenged by other cats. Key environmental resources include feeding, drinking, claw-scratching, playing and resting areas and, importantly, toileting sites. Ideally, these resources should be available in multiple, physically separate locations. This avoids the stress of competition for resources among cats in multi-cat households. Even in single-cat households, having more than one litter box or food and water bowl in separate locations may be beneficial. Provide the following:

- ✦ Separate feeding stations for each cat.

- ✦ Multiple water locations separate from feeding stations.
- ✦ Multiple resting places, some of which are elevated (increased vertical space increases a cat's perception of territorial space and facilitates 'time sharing' of favorite locations). Some covered resting places should be provided. These can be as basic as cardboard boxes or cat carriers.
- ✦ Multiple litter boxes containing preferred substrates located in multiple places (see section on 'Designing the optimal litter box', pages 585–586).

### Pillar 3 Provide opportunity for play and predatory behavior

Boredom stresses cats. Hunting provides both play and food for cats. Pseudo-predatory play and feeding behavior satisfies a cat's instinctive desire to locate, stalk and kill its prey. This type of activity provides physical and mental stimulation that may help to reduce the risk of obesity, boredom and undesirable behaviors. Play-based interaction with its owner and use of feeding devices that require a cat to actively acquire its food can occupy a significant portion of its daily activities.

To stimulate cats, offer self-directed activities or devices such as food balls, puzzle toys and small food caches

throughout the house. Locate these in boxes or elevated locations to keep cats interested. Small, soft plush toys that the cat can attack and carry away are often effective enrichment devices. Multiple short periods of play (1–10 mins) with laser pointers and fishing pole toys also decrease boredom. If laser pointers are used it is essential that the light comes to settle on a physical object that the cat can get hold of. Use of a laser pointer without this provision can induce significant levels of frustration. Cats from different social groups need individual play.

### Pillar 4 Provide positive, consistent and predictable human–cat social interaction

Cats benefit from regular, friendly interaction with humans. Consistent, gentle and friendly handling of a kitten from a young age establishes a strong human–cat bond and minimizes a feline pet's general level of stress and fear of humans. Tolerance and preferences for human contact vary by individual cat and its life stage. Most cats normally seek

frequent, low-intensity interactions, and tend to prefer shorter periods of petting around the face and head. Owners who prefer fewer but more intense interactions such as extended petting may create stress for the cat. The owner should allow the cat to both initiate and stop interactive behavior.

### Pillar 5 Provide an environment that respects the importance of the cat's sense of smell

Olfactory and chemical information is a primary means by which cats evaluate their surroundings and affirm their sense of security and comfort within their core living area. It is important for pet owners or other humans to avoid introducing odors or substances (eg, detergents, medications, foods, laundry, or unfamiliar clothing items) that compete with or

disrupt the cat's sensory perception of its environment. When a cat encounters unpleasant or threatening olfactory stimuli, anxiety-associated problem behaviors often occur. Marking is an important form of olfactory communication. A fundamental principle of maintaining a secure and familiar sensory environment is not to punish cats for house-soiling.

disease-free interval in cats with chronic FIC. The three most important modifications are optimal litter box management, increased owner interaction with the cat and client education.<sup>38</sup>

- ✦ **Dietary management** A canned diet may be helpful for some cats. Efforts to acidify the urine using dry foods have no demonstrated value in the treatment of cats with FIC. However, if pronounced struvite crystalluria

**Table 1** Drugs that have been used for the treatment of house-soiling in cats

	Class of drug	Mechanism of action	Indications	Suggested dosage	Potential side effects	
Drugs for cats with urethral obstruction	<b>Prazosin</b> (Minipress; Pfizer)	Alpha adrenergic antagonist	Inhibits $\alpha$ -1 adrenergic receptors	Functional urethral obstruction. Also ureteral obstruction	0.25–1 mg/cat PO q8–12h	Sedation, hypotension
	<b>Tamsulosin</b> (Flomax; Boehringer Ingelheim)	Alpha adrenergic antagonist	Inhibits $\alpha$ -1 adrenergic receptors	Functional urethral obstruction. Also ureteral obstruction	<i>Doses are anecdotal:</i> 0.004–0.006 mg/kg PO q24h	Sedation, hypotension
	<b>Bethanechol</b> (Urecholine; Barr/Duramed)	Parasympath-omimetic	Stimulates muscarinic receptors in the bladder	Detrusor atony	2.5–5 mg/cat PO q12h	Vomiting, diarrhea, salivation
Drugs considered for treatment of house-soiling	<b>Amitriptyline</b> (Elavil; AstraZeneca)	TCA	NE reuptake inhibition; central and peripheral anticholinergic activity; antagonism of the H1 receptor; 5-HT reuptake inhibition; glutamate and Na <sup>+</sup> channel receptor antagonist	Chronic FIC	2.5–10 mg/cat PO q12–24h*	Sedation, weight gain, urine retention, urolith formation, anticholinergic effects
	<b>Clomipramine</b> (Anafranil; Mallinckrodt) (Clomicalm; Novartis)	TCA	NE and serotonin reuptake inhibition	Chronic FIC, urine marking	0.25–1.3 mg/kg PO q24h*	Sedation, anticholinergic effects, urine retention; less anticholinergic effects than amitriptyline
	<b>Buspirone</b> (BuSpar; Bristol-Myers)	Azapirone – serotonin 1A partial agonist	Blocks pre- and post-5-HT1A receptors; downregulates 5-HT2 receptors; moderate affinity for D2-dopamine brain receptors	Urine marking	2.5–7.5 mg/cat PO q12h*	Rare sedation or other neurologic effects. Avoid use in cats aggressive to other cats (and marking). May help the ‘victim cat’ (that is marking). Should not be given in combination with MAOIs; can be given with TCAs and SSRIs
	<b>Fluoxetine</b> (Prozac; Eli Lilly)	SSRI	Strong inhibitor of serotonin reuptake and very weak inhibitor of NE reuptake	Chronic FIC, urine marking	0.5–1.3 mg/kg PO q24h*	Decreased food intake, inappetence at higher doses (so start low); vomiting and lethargy (rare); urine retention reported
	<b>Paroxetine</b> (Paxil; GlaxoSmithKline)	SSRI	Highly selective inhibitor of serotonin reuptake; weak effects on neuronal reuptake of dopamine and NE	Urine marking	0.5–1.5 mg/kg PO q24h*. May be effective if given every other day	Decreased food intake, inappetence at higher doses (so start low); vomiting and lethargy (rare); urine retention reported
	<b>Alprazolam</b> (Xanax; Pfizer)†	Benzodiazepine – anxiolytic	Facilitates GABA in the CNS – binding to GABA <sub>A</sub> receptors	Urine marking	0.0125–0.025 mg/kg PO q8h; 0.125–0.25 mg/cat PO q12h (low dose first to evaluate for paradoxical excitement)	Sedation, increased appetite, ataxia; paradoxical excitement (rare)
	<b>Diazepam</b> (Valium; Roche)†	Benzodiazepine – anxiolytic	Facilitates GABA in the CNS – binding to GABA <sub>A</sub> receptors	Urine marking	0.1–1.0 mg/kg PO, IM or IV q4h* or less frequently as needed	Sedation, increased appetite, ataxia; paradoxical excitement (rare)
	<b>F3 fraction of feline facial pheromone</b> (Feliway; Ceva)	Synthetic pheromone	Alters emotional state of the animal via the limbic system and hypothalamus	Anxiety-related behaviors, chronic FIC	One spray in affected area once daily as needed, or room diffuser	None reported
<b>Megestrol acetate</b> (Ovaban; Schering-Plough)‡	Synthetic pro-gestin	Anti-estrogen and glucocorticoid activity	Refractory cases of urine marking	5 mg PO q24h x 5–7 days, then 1x/week; or 2 mg/kg/day PO x 5 days, then 1 mg/kg/day x 5 days, then 0.5 mg/kg/day x 5 days*	Adrenocortical suppression, adrenal atrophy, transient diabetes mellitus, mammary hypertrophy, neoplasia	
Drugs for treatment of urolithiasis	<b>DL-Methionine</b>	Sulfur-containing amino acid	Methionine metabolized and sulfate excreted in urine as sulfuric acid, thereby acidifying urine	For urine acidification when dietary management fails	0.5–1 g PO on food q24h	Gastrointestinal distress, metabolic acidosis
	<b>Ammonium chloride</b>	Acid-forming salt	Administration results in a decrease in serum bicarbonate and decrease in blood and urine pH	For urine acidification when dietary management fails§	20 mg/kg PO q12h	Gastrointestinal distress, metabolic acidosis

Many of these agents are not approved for feline use but have been used off-label in cats (see text)

\* Start at low end of dosage range and increase as needed; use lowest effective dose

† Some clinicians avoid use of diazepam because it has been reported rarely to cause fatal hepatopathy; other benzodiazepines may pose a similar risk

‡ No one recommends this drug as a first-line treatment. Some behaviorists never use the drug because of its potentially very serious side effects. Other behaviorists offer it as a final alternative to euthanasia or rehoming because they have used it successfully based on experience and prior research data

§ Urinary acidifiers should only be used (1) in cats with a disease where this might benefit them such as struvite urolithiasis and (2) when diet alone under ad libitum feeding conditions does not produce the desired pH; (3) the cat should be monitored to ensure acidosis does not occur

TCA = tricyclic antidepressant, SSRI = selective serotonin reuptake inhibitor, NE = norepinephrine, MAOI = monoamine oxidase inhibitor, 5-HT2 = 5-hydroxytryptamine, GABA = gamma-aminobutyric acid

is present in an obstructed male cat, consider using a diet formulated for struvite dissolution and prevention.

❖ **Antibiotics** *Do not use* antibiotics unless you obtain a positive urine culture. For cats with previous urinary catheterizations, we recommend culture of urine collected by cystocentesis because these cats may be at increased risk for UTI.<sup>29</sup>

❖ **Synthetic pheromones** Use of synthetic pheromones can reduce or eliminate house-soiling behavior (see page 591).<sup>28</sup>

FIC is a complex disease process that is not fully understood at this time. Careful disease management involving the owner can result in beneficial effects for the cat and improve veterinarian–client relationships. Because FIC can be a chronic, frustrating disease, excellent client communication in conjunction with MEMO therapy, including the environmental management recommendations discussed elsewhere in the Guidelines, analgesics, and other pharmacologic agents may be of benefit in treating acute and chronic cases. Some cats with an underlying predisposition for FIC may develop recurring clinical signs when exposed to a significant stressor.

Table 1 provides a comprehensive list of drugs that have been used for treatment of house-soiling, including dosage and administration recommendations. Many of these agents are not approved for feline use but have been used off-label in cats. Appropriate precautions should be observed for any off-label drug use. These agents have variable degrees of anecdotal success but little scientific evidence as to their efficacy. Do not use tricyclic antidepressants (TCAs) or selective serotonin reuptake inhibitors (SSRIs) for treatment of acute FIC because they have little or no benefit for short-term resolution of clinical signs. Consider using TCAs and SSRIs only for recurrent, severe cases. Also, use these drugs only after environmental strategies, dietary changes and behavior modification have failed. Amitriptyline, a TCA, has been investigated in a non-placebo clinical trial, and may decrease clinical signs of severe, recurrent FIC when given long term; short-term usage may worsen the condition and is not recommended.<sup>39</sup> Anecdotal improvement has been reported in some cats treated with clomipramine, another TCA, in recurrent cases of FIC. Fluoxetine, a SSRI, has some efficacy in managing house-soiling.<sup>27</sup>

Studies have shown that glycosaminoglycans (GAG) replacers such as pentosan polysulfate provide no significant benefits over placebo in treating FIC.<sup>19,40</sup> However, GAG-treated and placebo cats that responded to treatment possibly did so by decreasing stress and increasing owner–cat interaction ('placebo effect').

## Urine marking

A multifaceted approach using environmental modification, a cleaning regimen and, in some cases, psychopharmacology has the greatest chance of reducing urine marking.<sup>41</sup> The basic treatment plan for a urine marking cat includes four components:

- ❖ Determine the most likely stimuli for this cat's marking behavior.
- ❖ Remove the cat's need to mark, including elimination of marking 'triggers', cleaning urine-soiled areas that can stimulate marking, and gradually reintroducing cats to the home environment after an absence.
- ❖ Modify the cat's behavior by using positive reinforcement.
- ❖ Use pharmacologic therapy, pheromone therapy and nutraceuticals, as appropriate.

Always use each of the first three components of the plan. Understand and explain to the owner that because urine marking is a normal behavior, modifying or eliminating it can be challenging – and sometimes impossible. This is especially true in cases where the owner cannot reduce the stress in a cat's environment or if the cat's temperament limits the success of behavior management techniques. In such cases, pharmacologic therapy may significantly decrease or eliminate urine marking.

### Determine the most likely stimuli for marking behavior

Several resources are available that enable the veterinarian and pet owner to jointly determine what motivates the cat to urine mark. These indicators include the clinical presentation timeline on the patient's history form, the house floor plan diagram that the owner provides, and information about the cat's litter box location and design, physical environment, family interactions and cat-to-cat relationships.

### Remove the need to mark

Optimizing litter box management decreases urine marking in some cats, especially females.<sup>42</sup> Improving the cat's perceived core territory security and addressing its social needs will decrease the cat's need to mark.<sup>43</sup> (See 'Tips for improving a cat's territorial security', page 590.)

### Remove marking 'triggers'

Examples of ways in which marking triggers can be removed include:

- ❖ Spaying or neutering to physiologically eliminate sexually related marking behavior.
- ❖ Restricting the potential threat from other cats (roaming cats encroaching on the household can act as triggers). If the resident cat resides indoors only, using motion-activated water sprinklers will make the yard an

Many of the agents in Table 1 are not approved for feline use but have been used off-label in cats. Appropriate precautions should be observed for any off-label drug use.



Compounding pharmacies may be useful in providing highly palatable oral preparations of some of the medications listed in Table 1. This could be an ideal solution for the difficult to treat patient, which in turn will make successful management more likely. We emphasize due diligence in the selection of such pharmacy.

## Tips for improving a cat's territorial security

**Resource distribution should ensure that cats in different social groups are not forced to share essential resources.**



### Distribution of resources

More than one social group may exist in the household, depending on the number of cats and their interactions. Resource distribution should ensure that cats in different social groups are not forced to share essential resources. 'Despot' cats are bullies that deliberately monopolize resources and intimidate one or more of the other cats in the household.<sup>44</sup> To decrease conflict, ensure that each cat has access to all resources, especially as they reach social maturity at 2–4 years of age.<sup>45</sup>

Owners frequently think that cats get along well when they eat next to each other. Cats will often tolerate each other at feeding sites because of the importance of having access to food, but they are naturally solitary feeders and eating in groups can be very stressful for some cats. Cats should, therefore, be fed alone. Anxious cats may be prevented by more confident cats from having access to necessary resources such as the litter box, resting places or water bowls. Confident despot cats may block pathways to these resources, attack other cats, or stare fixedly at them. The more locations available for resources, the more easily every cat can safely access them.

### Visual security

A cat's visual security of its core territory can be improved by relocating feeding and water stations and some resting locations away from windows and glass doors. In cases where outdoor cats are triggers for marking, block the resident cat's view through windows, doors, and cat doors or flaps. Options include using opaque sprays, adhesive opaque film, temporary frosting, cardboard inserts, and colored plastic panes or other similar products. Cat doors can also be painted with opaque paint to prevent outdoor cats from looking inside.

### Restriction of core territory size

Restricting a cat's core territory size by reducing the amount of space the cat must defend will minimize stress, especially in the case of anxious, elderly or frail cats. Confinement to several environmentally enriched rooms or even one room can markedly reduce anxiety.

### Separation of social groups

Temporary or permanent separation of cats in different social groups into different areas of the house may mitigate marking behavior by reducing competition for resources.

unattractive space for unwanted feline visitors. Laying plastic carpet protectors upside down in front of sliding outside doors creates an uncomfortable surface for cats to contact and may help to dissuade other cats from sitting close to the house and intimidating residents.

- ✦ Removing or blocking cat doors that allow roaming cats to enter the household, or using microchip- or magnet-operated devices to allow access only for designated individuals.
- ✦ Optimizing relationships with people and other cats within the home, and ensuring that the physical environment meets the cat's natural behavioral needs, to minimize stress within the home.

### Clean urine-marked areas frequently

Frequent cleaning will reduce a cat's habit of refreshing its scent at a marking site. Many urine removal products are available, but they vary widely in efficacy.<sup>46</sup> Avoid using ammonia-based cleaners, which smell like urine to a cat. Chlorine-based products will remove odors from concrete and vinyl floors. Scrubbing the affected area with a 10% solution of biological washing powder (enzyme-based laundry detergent) to remove the protein content of urine, allowing the area to dry, and then spraying with isopropyl alcohol to remove the fat component is also effective.<sup>47</sup>

Some experts recommend deterrents such as placing food bowls or noise makers, mouse

traps or electronic pet training mats at urine-marked areas. These methods may be effective at stopping marking at those areas, but may result in urine marking at other locations and can induce other stress-related behaviors. Some experts avoid these approaches because deterrent strategies may create fear that can increase stress, stimulate marking at other locations, or trigger overgrooming, aggression or other unwanted behaviors.

### Allow returning cats to regain the 'group scent'

In a multi-cat household, allow cats returning to the home after an absence to regain the 'group scent' before encountering other cats. Place the returning cat in a separate room and rub it with clothing the owner has recently worn or with a hand cloth that has been in contact with an affiliate cat's cheek scent gland area.

### Modify the cat's behavior by using positive reinforcement

Behavior modification efforts should focus on positive reinforcement of desired behaviors. Physically punishing the cat during or after spraying only creates stress and increases the motivation to spray. Punishment can lead to fear-related aggression and will almost always reduce the bond between the cat and owner. Punishment also tends to encourage urine marking in less obvious areas.

### Use pheromones, drugs or nutraceuticals as adjunctive therapy

❖ **Pheromone therapy** Studies indicate that environmental use of synthetic pheromones (see box, right) can result in up to 90% cessation or reduction in urine-spraying behavior.<sup>41</sup> This effect can last even after discontinuing use of the pheromone product.<sup>48</sup> Pheromones do not require oral administration, are non-sedative and non-systemic. After toileting facilities have been individualized for the cat's preferences, adding a pheromone diffuser may make the litter box location more appealing.

❖ **Psychoactive drugs** Intervention with psychoactive drugs can be extremely helpful in treating urine marking. Many psychoactive drugs take up to 4–6 weeks for a full effect to be seen. The hope of success that these drugs offer may encourage some cat owners to implement other changes while the drugs begin to take effect. Psychoactive drugs should be used only in conjunction with the other marking behavior strategies, and not as a substitute for them. There is no single perfect behavior-modifying drug appropriate for marking mitigation. Individual responses to these drugs vary significantly, so it may be advisable to evaluate more than one drug in treating individual patients. Fluoxetine, bupirone, clomipramine and paroxetine are often used as an initial treatment choice.<sup>26,40,49–52</sup> If you are uncertain which agent to use, additional reading or consultation with a veterinary behaviorist will facilitate your selection.

#### Appropriate use of psychoactive drugs

- ❖ Currently available psychoactive drugs are not approved for feline use. Because they are used off-label, informed owner consent should be obtained
- ❖ Most psychoactive drugs are metabolized by the liver and kidneys, and like all drugs have potential side effects. Veterinarians should monitor periodic clinical chemistry screening assays for patients when medications are administered on a long-term basis
- ❖ Withdrawal times and schedules vary among these classes of drugs
- ❖ Psychoactive drugs may occasionally lessen inhibitions and increase aggressive behavior in cats
- ❖ Some veterinarians recommend nutraceuticals, dietary supplements or prescription diets to reduce stress and reactionary urine marking. However, no controlled trials have been published to support or refute such claims
- ❖ See Table 1 for details on pharmacologic agents used to treat marking behavior in cats

### Synthetic pheromones for use in cats

Synthetic pheromones can provide a sense of security and reduce anxiety in cats. An F3 fraction synthetic analog of feline facial pheromones is commercially available in the following formulations:

❖ **Diffusers** A pheromone room diffuser helps maintain odor signals in the cat's core territory. One diffuser will disseminate pheromones across approximately 650 square feet (50–70 square meters) for a period of 4 weeks. It should be left on 24 h a day. Replace diffuser refill bottles once a month or when the wick is pale tan, even if a small amount of residual liquid remains.

Use diffusers in areas where cats spend most of their time.

❖ **Sprays and wipes** Pheromone sprays and wipes (the latter currently only available in the US) can reduce stress when used in pet carriers prior to travel. They can also be applied to new objects such as items of furniture that are introduced into the household, or to deter claw-marking or defacing of household objects.

### Elimination related to primary environmental or social factors

Cats are individuals. Thus individualizing the litter box is an important aspect of the management of elimination related to environmental and social factors. By offering the cat choices in litter box design, location and maintenance, the pet owner can observe what the cat prefers and adjust the approach to litter box management accordingly. When a cat has access to a well-designed and maintained litter box in a location it prefers, elimination-related house-soiling should improve. More details about designing the optimal litter box are given on pages 585–586.

### ADDITIONAL CONSIDERATIONS FOR MANAGEMENT OF HOUSE-SOILING BEHAVIOR

The concepts of behavior modification discussed in these Guidelines may influence your clinical recommendations for the management of individual cases of house-soiling. Expert opinions differ on the use of treats or attention as a reward for litter box usage because both the cat's temperament and timing of the reward influence its effect. Similarly, the use of temporary confinement of a cat in a small room or cage with its preferred litter box and litter substrate is debated because various factors influence the cat's view of this situation. To determine if reward-based training or confinement will benefit a house-soiling cat, primary care practitioners should consult with an experienced behaviorist who utilizes these techniques.

If possible, the house-soiling cat should have restricted access to sites that it has soiled. Methods for restricting access include using aluminum foil, plastic sheeting, double-sided

Psychoactive drugs should be used only in conjunction with the other strategies to stop urine marking behavior and not as a substitute for them.

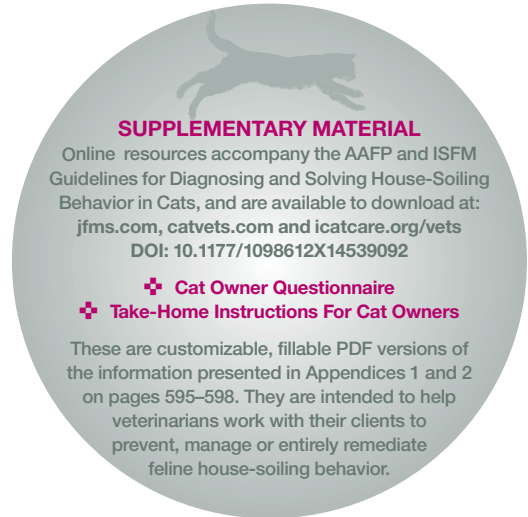


sticky tape, carpet protectors turned upside down so that the rough nubs would contact the cat's feet, or similar products. Placing catnip or pet toys in previously soiled areas may create positive associations that redefine soiling sites as places for play or enjoyment.

## CLIENT EDUCATION AND FOLLOW-UP

Regardless of its etiology (medical, FIC, marking behavior, or elimination related to environmental and social factors), correcting feline house-soiling is strongly dependent on providing the cat owner with guidance and support. The 'Take-Home Instructions For Cat Owners' (Appendix 2, pages 596–598; and Supplementary Material, see right for details) provides practical guidance that will enable clients to comply with the veterinarian's instructions for corrective action. A critical aspect of correcting house-soiling behavior is the design of the litter box as the cat's primary toileting site. The section on 'Designing the optimal litter box' on pages 585–586 of the

Guidelines can also be used for client education to help cat owners maintain an accessible and appealing site for proper elimination. Follow-up by telephone or e-mail will help monitor progress and ensure timely intervention if problems arise.



**SUPPLEMENTARY MATERIAL**  
 Online resources accompany the AAEP and ISFM Guidelines for Diagnosing and Solving House-Soiling Behavior in Cats, and are available to download at: [jfms.com](http://jfms.com), [catvets.com](http://catvets.com) and [icatcare.org/vets](http://icatcare.org/vets)  
 DOI: 10.1177/1098612X14539092

- ✦ Cat Owner Questionnaire
- ✦ Take-Home Instructions For Cat Owners

These are customizable, fillable PDF versions of the information presented in Appendices 1 and 2 on pages 595–598. They are intended to help veterinarians work with their clients to prevent, manage or entirely remediate feline house-soiling behavior.

## What to do if a client is considering euthanasia of a house-soiling cat

For the client who says 'I'm at my wit's end and want to euthanize my cat', there are various suggestions that can be offered.



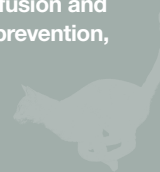
Many veterinarians may not be aware that their feline patients have a house-soiling problem until the cat owner announces, 'I'm at the end of my rope.' These clients may arrive wanting to euthanize their cats for urinating or defecating outside the litter box or for urine marking. In this situation offer to board the cat 'for as long as it takes', so long as the owner can afford such an approach. For the owner who sees no way out, you are providing one. By boarding the cat a number of things can be accomplished:

- ✦ The owner is given time to consider the situation and arrive at a decision that will involve no regrets: no regret in keeping the cat, euthanizing it, or relinquishing it to a shelter. Giving the owner time at home, without the presence of the cat, can be helpful in arriving at a good, long-term solution that avoids euthanasia.
- ✦ The owner can be educated about the cat's house-soiling behavior and treatment options. Client education literature, referral advice and cat behavioral consultations can be offered, beginning with a detailed patient history.
- ✦ The cat can be observed in a clinic setting where possible medical conditions can be diagnosed.
- ✦ Appropriate medications can be initiated (see sections on treatment for medical etiologies and urine marking, pages 586 and 589–591). For many owners, it may be helpful if their cats begin medication under clinical observation because it can take several weeks for treatment to reach peak effects.
- ✦ Discuss indoor environmental options. This can be done either before or after the cat has been boarded at the clinic.
- ✦ Discuss outdoor environmental options for cats currently living indoors only. Safe cat enclosures such as 'screened porches' can be attached to an existing fence or erected as a free-standing enclosure, even in a very small area. The cat can be given access to the safely fenced-in area via a cat door on a porch, from a small room in the house, or from an outdoor enclosure.
- ✦ Rehoming to a more suitable environment when possible should also be discussed if environmental or social stressors cannot be removed or reduced sufficiently.

None of these approaches has to be permanent, but can be implemented on a trial basis. These recommendations offer specific actions that may make euthanasia unnecessary and potentially enable the owner to have a satisfying, long-term relationship with his or her cat. At a time when the owner often feels helpless, it is important to provide tangible options. Remember, correcting house-soiling behavior often depends on thinking 'outside the (litter) box' and giving the owner alternatives to what has proven unsuccessful in the past.

## SUMMARY POINTS

- ❖ The AAFP and ISFM have long recognized that feline house-soiling behavior is not a trivial condition. house-soiling can directly affect the human–cat bond, the veterinarian–client–patient relationship and the overall welfare of cats.
- ❖ Feline house-soiling is emotionally taxing for the cat owner. It is important to offer the client encouragement and to manage expectations by explaining that resolution of house-soiling may take time.
- ❖ This unwanted behavior is not due to spite or anger towards the owner, but because the cat's physical, social or medical needs are not being met. If you help your client identify these causative factors and effectively address them, house-soiling behavior will cease or markedly decrease.
- ❖ House-soiling can be a clinically challenging case for the practitioner. If the veterinarian cannot resolve the problem or offer referral to a specialist, the owner may abandon, relinquish or euthanize the cat.
- ❖ For the general practitioner the Guidelines will help eliminate much of the confusion and ambiguity about house-soiling. They offer practical recommendations for the prevention, diagnosis and management of this commonplace problem in cat ownership.
- ❖ Ultimately, the Guidelines can make the difference between whether a cat is kept in a home environment or loses its life.



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## Appendix 1: Cat Owner Questionnaire

These questions are designed to help the veterinarian assess a cat that displays house-soiling behavior by quickly capturing relevant information for the patient's medical record. Practices may wish to produce their own questionnaire incorporating these questions, or can download a customizable version of the Cat Owner Questionnaire, in the form of a fillable PDF, from the Supplementary Material accompanying these Guidelines (see page 592).

- 1** Your name: \_\_\_\_\_ Date: \_\_\_\_\_  
Spouse, partner or roommate: \_\_\_\_\_  
Children and ages: \_\_\_\_\_
- 2** Cat's name, age, sex and breed: \_\_\_\_\_
- 3** How does your cat interact with family members?  
 Friendly  Aggressive  
 Nervous  Avoids contact  
Who is your cat's favorite person? \_\_\_\_\_
- 4** How does your cat interact with strangers?  
 Friendly  Aggressive  
 Nervous  Avoids contact
- 5** Name and age of other cats. Please label the order they arrived into the house: \_\_\_\_\_
- 6** Other pets (species, breeds and ages): \_\_\_\_\_
- 7** If you have other cats or pets in the household, have you recently seen your cat responding to them in any of the following ways?  
 Playing together  
 Sleeping together  
 Mutual grooming  
 Being aggressive (eg, hissing, growling, swiping)  
 Running away  
Please describe: \_\_\_\_\_
- 8** How do you think your pets get along?
- 9** Does your cat go outside?  
 Yes  No  
 Occasionally sneaks out  
 Goes outside supervised  
 Goes outside unsupervised  
 Has pen or outside enclosure
- 10** Do you have a cat door or flap to the outdoors?  
 Yes  No  
 Type: \_\_\_\_\_
- 11** Can your cat see other animals from inside your home?  
 Yes  No  
 If yes, describe (ie, cats, birds at feeder, etc): \_\_\_\_\_
- 12** What type of food do you feed your cat?  
 Canned food: \_\_\_\_\_  
 Dry food: \_\_\_\_\_  
✦ Have you changed the food recently?
- 13** How many litter boxes are in your home? \_\_\_\_\_  
✦ Type:  
 Open  Hooded or covered  Automatic  
✦ Liners used: \_\_\_\_\_  
✦ Deodorizers used: \_\_\_\_\_  
✦ Average size in cm or inches: \_\_\_\_\_
- 14** Who scoops the litter box? \_\_\_\_\_  
✦ How often:  
 Twice daily  Daily  
 Weekly  Other: \_\_\_\_\_
- 15** Type of litter used:  
 Fine grain (clumping)  
 Non-clumping clay  
 Coarse granules  
 Wood or paper-based pellets  
 Scented  
 Silica granules or beads  
 Corn- or wheat-based  
 Garden soil  
 Other: \_\_\_\_\_
- 16** How often do you wash the litter box and what cleaning products do you use? \_\_\_\_\_
- 17** If your cat urinates when house-soiling, how would you describe the urine?  
 Normal  Large volume  
 Small volume  Strong odor  
 Sticky consistency  Bloody  
 Passed more/less frequently than usual
- 18** If your cat defecates when house-soiling, how would you describe the stools?  
 Normal  Small and hard  
 Soft and watery  Blood/mucus  
 Formed in part, then softer  Other: \_\_\_\_\_
- 19** How long has the house-soiling been occurring?  
✦ Years: \_\_\_\_ ✦ Months: \_\_\_\_ ✦ Weeks: \_\_\_\_
- 20** Do you remember the first incident?  
 Yes  No  If yes, please describe: \_\_\_\_
- 21** What kind of surface is targeted?  
 Carpet  Wood  
 Vinyl  Tile  
 Bedding/clothing  A particular family member  
 Bath/shower/sink/basin  Other: \_\_\_\_\_

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Appendix 1 continued

22 Is the cat targeting vertical surfaces with urine?  
If yes, what volume is being passed?

23 How often is the house-soiling occurring?  
 Once daily                       Multiple times daily  
 Weekly                               Other: \_\_\_\_\_

24 How has the frequency changed since the problem started?  
 Increased                       Decreased  
 Remained the same       Don't know

25 Have there been any changes recently (or around when the house-soiling started)?  
 Moved to new home  
 New baby or pet  
 Absence of family member/pet  
 Other (including work/school schedule changes, please provide details): \_\_\_\_\_

26 Please detail what have you been doing to clean the soiled areas: \_\_\_\_\_

27 Have you used any physical punishment in response to the house-soiling (eg, rubbing nose in the urine or stool, spanking, water pistol, shouting, confinement)?  
 Yes                       No                       Please describe: \_\_\_\_\_

28 Is your cat easy to medicate?  
 Yes                       No

29 What are your preferred formulations for any medications?  
 Pills  
 Medication in food  
 Oral liquids  
 Transdermal gel (where available)

30 On a separate sheet draw a basic house floor plan.

This is very important but it does not have to be to perfect scale. Mark all items listed below on the house floor plan so we can get a feeling for the environment where your cat lives.

- a = Litter box locations
- b = House-soiling locations
- c = Windows and doors
- d = Scratching post locations
- e = Food and water bowl locations
- f = Cat doors or flaps

Please number the house-soiling locations in chronological order in terms of when you became aware of deposits in those locations (eg, b1, b2, etc).

Appendix 2: Take-Home Instructions For Cat Owners

These take-home instructions provide practical guidance on corrective action for clients with a house-soiling cat. The veterinarian indicates specific recommendations for the individual cat by checking or ticking the relevant boxes. Practices may wish to produce their own take-home instructions based on the information provided here, or can download a customizable version, in the form of a fillable PDF, from the Supplementary Material accompanying these Guidelines (see page 592).

Date: \_\_\_\_\_ Owner's name: \_\_\_\_\_ Cat's name: \_\_\_\_\_

Resolving house-soiling problems may require making changes to several aspects of a cat's home environment and care. All the changes are interrelated. They will help to provide the optimal litter box/tray and decrease stress by meeting the cat's other social and environmental needs. They may also include medical treatments and diet suggestions. **Please make the following changes in your cat's home environment, as indicated by the checked boxes.**

**Environmental management**

1 **Number, location and design of litter boxes**  
 Provide \_\_\_\_\_ additional litter boxes, making a household total of \_\_\_\_\_. Offer some large (1½ times the cat's length from nose to base of tail) deep, open boxes. Storage containers, sweater boxes and concrete mixing trays are examples. If necessary, cut a door in one end and cover edge with duct tape to avoid sharp edges. Your cat may prefer a hooded litter box if it is kept scrupulously clean.  
 If your cat often urinates over the edge of the litter

box, put plastic covered by newspaper around the litter box to absorb the urine. A rigid sheet of plastic cut so that it can be positioned vertically inside the box can protect adjacent surfaces.

Put the litter boxes in separate locations around the house, ideally in quiet private places that are easy for a cat to access. Locate litter boxes where the cat needs them, such as in previously soiled sites, and in areas separate from other pets' locations. Avoid high traffic or remote areas.

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This is the recommended litter box plan for your home. See house floor plan in the Cat Owner Questionnaire for clarity if needed.

Type of litter	Location
Box 1: _____	_____
Box 2: _____	_____
Box 3: _____	_____
Box 4: _____	_____

**2 Types of litter:**

Offer a variety of litter types and allow your cat to choose its favorite. Cats most commonly prefer fine-textured unscented clumping litters. Brand: \_\_\_\_\_. In addition, examples of alternative litters include play sand, potting soil or peat moss, or a piece of carpet or other soft material used as a temporary measure only and in select cases.

**3 Scooping and changing litter:**

Scoop the litter box daily and replenish litter. **Wash the box every \_\_\_ weeks and replace the litter.** (Some behaviorists feel that weekly washing and replacing the litter is optimal. Others find that every 2–4 weeks does not compromise the cat's response. Rarely, because of a particularly difficult to control urinary tract infection, daily washing of the litter box may be recommended.) Use soap and hot water only; avoid strong chemicals or any ammonia-based products.

**4 Litter attractants:**

Herbal products for this use are available in the US (but may not be available in other countries). An alternative is to sprinkle a small amount of the cat's urine-soiled litter on top of the clean litter.

**5 Synthetic pheromone sprays or plug-ins:**

Use a spray or plug-in diffuser in areas we have marked on your house floor plan. Spray vertical surfaces 1–2 feet (up to 0.5 m) from the floor three times daily; use the diffuser 24 hours a day. Replace diffuser refill unit monthly, or sooner if the top of the brown wick becomes pale tan in color.

**6** Ensure vertical spaces for resting or hiding places are available to cats. Use shelves, cat condos or trees to increase separation among cats. The more perceived space, the less stress cats undergo. Provide cardboard boxes and other cozy containers for resting places.

**7** For cats needing increased opportunities for play and predatory behavior, increase window access by using cat trees and shelves.

**8** If outside cats seem to be the stimulus for marking behavior, minimize exposure to them. Block the view through windows by applying something your cat cannot see through or prevent access to the window. Options include opaque glass decorating sprays, static film, or taping on paper or translucent window coverings. Put rough surface mats outside sliding doors to discourage other animals from resting there. If your cat lives indoors or does not leave the premises, use motion-activated water sprinklers at the perimeter of the yard to deter animals from entering the area.

**9** Put clothing away rather than leaving it on the floor or accessible to your cat.

**10** Place shoes, backpacks and luggage with unfamiliar odors off the floor and out of your cat's reach.

**11** Clean outside doors and walls where outdoor cats are spraying. Block drafts to prevent odors from penetrating indoors.

**12** Deny access to affected areas if possible or place an item in the affected area that may discourage house-soiling. For example, food and water bowls placed in the soiled areas may discourage soiling; battery-operated motion-activated lights may illuminate dark private areas that a cat previously soiled.

**13** Other recommended environmental changes: \_\_\_\_\_

### Behavior management

Behavior modification efforts should focus on positive reinforcement of desired behaviors. Physically punishing a cat during or after house-soiling only creates stress and increases the motivation to continue the behavior. Punishment can lead to fear-related aggression and will almost always reduce the bond between a cat and owner. Punishment also tends to encourage house-soiling in less obvious areas.

**1** If you catch your cat in the act of house-soiling, sneakily distract but do not scare it with noise that is not associated with humans, such as a whistle or by rattling coins in a can. Use your cat's temperament as a guide to how loud this noise should be.

**2** Praise your cat if you see it using the litter box. Keep a supply of treats near litter box stations for use as rewards.

**3** Confine your cat in a single room according to the following timetable:

At all times

When you are unable to supervise the cat

When the cat is separated from other pets

Whenever the cat is confined, provide food, water and two litter boxes.

**4** Make sure that adults, children, noisy appliances or assertive cats do not block traffic patterns or a cat's access to litter boxes, especially in the case of timid or anxious cats.

**5** Place a bell on the collar of the most assertive cat in the house.

**6** Set up multiple ( \_\_\_\_\_ ) food and water stations in the following locations (see house floor plan for clarification if needed): \_\_\_\_\_

### Cleaning soiled areas

Many products are available for cleaning areas affected by house-soiling. Urine will fluoresce in the dark under ultraviolet light. Use a black light from a poster store to find soiled areas. Clean affected areas with a good quality urine odor and stain remover according to the type of surface that the cat has soiled. **Test products on an inconspicuous area first.** Always ensure that you clean a sufficiently large area to remove the odor – this may be up to three times the diameter of a fresh wet patch or stain.

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Appendix 2 continued

- 1 Carpets:** Chemical, bacterial-based and enzyme-based cleaners can all be effective when used as directed. Scrubbing the area with a 10% solution of biological washing powder (enzyme-based laundry detergent) to remove the protein content of urine, allowing the area to dry, and then spraying with isopropyl alcohol to remove the fat component is also effective. You may need to pull the carpet up for several days and treat the subflooring/underlay again using either a specifically designated cleaner or both the washing powder and isopropyl alcohol. If the padding under the carpet is soiled, cut out the affected area and replace with new padding. Use a concrete sealer if appropriate or a polyurethane or other sealant product if there is wood subflooring/underlay. Treat the back of the carpet with urine odor remover and tack the carpet back down.
- 2 Concrete:** If allowed in your area, use a sodium hypochlorite bleach (1 tablespoon per gallon of water) to wash a concrete floor. Make sure the area is well ventilated, and eyes and hands are protected. Avoid all ammonia-containing cleaners.
- 3 Wooden baseboards/skirting boards:** Use a wood soap then seal the edge of the board to the wall with a silicone sealer.
- 4 Walls:** Use a product designed for urine and stain removal.
- 5 Bedding:** Launder in washing machine using your usual soap or detergent; add a peroxide-based bleaching agent, if available.
- 6 Upholstery:** Use products designed for these materials; for example, fabric or leather cleaners.

**Medical testing**

Urinalysis results:

- Normal
- Abnormal (blood, crystals, bacteria)
- Very concentrated
- Other: \_\_\_\_\_

Urine culture: \_\_\_\_\_

Blood panel: \_\_\_\_\_

X-ray/ultrasound: \_\_\_\_\_

**Medical treatment**

- Treat for lower urinary tract disease: \_\_\_\_\_
- Treat for constipation: \_\_\_\_\_
- Treat for diarrhea: \_\_\_\_\_
- Treat for kidney disease: \_\_\_\_\_
- Treat for other medical condition: \_\_\_\_\_
- Dietary changes needed (see below)
- Antibiotic: \_\_\_\_\_
- Pain medication: \_\_\_\_\_

Other: \_\_\_\_\_

Treat with anti-anxiety medication: \_\_\_\_\_

*NOTE: There are no anti-anxiety medications approved for use in cats. These drugs are prescribed for feline use as an extra-label application. Anti-anxiety drugs may cause side effects such as sedation, dilated pupils, weight gain, diabetes, increased appetite, liver and kidney disease, and cardiac arrhythmias. Do not change the medication dosing or frequency without consulting with your veterinarian. Laboratory tests are required before and during the use of many of these medications. Keep these medications out of the reach of children.*

Give: \_\_\_\_\_ times a day.

Other side effects that can be seen with this medication include: \_\_\_\_\_

- Full effects may take up to 4–6 weeks to be seen.
- Clinical examination and blood tests must be performed before using this medication and every \_\_\_\_\_ months thereafter due to potential liver and kidney side effects.
- Other treatments: \_\_\_\_\_

**Dietary changes**

Gradually change to the diet recommended below. We can offer you suggestions on how to make the change if needed. Change to:

- Canned
- Dry
- Prescription: \_\_\_\_\_
- Non-prescription: \_\_\_\_\_
- Other: \_\_\_\_\_

Sequentially offer the new foods we send home with you. Please purchase more of the prescription diet that your cat prefers and continue your cat on the prescription food until \_\_\_\_\_ (date).

*NOTE: Do not stop feeding the prescription diet unless directed to do so. Most cats will have further health difficulties on regular dry foods. If your cat will not eat the prescribed diet please contact us!*

- Dilution is the solution! Mix canned food with water to make a slurry consistency or 'kitty soup'. Warming may improve palatability.
- Give \_\_\_\_\_ 12 cc (12 ml) syringes of water daily by mouth to dilute urine if your cat will not eat canned food.
- Increase active feeding by placing food in toys or using puzzle toys to dispense food.

**Follow-up**

- Medical progress examination and repeat urinalysis and/or blood panel on: \_\_\_\_\_ (date)
- Call with progress report on: \_\_\_\_\_ (date)
- Other follow-up actions: \_\_\_\_\_

**We understand this may be a difficult time for you and your cat.  
Please call us with any questions or concerns at \_\_\_\_\_  
We are here to help you.**