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Behavioural Problems in Dogs and Cats Mini Series

Session 3: Inter-Cat Conflict Between Resident Cats

Jon Bowen BVetMed DipAS(CABC) MRCVS
Honorary Lecturer in Small Animal Behaviour

Feline behavioural problems

There are three sections in these notes:

- Section 1: An overview of feline social behaviour and communication
- Section 2: Problem behaviour
- Section 3: Questionnaire and client handouts

Section 1: An overview of feline social behaviour and communication

Introduction

Many of the behaviour problems commonly presented in the domestic cat arise as a consequence of the constraints of domestic life on an animal that is not truly domesticated and from human misinterpretations of natural feline behaviours. It is therefore important for anyone dealing with the prevention and treatment of these problems to have an understanding of feline social structure and of the communication systems that are central to the maintenance of an effective feline society.

In the wild cats live together in groups of related individuals and they have very little contact with outsiders. They hunt alone and when they are out on hunting expeditions they aim to limit their interaction with other felines. For these reasons most of feline language is designed to increase distance between individuals and those signals that are intended to encourage interaction are usually reserved for members of the same social group.

Social structure

Feline society is matriarchal in nature with related females living together in highly co-operative groups, sharing the rearing of each other's offspring and defending each other from potential intruders. In order for a society to function it is necessary for interactive behaviour patterns to signal group identity and structure and in many species, including dog and man, these patterns are related to some kind of hierarchical organisation, within which an individual's position can be determined by observation of its interactions with other members of its group. Some of the most significant of these patterns are those indicating submission, but within the feline world no such pattern has been identified and their reaction to hostile interactions is one of defence rather than submission. Without the presence of a hierarchical framework the stability of social groups relies on the presence of co-operative behaviours and in the case of feline society it appears that the affiliative social behaviours of allogrooming and allorubbing hold the key to social harmony. These mutual behaviours appear to be important in confirming the social relationship between individuals and in establishing and maintaining a common scent profile within the social group.

Allogrooming

In the case of allogrooming the behaviour appears to be reciprocal in nature. It often coincides with resting, and therefore it is most commonly seen between cats that rest together. In addition to its role in reinforcing bonds between closely related individuals and providing stability within the social group, allogrooming is also believed to facilitate reconciliation between two members of a social group that have recently been antagonistic towards one another.

Allorubbing

Allorubbing is believed to act not only as a means of mixing scents between individuals, but also as a means of exchanging tactile signals and, unlike allogrooming, this behaviour appears to be asymmetrical in nature with one individual noticeably taking the initiative in the interaction. Indeed

it is often possible to detect a pattern of rubbing within a social grouping which suggests some hierarchical significance to this behaviour as it progresses from kittens, which rub frequently on all cats except adult males, through juveniles, which rub on adult females, to the adult females themselves, which rub on each other and, occasionally, on adult males. Of all of the feline social behaviours rubbing is the one with most significance in the cat-owner relationship and when cats rub on their owner's legs it is usually interpreted as a sign of affection. However, observation of the behaviour between cats suggests that it is used when the relationship is slightly one-sided and is usually initiated by the weaker individual. Cats do not live in a structured hierarchy, but they do have respect for one another and while rubbing may not be classed as a submissive behaviour it does appear to be important as a means of acknowledging status. Immediately before a rubbing interaction the initiator will raise its tail as it approaches the other cat and this gesture appears to be a significant signal of intent to rub. What happens next appears to depend on the reaction of the recipient and in situations where it responds with a raised tail signal the rubbing appears to continue as a mutual and simultaneous behaviour while recipients that do not use a tail up response will either rub after the initiator has rubbed, or not at all. Within the context of cat-owner interactions rubbing appears to be a means of acknowledging owner status, confirming the relationship between the two species and also exchanging scent signals in order to establish a common scent, which can then be used to identify members of the same social group and reassure individuals that they belong. It is also a behaviour that is reinforced in most domestic cats by the response of the owners and for many individuals it has been conditioned as a behaviour, which results in the human response of opening another tin of cat food!

Communication channels

In common with canine communication the methods that cats use to convey information fall into the three main categories of visual, vocal and olfactory signalling, but transferring knowledge of dog communication into the feline world simply does not work and trying to do so can lead to unnecessary confrontation. Feline visual signals are often subtle in nature and can be difficult to interpret while olfactory communication, which plays such a vital role in feline society, is simply a mystery to human beings. Vocalisation is a highly conditioned form of communication in the domestic cat and while information is available about the function of the major vocal signals it should be remembered that some of the signals used by individual cats within households are learned responses to the interactions of those around them. These signals are used by cats to initiate social interaction with owners and to direct people to perform certain tasks, such as feeding the cat or opening doors and windows to allow access to outdoors.

Olfactory communication

Although cats are social creatures they retain an element of independence and when it comes to the process of hunting they act alone. Important consequences of this solitary hunter status are the need to maintain personal fitness, to avoid unnecessary conflict and risk of injury and to secure and protect a hunting territory. In order to fulfil these objectives the cat needs to be able to communicate with other cats from a distance and to signal its occupancy of its territory without risking direct physical interaction with total strangers. It is for this reason that olfactory communication, which provides a signal that lasts over a period of time and gives a message to other cats remotely, is so important in the feline world. Indeed the cat is highly adapted to send and receive scent signals through the presence of special scent producing glands in various locations around the body and through the use of the Jacobson's or vomeronasal organ to receive and interpret scent messages. The major areas of scent production are the face, the flanks and the tail base, but cats also have glands on the paws, which deposit scent signals during the process of scratching. The scent that the individual produces is believed to be unique and helps to identify it to other cats both within its social group and in the wider community. It is also important to realise that scent signals can be used as a means of self-directed communication and can be deposited as signals to the depositor regarding the familiarity of the environment and the level of security that it offers. The depositing of scent signals, or marking

behaviour, is therefore essential to feline communication and social behaviour and within the context of domestic cat behaviour it takes four main forms.

Rubbing

In addition to the social behaviour of allorubbing cats also use the glands on the face, flank and tail head to mark items within their territory. They will rub their face along twigs and fence posts in the garden and along items such as shopping bags and new furniture that are brought into the house. Owners will often comment that their cat rubs its face along their shoes when they return home and this appears to be a reaction to the multitude of different scent signals that are carried on the surface of shoes. Although little is known about the behavioural significance of many of the social odours produces from the range of scent producing glands on the cat's skin there has been extensive research into the constituents of some of the facial scent glands and the scents that are deposited during the act of facial rubbing seem to be highly correlated with the solicitation of social interaction and with familiarisation with the environment. Commercially produced analogues of the F3 (Feliway) and F4 (Felifriend) fractions are used in the prevention and treatment of certain behavioural problems in cats (see section three).

Scratching

When cats scratch they are engaging in a very natural and complex behaviour, which has both functional and marking components. As the front claws are pulled downwards in that familiar stropping action the blunted outer claw sheath is removed and a glistening new claw is revealed. In addition to preparing the claws for hunting scratching also enables cats to stretch their front legs, shoulders and back, and exercise the muscles and tendons involved in claw protraction, thereby ensuring swift action when prey is detected. Although the maintenance of hunting prowess is a priority for cats, scratching is also an important behaviour in terms of communication and the glands between the pads of the cat's feet deposit a special scent signal as the cat scratches. This scent message is in addition to a visual signal, which is created by the vertical scratch marks, which are left in the surface.

Urine marking

The use of urine as a marker is common practice in feline circles and the act of urine spraying is usually performed from a standing position. The name spraying comes from the very characteristic position that cats adopt as they back up against the scent post and squirt very small amounts of urine in a horizontal stream onto the vertical surface. They usually have their back slightly arched during the behaviour and will tread with their hind feet while the tip of their tail quivers. Most cats appear to concentrate while they are depositing their signal and a vacant expression on the face is common. Although spraying is the most common form of urine marking it is not the only one and some cats will mark with urine that they deposit from a squatting position. Whichever position they adopt all cats engage in urine marking at some point in their lives and most do so on a very regular basis in their outdoor territory. This is not a behaviour that is limited to tom cats and cats of either sex will still urine mark when they are neutered. One of the purposes of urine marking as a form of communication in the outdoor environment is to operate a very elaborate time share system which will ensure that the available territory is not over hunted and also minimise the risk of unfamiliar individuals coming into contact and potential confrontation.

Although spacing between cats appears to be one of the most important functions of feline marking behaviours it is important to remember that urine marking has the opposite function when it is performed by entire males and females as a means of informing neighbouring cats that they are ready and available for mating. In this situation the urine of in oestrus females appears to carry important information regarding her sexual status and level of receptivity and tom cats pay a great deal of attention to the marks of these females. It is this sexual component of spraying behaviour which is affected by neutering and therefore the likelihood of developing problems

associated with this form of marking can be reduced by ensuring that cats of both sexes are neutered pre-pubertally.

In many cases within the domestic environment urine marks appear to act as a self-directed signal and a means of reassuring the cat that the territory is their own or of signalling that a particular location is associated with potential danger. Indeed the locations of indoor spray marks are often those that are associated with something unpleasant, such as threat from outside cats. Spraying can also occur as a redirected activity when other forms of social interaction are frustrated, or even as a learnt attention seeking activity to gain social contact with their owners, and it has also been reported as a passive manifestation of aggression in situations of social tension between cats in the same household.

Middening

As well as using urine as a marker cats can use their faeces to communicate with other cats and when they deposit faeces in deliberate locations in order to get a message across to their fellow felines this is called middening. This behaviour is usually seen at the boundaries of the cat's territory and piles of faeces which are found in exposed locations such as the middle of a well mown lawn, the tops of fence posts and on the ridges of roofs are more likely to have been deposited as deliberate markers than be the product of normal elimination behaviour.

Vocal communication

Although cats do use vocalisation in order to communicate this is probably the form of feline communication that we know least about. Cats are generally considered to be their most vocal while they are kittens and a lot of vocal signalling in the cat is associated with greeting and with social contact. There are thought to be at least 16 different distinct vocal signals but research is still being carried out into exactly what each of these signals means. The picture is also complicated by the fact that many cats use vocal signals that are unique to them and owners of more than one cat will often comment on the fact that they know which cat is approaching by the type of miaow. It is well recognised that cats are very good at training their owners to respond to their vocal demands and the development of the individual noises is probably connected with the timing of the owner's response.

In general terms cat sounds can be divided into three groups. The first includes those noises that are produced with the mouth open and gradually closing, in a similar way to our own speech, and examples include the miaow, which is used in greeting, and the female and male calling signals, used during the mating process. Their aim is to incite social interaction and this group of sounds is associated with amicable encounters.

In the second category there are sounds that are produced with the mouth closed and these include the purr and the trill or chirrup. The purr is a very characteristic feline sound and the situations in which it occurs are many and varied. The old myth that all purring cats are happy is easily dispelled when you listen to purring road traffic accident victims and cats that purr loudly as they are examined on the veterinary consultation table. This form of communication is commonly associated with mothers and kittens and certainly kittens do use the purr to communicate during nursing. However it is also used in play and during social interactions with owners and it appears that the purr is either associated with periods of actual interaction between cats or with people or in situations where social contact is desired.

The loud vocal signals that make up the third category are produced when the cat holds its mouth open in a fixed position and they have been called strained-intensity calls. Examples include the hiss, the spit, the growl and the snarl and their use is limited to situations of defence and aggression. One specific example of this sort of call is the pain shriek which is designed to startle an attacker into loosing its grip and anyone who has had to handle a cat against its will understands just why it is classed as a shriek!

Body Language

Sound and smell are obviously very important in the feline world of communication but body language is also used to get messages across and it is important for those involved in dealing with feline behaviour problems to understand how cats uses both their whole body posture and their facial expressions to communicate. As a result of its solitary predator role the cat needs to have very clear and unambiguous signals in order to prevent misunderstanding with the strangers it encounters when away from home. The lack of any pack structure means that an injured cat is very vulnerable and therefore most of the cat's communication signals are designed to avoid conflict rather than incite it.

The position of the body and its readiness to flee from the situation give the best indications as to the intention of the cat and, although the facial signals are undoubtedly the most important in fine tuning the cat's message, it is the body posture that gives the first impression to an approaching cat. Cats are renowned for bluffing their way out of conflict and raising the hairs along the back and on the tail is often combined with arching of the back and standing sideways on to a potential opponent in order to make the cat look twice its actual size. The theory is that a large cat will scare away any would be attackers but in some situations the bluff fails and when it does so the cat will slowly retreat by moving sideways out of range. The slow movement is very important in order to prevent inciting the attacker to chase and the sideways movement allows the cat to keep its adversary in view just in case of a last minute change of tactic. Bluffing is not always considered an appropriate response and when cats are very frightened they will often shrink to the smallest possible dimensions and try to hide. It is in these situations that the feline maxim of "I can't see you so you can't see me" really comes into play. At the end of the day all cats would prefer to avoid conflict if possible and this explains why flight is seen as such a desirable option when a cat finds itself in a situation that it finds threatening.

Facial expressions

Cats use the position and shape of the ears, the eyes and the position of the whiskers as rapid vehicles of communication and, whilst overall body posture gives important information, it is the face that is most useful in the fine tuning of feline communication and is the most important part of the cat to watch for clues as to what it is going to do next.

The eyes can hold information about the emotional state of the cat with dilated pupils being commonly associated with fear and narrow pupils being regarded as a sign of contentment. However, it is important to read these signals in association with all of the body language that is being displayed since large pupils can also be associated with high arousal unconnected with fear and with poor light levels! Blinking can be used in communication between cats and even from cats to people and in it is believed to signal that the cat is seeking reassurance in a tense environment. Staring on the other hand is the sign of a very assertive individual and prolonged eye contact is used to intimidate an opponent so it is important to avoid such signals when meeting a cat for the first time. The fact that people who like cats are more likely to look at them and try to approach them leads to the paradoxical behaviour of cats in the company of people who dislike them and the tendency for them to head for the one person in the room who finds cats unpleasant to be with.

Ear positions can be useful indicators of feline emotion and of the intention to interact but serious confusion can arise if these signals are confused with ear positions in canine communication. Ears that are folded sideways and downwards indicate that the cat is trying to avoid confrontation and is preparing to defend itself from an approaching threat while the cat whose ears are flattened against the head with a backwards rotation is getting ready to attack. Ear positions can be altered very quickly and during any encounter it is not unusual to see cats alter their ear position several times as though these small movements are being used to test out the reaction of their opponent.

The role of the tail in feline communication

The tail of the cat is often one of its most striking features and its role in the balance and agility of the cat is well recognised. However the role of the tail in communication is sometimes overlooked and in the past the only comments regarding the tail have related to the belief that the wagging tail of the cat indicates anger and the potential to attack. In fact the rapid movement of the tail simply indicates that the cat is agitated and is in a state of emotional conflict. Obviously this may well lead to aggression if the warning goes unheeded but this does not necessarily show that the cat is bad tempered. In addition to wagging cats can use their tails to indicate a range of emotions and to assist in their overall communication.

During greeting cats will approach with their tail in an upright position and when this tail posture is associated with cats approaching their owners it appears that the cat is offering a greeting and an invitation to be stroked and played with. In encounters between cats the raised tail signal is usually given before a cat rubs on another cat and this is important as a means of avoiding conflict. Rubbing is a behaviour associated with relative status and if a cat just waded in and rubbed without asking permission he may find himself in trouble, so the raised tail is a friendly gesture used to test out the potential reaction of the other individual and to avoid rejection. Other tail positions have been associated with sexual communication and in particular with signalling of female receptivity and the bottle brush tail is usually associated with fear and defence. Aggressive cats may also use their tail to indicate their intentions and both the concave and the lowered tail positions are commonly associated with conflict.

Section 2: Problem behaviour

These notes include information on how to deal with two of the most common stress related problems in cats:

- House-soiling
- Intercat aggression within the home.

House soiling (Elimination and marking)

Enquiries relating to house soiling problems in domestic cats are common in veterinary practice and the potential negative effects on the cat-owner relationship make them some of the most important issues in feline behavioural medicine. This does not mean that they are necessarily the most common behavioural issue in the domestic cat but they are certainly one of the most frequently quoted reasons for relinquishing cats at rescue centres and even requesting euthanasia in an otherwise healthy pet. One possible reason for the strength of reaction to these problems is the high expectation that owners have in relation to cleanliness in their feline companions and the resulting lack of tolerance when urine or faeces are deposited in any location other than the facilities provided for that purpose. Indeed, cat owners may have chosen the cat as a pet specifically because of expectations of cleanliness. However, a breakdown in house training is just one potential reason for depositing urine or faeces in inappropriate places and it is important to take time to differentiate these true elimination problems from cases of unwanted marking behaviour and also from behavioural consequences of organic disease.

House training

Although most owners do not play a very active role in the house training process for cats, the development of associations between certain substrates and locations and the act of elimination is still achieved through a process of learning. When kittens are first born, the act of elimination is dependent on abdominal stimulation from the queen and this enables the queen to ensure that the nest site is kept clean and free from potential sources of infection. However, as the kittens get older, their movement away from the nest begins to stimulate the act of elimination and it is at this

stage that the formation of an association between toileting and substrate begins. The availability of suitable latrine substrates is therefore essential at this young age and kittens whose mothers are reliable in their own use of litter facilities will benefit from increased exposure to suitable sites as they follow their mother away from the nest. The fact that the act of toileting is in itself rewarding, means that the presence of external reward for the selection of an appropriate latrine site is not necessary and, provided suitable toileting facilities are available, most kittens will establish a classically-conditioned association between the presence of cat litter and the act of elimination within the first few weeks of life. Maintaining this association into adulthood will depend on ensuring the continued availability of suitable latrines and, in many cases of inappropriate elimination, it is important to consider the domestic environment from a feline perspective and to be aware of the shortcomings of many litter facilities.

Characteristics of indoor elimination behaviour

Behaviour and posture:

- The location may be sniffed and investigated before elimination
- Urine or faeces are deposited whilst the cat is in a crouched position with slight back arching.
- Abnormal postures may be seen during elimination: urination whilst standing up, or when crouched with a greatly arched or flattened back is indicative of pain or dysuria. In extreme cases, cats may cry or run away from the area where they have eliminated, as if in pain.
- Unlike marking behaviour, there is no visual 'display' element to normal elimination.

Deposit:

- Relatively large volumes of normal urine or faeces.

Location:

- Unless a particular location is excessively soiled and becomes objectionable to use, the cat will tend to use only a small number of latrine sites for elimination: one for urine and one for faeces.
- Latrines are usually in quiet locations where the cat will have some privacy when eliminating.

Marking behaviour

Deposition of urine and faeces is most readily associated with the act of evacuating the bladder and bowels during elimination but, in the feline world these deposits may also be made in the process of communication. Urine and faeces can both be used to convey messages from one cat to another or indeed to provide a reassuring scent message for the perpetrators themselves. When deposits are used in this way, there are certain characteristics both in terms of the nature and location of the deposits and the history of the cat that is making them which should help to differentiate marking problems from cases of inappropriate elimination.

Characteristics of marking behaviour
Behaviour and posture: • Cat approaches and sniffs the location. • It then turns around and reverses up to the spray site. • Whilst spraying the cat will paddle its feet. • The tail will twitch and vibrate. • The cat may have a glazed and vacant look on its face. **Deposit:** • Small to medium volumes of urine, perhaps with a greasy or oily appearance. • Intense odour, often musty. • Dries to a yellow-brown colour, with a greasy appearance and occasionally containing crystals. • Faeces [middening] are of normal appearance. **Location:** • Usually highly visible locations, where marks will be easily noticed. • Most often urine is placed on vertical surfaces, but occasionally horizontal. • Urine may be placed high up the vertical object. • Objects that heat up and cool down may attract spray marks [heaters, toasters, TV and audio equipment]. • Bags, shoes and other objects that may carry foreign odours into the home may be targetted. • Faeces [middening] are deposited, unburied, in open spaces where they will be most visible.

Organic disease

In any case of house soiling it is important to consider medical differentials before embarking on a purely behavioural assessment of the problem. Any condition which affects gastrointestinal or urinary tract function is a potential candidate for involvement in cases of inappropriate elimination and a full medical examination is therefore essential. Conditions which result in polydipsia and polyuria may also be implicated when urine deposits are found in unusual locations and endocrine disorders should be considered when investigating these cases. Any medical condition which alters the cat's mobility may limit its ability to gain access to latrines, and conditions which alter the animal's cognitive ability or sensory perception may also contribute to a breakdown in previously well-established house training. Organic disease may also be a factor in cases of undesirable marking behaviour.

Immediate intervention

Clients who present cats with housesoiling problems are often in a state of desperation and may be close to requesting euthanasia. Many of these clients may have known about a problem for months or years, but some change of circumstance has provoked an urgent need to prevent the housesoiling.
Specific reasons for an increase in the urgency include:

- Arrival of a new baby.
- New partner moving into the home.
- Forthcoming redecoration.
- Recently completed redecoration.
- Owner is about to sell their home.
- Damage to property causing conflict with landlord.

In each situation the client has an immediate short-term problem that needs to be dealt with in order to buy enough time to treat the housesoiling problem properly. It is therefore important to ask clients about any such circumstances.

Underlying these situations are some basic concerns:

- Odour.
- Hygiene.
- Damage.

Immediate action should include giving advice on how to protect property from urine damage and how to improve hygiene. Areas should be cleaned with a biological cleaner that contains no ammonia compounds, strong odours or bleach. A good choice is a 10% solution of biological clothes washing powder in water. Only odour free disinfectants should be used. Urine that soaks into woodwork can cause a great deal of damage and can be very difficult to remove.

Removing urine contamination
• **Make up and label three plant sprayer bottles containing:** **A: 10% solution of biological washing powder/liquid in water.** **B: Plain water.** **C: Surgical spirit.** • **Mop up excess urine and dry the surface using paper towels.** Do not soak up urine using the cloth you intend to use for cleaning or wring a urine soaked cloth into the cleaning bucket as this will spread urine odours. • **Spray the surface with bottle A [biological detergent solution]. Mop the surface with paper towel.** • **Spray the surface with bottle B [plain water]. Mop the surface dry with paper towel.** • **Mist the surface with bottle C and allow it to dry naturally. Do not allow the cat access to the area for at least 30 minutes to allow the alcohol to dry.** • **Dispose of paper towels to a dustbin *outside* the house.** **Test these cleaning products on an inconspicuous area of cloth or carpet before using them more widely to make sure that no discolouration or loss of colour is likely to occur.**

Furniture and floors should be protected from urine contamination so that cleaning becomes easier and further damage is limited. Residual urine odour will encourage cats to re-visit and use latrines or spraying sites, so removing urine odour is an essential element of preventing housesoiling as well as helping to reduce the immediate problem of urine contamination. Information for clients is provided in a handout in the appendix.

Protecting property from urine damage

Wooden floors:

- Seal joints and junctions between flooring and skirting boards or fitted furniture [kitchen units] with a silicone or an appropriate waterproof sealant to prevent urine from getting into cracks.
- Carefully seal joints between the panels of laminated flooring [urine ingress will cause panels to expand and pop up].
- Paint wooden floors with 2 or more coats of a heavy varnish [matt or gloss according to choice] or damp-sealant paint. If possible, extend the painted or varnished area to over-paint the sealant and thus create a complete barrier.

Concrete floors:

- Clean the floor and allow it to dry.
- Seal cracks as above.
- Paint it with several coats of a waterproofing paint.

Vinyl floors:

- Some vinyl floors are porous, especially if they are old.
- They may be sealed using specialist paints and coatings available from DIY centres.
- Cracked vinyl flooring should be removed and replaced.

Tiled floors:

- Glazed tiles are generally non-porous but grout between the tiles may absorb urine.
- Terracotta tiles are porous unless regularly sealed with a specialist coating [available from DIY stores].
- Use a specialist sealant on grout.
- Consider scraping out old grout in heavily urine-contaminated areas and replacing it with new waterproof grout.

Carpets:

- When fitting new carpet, clean and seal the flooring underneath [as above].
- Consider applying a layer of heavy plastic sheeting beneath the carpet or underlay to prevent urine from seeping into the floor.
- Protect existing carpets by covering them with heavy plastic sheeting and then cleaning the carpet underneath at least 2-3 times weekly until no further urine odour persists.

Wooden furniture:

- Where possible apply 2+ coats of varnish, especially under wooden feet of furniture [to stop urine absorption into wood grain].
- Otherwise use regular applications of a heavy wax furniture polish.

Computers and electronic equipment:

- Urine marking or soiling on electrical equipment is a serious health hazard: it can cause fires and electrical failures.
- Disconnect the equipment from the electricity outlet and clean carefully in accordance with the manufacturer's instructions.
- Allow to dry thoroughly.
- Dispose of any cooking equipment that is impossible to clean thoroughly [e.g. old toasters], because these represent a health hazard.
- Keep the equipment in a cupboard where it cannot be further soiled, or cover it in plastic sheeting when you are not using it [remembering the need for some equipment to be properly ventilated].

Electrical outlets:

- Urine entering a wall socket can cause a fire or shock hazard, so access to the location should be restricted.
- As an additional protection, cover the outlet with cling-film or a large flap of polythene hanging down over the socket, taped to the wall above it or alternatively use child proof plug guards.

General aspects of investigation of house soiling cases

Medical assessment

Medical factors are very important in housesoiling and marking problems. Certain conditions are directly involved in the generation and maintenance of behavioural problems, whilst others are contributory in an indirect sense [see box].
The medical workup must include:

- Medical history
- Clinical examination – including abdominal palpation
- Urinalysis
- Assessment of mobility, cognitive function and sensory perception
- Further investigation through haematology, biochemistry or imaging techniques.

If a case is to be referred to a non-veterinary behaviourist, it is essential to rule out any potential underlying or contributory medical factor.

Medical factors underlying housesoiling problems
• Conditions causing PU/PD: renal insufficiency, diabetes mellitus. • Feline lower urinary tract disease. • Diseases causing debilitation: osteoarthritis, senile dementia, and sensory loss. • Diseases affecting cognition: senile dementia, CNS pathology [primary or secondary to systemic disease].

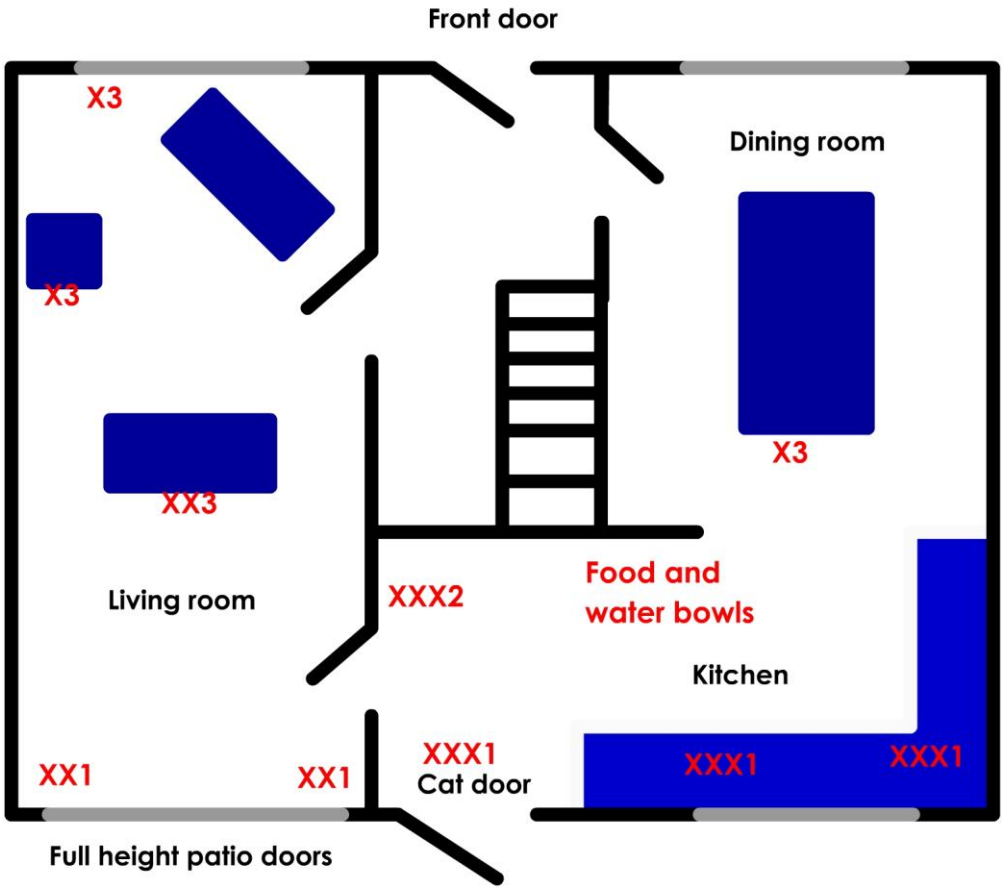
Behavioural assessment

Housesoiling and indoor marking behaviour may be difficult to differentiate in some cases, and in many they occur together. It is important to collect all of the information needed to make a judgement:

- Age of onset
- Previous record of house training
- Present reaction to litter facilities
- Pattern of deposits – location, frequency, volume
- Orientation of deposits – onto vertical or horizontal surfaces
- Posture of cat during deposition
- Relationships between animals in the household
- Presence or absence of the owner or other animals around the time of soiling [including other cats seen outside].
- Owner's reaction to the deposits
- Events in the household or the neighbourhood coinciding with the onset of the behaviour
- Assessment of the cat's emotional reactions to novelty in the environment and to strangers

Using a House Plan

One of the most useful tools when investigating a problem of feline house soiling is a plan of the house in which the cat lives. This does not need to be a detailed scale drawing but rather a basic plan indicating the layout of rooms in the house, the position of windows, doors and major furniture and the location of major resources such as feeding and watering stations, sleeping locations and play areas. Each individual cat's favourite resting places and rooms they prefer to inhabit should be noted on the diagram. The client should mark onto this diagram the location of urine and faces that they have found.



To give a better indication of the development of the problem the client should note the current frequency of urine/faecal deposition at a particular site, as well as how early in the development of the problem urine of faces were first found there. A convenient way to do this is to label each location on the diagram with a number of stars to indicate current frequency and a number that indicates whether that spot was one of the first, or last places to be soiled, or somewhere between. The clinician may use this diagram [see example] as a basis for recording additional information about each mark, such as the volume of urine at a site, where precisely on furniture or decorations it is located and whether any particular event appears connected to it.

The pattern of urine and faecal deposits can point to the source of the problem. For example, if the first deposits were found close to doors and windows, it is suggestive that the perceived threat was coming from outside the home whilst initial deposits in the centre of rooms or onto new pieces of furniture would suggest that the disruption of the cat's security was coming from within the household.

Once all of this information has been collected, it is then possible to make judgements about the nature of the problem, whether it is a matter of indoor marking or elimination and what the motivation may be.

Differentiating between elimination and marking

Once full information has been collected about the location and characteristics of each urine or faecal deposit, it is possible to differentiate between its cause.

Positioning of deposits and reaction to the litter tray

In the case of marking, the areas that the cat uses to deposit urine or faeces will often be of behavioural significance, for example areas that smell of the owner or of the new cat in the household or locations which are associated with potential threat from the outside world. There is often a provoking stimulus for this inappropriate behaviour such as some disruption to the home environment or competition within the local neighbourhood and the location of the marking deposits will reflect this. Urine or faecal marks are placed strategically in order to provide a signal to other cats, which means that they must be placed in locations that are likely to be noticed. The act of spraying itself also involves an element of visual display. It should be remembered that odour marks are not merely of use to the 'sender' of the signal, who is trying to maintain distance from other cats. They are also of use to the 'receiver', who is equally keen to avoid direct physical conflict. The location of scent marks therefore follows conventions that allow other cats to find and investigate them easily. Such places might include on door frames, or on doors, or on pieces of furniture that face doors or windows.

Typical locations where spray marks might be positioned around the entry point to a room.
Inappropriate indoor elimination, on the other hand, will usually take place in quiet secluded locations which reflect the sort of places which cats would naturally choose to use as latrines. It is also likely that elimination sites will have certain common characteristics in terms of the substrate that is used and cats will often develop preferences for the inappropriate substrate, such carpet or linen, and return to similar surfaces repeatedly. These inappropriate substrates may be similar to those the cat was forced to use as a kitten, through an inadequate provision of proper latrines in the rearing environment.

One useful difference between indoor “markers” and “elliminators” is their reaction to the indoor latrine facilities, with ‘markers’ often continuing to use the litter tray and “eliminators” actively avoiding the facilities provided. Indeed, in cases of a lack of, or a breakdown of house-training, signs of aversion to the litter tray may be the first thing that the owner notices.

Cats with lower urinary tract disease will often use several different sites in the house during the same period, breaking the usual pattern of the cat using only one or two latrines. This is because pain associated with micturition in each of the latrine sites discourages repeated use of the same locations. The cat associates eliminating in that place with pain or dysuria and chooses somewhere else next time. Amounts of urine found at each site may be smaller then normal and have a strong odour or contain blood. This pattern of urination is often cyclical, with cats eliminating normally for a few weeks and then suffering another bout of generalised housesoiling. This fits with the cyclical nature of the severity of lower urinary tract disease, which may wax and wane.

Frequency of deposits

If a cat is depositing urine and faeces, as part of the normal function of elimination, the frequency will reflect this and deposits will be limited in their number. However, when cats are using the deposits as a form of marking there is no limit on the frequency of deposition and it is not unusual for a urine-spraying cat to leave in excess of thirty marks within the home in a 24-hour period.

Volume of deposits

The amount of urine that is deposited can also help to determine the motivation for the behaviour with toileting problems usually involving larger quantities than marking problems. However, this can be confusing since a small amount of urine can be absorbed by carpets and other fabrics and the size of the moist patch on the floor can be misleading. Cats with FLUTD will pass many small quantities of urine in several sites, causing confusion with a marking problem. Likewise, cats with chronic diarrhoea. However, the choice of location will still fit with normal defaecation or urination.

Posture of cat and orientation of deposits

The posture of the cat can help in the differentiation process, since indoor urine spraying is usually associated with a characteristic stance**.** This is related to the function of the marking behaviour since a standing posture allows the cat to deposit urine on a vertical surface at just the correct height for another cat to sniff at it and take in the important information.

However, urine marking does not exclusively occur from a standing posture and it can be performed from a squatting position, which closely resembles the posture adopted during the act of elimination. This fact must be borne in mind when attempting to differentiate between motivations as it is easy to dismiss squatting urination on horizontal surfaces as always being eliminative and yet there are occasions when the cat is actually using that sort of urination as a marking behaviour.

Pattern of urine and faeces deposition [identified using a house plan]

Certain patterns are classic indicators of a specific underlying motivation. For example, if the first urine marking deposits were found close to external doors and windows it is suggestive that the perceived threat was coming from outside the home, whilst initial deposits in the centre of rooms, corridors or staircases, or onto new pieces of furniture would suggest that the disruption of the cat's security was coming from within the household. As a situation progresses, the pattern becomes more confusing so that it becomes very difficult to identify the originating cause unless the historical development of the pattern of the marking or elimination is known. For example, urine marking may progress from door and window areas to hallways and rooms if a neighbourhood despot begins to invade the resident cat's home.

Characteristic patterns in urine and faeces deposition
Indoor marking • *Initial locations are around cat flap, external doors and windows*: external threat. • *Initial locations are entry points to internal rooms, on landings and in corridors*: internal conflict within home. • *Spread of marking sites into the home from around cat flap*: potential intruder cat. • *Random locations throughout the home*: emotional disturbance within the household. • *Initial deposits on new items in the household, shoes or shopping bags*: insecurity and reaction to potential threat
Indoor elimination • *Single indoor toilet location or substrate [litter box available]:* location or substrate of litter tray is unsuitable, or cat may be afraid to use the litter tray. • *Single indoor toilet location or substrate [no litter box, cat previously used garden latrine]:* cat is unable to use outdoor latrine because it is unuseable [e.g. waterlogged, frozen, or paved over], or inaccessible [e.g. cat is unwell, or a dog now inhabits garden where the latrine is sited], or it is defended by other cats as part of their territory [e.g. despotism]. • *Multiple indoor toilet locations and substrates:* cat is unable to use a regular latrine due to conflict with other cats, aversive experiences during elimination [e.g. pain associated with FLUTD, or owner punishment].

Assessing emotional factors in cases of feline house soiling

In situations of both marking and elimination behaviour within the home, it is important to assess the cat's emotional status and to attempt to identify any triggers for alteration in that status. Perception of threat either from within or outside the home is commonly associated with the onset of marking behaviour but it is also important to remember that cats that are feeling threatened and insecure may be reluctant to use litter facilities that are positioned in vulnerable locations or that pose difficulties for the cat in terms of competition with other feline household members. In general, it is the insecure and timid feline that is more likely to present with problems of marking behaviour and individuals that do not cope well with change in their environment are going to be predisposed to the use of urine deposits that are designed to increase home security. In addition, cats that are living in a hostile social environment, where there is underlying tension between feline housemates, may use marking behaviour in an attempt to increase distance between them and to avoid overt physical confrontation. Therefore, an assessment of the compatibility between cats in the household is an important part of the investigation process. Likewise, the relationship

between the cat and the owner should be considered and questions about the owner's reaction to the discovery of deposits within the home should be included in the consultation. It is perfectly understandable for people to find it unacceptable that their pet is depositing urine or faeces within their home but the use of punitive techniques may be a factor in perpetuating the behaviour and confirming the cat's perception that the house is no longer a secure core territory.

Owners often misinterpret relationships between cats in multi-cat households because they are unaware of the significance of certain behaviours. For example, cats will often be described as 'getting on well' because they eat and rest in proximity to one another on the owner's bed or couch. Unfortunately, this apparent tolerance may exist only because the cats are forced to be close to each other when they are feeding or resting. They have no other choice because there are no other feeding stations or equivalent resting places. The cats may be very wary and hesitant whilst feeding and the owner will report that there are frequent bouts of hissing or spitting around the food bowl. Likewise, as one cat leaves a resting place or feeding area, it may be pursued or attacked and cats may attempt long distance intimidations, such as staring eye contact, to frighten each other away from resting places or latrines. Some cats will try to pull food out of a dish with their paws so that they can take it to eat in private. The same desire for privacy will drive them to make a toilet of their own somewhere in the house.

It is important to make a formal assessment of the relationships between cats in the household. A diagram should be constructed to illustrate the relationships. The social function of cats that have died or been re-homed may be important so it may be necessary to draw more than one diagram to illustrate the changing relationships as cats have departed or been added to the group.

Positive affiliative reactions that should be noted include allorubbing and allogrooming, tail up and trilled greeting between cats. Aggressive behaviours include active threats such as chasing, hissing or spitting and physical attacks, as well as more passive or distant threats such as staring eye contact, threatening body or facial posture, or spraying in front of other cats.
These classes of behaviour and their direction should be noted on a diagram of interactions, as illustrated.

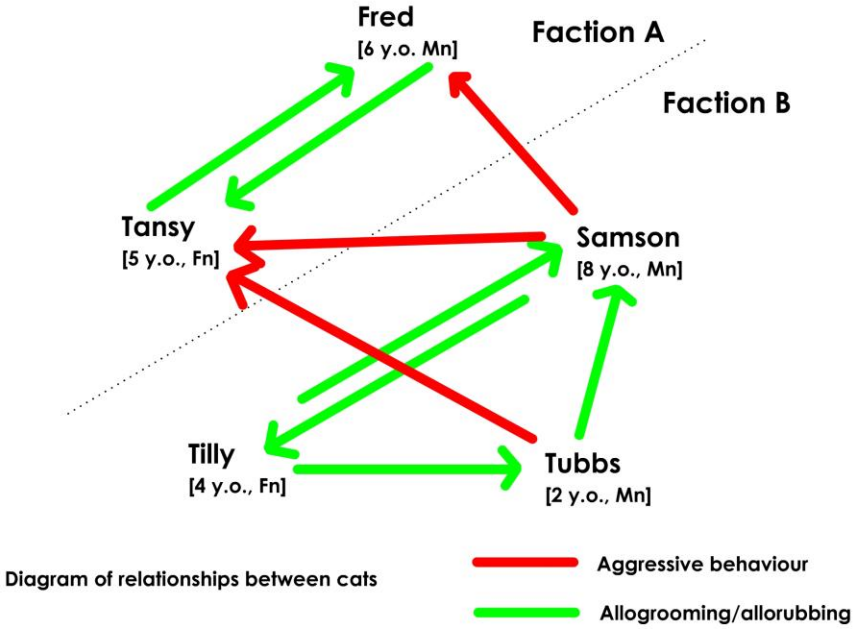


Diagram of relationships between cats

This may enable certain factions to be identified within the household. Combined with the information already obtained about where cats spend most of their time in the household, this makes the allocation of resources easier during treatment. It may also help to identify feline despots. Making an assessment of this kind is important even when looking at a multi-cat

household with what appears to be reactionary spraying due to conflict with outside cats. If resources in the home are sparse, then certain cats may perceive there to be a local overpopulation problem which is made worse by competition with outside cats. Sorting out internal conflict is likely to improve the cats' general welfare as well as help to resolve elimination and marking problems.

Inappropriate elimination

Once the initial history taking has been completed and the case has been categorised as one of elimination, it is important to spend time investigating the potential trigger factors, which lead to the onset of the behaviour. Only once the underlying reasons for the alteration in toileting behaviour have been identified can effective behavioural therapy be instituted and the cat taught to return to more acceptable patterns of elimination.

In some cases, the cat may never have achieved a state of successful house training but these are relatively uncommon. In the past, a belief that kittens needed to observe their mother's eliminatory behaviour in order to learn how to toilet appropriately was thought to be supported by the over representation of certain breeds, such as Persians, and the occurrence of house soiling issues within familial lines in those breeds. However, research suggests that observational learning is not involved in this process and that a lack of opportunity to explore and experiment with suitable substrates early in life is more likely to influence a failure to house train successfully. Obviously this access to suitable litter is going to be influenced by the mother's behaviour since kittens will follow her when she goes to use the tray and will thereby come into contact with an acceptable substrate. Kittens from mothers with poor toileting skills are therefore likely to have less interaction with a suitable substrate and may develop problems as a result but, even when the mother is a very clean individual, lack of suitable facilities near to the nest will have a similar effect. Failure to provide suitable substrate can also lead to the development of undesirable substrate associations.

Diagnosis

It is very important to properly identify the culprit[s] for the indoor housesoiling. Clients frequently blame a particular animal, usually because they have seen it eliminating in the house. However, other cats may also be involved. It is possible to use fluorescein dye to identify the urine of each cat in the household so that the identity of the soiling cat can be confirmed [see box below]. Recent research has shown that the fluorescence of urine spots from fluorescein treated cats may vary with urine pH. The fluorescence of fluorescein varies with pH, such that it only strongly emits light under UV illumination when it is in a neutral or alkaline solution. In acidic solution it may hardly glow green at all. Spots should therefore be sprayed with a buffer solution of sodium bicarbonate [baking soda], which will produce a pH of around 8, before testing with a UV lamp. If faecal soiling is involved, then a small amount of indigestible material is added to each cat's food for several days and the faeces are inspected. Crushed sweet corn works very well because it is easy to identify in the faces and does not upset digestion.

Using fluorescein to identify urine marking or soiling cats
• Fluorescein is available as sterile paper strips, for ophthalmic examination. These contain approximately 1 mg of fluorescein per tip, but this should be checked with the manufacturer. • The tips should be torn off and rolled to fit into gelatine capsules, giving approximately 5 per capsule [5mg]. • This dose is given once daily for 3-4 days. • Urine sites are checked daily. • Lightly spray each site with a solution of sodium bicarbonate [baking powder], mixed in water [1 tablespoonful in 125ml water]. • A UV lamp is then used to check the site for fluorescence. • It is vital to start by testing the least probable culprits first, working up to the most probable. Otherwise fluorescence marks left by one cat will obscure those of another. If it is certain that the culprit is a resident cat then the culprit may be identified by a process of elimination, which minimises the risk of leaving lots of fluorescent stains for the client to clean up. • A 5-day washout is left between testing of each cat, to make sure that each individual has excreted all of the dye before testing the next. • Although fluorescein is water-soluble and can usually be removed with normal cleaning, this testing method may leave stains on fabric, carpets or wall paper and owners must be warned of this.

A behavioural diagnosis should only be attempted after medical underlying and contributory factors have been investigated. A diagnosis is reached after collecting a detailed history and making diagrams of the soiling locations. Causes of housetraining breakdown are many and varied and detailed history taking and in-depth consultations are essential to get an accurate picture. Post trauma breakdown is relatively common and examples of trauma can include a period of enforced confinement, fear of the litter tray due to administration of medication or negative associations with the tray as a result of medical problems. Inappropriate facilities may be at the root of inappropriate toileting problems and it is important to consider the type of litter used in the tray, the sort of tray that is being offered and also the location of that tray. The cleaning regime may also be relevant since most cats are reluctant to use trays that are dirty and some others will fail to bond successfully to their latrine if it is cleaned too frequently. Other potential causes of a breakdown in house training include challenges to security in nervous individuals, overcrowding within a small-sized territory where there is competition over the resource of the latrines or access to the trays is controlled and manipulated by one individual within the household. There is also the issue of old age and debilitation.

Typical causes for inappropriate elimination
• **Lack of privacy in latrine locations**: litter trays that are placed too close to feeding areas or cat doors, or sited in busy places where the cat does not feel safe to go to the toilet. A previously satisfactory location may become unacceptable if the presence of new pets or children constantly disturbs the cat. New cats in the neighbourhood may overlook the litter tray from outside, again reducing privacy. • **Inappropriate substrate**: Certain scented, pine or wood-pulp based litters are aversive to cats. When urinated on they may release odours that the cat finds repellent, especially if the litter tray is hooded or enclosed. Substrate depth is also important, with cats preferring a depth of around 3cm. • **Competition and excessive latrine use**: if several cats are using the same litter tray then it quickly becomes soiled and cats may be forced to find somewhere else. Cats may be forced to displace each other in order to gain access to the solitary household latrine. Cats prefer to use separate toilets for urine and faeces wherever possible. • **Despotic control of entry/exit points**: Feline despots may perch close to cat doors and threaten other cats as they come and go. Nervous cats may not have the confidence to go in and out so they cannot use outdoor latrines. Threatening of cats leaving or entering the litter tray may also occur from cats within the same household. • **Specific fears**: Cats that are moved to a noisy or stressful location may be unwilling to go outside to use latrines. They may stay inside and soil the house if not provided with a litter tray. • **Negative litter box associations**: If the cat has been attacked or disturbed whilst using a particular latrine, or if it has experienced pain on micturition, then it is likely to chose a different toilet location the next time it needs to eliminate. • **Inability to use/find litter trays:** Elderly or debilitated cats may be less willing to travel to find a latrine, so they may resort to soiling in the house. They may be unable to make use of high-sided or covered trays. • **Medical illness:** Cats with PU/PD, incontinence, FLUTD or recurrent/chronic diarrhoea are unlikely to maintain a normal or acceptable pattern of elimination. • **Punishment:** cats that have been punished for eliminating in the wrong place may refuse to go to the toilet in the presence of the owner. Litter trays tend to be placed in public areas like the kitchen or utility area, which means that the fearful cat ceases to use them for fear of being punished further.

Recent research has demonstrated a direct connection between psychosocial stress and feline lower urinary tract disease. Feline idiopathic cystitis [FIC] is a complex condition that involves neurological changes in spinal pain fibres and biochemical changes in the bladder wall. The precise aetiology is not fully understood but cats with an anxious personality are predisposed to FIC and it is proposed that the condition arises from a combination of physical and psychological factors. Black and white cats, and Persian cats are commonly affected and FIC may account for a significant proportion of FLUTD in cats. Urine samples of FIC cats may be sterile or may contain crystals, plugs or traces of blood. Diagnosis is confirmed by double contrast radiography or ultrasound imaging of the bladder to reveal mural thickening.

Prevention: inappropriate elimination
• Latrine preferences are learned early in life as kittens explore their environment to find suitable latrine sites. • Specific preferences are conditioned according to the kinds of substrate and location that are available to the kittens. • Confinement to newspaper-covered areas without proper latrines can lead to inappropriate preferences that can be very difficult to overcome. • It is essential to provide kittens with latrines that resemble the kind of litter tray and substrate that the kitten can use when it is homed. • Litter trays should be large and have low sides, so that kittens can use them, otherwise they may learn a preference for eliminating on the newspaper around it. This also enables the kittens to discover a suitable toilet location when they are following their mother. • Several similar trays should be provided so that kittens have choice and easy access to them. • Adult cats should be provided with litter trays that are located in quiet locations, and deep filled with a mineral based or clumping type litter]. • Outdoor latrines may also be constructed [see handout on outdoor environmental enrichment]. • New cats should be introduced in an appropriate manner and with an accompanying increase in resources.

Treatment

Medical aspects of elimination problems must be resolved. There is a close relationship between stress and FIC so that dealing with social and environmental stress is an important component in resolving this condition.

Typically, it is possible to identify one or two environmental changes that have initiated the housesoiling problem. This may be something as simple as a change of cat litter. However, it is very important not to treat the problem at this superficial level. If a single inconsequential change has caused the cat to house-soil then it is very likely that there are other underlying problems that also need to be addressed. Not to do so may mean consigning the cat to a life of stress and impaired welfare.

Treatment of housesoiling, therefore, involves dealing with general environmental and social issues that cause stress, as well as the specific aspects of latrine location and type. Aggression between cats sharing a household is often overlooked because actual fights may be uncommon and most of the threatening behaviours between them are subtle.

Overall resource levels should be increased and resources should be distributed so that individual cats and cat-factions can make use of them without coming into conflict with each other. This also helps to undermine the activities of feline despots who try to monopolise specific resources. Additional cat flaps may be needed if aggression between cats is preventing certain cats from using outdoor latrines.

The cats should be provided with a range of suitable latrines, inside and outside the house. Cats do not share latrine facilities so, in multi-cat households, the optimum number of latrines should be one per cat plus one extra. This number of cat litter trays is obviously a horrific prospect for the owner of a lot of cats. The answer is to provide cats with outdoor latrines in the owner's garden. With the current fashion for hard landscaping, cats may have few opportunities to use good outdoor latrines and may have to travel across several gardens to find somewhere suitable. In winter, these toilets may become sodden or frozen, making them unusable. For this reason, many housesoiling problems are worse during the winter.

Outdoor latrines are actually very easy to construct. To create an outdoor latrine, dig a hole about 45-60 cm deep and 60cm square. This is filled 2/3 with pea sized gravel and then topped up with soft white sand of the type used for children's playgrounds. Hard yellow builder's sand is not suitable. These outdoor toilets should be hidden in flowerbeds behind shrubs and tall plants to give the cat privacy. These latrines are essentially self-cleaning but it is sensible to regularly use a litter scoop to remove faeces in the same way as with a conventional litter tray. The sandy part of the latrine should be dug out and replaced every six months. One outdoor latrine is unlikely to be enough, and different cats will have different preferences for location. At least two latrines should be provided.

There are often concerns that other cats will come into the territory to use the outdoor latrines. This is a possibility but rarely causes a problem. In fact, the presence of nearby latrines tends to strengthen the boundary of the resident cat's own territory. Information about improving indoor and outdoor environments for cats is included in handouts in the appendix.

Indoor latrines should be made as appealing as possible. They should be positioned in quiet locations and deep filled with a scent free mineral based litter. In some cases, soft sand or a mixture of soft sand and litter is attractive to cats, and the sand content can be reduced gradually once the cat has shifted its location preference to the designated litter tray. F3 diffusers are traditionally used to treat spraying problems, but can be used to make a latrine location more attractive. The diffuser is placed very close to the litter tray in a confined area. This can be effective for cats that choose to eliminate on piles of the owner's clothing or on the owner's bed because these locations are associated with increased security. F3 diffusers may also be used to reduce general social stress in the household. In this situation, the diffuser should be allowed to warm up for at least a couple of hours before allowing cats to have access to the room where the diffuser is installed.

Conversely, inappropriate latrine sites should be made less appealing. There are a number of ways to do this, including changing the floor substrate to make it less pleasant to stand on, placing small bowls of food close to the location so that it becomes designated as a feeding station instead of a latrine. The best guide for how to modify a particular latrine site is the cat's reason for choosing it in the first place. For example, a dark and secluded corner can be made a lot less discrete by moving furniture, putting in a loud radio close by or illuminating the corner with a bright spot lamp. Battery powered infra-red activated lamps can be bought very cheaply from hardware stores and can be installed in small corner, where it will switch on every time the cat approaches. This can act as an effective deterrent.

Cats that are inhibited, fearful and therefore unable to utilise improved resources because of their apprehension, may benefit from psychoactive drug therapy. Selegiline [Selgian, CEVA Animal Sante] is not licensed for use in the cat, but it can be used at a rate of 1 mg/kg once daily for the treatment of specific fears, a condition for which it is licensed in the dog [UK]. This drug increases confidence and exploratory behaviour, but takes 4-6 weeks to show efficacy. It should be continued until the cat is fully utilising resources and has not eliminated in the house for 8 weeks.

Where signs of chronic anxiety are apparent, despite the use of F3 diffusers, then an SRI or SSRI type drug, such as Clomipramine or Fluoxetine, may be appropriate.

Trial treatments for Feline Idiopathic Cystitis have included polysulphated glycosaminoglycans and Amitriptyline. Response to glycosaminoglycans was variable, with some individuals responding extremely well and others less so. Treatment with Amitriptyline has produced good results, with the affects being attributed to the nor-adrenergic effects of the drug. Amitriptyline is 5:1 selective in favour of nor-adrenaline over serotonin reuptake inhibition, whereas Clomipramine is 5:1 selective in favour of serotonin reuptake. However, both drugs do have significant effects on nor-adrenaline reuptake and Clomipramine may be a suitable alternative if there are concerns over adverse effects with Amitriptyline.

In all cases, psychoactive drug therapy should only be considered after reaching a specific diagnosis and taking into account the risks of disinhibition of aggression. Obstructive urinary tract disease should be ruled out before initiating therapy with SRI or SSRI drugs, which have a risk of increasing outflow obstructions through their effects on acetylcholine transmission.

Altering inappropriate latrine sites to make them less appealing to the cat (this must only be done when a potential alternative has been made available)
• Cover the location with thick polythene: urine will then drain towards the cat's feet when it is standing on the sheet. • Cover the location with a large sheet of silver foil: some cats do not like to stand on this. • Apply strips of double-sided sticky tape to either of the above to make them even more repellent. • Place small bowls of food on top of the latrine sites, so that they become feeding stations. Cats are usually reluctant to urinate near sources of food. • Illuminate dark corners with a bright spot lamp so that any privacy is taken away. • The same effect can be achieved using a small, battery powered infra-red activated lamp, which will turn on each time the cat approaches [these are very inexpensive].

Treatment: inappropriate elimination

General environmental and social issues:

- Increase resources available to the cat and strategically locate them for easy access by the various cats and factions within the household.
- Give the cats indoor-outdoor access with an electronic coded cat door.
- Switch feeding to activity feeding.
- Provide more choice of resting and hiding locations.
- Install F3 diffusers, to reduce anxiety and improve inter-cat relationships in the house.
- Use scent swapping to improve group odour.
- Consider temporarily isolating and then reintroducing cats if there are problems of aggression.

Latrine number, location and substrate:

- Latrines should be relocated to quiet areas.
- Litter trays should be deep filled [3cm] with a mineral-based or clumping litter [not pine or wood-pulp based or scented].
- In some cases using pure sand or a 50% mixture of litter and sand as a substrate in trays, is attractive to cats.
- A mixture of covered and open litter trays may be trialled.
- Additional outdoor toilets should be provided.
- Total latrine number may need to be as many as one per cat plus one extra.
- A specific latrine location may be made to feel more secure by locating an F3 diffuser [Feliway, CEVA Animal Health] next to it.

Owner behaviour:

- Stop punishment of inappropriate elimination.

Psychoactive drug therapy

- Selegiline: specific fear with behavioural inhibition that limits normal behaviour
- Clomipramine/Fluoxetine: chronic anxiety [concomitant signs of stress such as over grooming].
- Clomipramine/Amitryptilene: FIC

Prognosis

Cats with a history of inadequate housetraining, or inappropriate substrate or location preference are likely to relapse on occasion during periods of stress, or if the owner makes changes to existing toilets. These cats may always be a short step from reverting to using their own preferred toilet sites so it is important to stick to environmental modifications that work.

The prognosis for cats with house-soilng problems is good, as long as owners can accept that there may be brief relapses in the future. Even if the domestic indoor and outdoor environment is optimised and relationships between cats in the household have been improved, there is always the possibility that new cats to the neighbourhood may upset the situation.

Indoor marking

Indoor marking and housesoiling often occur together in the same household, and in a multi-cat household several cats may be involved. An important part of reaching a behavioural diagnosis must be to identify the culprits. Fluorescein dye or sweet corn may be administered in the same way as for house soiling problems, starting with the cats that are least likely to be involved in the problem [see box on the use of fluorescein for identifying the origin of urine deposits]. More than one cat may be involved, and it should be remembered that, in some cases, the culprit for indoor marking may not be a resident cat at all. Intact male cats and despots may enter the homes of other cats to take food, and then leave urine marks within the home. In these cases, treating the resident cats will have no effect on the marking behaviour and, in fact, increasing the level of resources available within the home may raise its value and therefore encourage the despot to try to take it over. In such circumstances, an electronic coded cat-door would need to be fitted.

Prevention: Indoor marking
• Introduce new cats carefully and with an accompanying *increase* in resources for the group. • When redecorating, building or making changes to house layout, install an F3 diffuser [Feliway, CEVA Animal Health] to maintain core territory odour signals. Allow paint to dry and the room to air thoroughly before allowing the cat[s] back into it. Harvest facial and flank odours from the cat[s] and apply these to doorways, and furnishings in the newly decorated area. If the cat is particularly sensitive to change it may be better to arrange a cattery stay during major projets of redecoration or renovation, especially if they involve core territory areas for the particular cat. • Provide adequate resources for the group. • When cats are temporarily removed from the group [such as when going to the vet clinic] they should be reintroduced carefully after trying to re-label them with the group odour.

Diagnosis

Diagnosis involves several steps:

- Identify culprits.
- Assess health status of all group members.
- Map the location of resources and the progression of urine and faecal marks within the home.
- Assess the structure of the social group within the home, to identify potential conflict.
- Identify specific situations in which marking occurs.
- Detail the cat's behaviour before, during and after incidents.

The function of marking behaviour is to identify the significance of certain locations to the 'sender' and 'receiver' of the mark. Scent marks, therefore, act both as a memento of previous experience in a location as well as a signal to others. When a cat encounters the facial and flank marks on inanimate objects in the core part of the territory, they signify that this location has been safe in

the past and when a cat leaves another face or flank mark, it is re-labelling that place as safe based upon its current experience. The odours that cats share when allogrooming and allorubbing help to identify the group so that these and the core territory odours are a memento of previous interactions. Other odour marks are intended to enable cats to maintain distance from one another. Both claw marks and urine spray marks contain pheromone chemical signals that are intended to signal to cats outside the social group that they are entering an area that is also occupied by other cats. The home range that surrounds the core territory is quite large and is intensely defended. Beyond this home range, the wider territory controlled by the cat or cat group may be very large. Feral and wild cats may hold territories that are more than 1-2 square miles. However, it is clear that cats may need to pass through areas of each other's territory and the boundaries are not absolute. Claw and urine marks are therefore intended to warn other cats to avoid certain locations at certain times so that they do not come into conflict with each other. This works well when there is a large enough territory for the different types of odour marks to be deposited in a meaningful way that allows the cats to avoid potential enemies and remain close to their affiliates. Natural social groups are made of related female cats and juveniles, with adult males and surplus females being displaced from the group at maturity. Intact males will range over much larger territories, visiting different groups of females to mate.

Contrast this with the situation in the domestic environment. Pet cat groups are made up of unrelated and neutered males and females with widely differing rearing backgrounds. Some may come from a genetic and rearing background that does not favour sociable living in a group. From the owner's perspective, the expectation is that the cat's core territory will match the internal living space of the home, so that facial and flank marking are seen indoors and spraying or claw marking is only performed outdoors. However, instead of being one large contiguous area, each domestic cat's territory may consist of several small patches that are distant from each other. Each cat is forced to travel across several other cat's territories in order to get to a latrine or hunting site. This increases the amount of feline traffic through gardens and increases the likelihood that each cat's core territory will be overlooked by cats outside. If underfed, despotic or intact male cats enter the homes of resident cats then this further undermines the perception of the owner's home as 'core' territory.

So several scenarios emerge. If the core territory is threatened by being overlooked or invaded by cats that are not part of the group, then the boundary of the core territory can retreat into the house and the resident cat[s] will use spray or claw marks to delineate a boundary at the edge of the core territory which happens to be within the home. These cats may end up inhabiting the upper rooms of a house as core territory and then spray marking or middening on the ground floor, but the situation often starts when urine marks appear at windows or external doors, or around the cat flap.

If the relationship between cats within the home is flawed, then, rather than one group, there may be two or more factions coexisting within the home. They may have little tolerance for each other. Most domestic cat groups are of mixed gender and are not actively engaged in mutual kitten rearing, so that there is no positive reason for the cats to coexist other than their own individual social preferences and affiliations. The continued function of the group is highly dependent on whether present resources are plentiful enough to maintain the whole group without competition. Within domestic cat groups sharing a home it is possible to identify patterns of interaction by analysing greeting, affiliative and aggressive behaviour between cats [see example diagram].

Groups can contain several types of individuals and sub-groups:

Cliques or Factions: groups or 3 or more cats that show greeting and other affiliative behaviour towards each other, but may be aggressive to other members of the domestic group.

Pairs: Pairs of cats, often littermates, that greet and show affiliative behaviour towards each other.

Social facilitators: These cats will often offer and receive greetings and affiliative behaviour with cats from several factions or cliques. They may also associate with other cats outside the group and serve to maintain group odour between individuals and sub-groups that rarely interact directly with each other.

Satellite individuals: These offer and receive little or no greeting or affiliative behaviour with the other cats in the home. They may be involved in minor or passive aggressive incidents with other cats in the group, often as the recipient of threat.

Despots: These individuals may deliberately monopolise resources and create opportunities to intimidate other cats in, and outside the home.

Identifying the social structure of the group may give insights into why the relationship between resident cats has broken down. For example, the loss of a social facilitator cat may cause aggression to begin between factions because no other individual is maintaining the group odour. The same situation can occur when the owner goes away on holiday or when a social facilitator becomes ill or infirm. The role of a particular individual may change according to its health status. A pair or faction may break up if one cat suffers from pain, hyperaesthesia or some other condition that changes its acceptance of grooming or affiliative behaviour. It may change to become a satellite individual. A polyphagic hyperthyroid or diabetic cat may consume more food or despotically control access to it, leaving the rest of the group resource deficient. Investigating and treating marking problems that relate to social difficulties between cats can be demanding.

Typical causes of indoor marking
Loss of core territory facial or flank marks: Usually due to redecoration or change of house. **Loss of maintenance of group odour**: Temporary or permanent loss of a social facilitator cat, absence of the owner, or housing of group members apart [at a cattery] so that odour is not mixed between individuals and factions. **Failure of odour recognition of a specific individual**: Individual odour may be altered or lost if a cat is taken away for grooming or veterinary treatment such as dental work. The cat may also return home with the odour of an unfamiliar cat on it. The returning cat may be regarded as an intruder. This causes aggression or the cat may never regain its previous role in the social group. **Introduction of a new cat**: This may exceed the population that can be supported by existing resources, or the new cat may upset existing social relationships [through despotism, competition or by increasing stress in the group]. The same effect is apparent when a recently introduced kitten reaches maturity. **Illness**: Conditions that alter the cat's emotional state or interaction with other cats [Hyperthyroidism, senility, pain, hyperaesthesia, debilitation] or need for resources [conditions causing polydipsia or polyphagia]. **Excessive population density outside the home**: existing overpopulation, new cats introduced to an area, or when a cat owner moves a group of cats into a new home in an area where many cats already live. **Unfamiliar odours brought into the house**: non-resident cats may spray close to a front or garage door so that this odour seeps into the house. Owner's shoes, clothing or bags may pick up odours from outside.

Treatment

Underlying medical conditions should be investigated and treated. Regardless of the cause for the marking behaviour, it is useful to increase available resources so that cats have easy access to them and perceive their core territory to provide a surfeit of the things that they need. F3 diffusers [Feliway, CEVA Animal Health] help to create a sense of core territory and can

considerably reduce tension in cat groups. Soiled areas should be protected according to the guidelines in the box entitled ‘protecting property from urine damage] and on the handout in the appendix. This prevents soiling from becoming ingrained and harder to remove.

In the case of spraying caused by an external threat from cats, the perceived threat must be reduced and the boundary of the core territory strengthened. Basic changes might include installing an electronic coded cat flap so that outside cats cannot gain access to the home and the use of glass etch spray on windows. Glass etch spray is applied in several coats until the window is effectively opaque. Light will still enter, but it will be diffuse. This has several functions. It removes the opportunity for non-resident cats to use visual threats [posture, eye contact] to intimidate resident cats in their own home. It also prevents the resident cats from using internal vantage points to threaten cats outside, and encourages them to go outside instead. This helps to prevent reactionary spraying on areas around the window, which are intended to be a deterrent to the outside cat. Glass etch is not needed on all windows; only those which are known to be used as vantage points by indoor cats or are associated with areas of spraying or provide outdoor cats with a view indoors. It may be removed after marking has stopped for a period of 8 or more weeks, and can be shaved off the window in strips using a razor blade or scraper. This makes the change back to normal transparency more gradual.

The intensity of core territory facial and flank marks can be enhanced using F3 diffusers [Feliway, CEVA Animal Health]. These should be positioned in each of the rooms in which the cats spend a lot of time, and used at a rate of 1 per 50-70 m^2. F3 may have no effect if used at less than this rate.

Having made the core territory safer, the aim is to enable the cats to re-establish a pattern of territorial defence outside. The cats should be given several vantage points that face into the garden but have no view back to the house. This prevents non-resident cats from using these perches to threaten the owner’s cats. Non-resident cats may have favourite places from which they use long-distance visual threats to intimidate the client’s cats. These should be removed or altered so that they are unusable. Flat headed nails,8-10 cm long, knocked into the top of a fence about 6-8 cm apart will allow cats to walk along the fence but will prevent them from sitting comfortably on it. Pieces of sharp plastic doormat or plastic anti-burglar strip can be put onto the top of concrete posts or roofs so that perching is uncomfortable. If a particular perch cannot be made unusable, then the view from it can be blocked using fencing or plants. Glass and other hazardous deterrents should not be used because these may cause injury to the cats.

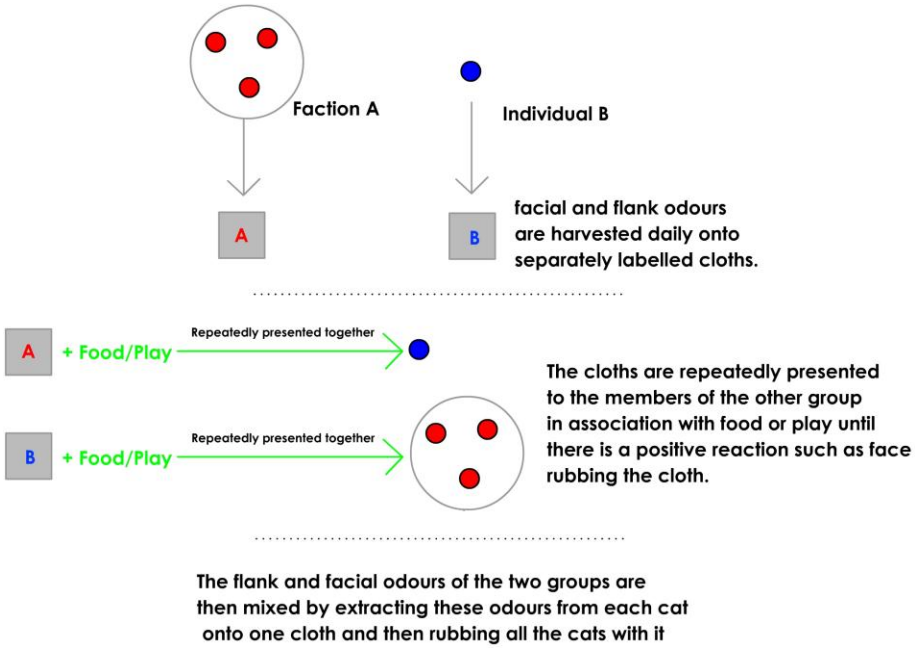
Softwood posts make good clawing places and they should be installed at the edge of the territory so that the resident cats are able to leave appropriate territorial scent marks. Rub them against existing scratch places and then break up the surface with a wire brush to make them appear attractive to claw. It is also sensible to place claw posts or pads near to the cat door inside the home so that the cat can leave a territorial scent mark without spraying. The cats should be provided with outdoor latrines around the edge of the garden, as these also help to strengthen territorial boundary and reduce the need for resident cats to cross other territories to find a latrine. Information about these ideas is included in a handout in the appendix.

If indoor marking has been caused by conflict between cats in the home then comprehensive environmental enrichments should be provided. The aim is to provide separate factions with their own resources so that they can effectively live separately from each other whilst sharing the same domestic space. This ability to coexist without competition actually increases the likelihood that the cats will begin to associate with each other.

The mixture of facial and urine marking odours impairs the sense of core territory for the cats. Urine marks are also self-perpetuating because the marker feels compelled to refresh them periodically. For these reasons, it is very important to remove urine odours thoroughly using the cleaning methods detailed in the box entitled ‘removing urine odours’ and on the handout in the appendix. Scented products and those containing ammonia should not be used to clean up spray

marks because they may intensify urine odours and leave an objectionable smell that encourages over-marking. F3 diffusers may be used to intensify the core territory facial and flank odours, and these scents may be harvested from the cats and then spread around the house.

Group odour is crucial to maintaining a conflict-free multicat household and it is often apparent that relationship breakdown occurs when cats are unable to maintain this for themselves. In the same way as for treatment of inter-cat aggression in the household, it is possible to classically condition an association between the odour of a specific cat or cat-faction and the presentation of food or play. The scent is harvested from the facial and flank regions of the individual cats [or factions] onto separate cloths. The cloth from one individual or faction is then regularly presented to one of the other cats before giving food or play, until that cat shows a positive response to that odour. That cat's cloth is presented in the same way to the group or individual represented by the cloth. Initially the presentation of the odour may cause some alarm. However, after repeated presentation each cat should begin to rub against the cloth when it is presented, which indicates that the odour has been fully accepted. The body odour of the factions or individuals may then be merged, by exchanging odours between them [see diagram below]. In situations where there is overt aggression between cats it is best to isolate them for a period of 1 to 2 weeks and reintroduce them as if bringing in a new cat for the first time.



Marking sites can be made less attractive for cats in a number of ways, but it has to be remembered that, if the motivation is strong, this will merely displace the activity elsewhere. Deterrent methods must therefore be used in combination with other environmental modifications. Cats are generally reluctant to spray or midden close to feeding sites, so small bowls may be put close to spraying locations. This also increases the number of feeding places. Odour deterrents should be avoided, because these may actually draw attention to spray sites or produce odours that the cat will deliberately over-mark. Sheets of aluminium foil or plastic can serve to protect the floor around a spray site and may deter cats from going there. These methods are best used for isolated locations where it is imperative that the cat does not spray, such as around electrical equipment.

Claw marking often exists as a sub-problem in indoor marking cats. Claw marks have a similar territorial function to urine spraying and the rate of claw marking may increase along with other forms of indoor marking. Providing cats with good claw marking sites that fit with their need to

defend territory can be an effective way to displace the patter of marking from spraying to clawing. Most owners find this desirable. Claw marking posts or pads may be positioned close to windows, doorways and cat doors. They are made more attractive by rubbing them against existing clawing sites and then raking them with a wire brush to simulate real claw marks. Bold vertical stripes made with a permanent marker pen will draw attention to the object as a suitable clawing place. Undesirable claw marking can be deterred by daily application of F3 spray, combined with the provision of a nearby alternative scratching place. Client information on the provision of clawing places is provided in a handout in the appendix.

Psychoactive drug therapy is often prescribed for cats with indoor marking problems, but this will not offer a solution. The underlying reasons for the indoor marking must be addressed. Medication does have a role in longstanding cases where the number of marked sites is large, or when marking has become habitual, or there is an emotional problem that may benefit from temporary drug support. Analysis of the general emotional state of the animal is important. SRI/SSRI drugs such as Fluoxetine and Clomipramine are beneficial for cats that are habitual indoor markers, or show a pattern of anxious, reactionary spraying. Selegiline benefits behaviourally-inhibited cats that will not explore their environment, or that display fearful reactions followed closely by reactionary spraying when they see certain cats lurking outside the home. These drugs will not help confident cats that show no signs of anxiety or fear and are merely using spray marks, albeit inappropriately, as part of a calmly considered strategy to control territory in the house. Hormonal preparations have no role in the treatment of indoor marking.

The decision to use psychoactive drugs for indoor marking

Psychoactive drugs may be of value when:

- Individual cats are showing signs of chronic anxiety [SRI/SSRI] or inhibition of normal behaviour [Selegiline].
- The case is longer than 6 months duration.
- Response to environmental change has been incomplete.
- Spraying is a reaction to specific fear [Selegiline].
- A rapid resolution is demanded and the client can be relied upon to complete environmental modification.

Risks of using psychoactive drugs include:

- Disinhibition of aggression: SRI/SSRI/benzodiazepine drugs.
- Clients may assume that changes in behaviour are solely due to medication, so that they do not comply with behavioural therapy or environmental modification.
- There may be a relapse if drugs are withdrawn before environmental and social factors have been remedied.
- Potential adverse effects of drugs: fatal hepatic disease after oral benzodiazepine administration, cardiovascular effects of SSRI/SRI drugs.
- Interactions with concurrent medication or disease: drugs that affect the function of cytochrome P450 can interfere with the metabolism of SRI/SSRI drugs [e.g. Cimetidine]. SRI drugs should be used with care in cats with thyroid disturbance, or with bladder disease [risk of outflow obstruction].

Altering spraying sites to make them unattractive to the cat
• Place small bowls of food close to the marking location and combine this with an increase in the overall number of feeding stations throughout the house. • Use plastic or aluminium foil sheets to cover flooring around the spray site, as some cats will not tread on this. • Position a scratching post in front of the site to provide an alternative method of marking.

Treatment: Indoor marking
General changes: • Provide additional resources around the home, including extra resting, feeding, drinking and latrine sites. These should be located so that each faction or individual cat has easy access to its own set of resources close to a location where it spends time. • Soiled sites should be cleaned properly [see box and handout in the appendix]. • The cats should not be punished or threatened and chased when spraying, as this may increase stress or encourage the development of spraying to gain attention. • Strategically install F3 diffusers [Feliway, CEVA Animal Health] **External threat:** • Install one or more coded electronic cat flap to prevent entry by non-resident cats. Transparent cat doors should be sprayed with a solid coloured paint so that they are completely opaque, otherwise non-resident cats may threaten residents through it. • Use glass etch spray to prevent outside cats from seeing into the home through windows close to where the resident cats have sprayed, or which overlook resources. • Install scratching posts, vantage points and latrines in the garden so that territorial control is shifted from inside to outside. • If a stray entire male cat has moved into the area it should be trapped, neutered and homed away from the area. **Internal conflict:** • Follow general advise on resource distribution, giving each faction its own feeding stations and other resources. Consider providing an additional cat-door if one cat is guarding it. • Introduce activity feeding. • Use scent reintroduction and scent swapping to re-establish a group odour. • Consider isolating and reintroducing cats in accordance with guidelines on dealing with inter-cat aggression. • If cats have spent time away from the group, reintroduce them appropriately. **Unfamiliar odours coming in from outside the home:** • Regularly clean doorways, paths and walls where non-resident cats are spray marking [scrub with a solution of biological washing powder and hose clean]. • Fit draft excluder around doors and frames to prevent odours from coming in, and install a weatherboard to the bottom of external doors so that urine marks do not run down the door and into the house. • Take off outdoor shoes and put them on a high shelf when entering the house. • Apply a squirt of F3 [Feliway, CEVA Animal Health] to bags when they are brought into the house. • Allow new furniture to air for several hours before allowing the cats access to it. This allows plastic and other odours, that may trigger spraying, to disperse. Apply F3 spray [Feliway, CEVA Animal Health] to the furniture regularly until cats are voluntarily face and flank marking it.

Withdrawing treatment
• Environmental modifications that are made outside should be permanently maintained, but glass-etch on windows, food bowls that have been used as spraying deterrents and other minor environmental modifications should be gradually removed after 6-8 weeks without spraying. • Psychoactive drug or F3 diffuser therapy should be gradually withdrawn after 6-8 weeks without spraying or after the temporary environmental modifications have been removed. Drugs are withdrawn over a 4-8 week period depending on the duration of therapy. At least two dose decrements are required, first halving the daily dose and then doubling the dose interval. • Feliway diffusers are allowed to run out completely, one at a time, after drugs and temporary environmental modifications have been removed. • If inter-cat hostility exists in the household then F3 diffusers should be continued until the cats have fully re-established their previous allogrooming and allorubbing affiliative behaviour.

Proper use of pheromone products
• F3 diffusers must be used at a rate of 1 per 50-70m^2, in accordance with the manufacturer's instructions. • Diffusers should be left switched on at all times and must not be moved from room to room. • They should be installed strategically, one in each of the locations where individual cats or factions of cats spend time. Installing a single diffuser in a hallway between rooms will not generally produce an effect in the rooms. • When F3 diffusers are first installed the cats should be kept away from the diffuser for the first 1-2 hours to prevent them from spraying onto the diffuser. Being plastic, the diffusers will initially release a combination of smells that some cats may find objectionable. • If a diffuser becomes contaminated with urine it should be thoroughly cleaned, other wise it will release urine odours along with the F3. Some diffusers may need to be thrown away. • F3 spray can be used to spot mark new objects that are brought into the house [clothing, bags, new furniture]. • F3 spray can also be used as a deterrent for scratch marking in the home: one squirt is applied daily to the claw marking location. An alternative claw marking location should be provided nearby.

Cooperation between cat owners
• Cat ownership is increasing, which means that local feline population density may be very high, and rising. • The problems of house soiling and indoor marking that affect one cat owner may also be affecting others. • Indoor and outdoor environmental modification can have a much more dramatic effect on the welfare and behaviour of cats, if all cat owners in a neighbourhood make the same changes. • Veterinary practices should encourage neighbours to work together to solve problems that arise form overpopulation and inter-cat conflict. • Distribution of advice leaflets and running educational evening can help, and will gain good publicity for the practice. • It can be beneficial for clients to be educated in feline behaviour, social structure and resource requirements.

Prognosis
Cats with a history of indoor marking are likely to relapse at some point in the future, because this behaviour is normal and situations outside the owner's influence may create the conditions for a new bout of marking. Typical times when marking may re-emerge are after redecoration, a house move, or the introduction of a new stressor [new baby, new pet]. Spring and summer bring a social turmoil for cats, as these are times when they are most active and territorial space is hotly disputed. The presence of young entire females may lure intact males into a neighbourhood, where they may settle and despotically wreak havoc on the local cat population.

It is possible to minimise the risk of recidivism by continuing to offer an excess of resources and maintaining a suitable core and garden territory for the cats. If a new bout of marking is anticipated, then the environmental changes and F3 diffusers may be temporarily reinstated.

Aggression between cats in the same household

The sequence of aggressive behaviour
The cat's primary defence strategy is to escape or avoid conflict. Cats do not possess a repertoire of appeasement behaviours to halt or modulate intraspecific aggression so physical confrontation may result in serious injury to both parties. As solitary hunters, survival depends on individual fitness so cats tend to avoid conflict in order to protect themselves. If escape is impossible, then cats will frequently freeze and deliver a range of threatening behaviours, including postural and vocal signals, designed to repel or hold the threat at bay. Meanwhile, the cat is re-evaluating its opportunities for an escape. Attacks may be sudden and brief, and again aimed at repelling the threat so as to re-open an opportunity for escape. Cats will most often become aggressive when conflict is over a survival resource [including territory] or when escape from conflict is impossible; such as when the animal is debilitated or confined.

The feline aggressive sequence shares some similarities with other species; non-specific increases in body tension and threatening eye contact for example. In addition there are a range of feline aggressive displays which involve whole body and facial components. The cat may attempt to present itself as as an active threat by increasing its apparent stature [piloerection, sideways body arched posture], or it may attempt to reduce the threat it poses by flattening onto the ground and adopting a self-defensive posture. These whole body postures are a reliable indicator of the cat's attitude to a situation but they are relatively static and do not indicate the moment-by-moment shift in the cat's reaction. For this it is better to look at facial signals such as head and ear position, and other expressions involving the mouth and eyes. One very important point is that the transition from a static defensive posture to an attack may be very sudden in cats. It is therefore very important to be able to read and appropriately respond to changes in facial signalling that indicate the cat's increasing sense of vulnerability and which may precede an aggressive outburst.

History taking
Inter-cat aggression presents a particular problem because many of the aggressive incidents are not directly observed by the owner or may be misinterpreted when they are. Observation of the cat during the consultation is important but house visits may be preferable and when they are not possible consultation observation is is best augmented with video footage of the cat's normal behaviour in its own surroundings. It is not acceptable to stage aggressive events for the purpose of making a diagnosis since this involves a serious risk of injury.

Important aspects of history taking

• Historical description of aggressive incidents [starting with the first that the owner can remember]. Details of each incident should include location, persons/animals present, context, time, and target of the aggression.

• The cat's body posture and facial expression before, during, and after each incident give strong indications of its emotional state and intent.

• The victim's response before, during, and after each event should be recorded.

• Relationship between cat and other animals in the household [allorubbing, allogrooming, play, aggression, fear-avoidance].

• List of all situations in which low level aggression behaviour is seen [hissing, spitting, growling, eye contact, body posture].

• List of stimuli/events that elicit fear or anxiety.

Diagnosis
As with house-soiling and spraying problems it is important to fully understand the nature of the cat's relationships with each other and the way that they make use of their domestic territory. Some basic information is vital:

• A plan drawing of the home and garden indicating the location of feeding places, latrines, resting places and any other resources the cats make use of.

• This drawing should also include information about places that each cat prefers to use [resting places etc] and any locations of spray marks or inappropriate elimination.

• The relationship between the cats can be determined by looking at the pattern of allorubbing, allogrooming and other affiliative behaviours such as tail-up greetings between individual cats. It is often found that small factions or cliques exist within the whole group, with some cats remaining peripheral to the social group. There may also be 'supersocial' individuals who show affiliative behaviour towards and are accepted by members of all of the factions. These cats may be instrumental in preventing outbreaks of aggression between factions.

• Observation of passive aggressive behaviours between the cats, chasing, resource guarding and other similar behaviours that indicate social conflict between factions or group members.

Common causes for aggression between cats in the household

• Illness or debilitation.

• Social pressure due to excessive population density.

• Inappropriate introduction procedure with a new cat.

• Temporary isolation of individual cats leading to failed recognition when they return, or loss of group odour.

• Fear-related aggression.

• Predatory or play-related behaviour.

• Redirected aggression (frustration).

Treatment
The ultimate aim of treatment is to produce a fully functioning cat group in which there is maximal affiliative behaviour and minimal aggression. Treatment of aggression within cat groups should only proceed where there is a genuine likelihood that the environment can be permanently modified to meet the cats' needs. This may mean giving the cats access to more space, a larger

number and diversity of resources, and possibly indoor-outdoor access if the cats are currently kept inside. Part of the solution to some inter-cat aggression problems may be to identify and re-home despotic cats, or to sensitively reduce the overall cat population in a household by re-homing certain factions en-mass. In this case the resolution is to produce several functioning cat groups that live separately. Some owners are fortunate enough to be able to provide two or more separate 'homes' for their cats within their property, using outbuildings. Making this kind of decision requires an in-depth analysis and understanding of the social dynamics of the group and how it accesses resources. A good solution that improves the welfare of all the cats should never be regarded as a failure, even if the cats are unable to continue living with the owner. One significant problem in cat ownership is Animal Hoarding, especially in the case of inter-cat aggression within the household. Animal hoarders or collectors should not be supported in their attempts to keep excessively large populations of cats. When treating aggression between cats sharing a household, it is important to address the basic factors that encourage cats to spontaneously form groups in feral or wild situations:

• An excess of resources [food, resting places, latrines, water].

• Instant access to available survival resources.

• Sufficient space [including 3-dimensional space].

This is in addition to any innate [genetic or acquired] tendency toward sociability in the individuals making up the group. The first step to treating inter-cat aggression is therefore to reduce apparent competition. Providing each cat-faction within a household with its own collection of resources will immediately reduce stress. The cats no longer have to queue for access to resources in close proximity to cats from opposing factions. Reduced contact in competitive situations will allow the cats to live in greater isolation from each other, but this in fact also enables them to associate with each other without the complication of competition for food or space.

In order to maximise available space for the cats it is also important to make the best use of the outdoor environment. Provision of extra resting places, perches and latrines outside will reduce competition for indoor resources. Access to outbuildings increases indoor space available to the cats, as does providing sheltered perches. Some owners are reluctant to give cats access to outdoors, and in some countries cats are not permitted to roam free. In these cases a secure outdoor run may be a viable option, to increase available space. Part of reducing competition is to reduce the value of the owner as a 'virtual resource'. The cats may regard the owner as a source of security or access to resources. They may be unable to gain access to food or go in and out of the house safely when the owner is not present to protect them, and may come to depend upon controlling or communicating with the owner in order to carry out normal self-maintenance activities such as accessing a latrine. This is not appropriate, given the cat's ethology, and also means that cats tend to congregate around the owner, which places them in close proximity at a time when they are most desperate to get food or outdoor access. Free access to food in bowls or activity feeders that always contain some food and are merely topped up by the owner at random will enable the cats to maintain distance from one another. Likewise cat-doors (preferably more than one) are better than a 'human operated' back-door.
Increasing access to space is also critical. The cat's primary means of controlling its interaction with other cats is to maintain distance from them. In the small rooms that are typical of most homes it may be very difficult for a cat to feel safe because it is always forced into closer than desirable proximity to other cats. This tends to favour aggression, because escape and avoidance are not possible. Fortunately, cats are able to make greater use of 3- dimensional space than humans and dogs, so giving them high perches in the form of shelves or cat furniture will enable the cats to re-engage avoidance and distance-maintaining behaviours. These should be provided indoors and out.

Cardboard boxes and other low-down boltholes provide an excellent escape route for cats that are regularly chased aggressively or during play. This enables the victim to take refuge without having to run too far, and removes some of the reinforcement for chasing by the other cat. If the motivation for chasing is predatory play then the owner should provide other play opportunities as an outlet for this motivation, such as play with a fishing toy and a changing supply of small, easily moved, brightly coloured toys.

The pheromone environment of functioning cat groups is quite special. Repeated face and flank marking of objects in the central section of the cats' territory, combined with allorubbing and allogrooming [rubbing and grooming of social partners] creates a strong sense of security and identity. This can be lost when factions of cats or individuals dissociate from one another. This is commonest when people are not present to transfer odours between cats, or when a super-social individual within the group has gone. It can also occur when a house is redecorated, stripping odour marks from the environment, or when individuals are reunited after a period of separation [such as when hospitalised or having gone missing].

The use of F3 diffusers [Feliway, CEVA Animal Health] can simulate the effect of dense facial and flank marking within an environment, whilst the cats re-establish their own marks and exchange odours that identify them. The pheromone F4 [Felifriend, CEVA Animal Health] ought to be very useful for treating inter-cat aggression within the household, but unfortunately there have been problems with its practical use. F4 signals indicate familiarity, but with cats that have already had a number of aggressive encounters there may be a dissonance between the memory of the visual appearance of the aggressor cat and the chemical 'familiarity' signal. This has been seen to trigger apparent panic and violent outbursts. F4 is not recommended for treating inter-cat aggression within the household, but is very useful for reducing fear of unfamiliar people and other animals and for helping in the introduction of a new member of the household.

Individual acts of aggression between cats must be minimised. Vantage points used by despotic cats to observe access points and resources, should be removed. Increasing the number of resource locations also makes despotism impossible.

Use of punishment is not generally recommended. A better method of distracting the cats is to try to trigger a predatory behaviour that is directed at a toy. Most toys will not provide sufficient distraction, but laser pointer may be used carefully to breakthe cats' concentration and lure them away from each other into a game. The advantage of this particular toy is that several cats can be independently distracted by moving the dot to different locations.

Successful resolution of aggression is most likely if individuals recognise each other as part of the same group. This can be achieved by swapping odours between the cats and possibly by isolating factions or individuals so that a complete re-introduction is carried out, as if the cats were being brought into the house for the first time [see box for introducing new cats]. This may be the most appropriate course if the cats are likely to inflict serious injury on each other, or where it is relatively easy for the owners to keep the cats apart in this way.

Treatment: Aggression to other cats in the household

• Identify factions within the house.

• Identify the main aggressor[s].

• Consider fitting the aggressor[s] with a bell and collar so that other cats can evade them.

• Provide each faction with its own complete set of resources, located in an area where the cats already spend most of their times.

• Each faction should also be provided with an F3 diffuser [Feliway, CEVA Animal Health] in the room where its resources are located.

• Provide additional hiding and resting places around the house.

• Increase access to 3-dimensional space, by providing shelves and high cat furniture.

• Provide low-level boltholes such as cardboard boxes so that cats have easy access to an escape route when chased.

• Remove or block access to vantage points from which a despotic cat [or cats] have previously sought to intimidate other cats while they are accessing resources or moving from space to space [cat doors, doorways, corridors, close to latrines or feeding stations].

• Consider isolating factions or individuals if there is a significant risk of fighting or if previous attempts at re-introduction have failed.

• Proceed with an odour introduction routine as detailed in the instructions on introducing a new cat.

• F3 diffusers may be removed when the cats are freely associating without aggression and showing allogrooming and allorubbing between members of factions.

• Some deliberate odour swapping and the provision of additional resource locations may be needed to maintain permanent harmony.

• It may be possible to inhibit aggressive behaviours at the moment that they start, using a conditioned punisher such as a rattle can. Care should be taken not to draw attention to the source of the punishment, and to time it carefully so that it does not induce fear or trigger an aggressive attack when the cats are intent on each other.

• Increase play to reduce the incidence of predatory play directed at other cats.

• Additional drug or other therapies may be required.

• Consider rehoming if a feline despot is unwilling to share space and resources, or if the welfare of the group is impaired, or if social behaviour between the cats cannot be maintained. Do not introduce additional cats.

• Monitor frequency and intensity of aggressive behaviour.