

# CP/Clinic

The Feline Magazine for Veterinary Professionals / Issue 1 / 2019



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the Acromegalic Cat*

## Behaviour

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Acromegaly and diabetes, what is the connection? Read more on page 4



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# Meet the team

**Fiona Brockman BVMS MRCVS**

**How long have you worked for CP?** I joined in September 2018.

**What did you do before**

**working for CP?** I worked in two independent vet practices in Scotland both of which worked with local CP branches, SSPCA inspectors and other smaller

rescues. I also locummed for an Out of Hours service and the Pet Blood Bank.

**What is your role within CP?** I'm the Field Veterinary Officer for Scotland and the North of England region.

**What do you like most about your job?** Every day is different, with centres and branches to visit, people to meet, talks to give and inspiring things to learn.

**What is your most memorable CP moment?** Getting my first ever cat, Ronald, from CP in 2008.

**Do you/did you have a pet/pets?** Growing up, we had a succession of retired guide dogs. I've had three CP cats, two other rescues and our current cat Rosie, a very placid tortie.

**What are your hobbies/other interests?** I have three young children so I spend my time supporting their hobbies and I'm the chairperson of their school's parents' association. I love to go Scottish country dancing, bake, sew, craft, walk and cycle.

**Where is your favourite place to visit?** My family loves to be outdoors so any beach or country park.

**If I wasn't doing this, I'd probably...** Realistically I'd still be in clinical practice doing shelter medicine. In fantasy land I'd be living on a small holding in beautiful countryside with lots of animals.



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# Hypersomatotropism – the Acromegalic Cat

*Sarah Spencer and Ruth Gostelow take a closer look at a still under-recognised condition resulting in insulin resistance and preventing diabetic remission.*

**In the second article discussing feline diabetes mellitus (DM) and remission, we will focus on the distinct entity that is feline hypersomatotropism (HS); what it means for the affected cat, how it is diagnosed and potential treatment options and outcomes. Diagnosis of HS by practitioners is likely increasing, but it remains under-recognised. A diagnosis of HS has particular relevance for a diabetic cat due to the substantial chance of cure, and DM remission, in those that are treated appropriately. Diabetes associated with HS should be considered an ‘other specific type of diabetes’ ie distinct from type 2-like DM, and is reported to be the cause of DM in a quarter of feline diabetics in the UK.**

## **What is hypersomatotropism and what does it mean for affected cats?**

Hypersomatotropism occurs due to the excessive production of growth hormone (GH). Most feline cases are caused by a benign tumour affecting the acidophilic cells of the pituitary gland, but rarely it can also result from pituitary hyperplasia. Acromegaly is the term used to describe the resulting clinical syndrome, including the phenotypic changes, which occur due to excessive GH exposure over time (Figures 1 & 2). These include weight gain, broad facial features, enlarged/‘clubbed’ paws, abdominal organomegaly and prognathia inferior (protrusion of the mandible). Such signs develop due to the anabolic effects of GH and the secondary release of insulin-like growth factor-1 (IGF-1) from the liver. Historically, HS was thought to be uncommon and lack of awareness meant that these phenotypic changes were usually present at the time of diagnosis. As awareness has increased, the most common presentation of affected cats is

DM (and associated clinical signs), which occurs due to GH-induced insulin resistance, and the ‘typical’ acromegalic phenotype is not consistently present. DM is often erratic to control or requires high doses of insulin ( $\geq 1.5$  U/kg twice daily).

*Figures 1 & 2: A cat with HS-associated DM and clinical signs of acromegaly. The cat has broad facial features and large, rounded (‘clubbed’) paws.*



Other common clinical signs include polyphagia, which can be extreme and beyond that expected due to uncontrolled DM alone, 'snoring' or stertor (due to excessive oropharyngeal soft tissue), signs of arthropathy and evidence of cardiomyopathy. Rarely, cats display neurological signs due to the mass-effect of a gradually-expanding pituitary tumour. It is important to note that not all cats with HS have DM, although those that are not diabetic at the time of diagnosis are at increased risk of developing DM in the future. The prevalence in the non-diabetic population is currently unknown.

## Diagnosis

No single test can be used to diagnose HS and the whole clinical picture must be considered. Routine clinical pathology parameters are not generally significantly different between diabetic cats with, and without, underlying HS. As prevalence of HS in the UK diabetic cat population is substantial, screening all diabetic cats is justifiable. Screening is certainly indicated in cats that do not achieve good glycaemic control within two to four months of instituting insulin therapy, or require  $\geq 1.5$  IU/kg insulin twice daily. Prompt diagnosis is particularly important because affected cats are likely to experience ongoing poor DM control and compromised quality of life if their HS remains unmanaged.

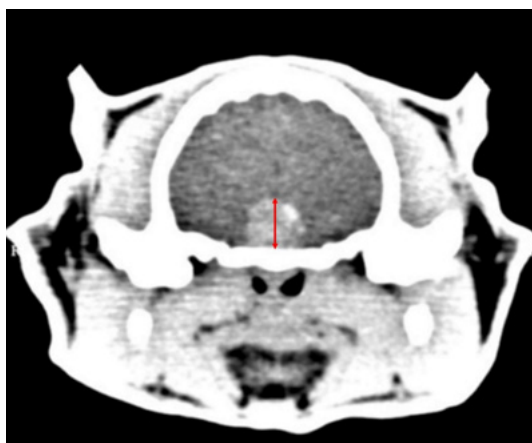
## IGF-1

Documenting an increased serum IGF-1 concentration is currently the recommended screening test for HS. The diagnostic cut-off varies between laboratories but is usually around  $>1000$  ng/mL. An increased value in a diabetic cat, with or without other clinical findings indicating HS, is highly suggestive and indicates that further testing, ie intracranial diagnostic imaging, is required. False positive and negative results are possible; the latter is most likely to occur in the presence of hypoinsulinaemia, as insulin is required for hepatic IGF-1 production. For this reason, testing is most sensitive at least four weeks after commencement of insulin therapy, or should be repeated six to eight weeks later if an initial false-negative result is suspected. Commercial GH measurement is currently unavailable, but is likely to become available in the future and could increase the sensitivity and specificity of diagnosis when used in combination with IGF-1.

## Diagnostic imaging

Intracranial imaging is indicated following the detection of an increased IGF-1 concentration to assess for the presence and magnitude of pituitary enlargement. Both contrast enhanced computed tomography (CT) (Figure 3) and magnetic resonance imaging (MRI) can be used for the detection of pituitary enlargement. MRI is considered more sensitive, but CT scan is sufficient in over 90% cases and is likely to be cheaper and more widely available. Furthermore, CT may be preferred for surgical planning for hypophysectomy due to superior bone representation. False negative intracranial imaging is possible (eg in the presence of microadenomas), and consultation with an internal medicine specialist should be sought in diabetic cats where HS is suspected but which do not have demonstrable pituitary enlargement. Such cats are still likely to have HS and failure to document pituitary enlargement is likely to become more prevalent as awareness of HS grows and advanced imaging is performed sooner in the disease course. Echocardiography should be performed in acromegalic cats with abnormal cardiac auscultation (eg gallop sound, murmur) and is preferred in all cases in which surgical treatment is pursued, due to the intensive intravenous fluid therapy often required perioperatively and risk of fluid-overload/congestive heart failure.

**Figure 3:** A transverse cranial CT scan image in a cat with HS-associated DM. The enlarged, contrast-enhancing pituitary gland is indicated by the arrow.



## Treatment

The treatment goal in cats with HS-associated DM should be to effectively manage their underlying HS and subsequently improve glycaemic control. This can result in permanent diabetic remission; although not possible for all cats and owners, hypophysectomy is considered the gold standard therapy as diabetic remission is attainable in approximately 75% of HS cats who undergo surgery.

## Hypophysectomy

Removal of the pituitary gland and the associated tumour (hypophysectomy) is highly successful when performed by experienced personnel. In the UK, hypophysectomy is only available at a limited number of centres, including the Royal Veterinary College (Figure 3). Surgery results in rapid and complete normalisation of GH (and subsequently IGF-1) levels, with the majority of cats achieving

*Figure 4: A cat with HS-associated DM positioned for hypophysectomy surgery, which is performed through the roof of the mouth.*



diabetic remission days to months post-operatively. Insulin sensitivity can rapidly change post-operatively. It is therefore useful if owners perform home glucose monitoring, in particular for the rapid detection of hypoglycaemia should it occur as treatment proves effective. Even if remission is not achieved, insulin requirements are usually markedly reduced post-operatively.

Disadvantages of hypophysectomy include perioperative risk (mortality is <10%), upfront cost (around £5,000-£6,000), and the requirement for lifelong glucocorticoid and thyroid supplementation for subsequent secondary hypocortisolism and hypothyroidism. Secondary diabetes insipidus is usually transient, although some cats require long-term DDAVP (antidiuretic hormone [ADH]) supplementation. Contraindications for surgery may include a very large tumour size, significant comorbidities (especially cardiovascular or renal disease) and non-committed owners.

## Radiation therapy

Before hypophysectomy became an established option, radiation therapy was the most widely applied treatment. It aims to reduce the size of the adenoma and subsequently excess GH secretion. However, this is not achieved in all cases, and often the response is delayed, up to a year after treatment. Another disadvantage is that diabetic remission appears less common than with hypophysectomy (6/14 cases in one study), although usually diabetic control improves. The duration of remission is also variable (three months to two years in the same study). The reduced efficacy of radiotherapy is highlighted by the fact that it does not usually normalise GH and IGF-1 concentrations, unlike hypophysectomy. Radiation is suitable for cases where a 'non-invasive' option is preferred, although multiple anaesthetics are required and adverse effects, such as keratoconjunctivitis sicca, are possible. It can also be of use in cats with neurological signs secondary to large pituitary adenomas.

## Conservative treatment

Routine diabetic management in cats with HS should be considered palliative only, and owners should be advised as such. Insulin doses are incrementally increased to gain the best glycaemic control possible, and comorbidities (such as cardiomyopathies and

painful arthropathies) must be monitored and addressed. It is not unusual for very large insulin doses (even up to 100 U per day) to be required, and even then only the minority of patients are expected to reach adequate glycaemic control. Home blood glucose monitoring is likely to prove useful to optimise insulin dose in these cats and feeding a high-protein, low-carbohydrate diet is advisable. Importantly, GH is secreted in a pulsatile manner and thus insulin overdose resulting in hypoglycaemia at times of lower GH concentrations is a risk when high insulin doses are used. Regular quality of life assessments should be performed in acromegalic cats managed conservatively, as extreme polyphagia and polydipsia/polydipsia can be distressing for both cat and owner. Although there is no large upfront cost associated with medical management, owners should be aware that the cost of high insulin doses and monitoring can equal that of hypophysectomy over time. There is also a risk of neurological signs developing as tumour size progresses.

### Novel medical therapies

Human acromegalics are often successfully treated with somatostatin analogues, which inhibit GH secretion. The most success in cats has been documented with pasireotide (Signifor, Novartis) which lead to an insulin dose reduction in all cats, diabetic remission in approximately 25% cases, and decreased IGF-1 levels in one study. It is available as a short-acting (once or twice daily) or long-acting (monthly) injectable, although only the short-acting form is readily available in the UK. This treatment is very expensive (around £3,000-£4,000/year) and gastrointestinal adverse effects are not uncommon.

### Conclusion

The prevalence of HS is sufficiently high to warrant its consideration and testing in diabetic cats, particularly in those where problems with glycaemic control occur. Early recognition of the condition is important given the treatment implications and the high chance of diabetic remission when definitive therapy, namely surgery, is pursued. IGF-1 is the recommended screening test, and intracranial imaging is performed to confirm the diagnosis. Treatment options should be discussed with all owners, with hypophysectomy considered the gold-standard. Medical management using somatostatin analogues, such as pasireotide, can also be associated with promising results.

*References available on request*

## Sarah Spencer

BVSc BSc Dip-ECVIM-CA MRCVS

Sarah is a European Specialist in Small Animal Internal Medicine currently completing a PhD on feline chronic kidney disease at the Royal Veterinary College. She underwent her residency training and undergraduate veterinary teaching at the University of Bristol. Sarah has a keen interest in feline medicine, in particular endocrine disease, geriatric conditions and infectious disease. At home she has two adoring tortoiseshell-and-white cats (sisters), Verity and Isla.

## Dr Ruth Gostelow

BVetMed(Hons) DipACVIM(SAIM)  
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Ruth is an American and European specialist in Small Animal Internal Medicine. She has a particular interest in endocrine disease and completed a PhD on feline diabetic remission in 2016. She is a lecturer in internal medicine at the Royal Veterinary College (RVC), where she is a member of the RVC Diabetic Remission Clinic and Hypophysectomy Clinic. Ruth is currently involved with a Remission Clinic project to uncover the genetic basis of diabetes mellitus in Burmese cats.



# Kitten socialisation

*Daniel Cummings explores how appropriate positive experiences during early life can lead to more resilient, adaptable and happier cats in the long term.*

**Kitten socialisation is one of those aspects of feline behaviour where predominantly people** either do not consider it at all, or if people do, they just have an image of someone cuddling kittens. Through experience, it appears that the consideration of socialising kittens seems to be significantly less than the awareness of puppy socialisation despite both being exceedingly important for each species. However nice that image of cuddling kittens is, it unfortunately is far from what is necessary to create confident, happy kittens that will develop into confident, happy adults (Karsh & Turner, 1988).

Discussing kitten socialisation, we are specifically talking about the sensitive socialisation period for kittens aged two to eight weeks. Primarily during this socialisation period is when kittens

need appropriate exposure to humans to learn to be comfortable in their presence and even seek interaction from them. In addition to this, the socialisation period is also when it is essential to introduce the kitten the new and novel stimulation. Anything the kitten may be exposed to throughout its life in a domestic setting. This includes everything from household sounds, to different litters to aspects of handling (including those necessary for vet handling). By the time the socialisation period is over, the kitten's fear response will have fully developed. This means that kitten will be less accepting of new, or novel stimuli after this point. This includes humans; if kittens have had no exposure to humans during this period then it would be likely that these kittens will develop into adult cats continuing to be fearful of humans

*Infection control is paramount in a shelter setting*





Getting this socialisation period correct for the kittens is essential for the long-term welfare of the cat. As veterinary professionals, rescue centres or breeders we have a duty to provide adequate socialisation during this time, even if we have no intention of keeping the kittens ourselves past eight weeks old. Preparing a kitten to cope with the human world and challenges therein throughout life is one of the most important ways to ensure their lifelong welfare. Without careful consideration of their development and socialisation, they may develop into adult cats, which struggle to cope within a normal domestic setting. Whereas a kitten that has been appropriately socialised will be far less likely to experience high levels of stress or develop behaviour problems as an adult.

Good socialisation is not a guarantee that the cat will have a 'happy' life, however, lack of and/or inappropriate socialisation almost guarantees that they will not have a 'happy' life, particularly if forced to live in a domestic setting. Other contributing factors that affect kittens' behaviours and how they develop include genetic influence (Turner et al, 1986) and the emotional state of the queen when pregnant. These elements all contribute to the behaviour of kittens and how they progress through life. As people that work with cats, we have less control over genetic influence and (particularly in rescues) the emotional state of the queen; however, the socialisation period is something we can have an impact on.

While socialisation for kittens should start in their second week, as the sensory system starts to develop further and their eyes open, there is plenty that can be done prior to this to prepare for socialisation of the kittens.

Initially, it is imperative to attempt to establish a positive relationship with the pregnant queen prior to the arrival of the kittens. Remember, when socialising kittens you will often come into the same space as the queen; if she is fearful or stressed this could be counter-productive to the socialisation you are attempting with the kittens. In a rescue environment where queens can come into care at all stages of their pregnancy, this is not always feasible. Breeders should make a conscious effort to establish that relationship, if it does not exist already, as soon as the cat is identified as being pregnant. In a rescue, breeder or veterinary setting, establish a relationship where possible but where this is not an option; simply avoid making the situation worse. There is often extra concern for a cat when they are pregnant however, ironically, this concern typically manifests itself in a way that increases stress or discomfort for the cat such as 'peeking' on them in their hiding place, lifting them up or stroking them when they want to be left alone. If the queen is not attempting to make contact with the caregiver, contact should not be forced on them. Sitting an appropriate distance away from the cat and reading a book ignoring the cat would be far more productive in this instance.

Secondly, consider what steps need to be taken with regards to infection control. This is more necessary in a rescue, veterinary or breeding establishment. However, it is still worth advising single litter or accidental breeders of the importance of preventing the spread of infection to the vulnerable kittens. It would be redundant to socialise a litter of kittens so they will develop into a content adult cats, if in the process they are exposed to an infection that may be fatal. Using personal

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## Behaviour

protective equipment to limit the spread of disease and infection as well as good hygiene standards will reduce the risk of spreading something potentially fatal to the kittens being socialised.

Thirdly, it is important to have a plan. Socialisation needs to follow a systematic approach, remember it is not just about kitten cuddling where one picks up a kitten and suddenly the kitten is 'socialised' to humans and handling. Cats Protection provide a free downloadable copy of a kitten socialisation chart ([www.cats.org.uk/kitten-socialisation](http://www.cats.org.uk/kitten-socialisation)) which will cover a week by week approach to socialisation of kittens from the second week onwards. Having this plan will ensure that different elements are introduced gradually and that nothing is missed.

Gradual exposure to humans in this socialisation period is essential. Often simply starting with being around when the kittens are moving around, letting them approach the person as opposed to forcing contact onto the kittens. As this process develops, they should grow in confidence around people. It is important to socialise the kittens to as many different people as possible. Studies indicate that kittens need to be socialised to at least four people

during this time to generalise their behaviour towards people (Collard, 1967), preferable people of varying gender, race, age etc. This means even if a kitten was hand-reared by someone, it is not automatically certain that this kitten will be comfortable with all people as it gets older, if they have only had access to one person during the socialisation period.

Exposure to common household sounds during this stage is also essential, particularly if the litter of kittens is being raised in a non-domestic environment. However, even in a home environment, the kittens may benefit from specific sound socialisation. Playing common sounds such as fireworks, vacuum cleaners and even the sound of children quietly each day will allow the kittens to habituate to the sound and reduce the chances of the kitten being fearful of those noises when exposed to them in the home. Cats Protection sells sound socialisation CDs with over 55 household noises or the sounds can be streamed, completely free, direct from the website through a phone or tablet. To find the sounds and further instructions on sound socialisation, check out the Cats Protection website – [www.cats.org.uk/kitten-sounds](http://www.cats.org.uk/kitten-sounds)

*Different litter substrates should be available*



The importance of socialising kittens during the socialisation period should not be underestimated. It is essential that anyone responsible for kittens up to the age of eight weeks ensure that a proper socialisation programme is a top priority. Not only is it incredibly beneficial from the cat's perspective. From the human perspective, people will feel more confident receiving a cat from a rescue or breeder, if they know they are getting a well-socialised kitten. As vets at the forefront of interactions with the cat-owning public you have an opportunity to play a crucial role in emphasising the importance of owners getting kittens from sources that do follow appropriate socialisation programmes. Additionally you are in a place to ensure breeders and rescues that utilise your facilities are encouraged to follow such plans that will enable their kittens to grow up content and to experience less distress than they would do, had they not been socialised (Casey & Bradshaw, 2008).

*References available on request*

## Daniel Cummings

BSc(Hons)



Daniel graduated with a degree in Zoology with Animal Behaviour from the University of Wales. Since then he has worked at some of the largest rescue and rehoming charities in the UK, most recently working as a behaviourist and trainer for the Dogs Trust before becoming the Behaviour Officer with Cats Protection. As Behaviour Officer Daniel works with feline behaviour cases of all natures alongside educating the sector and the public about feline behaviour and welfare.



# The Bristol Cat Study

*Emily Blackwell shares research highlights and insights gained into the behaviours, health issues and overall welfare of cats enrolled in this study*

**'Bristol Cats' is a pioneering study of cat health, welfare and behaviour run by vets, behaviourists and epidemiologists at the University of Bristol. Between 2010 and 2013, over 2,200 kittens, aged between eight and 16 weeks of age, were recruited to the study and the project has charted the kittens' lives as they have grown up into adult cats.**

Information about the cats is collected in a variety of ways. Owners complete detailed annual questionnaires asking about their cat's health, husbandry, living environment and behaviour. In addition, with the owner's permission, clinical information is obtained from the cat's vet and many owners have collected biological samples from their cat, such as urine, DNA and hair samples for analysis. A subset of cats has been visited by members of the research team to conduct direct observations of behaviour and obtain objective health measures.

The aim of the study is to improve knowledge of the common diseases and behaviour problems seen in cats, for example, kidney disease, aggression, obesity, osteoarthritis and inappropriate toileting. Findings from the study may be used by veterinary practitioners, cat breeders, owners and the cat community to improve the health and welfare of cats in the future.

## Recent research highlights

### *Influence of living in a multi-cat household on health and behaviour*

Multi-cat households can be a contentious issue, with strong views expressed on both sides. With around 42% of cats in the UK living in a multi-cat household, it is important to understand whether living in a multi-cat household is a risk factor for diseases and behavioural issues. Using data provided by the first five questionnaires of the Bristol Cats study, Claire Roberts investigated whether living in a multi-cat household influenced the odds of having a cat-bite abscess, being obese or behaving negatively towards their owner. None of these measures were influenced by the presence of more than one cat in a household, however the likelihood of negative interactions with the owner was influenced by the cats' relationships with one another. This indicates that the influence of household may be more nuanced than the categories 'single' or 'multi-cat' when considering the effects on some aspects of cats' health and behaviour.

*The aim of the study is to improve knowledge of the common diseases and behaviour problems seen in cats, for example, kidney disease, aggression, obesity, osteoarthritis and inappropriate toileting.*

### Owner-reported flea treatment measures and skin disease in cats

The aim of Sophie Tyler's study was to obtain information about the use of flea treatments and owner-reported flea infestation and skin disease. Sophie looked at the use of flea treatment in kittens aged two to four months and again when the same cats were 2.5 years old. By the time the cats reached 2.5 years of age, skin disease was reported by 4.8% of owners. Many owners who reported skin disease (45.5%) had not sought veterinary attention. The majority of cats (71.3%) received prescription flea treatments at both time points, but the use of non-prescription flea treatment at 2.5 years was more likely to be associated with owner-reported skin disease/flea infestation than those who used prescription flea treatment. This study highlights the importance of using flea treatments prescribed by a vet, rather than potentially less effective non-prescription products.



### Risk factors for road traffic accidents in cats up to age 12 months

Jess Williams' study looked at the risk of being involved in a road traffic accident in young cats. She found that of 1,264 eligible study cats, 49 (3.9%) had been involved in a road traffic accident by the age of 12 months, of which 71.4% were known to result in fatal injuries. Rural locations were associated with a higher risk of accidents than towns, cities or suburban locations. An increased risk of accidents was also associated with cats that were reported by their owners to hunt at the roadside, as well as cats whose owners classified the road by their house as being a 'long straight section of road'. Neither coat colour, breed, sex or neuter status influenced the likelihood of a road traffic accident.

### Welfare of cats housed exclusively indoors

Approximately 9% of UK pet cats are thought to live exclusively indoors. There are some obvious benefits to keeping cats indoors, primarily the avoidance of road traffic accidents, predation and reduced exposure to infectious disease, however concerns have been raised about an indoor cat's inability to display 'normal' behaviours such as hunting, possibly resulting in an increased risk of problematic behaviours. Emma Gibson compared

Two of the cats enrolled in the study, Blackberry and Ozzie





Lucrezia

obesity and problematic behaviours in cats housed exclusively indoors with those given access outdoors and found that compared to cats that have outdoor access, indoor cats had a greater likelihood of being obese, suffering from hairballs and chewing on fabric. These findings suggest that indoor cats may be less active and spend a greater proportion of time in sedentary activities such as grooming. No relationship was found between an indoor-only lifestyle and retained kitten behaviour or negative interactions towards owners.

Following on from this, the team is currently investigating whether the complexity of the cat's home environment and provision of enrichment influences owner-reported problematic behaviours in indoor cats.

More information about our research findings can be accessed here: <http://www.bristol.ac.uk/vetscience/research/projects/cats/>

*Following on from this, the team is currently investigating whether the complexity of the cat's home environment and provision of enrichment influences owner-reported problematic behaviours in indoor cats.*

Lucrezia, taking a well-deserved cat-nap



## What are we currently researching?

### *A prospective study of risk factors for feline gingivitis*

Periodontal disease, including gingivitis, is one of the most common conditions diagnosed in feline practice. It has been shown to be associated with several health consequences, as well as causing regional pain and discomfort. Data from cats aged up to six years is being used to estimate the prevalence of gingivitis in the Bristol Cats cohort, and to investigate factors that increased the risk of gingivitis in cats aged between three and four years. Data from veterinary surgeon-completed oral health scores is also being examined, alongside independent scores made during home visits to a subset of Bristol Cats. We hope that the results from this study will help veterinary surgeons to identify cats that may be at a greater risk of developing gingivitis, enabling them to provide targeted preventative advice on dietary management and monitoring of oral health.

### *The impact of joint disease on mobility and quality of life in cats*

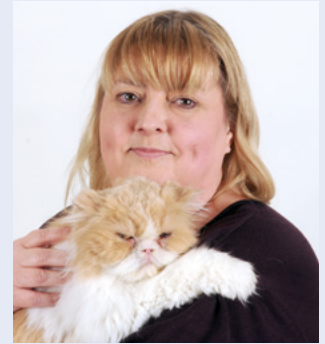
Joint disease is a common but challenging condition in cats, which can lead to reduced mobility and pain, with significant impacts on the cat's quality of life. Diagnosis is far from straightforward, because it primarily depends upon owners detecting changes in their cat's activity (eg reluctance to jump) or behaviour (eg playing less). As cats are 'masters of disguise', it is likely that a significant number of cats go undetected. This study is using new technology to identify early signs of disease, by measuring the activity of the cats as they progress into old age. Early detection of joint disease would allow owners to modify their cat's environment and implement physical therapy techniques that may delay or halt progression of the disease, thereby improving the cat's quality of life.

### *Environmental influences on gastrointestinal health in cats*

We know that certain environmental factors can increase a cat's risk of having illnesses such as cystitis or cat flu and we suspect that this is the case with cats having ongoing vomiting and diarrhoea. In this study we are investigating whether environmental stressors influence gut health. As behaviourists we are also constantly striving to improve our understanding of stress in cats, and in the second part of this study we will be asking owners whether there is anything specific that their cat is frightened of and assessing how good they are at recognising when their cat is worried.

## Emily Blackwell

BSc(hons) PhD FHEA CCAB



Emily teaches on the Veterinary Science and Veterinary Nursing programmes at Bristol Vet School. She is an established research scientist with an international reputation for research into companion animal behaviour and welfare. Emily leads the Bristol Cats study and shares the benefits of her work through extensive public engagement, working with cat owning members of the public, charities and regulators. As a Certificated Clinical Animal Behaviourist (CCAB) Emily also helps pet owners to deal with a wide range of problematic behaviours.

# Stress in cats in rescue and rehoming organisations

*Henry Phillips investigates stressors faced by cats entering rehoming and rescue settings, stress management and how these methods can be translated to integrating cats into new homes*

**Stress to cats is almost inevitable in the shelter environment. A sudden change in surroundings** coupled with the presence of multiple unknown cats and people, as well as alterations to routines that a cat may have adhered to for many years, can be very distressing. Stress may manifest itself as problem behaviours in the shelter and can cause severe medical issues – either of these can result in an otherwise healthy cat being euthanased on welfare grounds. Fortunately, there are many ways in which stress to cats in shelter environments can be reduced, ranging from general principles of good practice to tailored plans of action for individual cats. This report describes the methods available to reduce stress in shelter cats and explores how these principles can be applied to a subsequent stressful environment for a shelter cat – that of a new home.

## Stress in shelters

It has been shown that cats find shelter environments stressful. While in the majority of cases stress decreases over the time spent in shelter, some cats maintain high levels of stress for prolonged periods, sometimes to the point where their housing in a shelter may be deemed inappropriate. Stress may be acute, with resultant effects on behaviour such as fear and can lead to the display of aggression. Frustration can lead to stress as well. Stress, in particular chronic stress can also have effects on general health – it has been shown that stress can cause immune system suppression, in turn causing an increase in risk of a cat developing idiopathic cystitis, upper respiratory tract infection or even the reactivation of latent viral infections. Stress may impact a cat's eating habits – anorexia or obesity may ensue, with associated

effects on existing conditions. Stress can also alter key biological parameters within a cat, resulting in hyperthermia, tachycardia and tachypnoea. These differences may interfere with biological test results, complicating medical intervention. It is clear that stress to cats in shelter is undesirable and should be eliminated as much as possible. Stressors to cats in shelter environments include other cats (with a demonstrated effect of cat density on stress levels), loss of a routine, a changed environment and an inability to express their natural behaviours, resulting in boredom.



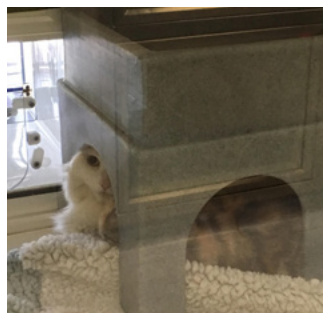
*Figure 1 – a cat pen at Cats Protection (CP) National Cat Adoption Centre in Chelwood Gate. Pens have opaque dividing walls and soundproofed doors to minimise stimuli from other cats. An opaque runner has been placed on the front window to minimise the view of any cats opposite. Rigorous cleaning of all pens between occupants will minimise olfactory stimuli.*



**Figure 2** – a double pen at CP National Cat Adoption Centre in Chelwood Gate. There are two distinct sleeping areas, with separate toileting and feeding areas in the rear.

## Managing stress in shelters

Before considering the individual cat, a shelter's pen design and protocols can be altered to maximise cat welfare generally. As one of the great stressors to cats is the perceived presence of other cats, all efforts possible should be made to prevent sensory detection of cats in shelter, by cats in shelter. This is achieved by good pen design, as shown in figure 1. While stress from these unfamiliar cats may be reduced, stress can also be caused by familiar cats when coming into shelter. Cats relinquished to shelters in pairs (or more) will always be housed together initially, but this may be detrimental. It is entirely possible that two cats occupying the same household do not consider themselves in the same social group and do not get along. The large space and widely distributed resources of a home means that this may often go unnoticed by owners, who will perceive that their cats are 'friends'. In reality, the two cats may have developed complex coping mechanisms to deal with each other's presence. In the shelter environment, the decreased space could mean that these coping mechanisms break down, with cats becoming acutely stressed as they are forced into each other's company. Again, this can be



**Figure 3** - two pairs of cats using the CP Hide & Sleep® part of the Feline Fort® in different ways. (A) These two cats are sleeping apart, using the two levels of the Hide & Sleep® to separate themselves – it is possible they do not consider themselves in the same social group. (B) Two cats occupying the same level of the Hide & Sleep® – it is likely they are in the same social group, so it would be appropriate to rehome them together.

combated with good pen design and management, as shown in figure 2. Once a group of cats is settled in a pen, their behaviour can be observed to see whether they genuinely enjoy each other's company – two contrasting cases are shown in figure 3. In instances where occupying the same pen is causing multiple cats stress, they should be housed and rehomed separately. Pheromone diffusers such as FELIWAY FRIENDS® may also help with stressed cats.

Pens should also be enriched to allow cats to exhibit their natural behaviours as much as possible. A range of toys and scratching materials will help prevent frustration, although these should be regularly rotated. Feeding enrichment can also be very useful, with scatter feeding in particular appearing to be a useful tactic for keeping cats occupied.

Routine is very important to cats, so a regular one in shelter can be very useful in minimising stress. For example, ensuring the same people deal with particular cats on a daily basis can reduce stress levels. However, not all cats will be ready to interact with people immediately on arrival in shelter, so it is crucial that all pens have the facility for cats to



hide and get up somewhere high, to help them feel secure in their surroundings. A ‘hands free’ approach to cat handling will help with this, as is adopted by Cats Protection. As cats rely so heavily on scent to determine the nature of their surroundings, it is important that their scent within the pen is maintained, to help them feel secure. A double bed method can be employed, whereby bedding from each bed is washed on alternate days, meaning that there is always at least one bed that has the cat’s scent. This allows disease control protocols to be followed while maximising feline welfare.

New-born kittens can present their own range of problems. Exposure to a broad range of stimuli during the socialisation period of two to eight weeks of age is vital to avoid stress from the common household stimuli in later life. Due to the confined nature of the shelter environment, this is even more vital in kittens that spend their socialisation period in shelter. Poor socialisation will produce a large range of behavioural problems in later life, especially when kittens enter their new homes. With this in mind, CP in association with Dr Rachel Casey have produced a socialisation chart which is used in their centres, to ensure kittens are exposed to a range of stimuli over an appropriate time period – as seen in figure 4.

Once a shelter has the general infrastructure required to ensure minimal stress, a more individual, tailored approach to welfare can be adopted. The first port of call in reducing stress when a cat comes into a shelter is an accurately completed intake questionnaire. When a cat is relinquished to a shelter, the owner is required to complete a

document describing the cat’s normal routine, likes and dislikes. This immediately gives shelter staff a wealth of information about the cat’s habits and will allow them to structure its pen and lifestyle accordingly, to minimise the magnitude of the change they experience. This questionnaire also has great bearing on minimising stress in rehoming. Clearly, the benefits of the entrance questionnaire are not available when it comes to admitting stray cats to a shelter. Here, an observational approach is needed to determine their optimum environment. It has been shown that cats surrendered by owners experience greater stress than stray cats in the shelter environment. The individual approach to feline welfare in shelters relies on the skill and experience of those interacting with the cats on a daily basis, to detect potential stressors and control them.

Despite taking all these measures, cats may still be extremely stressed in shelter, for reasons that it may be hard for us to comprehend. In these instances, some behaviourists have suggested attempting to see the situation from the cat’s point of view in order to identify the problem, and then combat it. In cases where stress is unmanageable despite all the interventions described, the cat should be checked for any underlying medical issues by a vet, before being referred to a behaviourist if given the all clear. In severe cases of stress, where the cat is unlikely to be rehomed quickly and there is no alternative place to house the cat, such as an enrichment room or foster home, euthanasia on welfare grounds should be considered.

**Managing stress in the new home**

The steps taken to minimise stress when integrating a cat into a new home are much the same as those for shelter integration. Arguably the most important stage of this process is matching the cat to an owner that can provide them with an appropriate environment and lifestyle. The information collected from the intake questionnaire will help with this, suggesting whether a cat would be happy living with young children or dogs for example. This is complemented by a questionnaire for prospective owners to complete, detailing their living situation. Matching cats to owner expectations is also important in order to secure a happy long term outcome.



Figure 4 – a kitten socialisation chart used by CP



*Figure 5 – a relaxed rehomed cat, exhibiting a trusting 'belly-up' behaviour*

As with a shelter environment, there are constants that should be maintained within a household to keep stress levels low. These are baseline expectations that in an ideal world would be seen in all cat households, not just those where a cat has been rehomed. Adhering to the rule of 'one litter tray per cat plus one' ensures that there are adequate toileting facilities within the house for any cat. Applying this rule to food and water supplies is also vital. It is important to ensure that food, water and litter areas are all separated, as cats do not like to use litter trays near to food supplies, for fear of contamination. Lots of different sleeping areas should be offered, at a variety of heights and in low traffic areas of the house. Location of these facilities should also bear in mind the presence of other cats within and outside the house. As in the shelter, the environment should be enriched as much as possible – a variety of toys should be provided, as well as scratching facilities (horizontal or vertical depending on the cat's preference) near the sleeping areas. Poor placement of resources will result in problem behaviours developing. CP has produced information for owners regarding resource placement in the home.

As in the shelter, once the home is satisfactorily set-up to provide a stress free environment for the new cat, a tailored approach must be taken. It is important to educate new owners in the signs of a stressed cat, so they can note when their cat is unhappy and take steps with a behaviourist to identify the stressor and correct it. Once settled in a new home, it may be possible to train a cat to make its life even less stressful – for example, to get into its carrier or to take medication.

## Conclusion

While it is not possible to eradicate stress from the shelter and home environment entirely, a sound understanding of the principles of feline behaviour should allow the main causes of stress to be eradicated. The approaches to reducing stressors in the shelter and rehoming environments are broadly similar, with a standard approach that can be applied to all cats, and subsequent fine-tuning depending on the individual and the specific nature of the environment.

*References available on request*

## Henry Phillips

BA



Henry is a fifth year Veterinary Medicine student at St John's College, University of Cambridge. Having intercalated in Zoology, Henry has a particular interest in ethology and anthrozoology, specifically feline behaviour. During a placement with Cats Protection, Henry was especially interested to see the effects of management systems in shelter environments on feline behaviour and stress. He hopes to pursue a career in small animal practice.

# All the latest news from Cats Protection



## Cat conformation welfare issues – can you help?

In its recent consultation on licensing of dog, cat and rabbit breeding the Scottish Government considered whether it should discourage the breeding of cats with a predisposition for specific genetic conditions which can lead to health problems in later life.

The Advocacy & Government Relations team needs case studies of extreme breeds to highlight the issues arising from cats bred with such genetic conditions. While it is only the Scottish Government that is looking at this issue at the moment it would be very helpful to hear about cases throughout the UK. We are particularly interested in: **Scottish Folds**, **brachycephalic cats**, **Sphynx** and **Munchkins**. We would be grateful for any information that you can share.

Please send the following details and any photos of the cat to [campaigns@cats.org.uk](mailto:campaigns@cats.org.uk)

- The cat name and age
- The breed of the cat
- The specific health issues the cat suffered from
- The treatment the cat required

*Thank you!*





## Student hub

Cats Protection has recently launched the Student Hub on the Cats Protection website. This section is for vet and vet nurse students and includes relevant information about pre-clinical and clinical EMS opportunities at Cats Protection, links to the

kitten neutering database and associated resources, access to the Behaviour Hub and also the Cats Protection Shelter Medicine podcast.

Visit the hub here: <https://www.cats.org.uk/cat-care/vets-info/student-hub>

## Cats Protection Veterinary Questionnaire

*Win one of five deluxe M&S Food Hampers worth £40 for your practice*

The major UK feline welfare charity is seeking information on the veterinary profession's perception of its work. Cats Protection would be very grateful if you or someone within your practice can spare a few minutes to complete the questionnaire below by 30 September 2019. If preferred, responses can remain anonymous, but if the practice wishes to be entered in to the prize draw to win a deluxe M&S food hamper worth £40 then the details should be completed on the back page.

<https://www.surveymonkey.co.uk/r/cpvetsurvey>

## Grief support for cat owners – Paws to Listen

Cats Protection understands how difficult it can be for owners when their cat goes missing, has been rehomed, is nearing the end of its life or has recently passed away. We run a free and confidential telephone grief support service for people going through cat-related grief and loss. Our volunteers are trained to offer both emotional support and practical information to callers.

To promote this service we have produced a range of resources, which can be ordered from us free of charge and displayed around your practice. We can provide wallet-sized cards, leaflets and A4 posters for your reception and/or public areas. The previous issue of *CP Clinic* included an insert of an order form for these resources, or an online order form can be found at <https://www.cats.org.uk/cat-care/vets-info/vet-protocols> at the end of the page.

## Help Cats Protection raise awareness of cat welfare issues

We'd like to ask for your help in bringing case studies of cats to the attention of media, government and other audiences.

We're keen to get any current stories of cats injured by air weapons, fireworks, Christmas decorations, lilies or dangerous dogs, along with any overweight cats that are on a diet or cats that have suffered any visible sun damage.

Any sick kittens aged less than eight weeks of age that were bought online or from a private seller would also be welcome. High resolution 'before' and 'after' photos would be essential for all stories.

If you have something suitable, please could you drop a line to [media.office@cats.org.uk](mailto:media.office@cats.org.uk) and if the cat is owned then please could you ask the owner for permission to pass on their email address so that our Media team can discuss possible publicity with them.

In return, we would name-check your practice should the story appear on Cats Protection's main website, social media sites and/or official magazine. We'll also include the name in any press releases, though we can't guarantee journalists will include it in their articles.

*Thanks in advance for your help.*

*"It was a real privilege to spend time at the centre and learn more about the practicalities of shelter medicine and the challenges that can arise when accommodating such a large number of cats in an unfamiliar environment."*

## Cambridge student wins charity award

A student from the University of Cambridge has been announced as this year's winner of Cats Protection's vet student Awards.

Henry Phillips, a fifth year at the university took first place in the Extra Mural Studies (EMS) awards, which give veterinary students the chance to experience feline shelter medicine with Cats Protection and then write a report about an aspect of cat welfare.

Henry's report looked at the stressors faced by cats entering rehoming and rescue organisations, the methods to manage these and how these methods could be applied when integrating cats into new homes. Henry received his first prize of £500 at the BSAVA Congress on 4-7 April. Read his article on page 16

A runner-up prize of £250 went to Bethan Hann, a graduate of the University of Nottingham, who wrote a report on the same subject. Henry and Bethan did work placements at Cats Protection's National Cat Adoption Centre in Sussex during 2018. Bethan's article will be published in the summer edition of *CP Clinic*.

Henry said: "It was a real privilege to spend time at the centre and learn more about the practicalities of shelter medicine and the challenges that can arise when accommodating such a large number of cats in an unfamiliar environment."

Bethan said: "Since graduating I've spent six months in a small animal practice in Suffolk. I really enjoyed the behavioural teaching during my placement with Cats Protection and I apply a lot of my learnings during my consults."

Cats Protection's Director of Veterinary Services, Maggie Roberts, said: "We were hugely impressed with the standard of this year's entries, and the obvious dedication to feline welfare expressed by the students who spent time on placement with us. Although all the reports submitted were excellent, Henry and Bethan's insights really stood out. They both have a great future as veterinarians ahead of them and we wish them all the best with their studies."

Cats Protection is the UK's leading feline welfare charity, helping around 200,000 cats a year through a national network of over 250 volunteer-run branches and 36 centres. More information about the charity can be found at [www.cats.org.uk](http://www.cats.org.uk)

CP vet Lauren Kirk presenting Henry Phillips with his prize and award





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