

2021 AAFP Feline Senior Care Guidelines



Abstract: The ‘2021 AAFP Feline Senior Care Guidelines’ are authored by a Task Force of experts in feline clinical medicine and serve as an update and extension of those published in 2009. They emphasize the individual patient evaluation and the process of aging, with references to other feline practice guidelines for a more complete discussion of specific diseases. Focusing on each cat encourages and empowers the owner to become a part of the cat’s care every step of the way.

A comprehensive discussion during the physical examination and history taking allows for tailoring the approach to both the cat and the family involved in the care. Videos and analysis of serial historical measurements are brought into the assessment of each patient. These Guidelines introduce the emerging concept of frailty, with a description and methods of its incorporation into the senior cat assessment. Minimum database diagnostics are discussed, along with recommendations for additional investigative considerations. For example, blood pressure assessment is included as a minimum diagnostic procedure in both apparently healthy and ill cats. Cats age at a much faster rate than humans, so practical timelines for testing frequency are included and suggest an increased frequency of diagnostics with advancing age. The importance of nutrition, as well as senior cat nutritional needs and deficiencies, is considered. Pain is highlighted as its own syndrome, with an emphasis on consideration in every senior cat. The Task Force discusses anesthesia, along with strategies to allow aging cats to be safely anesthetized well into their senior years. The medical concept of quality of life is addressed with the latest information available in veterinary medicine. This includes end of life considerations like palliative and hospice care, as well as recommendations on the establishment of ‘budgets of care’, which greatly influence what can be done for the individual cat. Acknowledgement is given that each cat owner will be different in this regard; and establishing what is reasonable and practical for the individual owner is important. A discussion on euthanasia offers some recommendations to help the owner make a decision that reflects the best interests of the individual cat.

Keywords: Senior; frailty; comorbidities; quality of life; sarcopenia; blood pressure; pain; hypertension; chronic kidney disease; hyperthyroidism; osteoarthritis; degenerative joint disease; diabetes mellitus; anesthesia; gastrointestinal disease; dental disease; cancer; cognitive dysfunction syndrome; end of life; palliative care; hospice care; budgets of care; euthanasia

Introduction

Since the publication of the ‘AAFP Senior Care Guidelines’ in 2009,¹ our knowledge has advanced significantly, and today’s cat owners expect a higher level of care. In human medicine, gerontology has insufficient specialists for multiple reasons. In feline medicine, most of us love caring for older cats; they are often our favorite patients. We could likely fill a feline gerontology specialty with enthusiastic veterinarians. In response to recent advancements and an increased interest in senior feline medicine, we present updated guidance in these ‘2021 AAFP Feline Senior Care Guidelines’.

Frailty is a syndrome, more common with advancing age, in which the patient has a decreased functional reserve that leads to a decline in physiologic and cognitive performance and a greater vulnerability to adverse medical outcomes.

We consider ‘senior’ to be a term that describes age. While senior is defined as over 10 years of age in the ‘2021 AAHA/AAFP Feline Life Stage Guidelines’,² some cats may be more appropriately referred to as senior as early as 8 years of age, possibly sooner for some breeds or those with genetic predispositions.^{3,4} The Task Force feels that ‘geriatric’ is more a statement of health status, and has no specifically associated age. The Task Force also acknowledges the newer concept of ‘frailty,’ which plays a huge role in the care of older humans and is becoming more significant in feline medicine.



Michael Ray
DVM
Co-Chair*

The Cat Clinic of Roswell,
Roswell, GA, USA

Hazel C Carney
DVM, MS, DABVP
(Canine/Feline)
Co-Chair*

WestVet Emergency and
Specialty Center, Garden
City, ID, USA

Beth Boynton
DVM

College of Veterinary
Medicine,
Western University of Health
Sciences, Pomona, CA, USA

Jessica Quimby
DVM, PhD, DACVIM

The Ohio State University,
Department of Veterinary
Clinical Sciences,
Columbus, OH, USA

Sheilah Robertson
BVMS (Hons), PhD,
DACVAA, DECVA,
DCAW, DECAWBM
(WSEL), MRCVS
Senior Medical Director,
Lap of Love Veterinary
Hospice, Lutz, FL, USA

Kelly St Denis
MSc, DVM, DABVP (Feline)
Brantford, ON, Canada

Helen Tuzio
DVM, DABVP (Feline), CVA
Forest Hills Cat Hospital,
Middle Village, NY, USA

Bonnie Wright
DVM, DACVAA
Mistralvet, Johnstown,
CO, USA

*Corresponding authors:
mray@catclinicofroswell.com
hcccats@gmail.com

CONTENTS	page
✦ Introduction	613
✦ The senior cat wellness visit	614
– Information gathering: understanding owner and cat concerns	614
– The senior cat physical examination	616
✦ Recommended diagnostics	617
✦ Management tools that optimize health in the aging cat	619
✦ Concurrent issues to consider in the aging cat	621
– Anesthesia	621
– Hypertension	621
– Chronic kidney disease	621
– Hyperthyroidism	622
– Diabetes mellitus	622
– Dental disease	623
– Gastrointestinal disease	623
– Cancer	624
– Ongoing sources of pain	624
– Cognitive dysfunction syndrome	625
✦ Complex disease management	626
✦ Quality of life	628
– Environmental changes	629
✦ End of life	630
– Palliative and hospice care	630
– The budgets of care	630
– Ethical decision-making and difficult conversations	630
– Anticipatory grief	631
– Euthanasia	631
✦ Summary points	631
✦ Supplementary material	631
✦ References	632
✦ Appendix: Client brochure	637

Routine assessment facilitates health maintenance and early detection of disease. It is less costly and more successful than crisis management.



This Guidelines document concentrates on the feline examination and owner consultation, which together provide the best understanding of each cat's needs. It emphasizes that owner involvement in the assessment of a senior cat is crucial and impacts our interpretation of clinical findings. Although we briefly discuss individual diseases, our focus stays on individual patients and how their aging process influences their wellbeing. We discuss the common occurrence of comorbidities and how they bring complexity to senior care. We also want to emphasize that senior cats are often dealing with one or more sources of chronic pain. The Task Force proposes that pain be thought of as a disease itself that can greatly influence quality of life. Moreover, because teaching cat owners how to improve quality of life for these patients is the number one priority, we offer practical solutions to multifactorial health situations. Challenging scenarios include end of life care with the interactions of hospice, euthanasia, and an acknowledgment of possible burdens on the cat owner.

To best meet these demands, we encourage veterinarians to look more closely at the aging process, not just the individual diagnosis. Ultimately, we hope to augment the knowledge of older cats for both owners and veterinarians, and increase the level of senior cat veterinary care.

The senior cat wellness visit

Information gathering: understanding owner and cat concerns

Many domestic cats have seen an increase in life expectancy due to improved veterinary care, better nutrition and more informed, engaged owners. This gives veterinarians the opportunity to take a comprehensive approach to the assessment and management of senior feline patients. Educating clients to appreciate subtle changes that may point to an underlying disorder can help them partner with the veterinarian to observe their feline companions more closely. Routine assessment facilitates health maintenance and early detection of disease, often resulting in easier disease management and prevention, and may lead to better quality of life; it is less costly and more successful than crisis management.

Ideally, schedule longer appointments for senior cat visits. While we often come from the perspective of advocating for the cat, an understanding of client resources, abilities, behaviors and beliefs ensures we address client concerns. Sending a questionnaire to be completed ahead of time and checking on client goals early during the visit facilitate this understanding. Asking open-ended questions pertaining to all body systems yields more

ABBREVIATIONS

✦ BCS (body condition score)	✦ IBD (inflammatory bowel disease)
✦ BP (blood pressure)	✦ MCS (muscle condition score)
✦ CDS (cognitive dysfunction syndrome)	✦ NSAID (non-steroidal anti-inflammatory drug)
✦ CKD (chronic kidney disease)	✦ QOL (quality of life)
✦ DER (daily energy requirements)	✦ RER (resting energy requirements)
✦ DJD (degenerative joint disease)	✦ SDMA (symmetric dimethylarginine)
✦ DM (diabetes mellitus)	✦ T4 (thyroid hormone)
✦ FHT (feline hyperthyroidism)	✦ UPCr (urine protein:creatinine ratio)
✦ GI (gastrointestinal)	✦ USG (urine specific gravity)
✦ GFR (glomerular filtration rate)	✦ UTI (urinary tract infection)
✦ HRQOL (health-related quality of life)	



Figure 1 This 15-year-old cat shows a decreased pattern of grooming. Courtesy of Sheilah Robertson

meaningful data. Client observations can help the veterinarian detect subtle changes; however, many clients may be unaware of gradual changes until we ask provocative questions. Client-recorded videos of patient activities at home may provide additional insights into the health status of the cat. Obtaining a systematic and thorough history may take a little longer initially, yet often results in more accurate diagnosis and effective care of the senior cat.

Task Force members consider the following key items when developing a plan to ascertain the status of the cat:

✦ **Environment:** How the cat's home is structured; what other people/pets share the space; time the cat spends outside (free roaming, on leash, in outdoor enclosure); whether the cat must traverse stairs; feeding routine and location(s) of feeding stations; sleeping posture, patterns and locations; number of litter boxes, type and location.

✦ **Intake:** Specific products fed, amount consumed (caloric intake); supplements and/or medications given; intake from prey or other food sources; preventives used; observations of chewing behavior; estimated water intake.

✦ **Eliminations:** Urination and defecation sites, frequency and quantity (litter ball size, amount of stool passed, fecal score); any sudden onset of unusual behavior (eg, house-soiling) in either the current patient or another



Figure 3 Same cat as in Figure 1, showing signs of frailty, including loss of muscle mass and strength. This senior was diagnosed with sarcopenia, osteoarthritis and hyperthyroidism. Courtesy of Sheilah Robertson

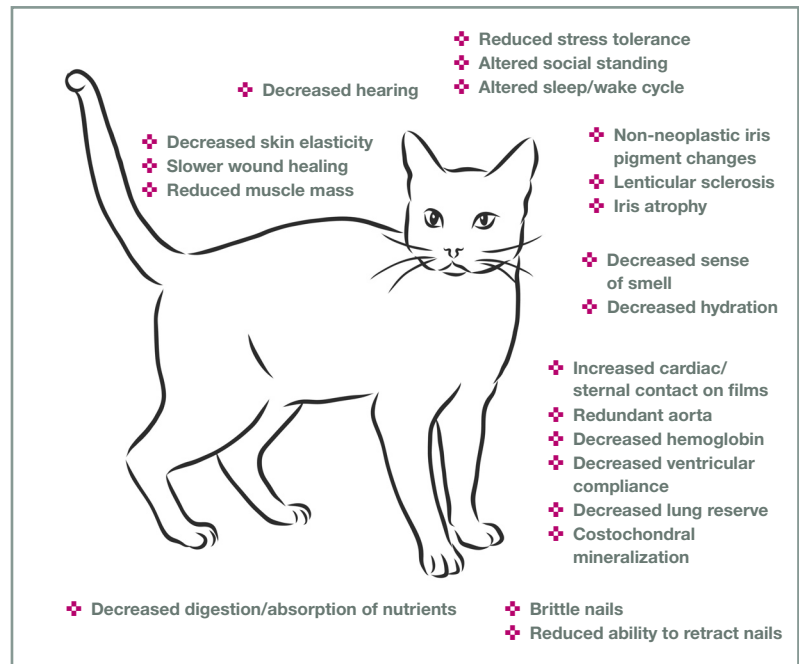


Figure 2 Changes associated with aging (and often seen in apparently healthy senior cats)

Although healthy aging means different things to different people regarding both themselves and their cats, comfort and enjoyment of life are likely to be common targets.



cat (may reflect occult disease); a cat may also detect illness in a housemate if the disease changes the smell of a companion cat or its eliminations.

✦ **Patterns of activities:** Grooming habits (Figure 1), vocalizations, and interactions with other animals/people; sleeping behavior and locations; response to visual cues and sounds; jumping and playing behavior (inviting clients to keep video records from an early age will allow comparisons with current levels of activity).

Veterinarians often quote the adage, 'Old age is not a disease', but it is a process. As with all species, changes are seen in the aging cat (Figure 2).

Muscle wasting in seniors carries important implications for health status. Cachexia refers to weight loss in the face of underlying disease.⁵ Sarcopenia refers to loss of muscle mass as a syndrome associated with aging, independent of illness.⁵ Sarcopenia includes a loss of both muscle mass and strength (Figure 3). This may manifest itself as decreased jumping and physical strength, as well as reduced activity and interactions. The physical manifestations of sarcopenia intersect with the physiologic manifestations of frailty. Given the association of sarcopenia with poorer outcomes, recognition of signs of feline frailty is especially important.⁶ Explore potential pathologic causes when signs of frailty are detected. Even if no diseases are found, early therapeutic interventions may help to restore some function.

Nutritional manipulation may be beneficial. Highly digestible diets rich in antioxidants and omega-3 fatty acids,⁷ as well as interactive toys and puzzles and environmental enrichment,^{8,9} may all help to slow the development of sarcopenia.

Unexplained trends in body weight, body condition score (BCS) and/or muscle condition score (MCS) are problems that must be investigated and managed as diseases. Consider weight changes in the context of the cat's size. Petite cats may not change much in absolute terms, but a proportional change could be significant. Body composition alters even within a constant weight, so concurrent assessment of MCS and BCS is critical. More information on body condition and muscle condition scoring is provided by the International Society of Feline Medicine (ISFM; www.bit.ly/ISFMMCS). Overweight and underweight cats have associated health risks.^{9,10}

The senior cat physical examination

Healthy people are encouraged to have wellness examinations yearly. The life span of a cat is five times shorter than the life span of a human, so an equivalent frequency in a healthy adult cat would be every 10–11 weeks! While this may not be practical, it does emphasize the need for more than one annual examination (see box). The cat's innate ability to hide ailments makes regular physical examination that much more critical in the elderly cat.

The Task Force recommends examinations twice yearly for cats 10–15 years old, with examinations every 4 months for healthy seniors over the age of 15. Those with chronic health issues may need to be seen more frequently, depending on the severity and stability of their ailments.

Cats, particularly senior cats, must be handled gently. If it is known beforehand that the cat may be painful or that an examination will be particularly painful, analgesia is appropriate and recommended, as described in the '2015 AAHA/AAFP Pain Management

Unexplained trends in body weight, body condition score (BCS) and/or muscle condition score (MCS) are problems that must be investigated and managed as diseases.



Guidelines'.¹² Provide patients that object to handling due to stress or pain with analgesics and/or anxiolytics. If stress or pain cannot be adequately and safely controlled, it may be necessary to abandon and reschedule the examination.

A thorough examination begins by observing from a distance. Simple observation can help detect changes in breathing patterns, gait, stance, strength, coordination and vision. The hands-on physical examination may be conducted in any order, provided it is thorough and painful areas are examined last. To reduce stress, save the most invasive parts of the examination until the end, such as the dental examination, temperature or nail trim, sample collection, and imaging studies.²

Especially for cats older than 10 years of age, blood pressure (BP) determination at each examination provides essential information. Risk of hypertension increases with age^{13,14} and is most often recognized in cats 10 years and older.¹⁵ Untreated, hypertension can cause severe target organ damage to the eyes, heart, brain and kidneys,^{16,17} which may not be reversible. Routine measurements at each examination may help reduce situational hypertension.

Detailed information on the standard protocol for systemic BP measurement in cats can be found in the AAHP Hypertension Educational Toolkit¹⁸ and 'ISFM Consensus Guidelines on the Diagnosis and Management of Hypertension in Cats'.¹⁷ Blood pressure measurement videos produced by ISFM are available at www.youtube.com/user/iCatCare.

Optimal care can only be planned if a cat's body weight is measured, and BCS and MCS are determined, at each visit.

For the senior cat, hydration status is extremely important because some of the more common comorbidities, such as chronic kidney disease (CKD) and diabetes mellitus (DM), produce a gradual loss of body fluid. Loss of subcutaneous fat and/or tissue elasticity may influence interpretation of skin tenting results and mucous membrane moisture could be more indicative of hydration status.

Assessment of skin, nails and haircoat includes paying particular attention to the quality of the nails, as they tend to thicken and become ingrown. Offering nurse or technician nail trim appointments provides a resource to owners who are unable to trim nails routinely. Nail quality changes can be particularly problematic for arthritic cats too painful to use a scratching post.

A thorough examination of the nose and mouth includes palpation of the nasal contours, and visualization of the gingiva, pharynx, palate, sublingual area and teeth, carefully noting unusual tooth loss. Additionally, palpation

Box 1

Examination begins at home

Teaching clients that the start of an examination appointment begins at home is important. Cats forced into carriers or swung by the carrier handle may display motion sickness, hypertension or other signs of stress that adversely affect physical examination findings and blood test results. Using techniques described in the 'AAFP and ISFM Feline-Friendly Handling Guidelines'¹¹ will help reduce stress. When patients' visits are a positive experience, clients are calmer and more likely to schedule an appointment to further evaluate medical concerns.

of the area between and under the mandibles may identify tumors or lymphadenopathy. Any asymmetry noted during evaluation of the head warrants closer investigation.

Ophthalmic evaluation includes careful examination of both the anterior and posterior chambers, iris color and shape, as well as the retinal area. Common lesions that progress with aging are lenticular sclerosis, iris atrophy, iris melanosis, focal or linear cataracts^{19,20} and variable tear production.^{21,22} Visualization of the retina is especially important for early detection of vascular changes or edema, which are warning signs of hypertension and subsequent retinal detachment.^{22–24} Sequential evaluations of the eye and concomitant images of lesions, or color and structural changes, will alert a practitioner early on to the possibility of developing neoplasia, and potentially allow lifesaving treatment.

Palpation of the cat's neck when the cat is sitting with its neck extended or standing with its head elevated and turned to each side will reveal a palpable thyroid gland in 80% or more cases of feline hyperthyroidism (FHT); however, a palpable nodule may also be present in cats with non-thyroidal disease.^{25–27}

Listen to all four quadrants of the thorax during thoracic auscultation to determine heart and respiratory rate, identify heart murmurs or arrhythmias and assess lung sounds. The cranial thorax should be compressible; cranial mediastinal masses can reduce compressibility (ie, absence of cranial rib spring).

Using a gentle technique, attempt to palpate each organ during abdominal palpation, noting evidence of pain or masses, areas of thickened bowel, the amount and consistency of stool, kidney and bladder texture, shape and size, as well as the size and location of identifiable lymph nodes. Palpation of the mammary chain can be incorporated into abdominal examination.

An orthopedic examination can help identify changes in joints, including thickening, fluid, crepitus, pain and range of motion. Gently palpate limbs and joints individually for thickness or tenderness. Some cats may not demonstrate pain nor have crepitus upon palpation. Assess muscle mass and assign an MCS. Pay special attention to areas of muscle atrophy as these can indicate localized painful conditions. Areas of barbering or overgrooming may indicate underlying pain. Overall muscle mass loss seems more indicative of systemic disease.

A myofascial examination is helpful to assess the viscosity, mobility, temperature and comfort of soft tissue structures. If performed correctly, the examination is a soothing, gentle and inquisitive approach to assess pain of multiple origins, including osteoarthritic,

spinal, soft tissue and visceral origin. Myofascial examination relies on soft tissue palpation while being attuned to subtle indicators of pain such as changes in body posture, facial expression, strain patterns in muscles or fascia, skin adherence, and heat. Pain detected during a myofascial examination may originate from the surface being palpated or be reflective of pain from internal viscera deeper below the surface.

A video demonstrating myofascial examination is included in the supplementary material (see page 631).

Finally, compare all parameters with those from the last examination to identify trends as early indicators of disease or a degenerative process.

Recommended diagnostics

Regular examinations combined with performing baseline diagnostics can help detect preclinical disease and serve as a reference point to track future trends. Consider performing baseline diagnostics (Table 1) at least annually, starting at age 7–10 years, with frequency increasing with age.

Table 1 Recommended diagnostics for senior cats

Baseline tests	Ancillary tests*
Complete blood count: hematocrit, red blood cells, white blood cells, differential count, platelets	Heartworm antibody/antigen Feline leukemia virus (FeLV)/feline immunodeficiency virus ELISA, FeLV provirus PCR ²⁸ Hematology slide review
Serum biochemistry panel: total protein, albumin, globulin, alkaline phosphatase, alanine aminotransferase, glucose, blood urea nitrogen, creatinine, potassium, phosphorus, sodium and calcium as minimum parameters	Ionized calcium/parathyroid hormone (PTH)/PTH-related peptide Cobalamin (B12)/folate Feline pancreatic-specific lipase Fructosamine NT-pro BNP SDMA Trypsin-like immunoreactivity
<i>Optional parameters often included in routinely available commercial panels:</i> aspartate transaminase, gamma-glutamyl transferase, creatine kinase, total bilirubin, chloride, HCO ₃ or CO ₂ , magnesium	
Urinalysis: specific gravity, sediment, glucose, ketones, bilirubin, protein, urine pH	Urine culture/sensitivity Urine protein:creatinine ratio
Total T4[†]	Free T4/thyroid-stimulating hormone
Blood pressure[†]	
	Fecal analysis (centrifugation)
	Echocardiogram Electrocardiogram Radiography Ultrasound

*May be indicated by patient health status and/or baseline test results

[†]See discussion in text

The incidence of many diseases increases as cats age, and comorbidities are common. More robust data about disease incidence by age would assist veterinarians in determining the value and desired frequency of testing, but such data are lacking. Veterinarians must therefore rely on clinical judgment and client discussions specific to each individual patient.

Regardless of the cat's age, more frequent or more expansive diagnostic evaluation (Table 1) is indicated if:

- ✦ Any abnormalities are noted in the history or physical examination, even if baseline laboratory work appears normal.
- ✦ Disease is suspected or revealed at routine veterinary visits.
- ✦ Comorbidities exist that require additional monitoring.
- ✦ Medications are prescribed.

Assessment and diagnostic evaluation may be necessary every 3–6 months in very elderly patients, those receiving chronic medical management and patients with multiple comorbidities.

When in doubt regarding suspected disease or subtle abnormalities, re-evaluate the patient to establish persistence and/or

progression of the abnormality. Biometric data trends in the cat provide invaluable information and are more important than a single data point. Look at the whole patient and view trends in context. For example, progressive increases in BP over time may help differentiate between situational hypertension and true hypertension requiring medical therapy.

Biometric data can also be more powerful when multiple tests are used in conjunction. For example, when evaluating for the presence of CKD, using all available information – physical examination findings, serum creatinine, urine specific gravity (USG), symmetric dimethylarginine (SDMA), and diagnostic predictive algorithms, some of which are becoming available as proprietary services (eg, RenalTech; Antech Diagnostics) – is more powerful than simply evaluating serum creatinine concentration alone.



Biometric data trends provide invaluable information and are more important than a single data point. Look at the whole patient and view trends in context.

Pain can be difficult to identify in cats. With proper guidance, clients can learn to detect changes in their cat's normal mobility and behavior patterns indicative of pain.



Table 2 Identifying the subtle signs of pain at home and in the practice

At home	Patterns of behavior	✦ Changes in interactions with family, visitors, other family pets ✦ Decreased appetite and food intake ✦ Diminished play ✦ Overgrowth of nails signaling decreased scratching behaviors ✦ Changes in normal routines
	Mobility	✦ Change in normal resting spaces ✦ Increased sleeping ✦ Decreased jumping ✦ Difficulty climbing stairs, utilizing intermediate surfaces to get to higher surfaces or not going to higher surfaces at all ✦ Sliding down the edge of surfaces to decrease jumping-down height ✦ House-soiling ✦ Lameness (rare)
	Response to touch	✦ Changes in petting preferences ✦ Sudden dislike of grooming care, perhaps only over one specific physical location ✦ Sudden dislike of being picked up
In the practice	Personality	✦ Change in demeanor: less or more approachable ✦ Hiding in carrier when previously came out willingly
	Mobility	✦ Altered gait ✦ Changes in jumping (no longer jumping onto examination table, difficulty getting onto examination room chair, etc) ✦ Changes in exploratory behaviors
	Appearance	✦ Evidence of muscle wasting ✦ Evidence of increased or decreased grooming (alopecia, mats, dull coat) ✦ Nail overgrowth
	Response to touch	✦ Objects to petting or examination touches
	Ability to obtain biologic samples	✦ Resistant to handling for blood or urine sampling ✦ Changes in behavior compared with previously (eg, no longer comfortable for hindlimb blood draw)



Figure 4 This 12-year-old cat with DJD is laying with stifle and hock in extension to be more comfortable. Courtesy of Kelly St Denis

Management tools that optimize health in the aging cat

A healthy senior lifestyle can be supported by the veterinarian through education and conversation with the client. Consideration must be given to making the home environment senior-friendly, guiding the owner in understanding their senior cat's needs and providing nutritional advice. Where there are no contraindications, preventive care including routine vaccinations, parasite prevention and dental care should be recommended.

Osteoarthritis and spondylosis deformans are the two most common forms of degenerative joint disease (DJD) in cats (Figure 4).²⁹ Both conditions can cause pain and pain-associated behavioral changes.^{29,30} Pain can be difficult to identify in cats. With proper guidance, clients can learn to detect changes in their cat's normal mobility and behavior patterns that are indicative of pain (Table 2). Mobility changes can be subtle, including



Figure 5 When this 11-year-old cat became unwilling to jump up to sit on the cat tree, he was examined and diagnosed with osteoarthritis. Courtesy of Sheilah Robertson



Figure 6 Subtle increases in sleeping pattern were noted for this 19-year-old cat. Courtesy of Kathleen Neumann

jumping patterns, house-soiling, changes in sleeping locations, and increased sleeping (Figures 5 and 6).

Because age carries an increased risk of DJD³¹ and other changes, including cognitive dysfunction, decreased senses, becoming 'pre-frail' or frail, and potential health issues, all senior cats will require enhanced care at home. While age alone is not a risk factor for frailty, frailty does become more common as age advances. Tailor care to the individual cat, referencing the five pillars of a healthy feline environment (see later).⁸ Educate clients about the importance of providing key resources including litter boxes, food dishes, drinking water, beds, scratching surfaces, hiding spaces and three-dimensional spaces in multiple locations throughout the house.^{8,9} Encourage clients to provide items that support the aging cat, including night lights for improved visibility in darker areas, ramps and steps for easier access to favorite spaces (Figure 7) and a variety of resting surfaces and spaces. Low-sided, wide-based food and water bowls that do not interfere with the whiskers are ideal for seniors.³² Senior cats should have safe access to food with minimal distractions and interruptions. Elevation of food bowls may benefit those with DJD, and warmed and/or aromatic foods can entice intake.

As frailty scales become more well defined (Box 2), interventions to keep the senior cat active and self-sufficient can be taken into the home environment. Although age alone is not a reliable predictor of frailty, many frailty factors become more common with advanced age.³³ As is established for human medicine frailty scales, frailty measurements should be able to identify frail subjects, be supported by a biologic causative theory, and reliably predict adverse clinical outcomes and patient response to therapy and stressors. In an effort to identify frailty factors, readers can utilize



Figure 7 (a,b) This 14-year-old cat with painful DJD uses steps to access a favorite resting place. Courtesy of Heather O'Steen

Box 2

Frailty scales

Phenotype frailty scale

Medical conditions/problems present	Yes	No
1 Unintentional weight loss		
2 Weakness		
3 Poor endurance, early exhaustion		
4 Slowness and low activity		

Pre-frail: 'Yes' to 2 out of 4. **Frail:** 'Yes' to 3 or 4 out of 4

Adapted from Fried et al³⁴

Index frailty scale

Medical conditions/problems present	Yes	No
1 Physiologic deficits		
2 Psychological (emotional) deficits		
3 Cognitive (task-oriented) deficits		
4 Deficits in social function		

Pre-frail: 'Yes' to 2 out of 4. **Frail:** 'Yes' to 3 or 4 out of 4

Adapted from Mitnitski et al³⁵

the 'phenotype scale frailty scale'³⁴ and 'index frailty scale'.³⁵ The former focuses on specific physiologic factors, and the latter allows for incorporation of psychological and social function to identify cognitive decline. Both are resources that are easy to use and repeat with serial assessments. With improved identification of frailty, we can establish corrective actions, physiologically and psychologically. With increased awareness and recognition, predictive factors can be identified.

Obesity in the cat is known to decrease life span;³⁶ however, with advancing age, weight loss is a more common occurrence.³⁷ BCSs of <5/9 and of 9/9 are negatively associated with survival and lifespan.³⁸ Routine nurse or technician visits, and educating clients to monitor body weight, BCS and MCS at home can improve early detection of negative trends.

Gastrointestinal (GI) tract efficiency changes over time in the aging cat. Cats aged 7–11 years will require reduced caloric intake,³⁹ while cats 12 years of age and older will have increased daily energy requirements (DER).^{39,40} Food intake can be negatively impacted by cognitive changes, dental disease and systemic disease.⁴¹ Diminished GI tract function in seniors may also lead to consumption of smaller volumes of food at each feeding, with cats over 10 years requiring calorie-dense diets with highly digestible proteins offered in smaller, more frequent meals.⁹ Resting energy requirements (RER) can be determined using the following calculation:⁴²

$$\text{RER (kcal)} = 30 \times \text{body weight (kg)} + 70$$

To determine DER add a factor of 10–20%, although some senior cats may require a factor of 25%.⁴³ Feeding amounts can be determined based on the energy density and nutrients of the food being fed. Guide clients to record actual intake and report any changes. Slower transit times may predispose senior cats to stool

dehydration and constipation.³² In some cases, use of specific diets⁴⁴ or addition of polyethylene glycol 3350 daily to food can be beneficial in promoting good stool consistency.⁴⁵

The 2020 AAHA/AAFP Feline Vaccination task force recommended individualized vaccination plans based on five risk assessment variables: age and life stage, health status, agent exposure, history and immunodeficiency.⁴⁶ Healthy senior cats and senior cats with controlled disease are eligible for vaccination based on these criteria. Although poor health status may increase the risk of side effects, the same cat may be more susceptible to infectious disease and may benefit from vaccination. The veterinarian will need to evaluate these risk variables on a patient-by-patient basis. Refer to the '2020 AAHA/AAFP Feline Vaccination Guidelines'⁴⁶ for additional information.

Regular, broad spectrum parasite prevention is recommended by the Companion Animal Parasite Council, regardless of lifestyle. Exposure risks increase when cats spend any time outside, including on patios or in enclosures, or travel for grooming, boarding or other care, and when other household pets have an indoor-outdoor lifestyle. A strictly indoor lifestyle does not eliminate exposure risks, however. Routine protection against common intestinal parasites, heartworm, fleas, and in some cases ticks, is recommended.

Dental disease and associated pain in cats is often unnoticed at home. Clinical signs may include head shaking, pawing at the mouth, tongue thrusting, hypersalivation, or rubbing the head along the ground,⁴⁷ but signs are often subtle and not explicitly linked with dental disease. Cats may display vague alterations in activity, appetite and interactions with family, and/or other subtle signs of pain (Table 2). The risk of periodontal disease increases with age,⁴⁸ as does the risk of tooth resorption,^{49,50} making a full dental evaluation an essential component of every senior examination. In the awake patient, this includes

extraoral examination of the head as well as intraoral examination.⁴⁷ Examination of the entire dental arcade can be difficult in awake cats, and lesions can be missed. For example, tooth resorption is commonly found first in 307 and 407,⁴⁹ yet assessing these mandibular premolars can be a challenge in the conscious cat. Cat friendly handling techniques can improve this process.¹¹ A video showing cat friendly tips for thorough feline dental examinations is included as supplementary material (see page 631).

Complete dental evaluation requires anesthesia and includes thorough extraoral and intraoral examinations as well as dental radiography.⁴⁷ Advancing age should not be a limiting factor in proceeding with dental care under anesthesia.⁵¹

Concurrent issues to consider in the aging cat

Anesthesia

Procedures including diagnostic ultrasonography, endoscopy, feeding tube placement and surgery require sedation or anesthesia. Historical data indicate higher mortality rates in cats compared with dogs, as well as in cats over 12 years of age (comparator group 1–5 years).⁵² However, risk factors have been identified, and anesthesia practices changed to mitigate adverse outcomes. The ‘AAFP Feline Anesthesia Guidelines’⁵³ highlight the importance of stress reduction (eg, pre-visit gabapentin, cat friendly handling¹¹ and nursing⁵⁴) in the perioperative period. Tachycardia is not well tolerated, and diminished cardiac reserve renders the older patient less able to respond to fluid losses or overload. Recommended fluid rates for cats during anesthesia are 3 ml/kg/h to reflect feline blood volume (50–60 ml/kg) and the prevalence of hypertrophic cardiomyopathy; note that this is lower than rates for dogs.⁵³ The type and volume of fluid used depend on many factors, including the patient’s signalment, physical condition, and the length and type of the procedure.⁵⁵

As humans age, the functional capacity of major organs diminishes; the decrease in size of, and blood flow to, the liver and kidneys results in delayed metabolism and excretion of drugs.⁵⁶ The decrease in grey matter lowers anesthetic requirements. Loss of muscle mass and diminished thermoregulatory control renders older humans susceptible to hypothermia, which further decreases drug metabolism and prolongs anesthetic recovery.⁵⁷ These changes affecting drug metabolism likely occur in cats. If adjustments are not made based on these age-related physiologic changes, the risk of anesthetic overdose dramatically increases.

If adjustments are not made based on age-related physiologic changes, the risk of anesthetic overdose dramatically increases.



Hypertension

Hypertension in the cat is well recognized but, due to a paucity of screening, is likely underdiagnosed.¹⁷ Feline hypertension can occur as a primary/idiopathic change, secondary to other disease or secondary to situational stress.¹⁶

Primary/idiopathic hypertension is uncommon in cats and thus detection of hypertension should prompt an investigation for underlying disease. Secondary hypertension may develop in association with CKD, hyperthyroidism, primary hyperaldosteronism, DM, pheochromocytomas and pituitary hyperadrenocorticism. The reader is referred to the AAFP Hypertension Educational Toolkit¹⁸ and the ‘ISFM Consensus Guidelines on the Diagnosis and Management of Hypertension in Cats’¹⁷ for additional details.

Chronic kidney disease

Kidney disease is common in older cats, and often begins in mature adult cats. Diagnosis and management are well documented.^{58,59} However, a few specifics deserve mention:

- ✦ Clinical signs of CKD can be overlooked by cat owners, and may include polyuria, polydipsia, inappetence, nausea, constipation, poor haircoat, weight loss and muscle wasting.
- ✦ Routine laboratory work (screening and evaluation of trends) may reveal early disease. Some patients with serum creatinine concentrations within published reference intervals may actually have CKD. Evaluation of combined data, including creatinine, USG, SDMA, body weight, MCS and hydration status, is important for disease determination. Persistent serum creatinine >1.6 mg/dl (>140 µmol/l), USG <1.035, and SDMA >14 µg/dl are indicative of renal dysfunction.

- ✦ Interpretation of urinalysis results, particularly USG and protein, is of particular importance in senior cats. Cystocentesis allows for greatest accuracy. If USG is <1.035, then measurement should be repeated on a subsequent sample to confirm persistence. Determine urine protein:creatinine ratio (UPCR) to quantify proteinuria when appropriate (ie, no gross hematuria or inflammation is present).

- ✦ After diagnosis of CKD is confirmed and the patient is stable and hydrated, International Renal Interest Society (IRIS) staging is performed. Staging is based on repeated assessment of serum creatinine (with consideration for SDMA) and substaging based on BP and UPCR. Staging the patient aids in management of disease, and substaging helps in determining when intervention for hypertension and proteinuria is indicated.

- ✦ Evaluate nutrition, including a complete dietary history and assessment of caloric intake

adequacy. Determine body weight, BCS and MCS. Ask open-ended questions about how the cat is eating. Address poor appetite and optimize caloric intake with anti-nausea and appetite stimulant therapy.⁶⁰

- ❖ Feeding a phosphorus-restricted 'renal' diet has been shown to improve CKD—mineral and bone disorder, reduce uremic episodes, and increase survival times.⁶¹ Canned diets provide the benefit of improving hydration. If a cat will not eat a commercial renal diet, a home-cooked diet can be formulated with the help of a nutritionist. Alternatively, a feeding tube can be placed to optimize nutrition and hydration, and assist in medication administration.⁶¹

- ❖ Address dehydration to promote renal blood flow and prevent constipation.

- ❖ As CKD is the leading cause of secondary hypertension, BP should be monitored and hypertension should be addressed medically when identified with a goal of returning BP to the normal range.

- ❖ Investigate and treat electrolyte abnormalities, such as hypokalemia and hyperphosphatemia.

- ❖ Evaluate for renal proteinuria, which may play a role in disease progression and has been shown to be a negative predictor of survival.^{62–64} Persistently elevated proteinuria (UPCR >0.4) determined to be renal in origin merits therapeutic intervention.

- ❖ Monitor for anemia, which is common in CKD and is a negative predictor of survival.^{63,64} Moderate to severe anemia warrants treatment.

- ❖ Perform urinalysis and urine culture (when indicated based on urine sediment clinical signs or low USG) to monitor for urinary tract infection (UTI), which is more common in cats with CKD.⁶⁵ Low USG is considered a potential factor in increased risk of subclinical UTI even if urine sediment is inactive.⁶⁶

- ❖ When prescribing therapies to CKD patients (eg, oral mirtazapine, gabapentin, fluoroquinolones), keep in mind that renal dysfunction may require dose reduction or alteration of dosing interval.^{67,68}

- ❖ Once the patient is stabilized, continue monitoring every 3–6 months or more often if indicated depending on individual patient factors.

- ❖ Balance quality of life with therapeutic interventions to develop a plan that works for clients and patients.

Hyperthyroidism

Hyperthyroidism affects 10% of cats over 10 years of age.⁶⁹ It is treatable, even curable, if detected early. FHT is diagnosed by a combination of clinical signs (eg, weight loss, polyphagia, polyuria, polydipsia, increased vocalization, agitation, increased activity,

vomiting, diarrhea, unkempt haircoat, apathy, inappetence and lethargy)⁷⁰ and elevated serum thyroid hormone (T4) concentration. Identifying trends in T4 is valuable in establishing an early diagnosis of FHT. Common myths pertaining to the treatment and management of FHT are dispelled in Table 3. For detailed information on treatment options, refer to the '2016 AAFP Guidelines for the Management of Feline Hyperthyroidism'.⁷⁰

Diabetes mellitus

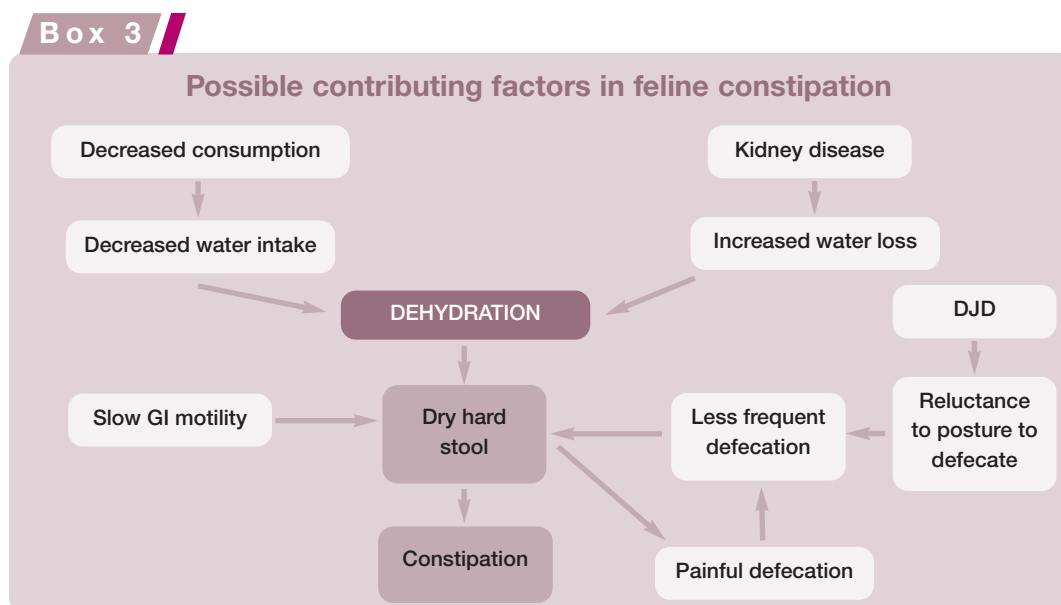
DM is a common endocrinopathy in senior cats. Most cases are similar to type II diabetes in humans, especially in cats over the age of 10, in which pancreatic beta cell destruction and peripheral insulin resistance are the underlying pathology.^{71,72} Corticosteroid usage may predispose sensitive individuals.

Nutritional management using low-carbohydrate, high-protein canned food can help these patients if they are receptive.⁷³ Most diabetic cats are insulin-dependent at the time of diagnosis. The more quickly the cat's blood glucose normalizes, the greater the likelihood of clinical remission.⁷⁴ Other factors found to be associated with an increased likelihood of remission are lower blood glucose at diagnosis, absence of hypercholesterolemia, lower mean 12-h blood glucose at day 17 of treatment and higher insulin-like growth factor at 1–3 weeks post-diagnosis.⁷⁵ Long-acting insulins may facilitate reaching this goal.⁷⁴ The presence of concurrent diseases, such as pancreatitis, affects clinical remission and

Table 3 Myths vs facts pertaining to treatment and management of feline hyperthyroidism (FHT)

MYTH	FACT
Treatment of FHT causes kidney disease	Excess T4 increases glomerular filtration rate (GFR). Effective treatment of FHT decreases GFR, unmasking pre-existing CKD
Cats with creatinine levels within reference intervals do not have CKD	Increased GFR and muscle loss associated with FHT cause a decrease in creatinine even if a cat has CKD
Maintaining T4 slightly above reference intervals will help patients with CKD	Even mild elevations in T4 can cause or exacerbate glomerular damage
Post-treatment T4 below the reference interval does not harm cats. The patient is not hypothyroid so long as T4 is in the reference interval	Iatrogenic hypothyroidism can cause progression of CKD and shorten lifespan. Cats can develop clinically significant hypothyroidism even if T4 is within the reference interval
Isolation after radioactive iodine (¹³¹ I) treatment is too stressful on a cat	Although 1 week away from home involves some stress, it is far better than stress associated with the disease itself, plus constant medication and frequent blood testing
¹³¹ I is cost-prohibitive	The cost of all treatment options for 1 year is essentially the same. Over the life of the cat the cost of ¹³¹ I is significantly less than the cost of disease complications, lifelong medication or prescription diets

Constipation is a common issue affecting older cats. Its etiology is likely multifactorial.



glycemic control. Exocrine pancreatic insufficiency may occur as a comorbidity in diabetic cats.⁷⁶

Monitoring the diabetic cat with in-hospital glucose curves can be difficult in some patients.^{77–79} Fructosamine evaluates serum glycemic control over longer time intervals and may differentiate between DM and stress hyperglycemia. Recently, continuous glucose monitors have become available and, potentially with feline a1c (glycohemoglobin) monitoring in the future, may facilitate home management.

For more information, see the 'ISFM Consensus Guidelines on the Practical Management of Diabetes Mellitus in Cats'⁸⁰ and AAEP Diabetes Educational Toolkit.⁸¹

Dental disease

Dental disease is a common but underdiagnosed condition in the feline patient.⁵¹ As many as 70% of cats will experience some form of dental disease by 2 years of age.⁵¹ In patients over the age of 7 years, common forms of dental disease include periodontal disease, tooth resorption, oral tumors and systemic diseases with oral manifestations (eg, CKD, DM).⁴⁷ Age correlates significantly with the incidence of periodontal disease⁴⁸ and tooth resorption.^{49,50}

The Task Force considers the following to be priorities with respect to dental disease and the senior cat:

- ✦ Never consider advancing age alone as a barrier to providing optimal dental care.
- ✦ Dental radiography is an essential component of dental care in the cat,^{51,82} including:
 - Full-mouth dental radiography preceding development of a treatment plan.
 - Post-surgical dental radiographs to ensure proper surgical extraction and to document the

extraction site (ie, ensure full root extraction, document degree of crown amputation, identify state of alveolar bone secondary to extraction techniques).⁵¹

✦ Utilize appropriate analgesia pre-, intra- and postoperatively.

✦ Utilize pain scales to assess the success of analgesia (eg, Feline Grimace Scale⁸³).

Gastrointestinal disease

Changes occur in every body system with aging, with some of the more profound changes taking place in the GI tract. Changes in pharyngeal, esophageal and GI motility, and alterations in gastric pH lead to a shift in the GI microbiota, resulting in decreased digestibility and progressive weight loss.⁸⁴ Weight loss may be the only sign of digestive system disease in cats. Constipation is also a common GI issue affecting older cats.^{84,85} Its etiology is likely multifactorial. Hypokalemia can contribute to slow GI motility⁸⁵ and constipation may be an indicator of hypercalcemia.⁸⁶ The pain of posturing to defecate and passing hard, dry stool potentiates the problem (Box 3). Fecal scoring charts can be utilized for stool assessment.

Inflammatory bowel disease (IBD), neoplasia, pancreatitis ± triaditis, pancreatic insufficiency and parasitism are common considerations for weight loss in the absence of other clinical signs. To obtain a definitive diagnosis, investigation beyond baseline laboratory work is required. Additional diagnostics include abdominal ultrasonography and serum measurement of feline pancreatic lipase immunoreactivity (fPLI), trypsin-like immunoreactivity (TLI), cobalamin and folate. A diagnosis of pancreatitis cannot be made by ultrasonography or blood tests alone; but, when performed together, they can increase the likelihood of a correct diagnosis.⁸⁷ Similarly,

a negative fecal examination for parasites must not be over-interpreted – it only means that none were present in the submitted sample.

Cancer

As cats age, the risk of cancers increases.⁸⁸ Signs are often non-specific such as loss of appetite, weight loss or lethargy. Use of cat friendly techniques with gentle and smooth palpation can aid in the quality of information the veterinarian gathers. Be alert for cachexia and paraneoplastic hair loss.

Up to 50 percent of feline cutaneous masses are histologically malignant⁸⁹ (commonly mast cell tumors, squamous cell carcinomas, melanomas, fibrosarcomas) and diagnostics should be performed when detected, as delaying diagnosis may lead to a poorer prognosis on account of growth and/or metastasis. Encouraging owners to check all cats monthly for skin masses, documenting location and size, can allow earlier detection.

Many cancers can be treated or ameliorated, especially if detected early. Working with an oncologist will provide up-to-date therapeutic options.

Discussing goals of therapy with owners will help guide recommendations. There has been great progress with chemotherapeutics, radiation and photodynamic therapies, as well as surgical techniques, leading to significant time in remission and increased owner satisfaction. Many cancers can be treated palliatively using less aggressive interventions, slowing growth, and managing pain and nausea to maintain wellbeing. Client education includes discussion about quality of life and available treatments. Route or modality of treatment may be modified in some cases to best suit the patient and/or owner. Providing information on ranges of response to therapy, evaluating the cat's acceptance of treatment regimens, and estimating costs will help owners make the most appropriate treatment decisions for their cat and themselves.

Ongoing sources of pain

Many of the conditions discussed in these Guidelines involve a component of pain. Pain must be investigated and managed as a disease in itself and treated concomitantly with the primary presenting problem(s). Assessing chronic pain in cats is challenging, but our ability to do so is rapidly improving.⁹⁰ There are multiple causes of ongoing pain in senior cats (see Box 4), and the pain experience may escalate when more than one condition is present due to amplification of the pain-sensing system. DJD, soft tissue, inflammatory and neurologic pain are important to discuss as they are a frequent cause of ongoing discomfort in senior cats.

Box 4

Common conditions associated with long-term pain

- ❖ DJD
- ❖ Dental disease
- ❖ Neurologic – lumbosacral disease, disc disease, cervical pain
- ❖ Myofascial and soft tissue pain
- ❖ Dermatologic – dermatitis, otitis, recalcitrant wounds
- ❖ Ocular – corneal ulcers, uveitis, glaucoma
- ❖ Visceral – IBD, pancreatitis, megacolon, constipation, idiopathic cystitis
- ❖ Cancer – primary tumor or treatment related (eg, radiation burns)
- ❖ Persistent postoperative pain – onychectomy, mastectomy, limb amputation

There are multiple causes of ongoing pain in senior cats, and the pain experience may escalate when more than one condition is present.



DJD is a chronic degenerative disease affecting the appendicular and axial skeleton.⁹¹ Its prevalence is strongly related to age, affecting up to 74% of cats ≥ 12 years of age.^{91,92} The disease is multifaceted; peripheral and central changes result in maladaptive pain. Maladaptive pain serves no purpose (ie, is not protective) and can be further divided into neuropathic pain (direct damage to neurologic tissue) and functional pain (malfunction of the nociceptive system).⁹³

Many cats with DJD are undiagnosed and go untreated. Diagnosis depends on client-based questionnaires,^{94–96} history, an orthopedic, neurologic and myofascial examination, radiographs, and, in some cases, response to a treatment trial. Clinically expedient screening tools will increase the likelihood of identifying affected cats; one such tool comprises six questions (Box 5).⁹⁷ The answer to 'how is your cat jumping up and down compared with last year?' can alert a clinician to whether or not they need to pursue a DJD work-up. A comprehensive resource for veterinarians and cat owners is the Feline Musculoskeletal Pain Index (FMPI; painfreecat.org).

Box 5

Owner checklist for detecting DJD-associated pain in cats

To determine if your cat is showing signs of DJD-associated pain, please complete the following questionnaire. Please answer all questions.

- | | | |
|--|------------------------------|-----------------------------|
| ❖ Does your cat jump up normally? | ☐ Yes | ☐ No |
| ❖ Does your cat jump down normally? | ☐ Yes | ☐ No |
| ❖ Does your cat climb up stairs or steps normally? | ☐ Yes | ☐ No |
| ❖ Does your cat climb down stairs or steps normally? | ☐ Yes | ☐ No |
| ❖ Does your cat run normally? | ☐ Yes | ☐ No |
| ❖ Does your cat chase moving objects (eg, toys)? | ☐ Yes | ☐ No |

From Enomoto et al.⁹⁷ Based on the Musculoskeletal Pain Screening Checklist (MiPSC) © 2019 North Carolina State University

DJD is currently incurable and requires lifelong treatment to maintain comfort, mobility and quality of life. With this comes challenges related to owner aversion and poor compliance, adverse effects of long-term medication, drug interactions and the impact of comorbidities. The complex etiology of DJD-related pain demands a multimodal and integrative approach involving pharmacologic and non-pharmacologic therapies, and environmental modification.

Veterinarians prescribe a wide variety of drugs and supplements for cats with DJD, despite a limited evidence base for many.⁹³ Drugs with published efficacy include non-steroidal anti-inflammatory drugs (NSAIDs),⁹⁸ gabapentin⁹⁹ and tramadol,^{100,101} however, most studies were designed to look at monotherapy. Approximately 68% of cats with DJD have some degree of CKD,¹⁰² making the use of NSAIDs in this population controversial. Retrospective studies showed no adverse effect on renal function (sequential serum creatinine concentration and USG) or longevity in cats with stable CKD (IRIS stages 1–3) receiving meloxicam at a median daily dose 0.02 mg/kg.^{103,104} No adverse effects were reported in cats with CKD (IRIS stages 1–2) given robenacoxib 1.0–2.4 mg/kg q24h for 28 days in a prospective study.¹⁰⁵ However, a recent prospective study (meloxicam 0.02 mg/kg q24h for 6 months or placebo) in cats with CKD reported a higher UPCR at 6 months in meloxicam-treated cats.¹⁰⁶

Emerging treatments (eg, feline-specific monoclonal anti-nerve growth factor antibodies) address the neuropathic component of the disease and overcome the problems of daily treatment because they are administered subcutaneously once every 4–6 weeks.¹⁰⁷

Soft tissue pain occurs with restriction of tissue mobility related to multiple disease states (eg, DJD, oral and visceral pain states, and direct injury to soft tissue structures). Myofascial palpation assesses tissue viscosity and mobility, and will elicit a response from the cat (eg, vocalization, turning, escape attempt) if pain is present. Soft tissues become restricted when movement is reduced, or inflammation is present. Exercise, massage, acupuncture, shock wave therapy and vibration are the definitive treatments for painful soft tissue restriction.

Neurologic pain is common in aging cats, especially at the lumbosacral and pelvic regions of the spinal cord. This type of pain is often maladaptive and difficult to treat. Neurologic conditions may remain localized or may be accompanied by pain and dysfunction of somatically related visceral structures (eg, colonic dysfunction and megacolon with lumbosacral disease).^{108,109}

Inflammatory pain is a feature of many feline diseases. Aging cats appear to experience

amplified changes in their immune system that may predispose them to comorbidities.

Cognitive dysfunction syndrome

Aging cats often exhibit excessive vocalization, altered social interactions or activity patterns, and house-soiling.^{110–112} In over 25% of cats 11 years or older, these changes have no recognized medical causation.^{111,113} Because feline motivations can be occult, inter- and intra-cat differences abound; also changes appear gradually and mimic adaptive responses to chronic pain.¹¹⁴ Owners and veterinarians may, therefore, blame cognitive dysfunction syndrome (CDS) on ‘just being an old cat’. If veterinarians strongly urge owners to record and serially review pictures and videos of their cat’s daily routines, changes for each cat become apparent earlier.

The acronym DISHA-AL (Box 6) has been used to describe clinical signs of cognitive decline. Provocative questions (Box 7) to identify components of DISHA-AL and the subsequent clinical work-up can distinguish medical from cognitive decline. CDS ultimately is a diagnosis of exclusion of medical and environmental causes for the behaviors.^{9,112}

The complex etiology of DJD-related pain demands a multimodal and integrative approach involving pharmacologic and non-pharmacologic therapies, and environmental modification.



Box 6

Components of DISHA-AL

- ✦ Disorientation
- ✦ Interaction changes
- ✦ Sleep–wake cycle alterations
- ✦ House-soiling
- ✦ Activity changes
- ✦ Anxiety
- ✦ Learning/memory

Courtesy of GM Landsberg

Box 7

Ten provocative questions for investigation of possible CDS

- ✦ What’s the highest surface to which your cat will jump? Does your cat seem lame?
- ✦ When was the last time you saw your cat stretch and yawn luxuriously?
- ✦ Has your cat urinated or defecated outside of the litter box since the last examination?
- ✦ How have your cat’s interactions with its housemates changed?
- ✦ Is your cat more aloof or clingier/more affectionate with you than previously?
- ✦ Does your cat ‘talk’ (vocalize), meow insistently or yowl for no apparent reason?
- ✦ How have your cat’s grooming and sleeping habits changed?
- ✦ How have your cat’s eating and drinking habits changed?
- ✦ How willing is your cat to play with toys or hunt if given the opportunity?
- ✦ How often does your cat act confused, forgetful or depressed?

If management that integrates client education, environmental optimization^{8,9,115} (see later in Table 5), supplements with essential fatty acids, antioxidants and B vitamins,^{116–118} and pheromones¹¹⁹ fails to bring improvement, selegiline (0.25–1 mg/kg q24h) may be beneficial.^{120,121} Individualized combination therapy is most effective and can improve brain function, longevity and owner peace of mind.⁹

Complex disease management

Comorbidities are common in gerontology, and cats are much like humans in this tendency.¹²² Reasons for the high frequency of comorbidities as cats age remain speculative, but this likely relates to a combination of exogenous stress causing oxidative injuries, infectious agent exposure over time, and imbalance of the immune system.^{123,124} As homeostasis of the immune system falters, immunosenescence (reduced sensitivity to external pathogens) and hypervigilance of autologous tissues can occur together and are sometimes referred to as ‘inflamm-aging’ changes.¹²⁵

While specific inflamm-aging discussion is largely restricted to the human gerontology literature, the Task Force feels the concept of frailty helps capture a component of the complex conditions that can coalesce in the cat. The concept of a ‘frailty prevention model’ delineates three levels of intervention: 1) primary – ie, minimize risk factors and disease onset; 2) secondary – delay progression of disease; and 3) tertiary – reduce or limit impairments, disabilities and complications that result from disease. By the time cats enter their senior years, the first two levels are behind them. The focus now is on the third category of reduction and limitation of impairment.

The goal of healthy aging has been with us since a time when cats seldom reached old age. Now that substantial progress has been achieved in increasing longevity, focusing on the quality of that longevity is important. Although healthy aging means different things to different people regarding both themselves and their cats, and one’s perspective of healthy aging often changes with time and circumstances, comfort and enjoyment of life are likely to be common targets. It is also important to recognize that that an owner’s expectations for a cat will reflect the owner’s own attitude toward healthy self-aging.

As cats get older, the risk of developing more than one disease increases, often complicating diagnosis and treatment. Diagnosis is aided by a combination of a thorough physical examination, screening diagnostic testing, and attention to the common comorbidities listed in Box 8.

The high frequency of comorbidities as cats age likely relates to a combination of exogenous stress causing oxidative injuries, infectious agent exposure over time, and imbalance of the immune system.



As the number of concurrent disease conditions increases, a related decrease in health-related quality of life (HRQOL) occurs.¹⁴⁰ Some of the issues that arise in senior cats with multiple diseases include:

- ✦ The effect of polypharmacy and risk of drug interactions. Reduced renal or hepatic clearance can require reduced dosing or increased intervals of medications.¹⁴¹
- ✦ Owner aversion and poor compliance to the medical plan, particularly where there is a high medication burden, risking negatively impacting the cat-owner bond.
- ✦ The effect of diet on body condition, inflammatory homeostasis, GI function, kidney function and overall health.
- ✦ The cumulative impact of multiple diseases. For example, CKD, DJD, DM, IBD, CDS and behavioral issues, when present in any combination, can compound inappropriate elimination.
- ✦ Hypertension. This may occur with various disease states (thyroid, cardiac, renal) and is much more common than previously recognized.
- ✦ A risk of diagnosing one disease while missing another, or assuming a single disease is severe when signs are actually due to multiple diseases. For example:
 - When cholangitis, pancreatitis and/or IBD occur together, one or more may be missed.¹⁴²

Box 8

Commonly recognized feline disease combinations

- ✦ CKD + hyperthyroidism
- ✦ CKD + DJD¹⁰²
- ✦ CKD + heart failure¹²⁶
- ✦ CKD + periodontal disease^{127,128}
- ✦ Hyperthyroidism + DM¹²⁹
- ✦ DM + obesity^{130*}
- ✦ DM + CKD¹³¹
- ✦ DM + hyperadrenocorticism^{132*}
- ✦ DM + lower urinary tract disorders¹³³
- ✦ DM + UTIs + hyperthyroidism + CKD⁶⁵
- ✦ Obesity + DJD/DM/cardiac disease/respiratory illness^{36,134}
- ✦ Triaditis^{135,136*}
- ✦ Hypertension + hyperthyroidism
- ✦ Hypertension + CKD
- ✦ Hypertension + hyperaldosteronism
- ✦ CKD + thin body condition/periodontal disease/cystitis¹³⁷
- ✦ Underweight + DJD/DM/CKD/hyperthyroidism/neoplasia^{138,139}

Based on Scherk¹²³

*These reviews appear within a JFMS virtual special issue on feline comorbidities, which discusses the complexities of diagnosis and management, available at cpsi.jfms.com

The presence of multiple diseases can be overwhelming for clients, and an important component of the care veterinarians provide includes supporting the owner.



Box 9

Tips for supporting owners of cats with multiple diseases

✦ Focus first on the disease that has the biggest impact on quality of life. Rankings are dynamic and the disease that poses the greatest threat to quality of life may shift over time.

✦ Be mindful of pill burden, cost and compliance. Educate clients about administering and scheduling medications, asking about their abilities and limitations.

✦ Multiple treatments can be difficult for the patient and the client; it is important that the quality of the human–animal bond is maintained. Coach clients on ways to administer medications in a calm manner that is comfortable for the cat.



✦ Explore using pastes, favorite food treats or treats specifically designed to hide pills or, alternatively, reformulating oral medications into treats, liquids or pastes. Never place medications in a prescription diet as the cat may reject that food.

✦ Research whether dosing can be once rather than two or more times a day by changing the dose or the product formulation. Some owners find subcutaneous injections easier to give than oral medications.

✦ Very few feline drugs are effective when applied transdermally. Many compounding pharmacies offer a multitude of drugs for this purpose but there is little to no evidence to demonstrate efficacy. Two drugs used commonly in senior cats, mirtazapine and methimazole, are measurable and reliable when administered transdermally.^{146,147}

– Chronic pancreatitis may be missed in a diabetic patient.^{76,143}

– Hyperthyroidism may be missed in cats with kidney or liver disease, or cancer because typical signs are masked and T4 may be suppressed back into the top of the normal range.^{144,145}

– Hyperthyroidism may be missed in cats with DM due to similarity in signs.

– The diagnosis of bacteriuria in cats with kidney disease, hyperthyroidism or diabetes can be complicated because signs of lower urinary tract disease, pyuria and/or active urine sediment are not always present. Diagnosis can only be confirmed by performing a urinalysis and bacterial culture.⁶⁵

– Hyperthyroidism and cardiac disease may occur together, with only one being recognized.

– Most diseases have a component of pain, complicating the assessment of other sources of pain, such as DJD, soft tissue or neurologic, when using standardized pain scales. Myofascial examination is a partial solution to this diagnostic dilemma.

– The impact of comorbid conditions on quality of life fluctuates (eg, during chemotherapy, nausea may be worse than pain).

✦ Pain severity will change throughout the cat's remaining lifetime depending on the disease and its progression, response to treatment, inflammatory status and lifestyle modifications. Complex disease management may feel overwhelming for a general

practitioner; however, they are often best suited to oversee the cat's care as they see the 'whole picture,' have a rapport with the owner, and can consult or refer the cat to specialists when needed. The presence of multiple diseases can likewise be overwhelming for clients, and an important component of the care veterinarians provide includes supporting the owner (see Box 9).

Ancillary therapies include environmental enrichment and modification as well as physical medicine treatments such as physical therapy, acupuncture, massage and electrophysical modalities. Many positive forms of activity can be instituted at home, and regular attendance at physical medicine sessions at a facility can be rewarding for both the cat and their owner. Involving owners as part of the treatment team, and making them feel they are part of the solution, promotes buy-in; it also increases the time the cat and owner spend together. Assigning owners duties that support positive interactions such as grooming or playing will decrease the risk that the cat will only associate the owner with receiving treatment.

Controlled exercise – when performed with appropriate restrictions, continuity and regularity – produces analgesia, similar to a pain medication.¹⁴⁸ Regular physical activity conveys multiple benefits – influencing gastric and colonic motility, balancing immune status, reducing seizure breakthrough, and improving appetite and cognition.¹⁴⁹

As many of the coalescing conditions in senior cats are likely related to imbalances in neuroimmune homeostasis, it is important to prioritize an approach that emphasizes quality of life and use of non-pharmacologic treatments, alongside pharmacologic treatments and appropriate monitoring.

Quality of life

'How will I know it's time?' is one of the most frequently asked questions by owners. Assisting owners in making the decision to euthanize their cat is an essential part of our job. Comorbid diseases and their treatments, as well as physical challenges related to aging, impact quality of life. More therapeutic interventions and radical surgical procedures are now available to prolong life, but we must put the patient's best interests first despite pressure from owners.¹⁵⁰ Just because we can, does not mean we should, and quality rather than quantity of life is a priority. Cats live in the moment and, unlike people, cannot know that 'tomorrow may be better' while going through unpleasant treatments. Our patients do not make choices for themselves; this falls on the owner and we must partner with them to make good, well-informed patient-centric decisions.

Animals, newborns, infants and cognitively impaired people cannot self-report and, therefore, patient-reported outcome instruments cannot be used.^{151,152} Despite wide usage, the term quality of life (QOL) with respect to animals does not have a universally consistent or accepted definition, which has hampered our ability to measure it. Most people have a general understanding of what is meant by the term QOL, but it is surprisingly difficult to verbalize.¹⁵³ One working definition is 'an individual's satisfaction with its physical and psychological health, its physical and social environment and its ability to interact with



Figure 8 Quality of life considerations. Courtesy of Sheilah Robertson

As
veterinarians,
we must
partner with
owners to make
well-informed
patient-centric
decisions.



that environment'.¹⁵² 'Health' is the state of being free from illness or injury and 'satisfaction' is the fulfilment of one's individual needs or state of positive mood.¹⁵² When the veterinary team shares an understanding of what QOL means, owners are supported with consistent guidance for assessing QOL in their cats.

QOL and HRQOL are different. QOL is a broad term and considers all aspects of a pet's life, which includes physical and mental health. HRQOL refers to the specific impact of a medical condition on an individual's health. An HRQOL instrument is able both to detect disease (be discriminative) and measure health changes over time (be evaluative).¹⁵⁴

How do we take something internal, private and uniquely individual and make it accessible, objective and measurable? As observers, we cannot validly report on a cat's pain intensity, but we can report behavioral changes thought to be a result of pain. Therefore, QOL can only be assessed in cats using proxy reports or direct observations; the proxy may be the owner, a veterinary professional or a combination of the two. These are referred to as observer-related outcomes.

Pain is an affective state (emotion) and is always unpleasant but is not the only unpleasant feeling associated with chronic disease. Other things to consider are shown in Figure 8 and Table 4.

Table 4 Examples of mental/emotional and physical states that contribute to a poor QOL

	Example
Mental/emotional	Anxiety
	Fear
	Isolation and loneliness
	Boredom
	Frustration
	Distress
Physical	Chronic (maladaptive) pain (eg, DJD, dental disease, non-healing wounds)
	Nausea and vomiting (eg, secondary to CKD)
	Breathlessness (eg, respiratory disease, congestive heart failure)
	Thirst (eg, uncontrolled DM, CKD)

There is some urgency to develop evidence-based assessment tools to inform clinical decision-making. Using expert consensus, feline welfare issues in the UK, both on an individual and population level, have been prioritized.¹⁵⁵ The priority (ranking) of issues was determined by judging their severity and duration. Pertinent to these '2021 AAFC Feline Senior Care Guidelines' is that out of the top 10 welfare issues identified, diseases of old age were ranked second in priority, and delayed euthanasia was listed second for prevalence.¹⁵⁵

In veterinary medicine, owner questionnaires and clinician-completed observation scales are frequently used to objectify the subjective.¹⁵⁶ Outcome assessment instruments must have specific attributes:

❖ **Validity:** proven to measure what is intended. This requires an accepted definition of what is being measured.

❖ **Reliability:** close agreement between different observers

❖ **Responsiveness and sensitivity:** ability to detect clinical changes over time or after treatment

Developing robust instruments to assess subjective states requires specific psychometric methodologies, which are time-consuming but worthwhile.^{153,157,158} Which questions we should ask in relation to feline quality of life ultimately depends on knowing what matters to each cat. Detailed information on QOL

Five pillars of a healthy feline environment

- A safe place
- Multiple and separate resources for food, water, toileting, scratching, resting/sleeping
- Opportunity for play and predatory behavior
- Positive and predictable social interactions
- Respect for the importance of a cat's sense of smell



Figure 9 The five pillars of an appropriate environment

and HRQOL instruments is provided in the supplementary material (see page 631).

Environmental changes

Maintaining the five pillars of an appropriate environment requires modification to the cat's home or lifestyle in the face of aging or disease. The five pillars are described in detail in the '2013 AAFC and ISFM Feline Environmental Needs Guidelines',⁸ and are summarized in Figure 9. Environmental changes and changes in care that may be required for aging cats are summarized in Tables 5 and 6.

When the veterinary team shares an understanding of what QOL means, owners are supported with consistent guidance for assessing QOL in their cats.

Table 5 Environmental changes to make the activities of daily living possible, or easier, for aging cats and those with health-related challenges

Health issue	Provide	Outcome
DJD Sarcopenia	☐ Steps or ramps to access elevated places	✓ Maintains access to a safe place
	☐ Low entry/easy access litter box	✓ Maintains toileting habits
	☐ Assisted grooming	✓ Maintains coat hygiene
	☐ Raised food and water bowls	✓ Easier to reach essential resources, and maintains caloric intake and hydration
	☐ Warm resting sites	✓ Maintains body heat
DM CKD	☐ Multiple, various configuration drinking stations in different locations throughout the home	✓ Provides easy access to water all of the time
CDS	☐ Stable environment: do not rearrange the cat's major resources (food, water, litter boxes)	✓ Assists the cat to locate essential resources

Table 6 Suggested enhanced care for aging cats

Enhanced care	Rationale
Flavor enhancers Strong smelling food	With age, sensory function declines, including smell
Regular nail trimming	Nails are more brittle and scratching behaviors may be decreased due to DJD
Assisted grooming	Self-grooming may be inhibited by DJD



End of life

Palliative and hospice care

In human medicine, when a life-ending diagnosis is made, the conventional default has been to treat and prolong life, but with the growth of palliative care and hospice specialists, there are now options on how 'the end will be'. Palliative and hospice care are still relatively new specialties in human medicine and even newer in veterinary medicine.¹⁵⁹ The general public often believe hospice is 'a place' and means 'giving up.' There is a clear need to educate people on what is really the case – for cat owners, a possibility of their cat living well until the end.

✦ **Palliative care** addresses the treatment of pain, mobility impairment, nutritional deficits, anxiety and other clinical signs such as nausea and vomiting to achieve the best quality of life regardless of disease outcome (eg, 'comfort care' with or without curative intent). It applies to curable or chronic conditions as well as end of life care, and it may be provided to patients of any age and at any time during the course of an illness. Palliative care includes supporting owners caring for their pet(s) and helping them make decisions.

✦ **Hospice care** is a specialized form of palliative care that focuses on caring for patients during the end stages of an illness. In veterinary medicine this can include comfort care without curative intent, either because there are no options, or the owners have chosen not to pursue treatment because the likelihood of success is small, the side effects outweigh the benefits, or it is beyond their financial budget. Hospice care for feline patients does not preclude euthanasia and can be looked at as bridging the gap between a terminal illness and euthanasia; it may constitute a short (days) or longer (weeks to months) period of time. Hospice care also includes supporting the pet's family.

The budgets of care

Some disease-specific QOL questionnaires consider the cat itself as well as the cat's owners.¹⁵⁹ A tool developed to examine the impact of skin disease showed that QOL was different between healthy cats and those with allergic dermatitis, and that in the latter group QOL improved with treatment.¹⁶⁰ Disturbed sleep, dislike of treatments, changes in appetite and disrupted daily routines contributed to poor QOL. For owners, the psychologic consequences of caring for cats with skin disease included feelings of sorrow, frustration, guilt and stress related to administration of medication or treatments. Caring for these cats takes time and money, and the human-animal bond may be negatively

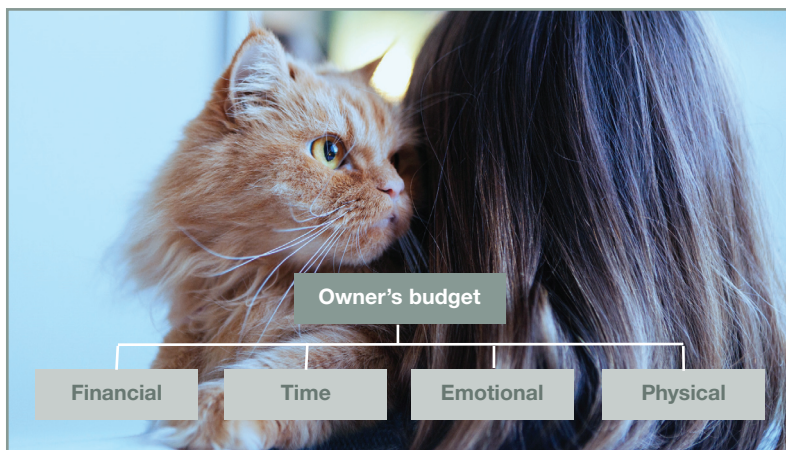


Figure 10 The four budgets of care. Courtesy of Sheilah Robertson

The Task Force recognizes that cat owners have four budgets that must all be considered when making treatment plans.



impacted. The severity of the cat's disease correlated significantly with the owner's QOL.¹⁵⁹

It is important to consider the impact of a cat's illness on the owner. The Task Force recognizes that cat owners have four budgets that must all be considered when making treatment plans, including euthanasia: financial, time, emotional and physical (Figure 10). The 'weight' that each of these carries will vary among different owners and these budgets, combined with the pet's QOL, will guide clinical decisions.

Ethical decision-making and difficult conversations

When a serious illness is diagnosed, our duty is to be honest with the client, but many find this type of news difficult to deliver. Owners may request life-prolonging treatments that we feel are futile and harmful, resulting in significant ethical stress.^{150,161} If the approach to ethical decision-making was less subjective and personal, it might be possible to decrease some stress within our profession. A veterinary working group set up by the European College of Veterinary Anaesthesia and Analgesia has created the 'Veterinary Ethics Tool (VET)' to assist in ethical decision-making. It employs a series of checklists and tables, and uses a traffic light system with green (valid reasons for the clinical procedure), orange (reconsider procedure and your responsibilities) and red (consider alternative treatment options) to guide the veterinarian.¹⁶²

The 'Serious Veterinary Illness Conversation Guide' is another resource based on similar recommendations developed for human

physicians dealing with patients at the end of life.¹⁶⁰ Serious illness conversation guidelines and checklists can help keep us on track, navigate complex issues and develop a plan to move forward. A key component of this conversation is to ask the owner what their cat would want given the situation they are in; this helps reframe the owner's thought process away from what they want. It is important to use the correct gender and name of the cat during these conversations.

Anticipatory grief

Anticipatory grief is a normal process through which those who will be left behind may begin experiencing emotional changes associated with death. Anticipatory grief has many of the hallmarks of grief experienced after a loss, and may lessen the intensity of grief reactions after the actual death.¹⁶³ The impact of losing a pet on individuals or families must not be underestimated. Proactively supporting families during this time is important and can include providing resources or referrals to grief counselors. The veterinary team can provide information so owners can prepare for what is to come; for example, explaining the euthanasia process removes elements of the unknown.

Euthanasia

Euthanasia is a humane endpoint; it is a treatment option for a sick cat, not a failure. End of life decisions are among the hardest decisions owners make. How well veterinarians conduct the 'last appointment' and support the owners impacts if they obtain another pet and return as clients. The AAFP has created an End of Life Educational Toolkit¹⁶⁴ that contains practical information about decision-

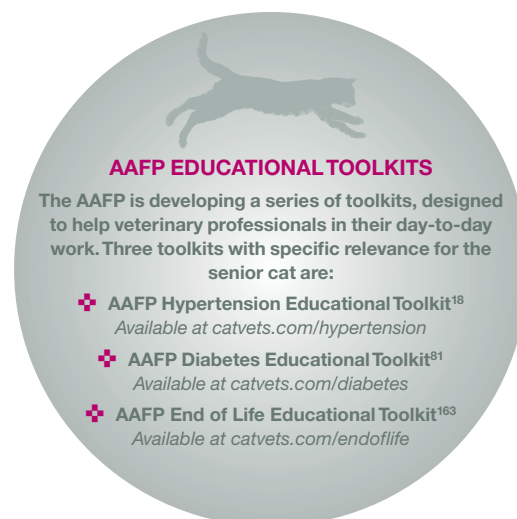
making, QOL, the euthanasia process, euthanasia experience, final arrangements, FAQs and client resources.

Supplementary material

The following files are available online at jfms.com and can be accessed at catvets.com/senior-care:

- ✦ Video demonstrating myofascial examination technique.
- ✦ Video showing cat friendly tips for thorough feline dental examinations.
- ✦ Information on QOL and HRQOL instruments.
- ✦ Client brochure (see Appendix, page 637).
- ✦ Recommended resources.

Supplementary materials that can be found at catvets.com/senior-care, in addition to the resources listed above, include 'Why are comorbidities the "new" norm for cats?'¹²³ and a video demonstrating pain when jumping.



SUMMARY POINTS

- ✦ Cats are living longer and may mirror the aging process in their owners' lives; hence they are often an integral part of their caregivers' lives, giving hope and emotional support that an owner wants to preserve.
- ✦ Senior cats deserve the best possible care veterinary professionals can offer. This Guidelines document reflects a knowledge of senior cat care that allows the veterinarian to integrate compassion and dignity with outstanding behavioral, psychological and medical recommendations. It utilizes the greatly increased diagnostic and therapeutic options that are more widely available today.
- ✦ Discussions with owners throughout a cat's senior years allow veterinarians to set the stage for optimal feline aging, help the owner to understand what the cat may experience and suggest modifications at home that ease the cat's transition toward life's end.
- ✦ Owners who are aware of what behaviors and activities to observe, and the significance of various changes in these behaviors, can then choose which tests and treatments may be most beneficial to the cat, while causing the fewest burdens.
- ✦ By building a trusting bond, the veterinarian and owner can ensure that major decisions truly represent an understanding of what is best for each individual cat.



Acknowledgements

The Task Force gratefully acknowledges the contribution of Dr Kathleen Neumann in the preparation of the Guidelines manuscript.

Conflict of Interest

Hazel Carney is a speaker for Royal Canin. Jessica Quimby is a key opinion leader for Boehringer Ingelheim Animal Health USA, Inc., Dechra, Elanco, Gallant Health Care, Heska, Hill's Pet Nutrition, Inc., IDEXX Laboratories, Inc., Kindred Biosciences, Inc., Purina ProPlan Veterinary Diets, Royal Canin, and Zoetis Petcare. Sheilah Robertson acts variously as a key opinion leader, speaker and consultant for Elanco, Zoetis Petcare, and Jurox. The other members of the Task Force have no conflicts of interest to declare.



References

- Pittari J, Rodan I, Beekman G, et al. **American Association of Feline Practitioners: senior care guidelines.** *J Feline Med Surg* 2009; 11: 763–778.
- Quimby J, Gowland S, Carney HC, et al. **2021 AAHA/AAFP feline life stage guidelines.** *J Feline Med Surg* 2021; 23: 211–233.
- O'Neill DG, Church DB, McGreevy PD, et al. **Longevity and mortality of cats attending primary care veterinary practices in England.** *J Feline Med Surg* 2015; 17: 125–133.
- Egenvall A, Nødtvedt A, Häggström J, et al. **Mortality of life-insured Swedish cats during 1999–2006: age, breed, sex, and diagnosis.** *J Vet Intern Med* 2009; 23: 1175–1183.
- Ali S and Garcia JM. **Sarcopenia, cachexia and aging: diagnosis, mechanisms and therapeutic options – a mini-review.** *Gerontology* 2014; 60: 294–305.
- Freeman LM. **Cachexia and sarcopenia: emerging syndromes of importance in dogs and cats.** *J Vet Intern Med* 2012; 26: 3–17.
- Laflamme DP. **Understanding the nutritional needs of healthy cats and those with diet-sensitive conditions.** *Vet Clin North Am Small Anim Pract* 2020; 50: 905–924.
- Ellis SLH, Rodan I, Carney HC, et al. **AAFP and ISFM feline environmental needs guidelines.** *J Feline Med Surg* 2013; 15: 219–230.
- Miele A, Sordo L and Gunn-Moore DA. **Feline aging: promoting physiologic and emotional well-being.** *Vet Clin North Am Small Anim Pract* 2020; 50: 719–748.
- Scherk M (ed). **Feline practice: integrating medicine and well-being (part 1).** *Vet Clin North Am Small Anim Pract* 2020; 50: 653–904.
- Rodan I, Sundahl E, Carney H, et al. **AAFP and ISFM feline-friendly handling guidelines.** *J Feline Med Surg* 2011; 13: 364–375.
- Epstein ME, Rodan I, Griffenhagen G, et al. **2015 AAHA/AAFP pain management guidelines for dogs and cats.** *J Feline Med Surg* 2015; 17: 251–272.
- Bijsmans ES, Jepson RE, Chang YM, et al. **Changes in systolic blood pressure over time in healthy cats and cats with chronic kidney disease.** *J Vet Intern Med* 2015; 29: 855–861.
- Jepson RE. **Feline systemic hypertension. Classification and pathogenesis.** *J Feline Med Surg* 2011; 13: 35–43.
- Maggio F, DeFrancesco TC, Atkins CE, et al. **Ocular lesions associated with systemic hypertension in cats: 69 cases (1985–1998).** *J Am Vet Med Assoc* 2000; 217: 695–702.
- Brown S, Atkins C, Bagley R, et al. **Guidelines for the identification, evaluation, and management of systemic hypertension in dogs and cats.** *J Vet Intern Med* 2007; 21: 542–558.
- Taylor SS, Sparkes AH, Briscoe K, et al. **ISFM consensus guidelines on the diagnosis and management of hypertension in cats.** *J Feline Med Surg* 2017; 19: 288–303.
- AAFP. **2021 Hypertension educational toolkit.** Available at: catvets.com/hypertension.
- Williams DL and Heath MF. **Prevalence of feline cataract: results of a cross-sectional study of 2000 normal animals, 50 cats with diabetes and one hundred cats following dehydrational crises.** *Vet Ophthalmol* 2006; 9: 341–349.
- Guyonnet A, Donzel E, Bourguet A, et al. **Epidemiology and clinical presentation of feline cataracts in france: a retrospective study of 268 cases.** *Vet Ophthalmol* 2019; 22: 116–124.
- Sebbag L, Kass PH and Maggs DJ. **Reference values, intertest correlations, and test-retest repeatability of selected tear film tests in healthy cats.** *J Am Vet Med Assoc* 2015; 246: 426–435.
- Sandhas E, Merle R and Eule JC. **Consider the eye in preventive healthcare – ocular findings, intraocular pressure and Schirmer tear test in ageing cats.** *J Feline Med Surg* 2018; 20: 1063–1071.
- Stiles J and Kimmitt B. **Eye examination in the cat: step-by-step approach and common findings.** *J Feline Med Surg* 2016; 18: 702–711.
- Carter J. **Hypertensive ocular disease in cats: a guide to fundic lesions to facilitate early diagnosis.** *J Feline Med Surg* 2019; 21: 35–45.

Funding

These Guidelines were supported by an educational grant to the AAHP from Boehringer Ingelheim Animal Health USA Inc., IDEXX Laboratories, Inc., Merck Animal Health, Purina Pro Plan Veterinary Diets, Royal Canin, and Zoetis Petcare. The authors received no financial support for the research, authorship, and/or publication of this article.

Ethical approval

This work did not involve the use of animals and therefore ethical approval was not specifically required for publication in *JFMS*.

Informed consent

This work did not involve the use of animals (including cadavers) and therefore informed consent was not required. For any animals or people individually identifiable within this publication, informed consent (verbal or written) for their use in the publication was obtained from the people involved.

- 25 Norsworthy GD, Adams VJ, Mcelhaney MR, et al. **Relationship between semi-quantitative thyroid palpation and total thyroxine concentration in cats with and without hyperthyroidism.** *J Feline Med Surg* 2002; 4: 139–143.
- 26 Paepe D, Smets P, van Hoek I, et al. **Within- and between-examiner agreement for two thyroid palpation techniques in healthy and hyperthyroid cats.** *J Feline Med Surg* 2008; 10: 558–565.
- 27 Boretta FS, Sieber-Ruckstuhl NS, Gerber B, et al. **Thyroid enlargement and its relationship to clinicopathological parameters and T4 status in suspected hyperthyroid cats.** *J Feline Med Surg* 2009; 11: 286–292.
- 28 Little S, Levy J, Hartmann K, et al. **2020 AAHP feline retrovirus testing and management guidelines.** *J Feline Med Surg* 2020; 22: 5–30.
- 29 Bennett D, Zainal Ariffin SM bt and Johnston P. **Osteoarthritis in the cat: 1. How common is it and how easy to recognise?** *J Feline Med Surg* 2012; 14: 65–75.
- 30 Kranenburg HC, Meij BP, van Hofwegen EML, et al. **Prevalence of spondylosis deformans in the feline spine and correlation with owner-perceived behavioural changes.** *Vet Comp Orthop Traumatol* 2012; 25: 217–223.
- 31 Slingerland LI, Hazewinkel HAW, Meij BP, et al. **Cross-sectional study of the prevalence and clinical features of osteoarthritis in 100 cats.** *Vet J* 2011; 187: 304–309.
- 32 Little S (ed). *The cat: clinical medicine and management.* St Louis, MO: Elsevier Saunders, 2012.
- 33 Whitlock EL and Whittington RA. **The frailty syndrome: anesthesiologists must understand more and fear less.** *Anesth Analg* 2020; 130: 1445–1448.
- 34 Fried LP, Tangen CM, Walston J, et al. **Frailty in older adults: evidence for a phenotype.** *J Gerontol A Biol Sci Med Sci* 2001; 56: M146–156.
- 35 Mitnitski AB, Mogilner AJ and Rockwood K. **Accumulation of deficits as a proxy measure of aging.** *Sci World J* 2001; 1: 323–336.
- 36 Scarlett JM, Donoghue S, Saidla J, et al. **Overweight cats: prevalence and risk factors.** *Int J Obes Relat Metab Disord* 1994; 18 Suppl 1: S22–28.
- 37 Harper EJ. **Changing perspectives on aging and energy requirements: aging, body weight and body composition in humans, dogs and cats.** *J Nutr* 1998; 128 Suppl 12: 27S–31S.
- 38 Teng KT, McGreevy PD, Toribio JL, et al. **Strong associations of nine-point body condition scoring with survival and lifespan in cats.** *J Feline Med Surg* 2018; 20: 1110–1118.
- 39 Laflamme DP and Ballam JM. **Effect of age on maintenance energy requirements of adult cats.** *Compend Contin Educ Pract Vet* 2002; 24: 82.
- 40 Cupp C, Perez-Camargo G, Patil A, et al. **Long-term food consumption and body weight changes in a controlled population of geriatric cats.** *Compend Contin Educ Small Anim Pract* 2004; 26: 60.
- 41 Bellows J, Center S, Daristotle L, et al. **Evaluating aging in cats: how to determine what is healthy and what is disease.** *J Feline Med Surg* 2016; 18: 551–570.
- 42 Rollins AW and Murphy M. **Nutritional assessment in the cat: practical recommendations for better medical care.** *J Feline Med Surg* 2019; 21: 442–448.
- 43 Taylor EJ, Adams C and Neville R. **Some nutritional aspects of ageing in dogs and cats.** *Proc Nutr Soc* 1995; 54: 645–656.
- 44 Freiche V, Deswarte G, Soulard Y, et al. **A psyllium-enriched dry extruded diet improves recurrent feline constipation [abstract].** *J Vet Intern Med* 2010; 24: 1547.
- 45 Tam FM, Carr AP and Myers SL. **Safety and palatability of polyethylene glycol 3350 as an oral laxative in cats.** *J Feline Med Surg* 2011; 13: 694–697.
- 46 Stone AES, Brummett GO, Carozza EM, et al. **2020 AAHA/AAHP feline vaccination guidelines.** *J Feline Med Surg* 2020; 22: 813–830.
- 47 Clarke DE and Caiafa A. **Oral examination in the cat: a systematic approach.** *J Feline Med Surg* 2014; 16: 873–886.
- 48 Whyte A, Gracia A, Bonastre C, et al. **Oral disease and microbiota in free-roaming cats.** *Top Companion Anim Med* 2017; 32: 91–95.
- 49 Ingham KE, Gorrel C, Blackburn J, et al. **Prevalence of odontoclastic resorptive lesions in a population of clinically healthy cats.** *J Small Anim Pract* 2001; 42: 439–443.
- 50 Whyte A, Lacasta S, Whyte J, et al. **Tooth resorption in Spanish domestic cats: preliminary data.** *Top Companion Anim Med* 2020; 38. DOI: 10.1016/j.tcam.2019.100369.
- 51 Niemiec B, Gawor J, Nemec A, et al. **World Small Animal Veterinary Association global dental guidelines.** *J Small Anim Pract* 2020; 61: 395–403.
- 52 Brodbelt DC, Pfeiffer DU, Young LE, et al. **Risk factors for anaesthetic-related death in cats: results from the confidential enquiry into perioperative small animal fatalities (CEP-SAF).** *Br J Anaesth* 2007; 99: 617–623.
- 53 Robertson SA, Gogolski SM, Pascoe P, et al. **AAHP feline anesthesia guidelines.** *J Feline Med Surg* 2018; 20: 602–634.
- 54 Carney HC, Little S, Brownlee-Tomasso D, et al. **AAHP and ISFM feline-friendly nursing care guidelines.** *J Feline Med Surg* 2012; 14: 337–349.
- 55 Davis H, Jensen T, Johnson A, et al. **2013 AAHA/AAHP fluid therapy guidelines for dogs and cats.** *J Am Anim Hosp Assoc* 2013; 49: 149–159.
- 56 Alvis BD and Hughes CG. **Physiology considerations in geriatric patients.** *Anesthesiol Clin* 2015; 33: 447–456.
- 57 Blatteis CM. **Age-dependent changes in temperature regulation – a mini review.** *Gerontology* 2012; 58: 289–295.
- 58 Sparkes AH, Caney S, Chalhoub S, et al. **ISFM consensus guidelines on the diagnosis and management of feline chronic kidney disease.** *J Feline Med Surg* 2016; 18: 219–239.
- 59 International Renal Interest Society. **IRIS staging of CKD.** http://www.iris-kidney.com/pdf/IRIS_Staging_of_CKD_modified_2019.pdf (2019, accessed February 6, 2020).
- 60 Quimby JM and Lunn KF. **Mirtazapine as an appetite stimulant and anti-emetic in cats with chronic kidney disease: a masked placebo-controlled crossover clinical trial.** *Vet J* 2013; 197: 651–655.
- 61 Ross SJ, Osborne CA, Kirk CA, et al. **Clinical evaluation of dietary modification for treatment of spontaneous chronic kidney disease in cats.** *J Am Vet Med Assoc* 2006; 229: 949–957.
- 62 King JN, Tasker S, Gunn-Moore DA, et al. **Prognostic factors in cats with chronic kidney disease.** *J Vet Intern Med* 2007; 21: 906–916.
- 63 Chakrabarti S, Syme HM and Elliott J. **Clinicopathological variables predicting progression of azotemia in cats with chronic kidney disease.** *J Vet Intern Med* 2012; 26: 275–281.
- 64 Syme HM, Markwell PJ, Pfeiffer D, et al. **Survival of cats with naturally occurring chronic renal failure is related to severity of proteinuria.** *J Vet Intern Med* 2006; 20: 528–535.
- 65 Mayer-Roenne B, Goldstein RE and Erb HN. **Urinary tract infections in cats with hyperthyroidism, diabetes mellitus and chronic kidney disease.** *J Feline Med Surg* 2007; 9: 124–132.

- 66 Dorsch R, Teichmann-Knorrn S and Sjetne Lund H. **Urinary tract infection and subclinical bacteriuria in cats: a clinical update.** *J Feline Med Surg* 2019; 21: 1023–1038.
- 67 Quimby JM, Gustafson DL and Lunn KF. **The pharmacokinetics of mirtazapine in cats with chronic kidney disease and in age-matched control cats.** *J Vet Intern Med* 2011; 25: 985–989.
- 68 Quimby JM, Lorbach S, Saffire A, et al. **Pharmacokinetics of gabapentin in cats with chronic kidney disease [abstract].** *J Vet Intern Med* 2020; 34: 2825–2826.
- 69 Peterson ME. **Hyperthyroidism in cats: what's causing this epidemic of thyroid disease and can we prevent it?** *J Feline Med Surg* 2012; 14: 804–818.
- 70 Carney HC, Ward CR, Bailey SJ, et al. **2016 AAFP guidelines for the management of feline hyperthyroidism.** *J Feline Med Surg* 2016; 18: 400–416.
- 71 Samaha G, Beatty J, Wade CM, et al. **The Burmese cat as a genetic model of type 2 diabetes in humans.** *Anim Genet* 2019; 50: 319–325.
- 72 Rand J. **Feline diabetes mellitus.** In: Mooney CT and Peterson ME (eds). *BSAVA manual of canine and feline endocrinology*. Gloucester: British Small Animal Veterinary Association, 2012, pp 133–147.
- 73 Gostelow R, Forcada Y, Graves T, et al. **Systematic review of feline diabetic remission: separating fact from opinion.** *Vet J* 2014; 202: 208–221.
- 74 Roomp K and Rand J. **Intensive blood glucose control is safe and effective in diabetic cats using home monitoring and treatment with glargine.** *J Feline Med Surg* 2009; 11: 668–682.
- 75 Cook A. **Diabetes mellitus: why cats are different.** <https://www.youtube.com/watch?v=-qSfYCKdaeY?> (2020, accessed month day, year).
- 76 Forcada Y, German AJ, Noble PJM, et al. **Determination of serum fPLI concentrations in cats with diabetes mellitus.** *J Feline Med Surg* 2008; 10: 480–487.
- 77 Reusch CE, Kley S and Casella M. **Home monitoring of the diabetic cat.** *J Feline Med Surg* 2006; 8: 119–127.
- 78 Casella M, Hässig M and Reusch CE. **Home-monitoring of blood glucose in cats with diabetes mellitus: evaluation over a 4-month period.** *J Feline Med Surg* 2005; 7: 163–171.
- 79 Alt N, Kley S, Haessig M, et al. **Day-to-day variability of blood glucose concentration curves at home in cats with diabetes mellitus.** *J Am Vet Med Assoc* 2007; 230: 1011–1017.
- 80 Sparkes AH, Cannon M, Church D, et al. **ISFM consensus guidelines on the practical management of diabetes mellitus in cats.** *J Feline Med Surg* 2015; 17: 235–250.
- 81 AAFF. **2019 Diabetes educational toolkit.** Available at: catvets.com/diabetes.
- 82 Perry R and Tutt C. **Periodontal disease in cats: back to basics – with an eye on the future.** *J Feline Med Surg* 2015; 17: 45–65.
- 83 Watanabe R, Doodnaught GM, Evangelista MC, et al. **Inter-rater reliability of the Feline Grimace Scale in cats undergoing dental extractions.** *Front Vet Sci* 2020; 7: 302. DOI: 10.3389/fvets.2020.00302.
- 84 Bellows J, Center S, Daristotle L, et al. **Aging in cats: common physical and functional changes.** *J Feline Med Surg* 2016; 18: 533–550.
- 85 Benjamin SE and Drobatz KJ. **Retrospective evaluation of risk factors and treatment outcome predictors in cats presenting to the emergency room for constipation.** *J Feline Med Surg* 2020; 22: 153–160.
- 86 de Brito Galvão JF, Parker V, Schenck PA, et al. **Update on feline ionized hypercalcemia.** *Vet Clin North Am Small Anim Pract* 2017; 47: 273–292.
- 87 Williams JM, Panciera DL, Larson MM, et al. **Ultrasonographic findings of the pancreas in cats with elevated serum pancreatic lipase immunoreactivity.** *J Vet Intern Med* 2013; 27: 913–918.
- 88 Graf R, Grüntzig K, Boo G, et al. **Swiss Feline Cancer Registry 1965–2008: the influence of sex, breed and age on tumour types and tumour locations.** *J Comp Pathol* 2016; 154: 195–210.
- 89 Ho NT, Smith KC and Dobromylskyj MJ. **Retrospective study of more than 9000 feline cutaneous tumours in the UK: 2006–2013.** *J Feline Med Surg* 2018; 20: 128–134.
- 90 Monteiro BP and Steagall PV. **Chronic pain in cats: recent advances in clinical assessment.** *J Feline Med Surg* 2019; 21: 601–614.
- 91 Lascelles BDX, Henry JB, Brown J, et al. **Cross-sectional study of the prevalence of radiographic degenerative joint disease in domesticated cats.** *Vet Surg* 2010; 39: 535–544.
- 92 Godfrey D and Vaughan L. **Historical prevalence of radiological appendicular osteoarthritis in cats (1972–1973).** *J Am Anim Hosp Assoc* 2018; 54: 209–212.
- 93 Adrian D, Papich M, Baynes R, et al. **Chronic maladaptive pain in cats: a review of current and future drug treatment options.** *Vet J* 2017; 230: 52–61.
- 94 Benito J, DePuy V, Hardie E, et al. **Reliability and discriminatory testing of a client-based metrology instrument, feline musculoskeletal pain index (FMPI) for the evaluation of degenerative joint disease-associated pain in cats.** *Vet J* 2013; 196: 368–373.
- 95 Benito J, Hansen B, Depuy V, et al. **Feline musculoskeletal pain index: responsiveness and testing of criterion validity.** *J Vet Intern Med* 2013; 27: 474–482.
- 96 Gruen ME, Griffith EH, Thomson AE, et al. **Criterion validation testing of clinical metrology instruments for measuring degenerative joint disease associated mobility impairment in cats.** *PLoS One* 2015; 10. DOI: 10.1371/journal.pone.0131839.
- 97 Enomoto M, Lascelles BDX and Gruen ME. **Development of a checklist for the detection of degenerative joint disease-associated pain in cats.** *J Feline Med Surg* 2020; 22: 1137–1147.
- 98 Gruen ME, Griffith E, Thomson A, et al. **Detection of clinically relevant pain relief in cats with degenerative joint disease associated pain.** *J Vet Intern Med* 2014; 28: 346–350.
- 99 Guedes AGP, Meadows JM, Pypendop BH, et al. **Assessment of the effects of gabapentin on activity levels and owner-perceived mobility impairment and quality of life in osteoarthritic geriatric cats.** *J Am Vet Med Assoc* 2018; 253: 579–585.
- 100 Monteiro BP, Klinck MP, Moreau M, et al. **Analgesic efficacy of tramadol in cats with naturally occurring osteoarthritis.** *PLoS One* 2017; 12. DOI: 10.1371/journal.pone.0175565.
- 101 Guedes AGP, Meadows JM, Pypendop BH, et al. **Evaluation of tramadol for treatment of osteoarthritis in geriatric cats.** *J Am Vet Med Assoc* 2018; 252: 565–571.
- 102 Marino CL, Lascelles BDX, Vaden SL, et al. **Prevalence and classification of chronic kidney disease in cats randomly selected from four age groups and in cats recruited for degenerative joint disease studies.** *J Feline Med Surg* 2014; 16: 465–472.
- 103 Gowan RA, Lingard AE, Johnston L, et al. **Retrospective case-**

- control study of the effects of long-term dosing with meloxicam on renal function in aged cats with degenerative joint disease. *J Feline Med Surg* 2011; 13: 752–761.
- 104 Gowan RA, Baral RM, Lingard AE, et al. **A retrospective analysis of the effects of meloxicam on the longevity of aged cats with and without overt chronic kidney disease.** *J Feline Med Surg* 2012; 14: 876–881.
 - 105 King JN, King S, Budsberg SC, et al. **Clinical safety of robenacoxib in feline osteoarthritis: results of a randomized, blinded, placebo-controlled clinical trial.** *J Feline Med Surg* 2016; 18: 632–642.
 - 106 KuKanich K, George C, Roush JK, et al. **Effects of low-dose meloxicam in cats with chronic kidney disease.** *J Feline Med Surg* 2021; 23: 138–148.
 - 107 Gruen ME, Thomson AE, Griffith EH, et al. **A feline-specific anti-nerve growth factor antibody improves mobility in cats with degenerative joint disease-associated pain: a pilot proof of concept study.** *J Vet Intern Med* 2016; 30: 1138–1148.
 - 108 Lanz OI. **Lumbosacral and pelvic injuries.** *Vet Clin North Am Small Anim Pract* 2002; 32: 949–962.
 - 109 Might KR and Gregory CR. **Tenesmus and obstipation in a cat.** *Compend Contin Educ Vet* 2010; 32: E1–3.
 - 110 Sordo L, Breheny C, Halls V, et al. **Prevalence of disease and age-related behavioural changes in cats: past and present.** *Vet Sci* 2020; 7: 85. DOI: 10.3390/vetsci7030085.
 - 111 Landsberg G. **Behavior problems of older cats.** In: Schaumburg I (ed). *Proceedings of the 135th Annual Meeting of the American Veterinary Medical Association*. San Diego, CA, 1998, pp 317–320.
 - 112 Gunn-Moore D, Moffat K, Christie L-A, et al. **Cognitive dysfunction and the neurobiology of ageing in cats.** *J Small Anim Pract* 2007; 48: 546–553.
 - 113 Moffat K and Landsberg G. **An investigation of the prevalence of clinical signs of cognitive dysfunction syndrome (CDS) in cats [abstract].** *J Am Anim Hosp Assoc* 2003; 39: 512.
 - 114 Bennett D and Morton C. **A study of owner observed behavioural and lifestyle changes in cats with musculoskeletal disease before and after analgesic therapy.** *J Feline Med Surg* 2009; 11: 997–1004.
 - 115 Gunn-Moore D. **Cognitive dysfunction in the cat.** In: Little SE (ed). *August's consultations in feline internal medicine*. St Louis, MO: Saunders Elsevier, 2016, pp 977–985.
 - 116 Haupt K, Levine E, Landsberg G, et al. **Anti-oxidant fortified food improves owner perceived behavior in the aging cat.** *Proceedings of the ESFM Feline Conference; 2007; Prague, Czech Republic*.
 - 117 Pan Y, Araujo JA, Burrows J, et al. **Cognitive enhancement in middle-aged and old cats with dietary supplementation with a nutrient blend containing fish oil, B vitamins, antioxidants and arginine.** *Br J Nutr* 2013; 110: 40–49.
 - 118 Araujo JA, Faubert ML, Brooks ML, et al. **NOVIFIT (NoviSAME) tablets improve executive function in aged dog and cats: implications for treatment of cognitive dysfunction syndrome.** *Intern J Appl Res Vet Med* 2012; 10: 90–98.
 - 119 Griffith CA, Steigerwald ES and Buffington CAT. **Effects of a synthetic facial pheromone on behavior of cats.** *J Am Vet Med Assoc* 2000; 217: 1154–1156.
 - 120 Landsberg G. **Therapeutic options for cognitive decline in senior pets.** *J Am Anim Hosp Assoc* 2006; 42: 407–413.
 - 121 Gunn-Moore DA. **Geriatric cats and cognitive dysfunction syndrome.** In: *Proceedings of the WSAVA Annual Congress*, Dublin, Ireland, 2008.
 - 122 Puig J, Cattin I and Seth M. **Concurrent diseases in hyperthyroid cats undergoing assessment prior to radioiodine treatment.** *J Feline Med Surg* 2015; 17: 537–542.
 - 123 Scherk M. **Why are comorbidities the 'new' norm for cats?** In: *Proceedings of the American Association of Feline Practitioners 2019 Conference*. San Francisco, CA, 2019, pp 71–76. Available at catvets.com/senior-care (2019).
 - 124 López-Otín C, Blasco MA, Partridge L, et al. **The hallmarks of aging.** *Cell* 2013; 153: 1194–1217.
 - 125 Fulop T, Larbi A, Dupuis G, et al. **Immunosenescence and inflamm-aging as two sides of the same coin: friends or foes?** *Front Immunol* 2018; 8. DOI: 10.3389/fimmu.2017.01960.
 - 126 Belanger MC. **Concurrent disease management: heart failure and chronic kidney disease.** In: Little S (ed). *The cat: clinical medicine and management*. St Louis, MO: Saunders, 2012, p 1108.
 - 127 Trevejo RT, Lefebvre SL, Yang M, et al. **Survival analysis to evaluate associations between periodontal disease and the risk of development of chronic azotemic kidney disease in cats evaluated at primary care veterinary hospitals.** *J Am Vet Med Assoc* 2018; 252: 710–720.
 - 128 Finch NC, Syme HM and Elliott J. **Risk factors for development of chronic kidney disease in cats.** *J Vet Intern Med* 2016; 30: 602–610.
 - 129 Hoenig M. **Concurrent disease management: hyperthyroidism and diabetes mellitus.** In: Little S (ed). *The cat: clinical medicine and management*. St Louis, MO: Saunders, 2012, p 1101.
 - 130 Hoenig M. **Concurrent disease management: diabetes mellitus and obesity.** In: Little S (ed). *The cat: clinical medicine and management*. St Louis, MO: Saunders, 2012, p 110.
 - 131 Pérez-López L, Boronat M, Melián C, et al. **Assessment of the association between diabetes mellitus and chronic kidney disease in adult cats.** *J Vet Intern Med* 2019; 33: 1921–1925.
 - 132 Cook AK and Evans JB. **Feline comorbidities: recognition, diagnosis and management of the cushingoid diabetic.** *J Feline Med Surg* 2021; 23: 4–16.
 - 133 Greco D. **Concurrent disease management: diabetes mellitus and feline lower urinary tract disorders.** In: Little S (ed). *The cat: clinical medicine and management*. St Louis MO: Saunders, 2012, p 1106.
 - 134 Tarkosova D, Story MM, Rand JS, et al. **Feline obesity – prevalence, risk factors, pathogenesis, associated conditions and assessment: a review.** *Veterinarni Medicina* 2016; 61: 295–307.
 - 135 Simpson KW. **Pancreatitis and triaditis in cats: causes and treatment.** *J Small Anim Pract* 2015; 56: 40–49.
 - 136 Cerna P, Kilpatrick S and Gunn-Moore DA. **Feline comorbidities: what do we really know about feline triaditis?** *J Feline Med Surg* 2020; 22: 1047–1067.
 - 137 Greene JP, Lefebvre SL, Wang M, et al. **Risk factors associated with the development of chronic kidney disease in cats evaluated at primary care veterinary hospitals.** *J Am Vet Med Assoc* 2014; 244: 320–327.
 - 138 Saito E and Kleinhenz S. **Comorbidities in underweight cats.** *Vet Focus* 2017; 27.
 - 139 Campigotto AJ, Poljak Z, Stone EA, et al. **Investigation of relationships between body weight and age among domestic cats stratified by breed and sex.** *J Am Vet Med Assoc* 2019; 255: 205–212.

- 140 Fotin M, Lapointe L, Hudon C, et al. **Multimorbidity and quality of life in primary care: a systematic review.** *Health Qual Life Outcomes* 2004; 2: 51. DOI: 10.1186/1477-7525-2-51.
- 141 Kukanich B. **Geriatric veterinary pharmacology.** *Vet Clin North Am Small Anim Pract* 2012; 42: 631–642.
- 142 Mansfield CS and Jones BR. **Review of feline pancreatitis part two: clinical signs, diagnosis and treatment.** *J Feline Med Surg* 2001; 3: 125–132.
- 143 Xenoulis PG, Suchodolski JS and Steiner JM. **Chronic pancreatitis in dogs and cats.** *Compend Contin Educ Vet* 2008; 30: 166–181.
- 144 Peterson ME and Gamble DA. **Effect of nonthyroidal illness on serum thyroxine concentrations in cats: 494 cases (1988).** *J Am Vet Med Assoc* 1990; 197: 1203–1208.
- 145 Wakeling J, Moore K, Elliott J, et al. **Diagnosis of hyperthyroidism in cats with mild chronic kidney disease.** *J Small Anim Pract* 2008; 49: 287–294.
- 146 Barnoski J, Lee-Fowler TM, Boothe DM, et al. **Serum theophylline after multiple dosing with transdermal gels in cats.** *J Feline Med Surg* 2019; 21: 329–334.
- 147 Eichstadt LR. **Compounding transdermal medication for feline patients.** *Int J Pharm Compd* 2016; 20: 271–274.
- 148 Naugle KM, Fillingim RB and Riley JL. **A meta-analytic review of the hypoalgesic effects of exercise.** *J Pain* 2012; 13: 1139–1150.
- 149 Whitehead K, Cortes Y and Eirmann L. **Gastrointestinal dysmotility disorders in critically ill dogs and cats.** *J Vet Emerg Crit Care* 2016; 26: 234–254.
- 150 Batchelor CEM and McKeegan DEF. **Survey of the frequency and perceived stressfulness of ethical dilemmas encountered in UK veterinary practice.** *Vet Rec* 2012; 170: 19. DOI: 10.1136/vr.100262.
- 151 Tatlock S, Gober M, Williamson N, et al. **Development and preliminary psychometric evaluation of an owner-completed measure of feline quality of life.** *Vet J* 2017; 228: 22–32.
- 152 FDA. **Patient-reported outcome measures: use in medical product development to support labeling claims: guidance for industry.** US Food & Drug Administration. <https://www.fda.gov/regulatory-information/search-fda-guidance-documents/patient-reported-outcome-measures-use-medical-product-development-support-labeling-claims> (2009, accessed September 19, 2020).
- 153 Spofford N, Lefebvre SL, McCune S, et al. **Should the veterinary profession invest in developing methods to assess quality of life in healthy dogs and cats?** *J Am Vet Med Assoc* 2013; 243: 952–956.
- 154 Noble CE, Wiseman-Orr LM, Scott ME, et al. **Development, initial validation and reliability testing of a web-based, generic feline health-related quality-of-life instrument.** *J Feline Med Surg* 2019; 21: 84–94.
- 155 Rioja-Lang F, Bacon H, Connor M, et al. **Determining priority welfare issues for cats in the United Kingdom using expert consensus.** *Vet Rec Open* 2019; 6. DOI: 10.1136/vetreco-2019-000365.
- 156 Meyer RE and Robertson SA. **Surveys and objectifying the subjective.** *Vet Anaes Analg* 2016; 43: 358–360.
- 157 Yeates J and Main D. **Assessment of companion animal quality of life in veterinary practice and research.** *J Small Anim Pract* 2009; 50: 274–281.
- 158 Scott EM, Nolan A, Reid J, et al. **Can we really measure animal quality of life? Methodologies for measuring quality of life in people and other animals.** *Anim Welf* 2007; 16: 16–24.
- 159 Bishop G, Cooney K, Cox S, et al. **2016 AAHA/IAAHPC end-of-life care guidelines.** *J Am Anim Hosp Assoc* 2016; 52: 341–356.
- 160 Noli C, Borio S, Varina A, et al. **Development and validation of a questionnaire to evaluate the Quality of Life of cats with skin disease and their owners, and its use in 185 cats with skin disease.** *Vet Dermatol* 2016; 27: 247–e58.
- 161 Goldberg KJ. **Goals of care: development and use of the serious veterinary illness conversation guide.** *Vet Clin North Am Small Anim Pract* 2019; 49: 399–415.
- 162 Grimm H, Bergadano A, Musk GC, et al. **Drawing the line in clinical treatment of companion animals: recommendations from an ethics working party.** *Vet Rec* 2018; 182: 664. DOI: 10.1136/vr.104559.
- 163 Cox S. **Anticipatory grief and preparation for pet loss.** In: Gardner M and McVety D (eds). *Treatment and care of the geriatric veterinary patient.* Wiley Blackwell, 2017, pp 311–315.
- 164 AAFP. **2021 AAFP end of life educational toolkit.** Available at: catvets.com/endoflife.

Available online at jfms.com and catvets.com/senior-care

Article reuse guidelines: sagepub.co.uk/journals-permissions

Senior Cats Have Special Needs



Our cats can live longer, better lives than ever before. Understanding the changing needs is critical in helping your aging cat live a long, happy life. Together with your veterinarian, you can provide a good quality of life for your older cat. Caring for a senior cat can be a deeply rewarding experience that will enhance the uniquely special bond you and your cat share.

WHAT IS A SENIOR CAT?

Cats go through four life stages: kitten, young adult, mature adult, and senior. They become a senior cat when they are 11 years old.

Senior cats have very different needs and it is helpful to understand the physical and emotional changes that happen as your cat ages.

Common age-related changes include:

- Changes in behavior and sleeping patterns
- Increased 'talking' or meowing
- Pain related to movement (jumping, using stairs, in/out of high-sided litter box)
- Changes in sight and hearing
- Decreased sense of smell and taste
- Weight loss and loose skin
- Brittle nails or nails that need to be trimmed more often
- Decreased ability to absorb nutrients and increased need for protein

Sponsored by



Senior Cats Have Special Needs

The lifespan of a cat is five times shorter than the lifespan of a human, so cats age more quickly than people. An 11-year-old cat is about 60 in human years, but a 16-year-old cat is already 80 in human years. We get a checkup once a year; an equal number of checkups for a healthy senior cat would be every 10–11 weeks! Because much can change in a short time, bringing your senior cat for regular checkups is very important.

SENIOR CAT CHECKUPS

Cats are masters of hiding signs of disease and pain, and may appear healthy even if they are sick or hurting. Being a responsible caregiver includes bringing your cat in for regular checkups. Cats 10 to 15 years old should have checkups every 6 months, and cats over 15 years should be seen every 4 months. Cats with ongoing health issues may need checkups more often depending on their illnesses. Your veterinarian relies on the information you provide about your cat's daily lifestyle to identify signs of disease, pain, or behavior changes.

During checkups, your veterinarian will thoroughly examine your cat's weight, mouth, teeth, eyes, ears, thyroid gland, heart, lungs, stomach, joints, muscles, lymph nodes, blood pressure, and skin/coat quality. They will discuss vaccinations and parasite prevention based on your cat's lifestyle. Annual blood and urine tests, similar to your annual checkup tests, can help discover problems and monitor your cat's health. Your veterinarian will compare new bloodwork results with previous testing and examine any changes. Checkups often identify disease or age-related health conditions before they are painful or cost more to manage.

IS MY SENIOR CAT IN PAIN?

Pain can be hard to notice because cats try to hide signs of discomfort and illness from us. Your veterinarian is trained to recognize subtle signs of pain. Feline arthritis, or degenerative joint disease (DJD), is very common in cats. Studies show that as many as 92% of cats have DJD. Any change in your cat's normal behavior or routine can be a sign of pain (learn more at catfriendly.com/pain). You can help your senior cat by providing steps or ramps for easy access to favorite spaces, as well as night lights to help your cat see better in the dark. Consider a litter box with lower entry so senior cats can get in and out more easily and think about items for senior cats in a more "accessible manner."



NUTRITION AND WEIGHT MANAGEMENT

Keeping your senior cat at a healthy weight is crucial. During checkups, your veterinarian will weigh your cat and feel your cat's muscles. This information helps to determine your cat's healthiest weight and body condition. Gradual weight gain or loss is hard to see. You can weigh your cat at home using a scale for lower weight levels (e.g., baby scale), and alert your veterinarian to any weight gain or loss.

Senior cats are at risk of becoming underweight due to a decreasing sense of taste or smell, which can cause a lack of interest in eating. Overweight cats are more likely to develop diabetes, arthritis (DJD), heart disease, and lower urinary tract disease.

You are an important member of your cat's healthcare team. You are instrumental in helping with the success of treatments and improved healthcare for your cat.



www.catvets.com

For more information about senior cats, visit www.catfriendly.com/senior.

© Copyright 2021 AAFP. All rights reserved.

Sponsored by



If you are having problems getting your cat to eat, have your veterinarian make sure your cat is not sick. If your cat is healthy, try offering a different texture of food (e.g., finely ground food instead of chunky), strong smelling food, warmed or chilled canned food, or fresh food that hasn't sat out too long and offered a few times throughout the day. Some cats like small amounts of flavoring, such as canned tuna juice or low-sodium, unseasoned broth. Place food where your cat spends the most time and in a location where your cat can eat quietly and calmly. Senior cats may prefer wide and low-sided food and water bowls that don't touch their whiskers. Providing elevated bowls can help those that may be in pain from bending down to eat. Hydration is very important for senior cats so consider providing multiple drinking stations, and speak to your veterinarian about foods or supplements that can increase water intake.

MANAGING DISEASES AND CONDITIONS

Many illnesses and conditions can occur as your cat ages, and sometimes several at a time. If you see a change in your cat's behavior and habits, alert your veterinarian. Some common diseases affecting older cats are arthritis (DJD), cancer, chronic kidney disease, diabetes, dental disease, gastrointestinal disease, high blood pressure, thyroid disease, and cognitive dysfunction syndrome (affecting memory and awareness). General signs of disease, which may be hard to notice at first, can include:

- Drinking more or less, and/or producing larger amounts of urine
- Nausea, vomiting, or constipation
- Decreased appetite, weight loss, or muscle loss
- Poor fur/coat and decreased grooming
- Changes in behavior including hyperactivity (unusual activity), anxiety, tiredness, or not using the litter box; changes to sleeping patterns and resting locations
- Abnormal swelling or skin masses (unusual lumps or growths)
- Sores that do not heal; bleeding or discharge
- Difficulty breathing, urinating, or passing stools

Managing diseases can be stressful for you and your cat. Your veterinarian will discuss a treatment and management plan with you. Discuss your concerns, ideas, and ability to follow through with recommendations so you can create a plan to minimize pain and stress for your cat. Continuing checkups is the best way to monitor your cat's health, pain, and quality of life status.

QUALITY OF LIFE AND END OF LIFE DECISIONS

Even with regular veterinary care and treatment, many senior cats will reach a point at which their quality of life is severely affected by illness or pain. When this time comes for your cat, please discuss the best course of action with your veterinarian. Together you will work through a quality-of-life assessment that asks questions to help you determine the next steps.

Your veterinarian can support you and your cat during end of life care, provide hospice care, and teach you ways to help your cat be comfortable during the end stages of an illness. If euthanasia becomes necessary, your veterinarian will help you understand what to expect during and after the process. Preparing for the experience will not take away the pain and grief, but will help ensure a calmer, more informed process. Read more at catfriendly.com/end-of-life.