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FELINE health topics

for veterinarians

inside

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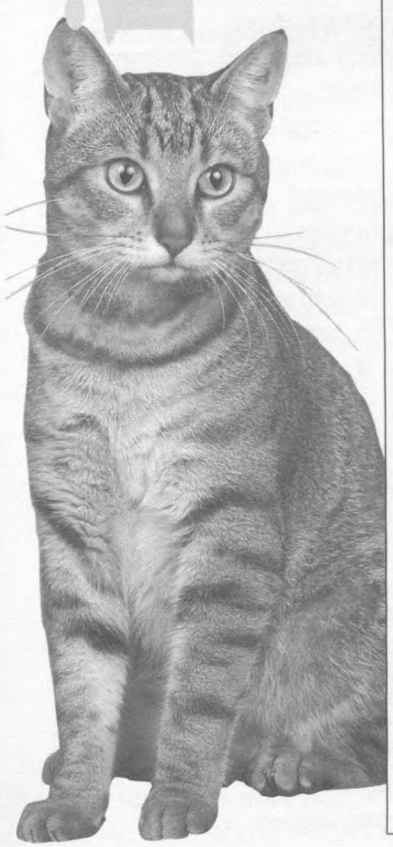

Feline Population Medicine: a Herd Health Approach — Part II

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Behavioral health/environmental enrichment

Apart from control of overcrowding, reduction of stress is probably the single biggest factor in promoting feline population health. Enrichment programs should recognize variations in individual temperament; what is relaxing and pleasant for one cat may be stressful for another. It is also important that cat socialization programs strike a balance between preventing disease transmission and allowing cats to experience socialization, petting, toys and time out of their cage. This can be accomplished through effective quarantine of cats with unknown health status, careful observation and hygiene on the part of cat handlers, and quick identification and isolation of sick cats. Enrichment questions include:

Individually housed cats:

- Do cats have a hiding space?
- Do cats have a bed or place to curl up other than the litter box?
- Are there toys in the cages?
- Are the feeding and litter areas separated as widely as possible?
- Is the litter box of adequate size to accommodate the cat?
- Do cats remain in the same cage throughout their stay at the facility?
- Moves from cage to cage can be stressful and can promote disease spread.

Group housed cats:

- Are cats selected based on compatible temperament?
- For cats not previously socialized to other cats, group housing can be significantly more stressful than single cat housing [7].
- Are cats gradually introduced and monitored after introduction?
- Are stable groups maintained, or is there constant flux in and out?
- Are there multiple perches and hiding spaces?
- Are there multiple litter boxes in several different parts of the group cat area?
- Guarding may occur if litter boxes are all clumped in one location.
- See density considerations discussed in crowd control section in *Feline Health Topics*, Vol. 18, No. 3.

All cats:

- What is the noise level like in the cat housing areas? Is there lots of noise from barking dogs?
- Are lights turned off at night?
- Is the temperature comfortable?

Facility health

The condition of the facility can have a significant effect on the health of the population. Take a walk through the facility and look for hazards or problems such as blocked vents, peeling paint, cracked floors that could harbor germs, etc. Facility questions include:

- Ventilation:
  -Source of fresh air flow?

-How many air exchanges per hour are there in the cat housing areas?
-Is the ventilation system routinely serviced and checked?
-Are air filters used?
  - What type? (The EPA has a good website on air cleaners at: www.epa.gov/iaq/pubs/residair.html.)
  - Are the filters changed on a regular basis?

- What is the general humidity level in the cat housing areas? Are cat areas constantly moist or do they dry out on at least a daily basis? (Low humidity is much preferable for disease reduction.)
- Are there any problems with rodent or insect infestation? Is there a pest control program in place? (Rats, flies and cockroaches can transmit some infectious agents from cage to cage.)

Specific disease considerations

As one works with a population, individual cases of illness will be treated as they arise. However, it is important not to get so caught up in putting out fires that you lose track of the big picture: the preventive measures that keep animals from getting sick in the first place. However, at some point in a herd health visit, the veterinarian should review with the manager any unusual or serious disease occurrences since the last visit. If any data regarding disease occurrence has been collected (see below), it should be analyzed and compared to previous data collection periods. If endemic disease such as URI or diarrhea seems more severe than usual or has an atypical presentation, samples should be taken for analysis. More information on collecting herd health diagnostics can be found online at: www.vetmed.ucdavis.edu/CCAH/Prog-ShelterMed/Diagnostics.htm.

Herd Treatment Plan

Policy and Protocol Development

Answers to the questions raised above will most likely suggest areas for improvement or change. Because multiple people with widely varying levels of medical knowledge and training will be responsible for implementing changes, development of written protocols to cover common situations is vital. In addition to general protocols for cleaning, vaccination, test administration and the like, specific protocols should be developed for the most common and serious diseases encountered in that population. The veterinarian may not be the one to actually write all this, but should at least encourage and consult on development of such documents. A protocol for an infectious disease in a shelter should include the following information (not all categories will apply to other feline populations):

- Basic disease description (i.e., it's a virus, it causes diarrhea, it can be fatal, etc.)
- General policy regarding admission, treatment, adoption or euthanasia.
- How recognized/diagnosed? (case definition)
- Who to notify?
- Where to house the animal? (general population, isolation, test and remove, etc.)
- How to clean contaminated cages, exam surfaces, etc.?
- Which animals will be treated? (if applicable)
- Treatment? (if standard treatment is initiated by other than veterinarian)
  -Who can initiate treatment?
  -Circumstances under which standard treatment initiated?
  -Side effects and/or contraindications to standard treatment?
- Monitoring
- Recovery/treatment failure
  -How defined?
  -Who can determine?
    - If other than veterinarian, standardized protocol for determining recovery/treatment failure.
- Adoption
  -Will animal be adoptable prior to recovery?
  -Adoption release required notifying adopter of medical condition?
  -Medications to go home with animal?
- Documentation

CORNELL FELINE HEALTH CENTER

The ultimate purpose of the Cornell Feline Health Center is to improve the health of cats everywhere by developing methods to prevent or cure feline diseases, and by providing continuing education to veterinarians and cat owners. All contributions are tax-deductible.

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For a truly exhaustive discussion of policy and protocol development, see website at: www.vetmed.ucdavis.edu/CCAH/Prog-ShelterMed/pdfs/ID_protocols_KFH.pdf.

Herd Follow-Up

Monitoring the Response to Intervention

Resources are limited, and if changes cost money or time and don't result in a measurable improvement, the approach may need rethinking. Measurable values, such as CBC, chemistry, pulse and heart rate, assist in following the course of illness in a patient. Success of treatment is assessed by following the trend of these values towards normal. Similarly, data collection and analysis helps determine the success of intervention in a herd.

Examples of performance measures revisited

Some measures of herd health or performance are fairly simple to collect. For a cattery, important numbers to track may include number of live births per litter and per queen, proportion of kittens surviving to weaning, and occurrence of heritable defects and infectious disease. For an animal shelter, numbers to track may include number of intakes, number of adoptions, number and cause of disease and death/euthanasia. Results of all routinely administered tests should be recorded, both positive and negative, to allow an estimate of the true prevalence of the disease in the tested population and watch for trends. In general, data is best collected and displayed with both a numerator and denominator: number of adoptions out of total intake is more informative than simply the number of adoptions in a shelter, for instance.

Animal risk factors

It is often valuable to distinguish risk factors for various outcomes, such as disease, heritable defects, small or large litter size, adoption or euthanasia, etc. Animal risk factors to consider may include age, breed (or genetic line, in a cattery), color, location in facility, vaccination status, reproductive status, source (in an animal shelter, e.g., stray, feral, owner surrendered), and presence of concurrent disease. Availability of such information is particularly helpful in tracking an outbreak.

Disease occurrence

There are two common methods used specifically to describe disease levels in a population: incidence and prevalence. Each measure has certain strengths and weaknesses.

Prevalence equals *the number of cases of disease present in a population at risk at a given point in time*, and represents a "snapshot" of disease.

> **Example:** 20 cases of URI out of a total of 100 cats in the shelter that day = 20/100 = .2 = 20 percent prevalence.

Prevalence is fairly simple to calculate: count total sick and total population daily, weekly, etc., and plot results over time. Prevalence goes up with an increase in either the number of *new cases* of disease *or* increased *duration* of disease. For instance, if a shelter becomes able to treat cats with URI rather than euthanizing them immediately, prevalence will increase because the cats will be present in the population longer, even if the number of new cases of URI does not change. On the other hand, if a more effective treatment for URI is found such that cats recover more rapidly, prevalence will decrease even if the number of new cases remains the same. *Because prevalence is influenced by duration, it should not be used to measure a disease for which animals are frequently euthanized, sent to foster care or otherwise removed from the population before recovery.* In such cases, "duration" is artificially controlled by facility policy, and resulting prevalence levels will be misleading.

Incidence equals *the number of new cases of a disease occurring in a population at risk over a period of time.*

> **Example:** Shelter that cared for 100 cats for 10 days apiece in a given month (100 x 10 = 1000 cat days at risk). 20 cats developed URI out of 1000 cat days at risk that month = 20/1000 = .02 cases of URI per cat day at risk.

Incidence is independent of disease duration, and is therefore a useful measure in cases where prevalence is unreliable as discussed above. A minor disadvantage is that it requires calculation of population time at risk. This is defined as the total time contributed by all disease-free individuals in the facility during the period under consideration. Population time at risk is obtained by taking a daily head count of "healthy cats" (cats without the disease in question) and summing that for the time period under consideration. If that is impractical, population time at risk can be estimated by taking a periodic count (at the beginning and end of the time period or at regular intervals during the time period) and using the average. This is fairly accurate if there is not much fluctuation in the daily population. In a facility where cages for healthy cats are almost always full, the population time at risk can also be estimated by simply multiplying the number of cage spaces for healthy cats by the number of days in the time period under consideration.

Duration of disease

Neither incidence nor prevalence indicates duration (or severity) of disease. Duration should be considered when assessing the benefits of some interventions. For instance, some vaccines claim to decrease duration and severity of disease, although a greater number of mild cases of disease/vaccine reaction may be seen. If one considered only incidence, such a vaccine would seem harmful, but considering duration will give a more realistic assessment of possible benefit. Note that duration cannot

be calculated for animals that are euthanized, adopted or otherwise lost to follow-up prior to recovery.

Statistical analysis

Tracking data as described above is useful for determining trends and suggesting areas for further investigation or action. However, it does not demonstrate the cause of the observed changes. A certain amount of variation between animals or within a population over time is expected due to chance alone. Additional variation is likely to be the result of more than one factor. A change in season, an increase in the average age of the population at risk, and a change in vaccination protocol could all contribute at once to a decrease in URI levels, for example. Establishing the significance of observed changes requires statistical analysis, which is well beyond the scope of this presentation. A full chapter is devoted to use of statistical testing in herd health in the book "Herd Health: Food Animal Production Medicine"[8]; much of this information is equally applicable to the feline herd.

The BIG picture:
Feline "meta-population" health

Most feline populations are not closed systems. The health of the population is influenced by the health of the surrounding community with which it interacts, and in turn influences that community. As more and more people get their cats from concentrated sources such as shelters and catteries, the health of these populations exerts an ever greater influence on the health of cats in general. If an animal shelter draws from a community in which overpopulation is rampant, few cats are vaccinated or identified, and disease is common, even a well run shelter will most likely be a crowded, unhealthy place. Concentrating a vulnerable population in the shelter furthers the opportunity for spread of disease, and cats are likely to leave the shelter and re-enter the community (and veterinary practices!) carrying contagious, chronic and/or zoonotic conditions. On the other hand, reducing feline overpopulation, increasing owner retention and improving the condition of the greater feline population relieves pressure on the shelter, which in turn leads to healthier cats re-entering the community. What goes on outside the shelter is as important as what goes on inside the shelter in determining the health of the feline community.

Outbreak tracking form

Tracking outbreaks can be done easily by collecting the following data:

- **Animal ID**
- **Shelter Entry Date**
- **Date of Vaccine**
- **Date of Diagnosis**
- **Cage/Run # at Time of Diagnosis**
- **Animal Description**
  (breed, sex, age, spay/neuter)
- **Symptoms**
  - (D) Diarrhea
  - (V) Vomit
  - (B) Blood in D/V
  - (L) Lethargy
  - (N) No abnormal signs
- **Test Results**
  (necropsy, SNAP test, other)

NOTE: Feline Population Medicine: a Herd Health Approach - Part I appeared in Feline Health Topics, Vol. 18, No. 3.

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Research Briefs

A snapshot of recent feline research from the world's scientific literature

Ibrahim, W.H.; Bailey, N.; Sunvold, G.D.; Bruckner, G.G., ***"Effects of carnitine and taurine on fatty acid metabolism and lipid accumulation in the liver of cats during weight gain and weight loss,"*** *Amer. J. Vet. Res. 2003, 64:1265-1277.*

The objective of this study was to determine the effects of carnitine (Ca) or taurine (Ta) supplementation on prevention of lipid accumulation in the liver of cats. Twenty four adult cats were fed a weight-gaining diet sufficient in n-6 polyunsaturated fatty acids (PUFAs), low in long-chain n-3 PUFAs (n-3 LPUFA), and containing corn gluten for 20 weeks. Cats gained at least 30% in body weight and were assigned to 4 weight-reduction diets (6 cats/diet) for 7 to 10 weeks (control diet, control plus Ca, control plus Ta, and control plus Ca and Ta). Hepatic lipids accumulated significantly during weight gain and weight loss but were not altered by Ca or Ta after weight loss. Carnitine significantly increased n-3 and n-6 LPUFAs in hepatic triglycerides, decreased incorporation of C-13 palmitate into very low-density lipoprotein and hepatic triglycerides, and increased plasma ketone bodies. Carnitine also significantly increased weight loss but without altering the fat to lean body mass ratio. Taurine did not significantly affect any variables. Diets low in n-3 LPUFAs predisposed cats to hepatic lipidosis during weight gain, which was further exacerbated during weight loss. Mitochondrial numbers decreased during weight gain and weight loss but were not affected by treatment. Carnitine improved fatty acid oxidation and glucose utilization during weight loss without correcting hepatic lipidosis. The authors concluded that the primary mechanism leading to hepatic lipidosis in cats appears to be decreased fatty acid oxidation. Carnitine may improve fatty acid oxidation but will not ameliorate hepatic lipidosis in cats fed a diet low in n-3 fatty acids.

Kunkle, G.A.; McCall, C.A.; Stedman, K.E.; Pilny, A.; Nicklin, C.; Logas, D.B., ***"Pilot study to assess the effects of early flea exposure on the development of flea hypersensitivity in cats,"*** *J. Feline Med. Surg. 2003, 5:287-294.*

This pilot study was to determine if early oral flea exposure reduces the incidence of flea allergy dermatitis (FAD) in cats. Eighteen kittens, assigned to three groups, received no flea exposure, oral flea exposure or flea infestation for 12 weeks. Then all the kittens were exposed continually to fleas for 31 weeks. Sensitization was monitored using intradermal testing (IDT), in-vitro measurement of anti-flea saliva immunoglobulin E (IgE) and development of FAD. There was no statistically significant difference between groups in IDT reactions, in-vitro data or clinical scores. The development of FAD was not associated with the presence of anti-flea saliva IgE. However, the development of a delayed reaction to flea bite was associated with symptoms after flea exposure. Although not statistically significant, the FAD scores in the oral group were lower than in the controls. Further studies are required to determine the role of oral flea exposure in the development of FAD in cats.

Lamb, C.R.; Richbell, S.; Mantis, P., ***"Radiographic signs in cats with nasal disease,"*** *J. Feline Med. Surg. 2003, 5:227-235.*

Radiographic signs in 64 cats that had radiography as part of the diagnostic work-up for suspected nasal disease were reviewed in a blinded fashion. Final diagnoses in these cats were rhinitis in 27, primary nasal neoplasia in 21 and non-nasal disease in 16. The signs with highest predictive value for nasal neoplasia were displacement of midline structures (73%), unilateral generalized soft tissue opacity (70%), unilateral generalized loss of turbinate detail (69%) and evidence of bone invasion (64%). The only radiographic finding that occurred more frequently in cats with rhinitis was a nasal cavity within normal limits, and the predictive value of this sign was only 38%. Radiographic signs in cats with nasal neoplasia are similar to those reported in dogs, whereas the radiographic signs in cats with rhinitis are variable and nonspecific, and may be absent.

Macdonald, E.S.; Norris, C.R.; Berghaus, R.B.; Griffey, S.M., ***"Clinicopathologic and radiographic features and etiologic agents in cats with histologically confirmed infectious pneumonia: 39 cases (1991-2000),"*** *J. Amer. Vet. Med. Assn. 2003, 223:1142-1150.*

The authors' objective in this study was to determine clinicopathologic and radiographic features and etiologic agents in cats that died as a result of infectious pneumonia. In this retrospective study, the medical records of 39 cats in which infectious pneumonia was confirmed by histologic examination of necropsy specimens were reviewed. Signalment, clinical signs, and results of a CBC, viral serologic tests, and thoracic radiography were evaluated. Infectious agents were classified as bacterial, viral, fungal, protozoal, or parasitic. Histologic features (severity, duration, anatomic location, and distribution) were analyzed. Clinical signs referable to the respiratory tract were not detected in 14 of 39 (36%) cats,

and results of a CBC (4/18 cats) and radiography (3/13) were unremarkable. Sixteen of 39 (41%) cats lacked clinical signs of systemic illness. Etiologic agents identified included bacteria (n = 21), viruses (11), fungi (6), protozoa (2), and parasites (1). Cats with clinical signs related to the respiratory tract (19/24 [79%] cats) were more likely to have severe histologic changes than cats without signs related to the respiratory system (6/14). Twenty-nine of 38 (76%) cats had histologic evidence of systemic disease, whereas the remaining cats had lesions limited to the respiratory tract. The authors conclude that infectious pneumonia is uncommon in cats. Cats with infectious pneumonia may lack clinical signs and have unremarkable results for a CBC and thoracic radiography, yet frequently have systemic infections. Clinicians should maintain an index of suspicion for pneumonia and evaluate the respiratory tract when infection is detected in other organ systems.

Robertson, S.A.; Taylor, P.M.; Lascelles, B.D.X.; Dixon, M.J., ***"Changes in thermal threshold response in eight cats after administration of buprenorphine, butorphanol and morphine,"*** *Vet. Rec. 2003, 153:462-465.*

Thermal thresholds were measured in eight cats after the intramuscular administration of morphine (0.2 mg/kg), buprenorphine (0.01 mg/kg) or butorphanol (0.2 mg/kg), doses commonly used in clinical practice; 0.9 per cent saline (0.3 ml) was injected as a control. Groups of six cats were used and each cat participated in at least two treatments, according to a randomized design. The investigator was blinded to the treatments. The thermal thresholds were measured with a testing device developed specifically for cats, and measurements were made before and five, 30, 45 and 60 minutes and two, four, six, 12 and 24 hours after the injections. There was no significant change in thermal threshold after the injection of saline. With butorphanol, the threshold was increased only at five minutes after the injection and was decreased two hours after the injection; with morphine it was increased from between four and six hours after the injection, and with buprenorphine it was increased from between four and 12 hours after the injection.

Salvadori, C.; Cantile, C.; DeAmbrogi, G.; Arispici, M., ***"Degenerative myelopathy associated with cobalimin deficiency in a cat,"*** *J. Vet. Med. A Physiol. Pathol. Cl. 2003, 50:292-296.*

A severe myelopathy was observed in a 9-year-old neutered male cat with a clinical history of chronic pancreatitis associated with deficiency of serum cobalamin and folate concentrations, and progressive spinal ataxia. The spinal cord lesions mainly involved the dorsal columns of the caudal cervical and cervicothoracic segments, and were characterized by diffuse vacuolated myelin sheaths and axonal degeneration, marked gliosis, fibrosis and presence of gitter cells. The pancreas showed severe atrophy of the exocrine tissue, periductular fibrosis and infiltration of inflammatory cells, consistent with chronic interstitial pancreatitis. This condition can be accountable for cobalamin deficiency, as the pancreas is the only source of intrinsic factor in cats. The spinal cord lesions in the cat of this report resembled the subacute combined degeneration of the spinal cord described in human beings with cobalamin deficiency and hence a similar pathogenetic mechanism is hypothesized.

SchorrEvans, E.M.; Poland, A.; Johnson, W.E.; Pedersen, N.C., ***"An epizootic of highly virulent feline calicivirus disease in a hospital setting in New England,"*** *J. Feline Med. Surg. 2003, 5:217-226.*

This article reports an outbreak of 24 cases of an unusually virulent feline calicivirus (FCV) infection in a small animal hospital. The circumstances and disease signs were very similar to those recently described in an outbreak of FCV hemorrhagic disease in Northern California (Vet. Microbiol. 73 (2000) 281). The virus entered the facility through shelter cats showing upper respiratory signs. Affected cats manifested high fever, anorexia, labored respirations, oral ulceration, facial and limb edema, icterus, and pancreatitis. The infection spread rapidly among the patients by contaminated animal caretakers and hospital equipment. One case of fomite transmission from an employee to a housecat was documented. Prior vaccination, even with multiple doses of FCV-F9-based live calicivirus vaccine, was not protective. Affected cats often required extensive supportive care for 7-10 days, and the overall mortality from death and euthanasia was 32%. The strain of FCV responsible for this outbreak was genetically and serologically distinct from the FCV strain responsible for a similar epizootic and the FCV-179 strain contained in most vaccines. Outbreaks of this type are being reported with increasing frequency, and are often associated with the practice of treating sick shelter cats in private practices. Similar to the present epizootic, outbreaks of FCV hemorrhagic disease have been self-limiting, but require prompt application of strict quarantine, isolation, personnel sanitation, and disinfection procedures.

Vascellari, M.; Melchiotti, E.; Bozza, M.A.; Mutinelli, F., ***"Fibrosarcomas at presumed sites of injection in dogs: Characteristics and comparison with non-vaccination site fibrosarcomas and feline post-vaccinal fibrosarcomas,"*** *J. Vet. Med. A Physiol. Pathol. Cl. 2003, 50:286-291.*

Fifteen fibrosarcomas surgically excised from presumed sites of injection in dogs, and 10 canine fibrosarcomas excised from sites not used for injection, were histologically and immuno-histochemically compared with 20 feline post-vaccinal fibrosarcomas. Canine fibrosarcomas from presumed injection sites were of grade 1 (3), of grade 2 (4) and grade 3 (8). Two fibrosarcomas from non-injection sites were of grade 1, four of grade 2 and four of grade 3. Feline samples were classified as grade 1 (2), grade 2 (4) and grade 3 (14). All fibrosarcomas from presumed injection sites of both species showed lymphocytic inflammatory infiltration located at the tumor periphery, while two canine fibrosarcomas from non-injection sites showed perivascular inflammatory infiltration within the neoplasm. All samples were immunohistochemically examined for vimentin, smooth muscle actin, muscle specific actin and desmin expression. All tumors were positive for vimentin. Ten canine fibrosarcomas from presumed injection sites and all feline samples contained cells consistent with a myofibroblastic immunophenotype. Aluminium deposits were detected in eight canine fibrosarcomas from presumed injection sites and 11 feline post-vaccinal fibrosarcomas by the aurintricarboxylic acid method. The present study identifies distinct similarities between canine fibrosarcomas from presumed injection sites and feline post-vaccinal fibrosarcomas, suggesting the possibility of the development of post-injection sarcomas not only in cats, but also in dogs.

Tynes, V.V.; Hart, B.L.; Pryor, P.A.; Bain, M.J.; Messam, L.L.M., ***"Evaluation of the role of lower urinary tract disease in cats with urine-marking behavior,"*** *J. Amer. Vet. Med. Assn. 2003, 223:457-461.*

The authors sought to determine whether findings of urinalyses could be used to reliably distinguish gonadectomized cats with urine-marking behavior from those with no problem urination. In this case control study, urine was collected by cystocentesis from 58 gonadectomized cats (47 males and 11 females) with urine-marking behavior (i.e., marking of vertical surfaces) and 39 (26 males and 13 females) without problem urination or urinary tract-associated conditions. Findings of urinalyses of cats with urine-marking behavior were analyzed statistically for sex-related differences and differences between cats that marked vertical surfaces only and those that marked both vertical and horizontal surfaces; findings of urinalyses of control cats were compared between sexes. Subsequently, results of urinalyses of cats with urine-marking behavior were compared with those of control cats. With regard to variables measured via urinalysis, there were no differences between male and female cats within either group. Among cats with urine-marking behavior, there were no differences between those that marked vertically and horizontally and those that only marked vertically. Analyses of data from all cats with urine-marking behavior and control cats revealed no differences that could be associated with urine marking. These data suggest that urine-marking behavior by gonadectomized cats is an aspect of normal behavior. Clinicians are advised to focus on behavioral history of house-soiling cats to differentiate between urine-marking behavior and inappropriate urination; for the latter, urinalysis is appropriate to rule out lower urinary tract disorders.

Smith, D.D.; Frenkel, J.K., ***"Immunological comparison of 124 isolates of Toxoplasma gondii,"*** *Parasitol. Res. 2003, 91:332-337.*

The investigators tested 124 isolates of *Toxoplasma gondii*, as determined morphologically and by their ability to elicit antibodies in the dye test with the RH strain of *Toxoplasma* in mice. The isolates were compared for their capacity to immunize CF-1 mice against isolate T-1, and T-1 immune mice for their capacity to resist each of the 123 other isolates. Of the 125 isolates, 52 had been isolated in the continental USA, 33 in Central America, 15 in Europe, nine in Hawaii, five in Japan, two in Taiwan, five in Australia, one in Indonesia, one in Tunisia, and one was of unknown origin. Complete cross-immunity was found. This suggests that only one immunotype of *Toxoplasma* is prevalent in the United States, and perhaps all over the earth. Vaccines are likely to immunize against most or all *Toxoplasma* isolates.

Upcoming Meetings

Feline Cardiology

February 8-10, 2004

Westin Resort and Spa

The American Association of Feline Practitioners is hosting its 2004 Winter Conference in beautiful Whistler, British Columbia. Join Drs. Clarke Atkins and Matt Miller for an exciting seminar on feline cardiology.

February 8, 2004

- Pathophysiology and Therapy of Cardiac Disease - *Atkins*
- Thoracic Radiography - *Miller*
- Echocardiography & Electrocardiography - *Miller*

February 9, 2004

- Cardiomyopathy - *Atkins/ Miller*
- Case Studies - Atkins/Miller

February 10, 2004

- Heartworm Disease - Atkins
- Systemic Hypertension - Miller

For more information or to register online, go to the AAFP website at:

www.aafponline.org

Nonsurgical Contraceptive Methods for Pet Population Control

June 24-27, 2004

Beaver Run Resort

The Alliance for Contraception in Cats and Dogs (ACCD) is hosting its second annual international symposium in Breckenridge, Colorado. Scientific sessions will address state of the art information on contraceptive drugs and vaccines, as well as regulation, funding and marketing of contraceptive products. Keynote speakers will address the dynamics and demographics of pet population control. Experts in contraception in companion animals will share their expertise, experience and results. Poster and platform presentations of original research are invited. Each session will be summarized by a senior scientist in the field. Abstracts of presentations and summary sessions will be provided to participants and be made available to those who are unable to attend.

For more information visit the ACCD website at:

www.vetmed.vt.edu/ACCD

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