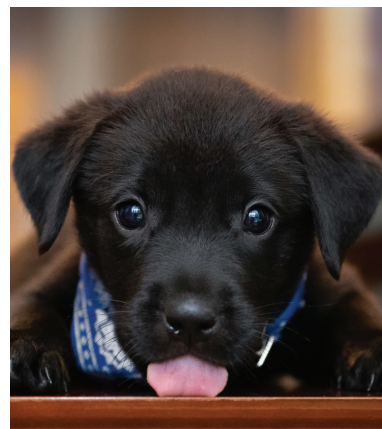


Time to rethink the early spay?

Two doctors share their perspectives on the pros and cons of early sterilization.

page M1



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Dogs and cats should be tested for heartworm prior to use. In a small percentage of treated dogs, digestive and neurologic side effects may occur. Safety in heartworm-positive cats has not been established. Safety in breeding, pregnant, and lactating queens and breeding toms has not been established. In cats, safety studies up to 10 times the label dose did not detect any adverse drug reactions.

See full product label on page 34.

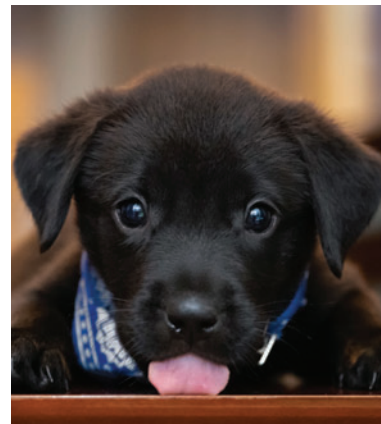
1. Data on file. - CAH

2. Based on manufacturer published veterinary pricing; 12/1/2018

Time to rethink the early spay?

Two doctors share their perspectives on the pros and cons of early sterilization.

page M1



Veterinarians are likely to be neurotic, study finds

Merck well-being research explores personality traits in veterinary medicine.

By Kristi Reimer Fender, News Channel Director

Elizabeth Strand, PhD, LCSW, director of veterinary social work and associate professor at the University of Tennessee, spoke at the Western Veterinary Convention (WVC) in Las Vegas in February about the “Big Five” personality traits and their prominence in the veterinary profession, as shown in the Merck Animal Health Veterinary Wellbeing Study. This was the first time these particular results from the study had been revealed, Dr. Strand said.

The Big Five is an assessment tool used by clinical psychologists and researchers for exploring personality style, Dr. Strand says. “Personality” in a psychological context refers to individual differences in patterns of thinking, feeling and behaving, and Big Five research has shown these traits to be stable over long periods of time. Environmental factors don’t seem to affect them much.

The Big Five personality traits—all of which have both positive and negative aspects, according to Dr. Strand—are:

» **Openness to experience:** the ability to think creatively and to be innovative; a tendency to “wear your heart on your sleeve.”

See page 16>



2019. Hospital of the Year:

Small but mighty—this Miami practice packs award-winning design in a tiny strip mall facility.

» Read about the under-8,000-square foot winner on page 18

» Find a complete list of dvm360 Hospital Design Competition winners on page 20



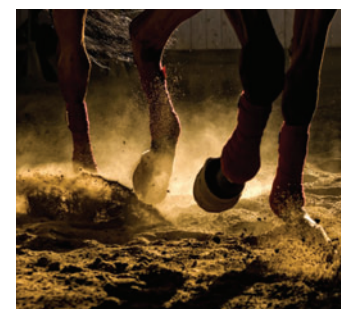
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- ✓ Over 30 years of trusted prevention



¹ Freedom of Information: NADA140-971 (January 15, 1993).

² Data on file at Boehringer Ingelheim.

³ Data on file at Boehringer Ingelheim.



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We welcome your guests who don't work in the veterinary industry. Guest badges will give your friends and family access to the exhibit hall for the welcome party. Veterinarians, technicians, practice managers, and team members must register and pay registration fees. (A \$5 processing fee will be charged for guest badges added on site.)

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FDA issues update on possible tie between heart disease and grain-free diet

Investigation is ongoing, and the agency hasn't changed its recommendation to pet owners whose pets are not ill.

The FDA has issued an update to its investigation into reports of dogs developing dilated cardiomyopathy (DCM) while eating certain pet foods, according to a release from the agency. Since first announcing it would investigate the issue in July 2018, the agency has analyzed reports it has received from Jan. 1, 2014, through Nov. 30, 2018. This update doesn't include reports received in December 2018 and January 2019 because of a loss of appropriations during the government shutdown in that time period, and it was unable to continue its investigation at that time, the release notes.

The FDA has taken a multifaceted

ian directly for advice about their pet's diet, the release notes.

The investigation has included the following steps to date:

- > Analysis of reported cases to search for correlations between diagnosed DCM cases and what the dogs did or did not eat.

- > Collaboration with the Veterinary Laboratory Investigation and Response Network to test blood, serum and tissue samples from affected dogs.

- > Collaboration with Chesapeake Veterinary Cardiology Associates to collect case summaries as well as blood, serum and tissue samples of dogs diagnosed with DCM to see if there are unique factors that separate diet-associated DCM from genetic-associated cases. The agency is also reviewing echocardiograms of dogs that are not showing clinical signs of DCM to evaluate the significance of early changes in heart function.

- > Consultation with veterinary nutritionists to identify factors such as nutrient bioavailability and ingredient digestibility that may contribute to the development of heart disease.

- > Examination of ingredient sourcing, processing and product formulation with pet food manufacturers.

Between Jan. 1, 2014, and Nov. 30, 2018, the FDA received 300 reports of DCM, the release notes—294 were canine patients and six were feline. Of those cases, 276 of them (273 canine and three feline) were received after the notification about the FDA's investigation was made public in July 2018. Some of the reports involved more than one animal affected from the same household, the release says.

According to the agency's documentation there are some dog breeds that are known to have a genetic predisposition to DCM, typically large and giant breeds and cocker spaniels. But the reports the FDA has

received span a wide range of breeds, many that don't have a known genetic predisposition. While it has received reports of cats with DCM, the low number of reports—only 10 since January 2014—has led the FDA to focus on cases in dogs only.

In the cases where the dogs ate only a single primary diet and did not eat multiple foods, excluding treats, 90 percent reported feeding a grain-free food, the release states. About 10 percent of cases reported feeding food containing grains, some of which were diets considered to be vegan or vegetarian. A large proportion of the reported diets in the DCM cases, both in the grain-free and grain-containing cases, contained peas and/or lentils in various forms (whole, flour, protein) as a main ingredient, i.e. listed within the first 10 ingredients and before vitamins and minerals. These diets were commercially available kibble, canned and raw foods, as well as home-cooked diets, the release says.

The agency notes that it appreciates the assistance from pet owners and veterinarians who have submitted case reports, but that due to a high volume of reports, it can't respond to each report individually, though each report is valuable and becomes part of the FDA's investigation. Veterinary professionals and pet owners are encouraged to report both symptomatic and asymptomatic cases of dogs suspected to have DCM connected to diet using the electronic Safety Reporting Portal or calling their state's FDA Consumer Complaint Coordinators.

For more details, visit the FDA's DCM Investigation site online. The agency states that it will continue to provide updates on the progress of this investigation and will alert the public about significant developments, the release says.



approach to its investigation, collaborating with other groups in the animal health sector to collect and evaluate information about the DCM cases and the diets the affected pets were eating prior to becoming ill. As of now, it has not identified specific recommendations about changes to the diets of dogs that are not displaying clinical signs of DCM, but encourages pet owners to consult their veterinar-



Class-action lawsuits filed against Hill's in wake of recall

Pet owners point to excess vitamin D in animals' deaths. *By Maureen McKinney*

At least two law firms have filed class action suits on behalf of individuals who claim they lost their pets as a result of the Hill's recall.

San Francisco law firm Schubert Jonckheer & Kolbe LLP announced in mid-February that it had filed a class action lawsuit against Hill's Pet Nutrition for selling dog food containing excessive and dangerous amounts of vitamin D.

It's unclear how many dogs have died as a result of eating the recalled Hill's products, but a glance through social media indicates that hundreds of owners believe their pets have been affected.

Filed on February 12 in the U.S. District Court for the Northern District of California, the lawsuit seeks monetary damages and injunctive relief to prevent Hill's from selling pet food with potentially toxic levels of vitamin D.

To say affected owners are devastated and angry is an understatement—*dvm360* spoke with several grief-stricken owners who believe their dogs have died after eating the recalled foods.

The pet owners' stories

The stories pet owners are sharing are eerily similar. When Los Angeles pet

owner Kimberly Mull's 13-year-old pug-bichon frise mix Precious was diagnosed with diabetes in November, her veterinarian prescribed Hill's Prescription Diet w/d. Mull started noticing signs of serious illness in January, a week before the recall announcement. In a Facebook post she said of Precious: "Her little body couldn't handle the kidney dysfunction and she took a rapid turn for the worse and died."

Mull describes Hill's response as "very cold, very stock" when she contacted the company. "They were less than compassionate or caring that they killed my fur baby, my daughter's best friend," she told *dvm360*.

A Pennsylvania pet owner, who wishes to remain anonymous because she's in discussions with the Chicago law firm Cafferty Clobes Meriwether & Sprengel to become the fourth plaintiff in its suit against the company, lost her dog in much the same way as Mull, but her experience with Hill's was more compassionate. "The gentleman was very nice on the phone," she told *dvm360*. "He kept apologizing for the incident and offered his condolences." Her dog began eating one of the Pre-

scription Diet w/d recalled products in early December after being diagnosed with sudden-onset diabetes on November 30 and died about four weeks later.

Christina Marie Sawyer also lost her 13-year-old dog Taco a week before the recall announcement. "Taco's battle started at Thanksgiving when she was diagnosed with acute pancreatitis," Sawyer told *dvm360*. "We put her on Science Diet Youthful Vitality Chicken & Vegetable Stew, which she loved."

Taco stopped eating and started losing weight rapidly after about a week on the diet. He died on January 24. "For a company as large as Hill's not to recognize a potential threat is unfathomable," she says.

What clients should know

Although Hill's insists that the recall extends only to varieties of canned dog foods, many pet owners are calling for the company to look more carefully at its dry foods after they claim their pets exhibited signs of vitamin D toxicity while on dry Hill's diets.

Affected pet owners can reach out to Hill's via social media or phone at 800-445-5777.



All the recall updates

Hill's expanded its recall in late March to include additional canned dog food products. Find this news and other recall coverage at dvm360.com/recalls.

Get the skinny on transdermal moxidectin:

Leveraging the full potential of moxidectin

Moxidectin is a potent, broad-spectrum parasiticide of the macrocyclic lactone drug class, the only class currently utilized for the prevention of dirofilariasis. Older drugs in this class include ivermectin and milbemycin oxime.

With biological activity that provides significant immediate and residual antiparasitic activity,¹ moxidectin is a potent macrocyclic lactone (ML) preventive against *Dirofilaria immitis*.²

Three routes of administration have been approved by the FDA for moxidectin use in dogs:

- oral tablet*
- injection
- transdermal

Transdermal moxidectin allows the safe delivery of 2.5 mg/kg which is then broadly distributed into tissues and fat.

This allows for both backward and forward protection against *D. immitis* and the treatment and control of internal parasites with monthly application.

Repeated monthly, transdermal administration results in high and sustained levels.³⁻⁴

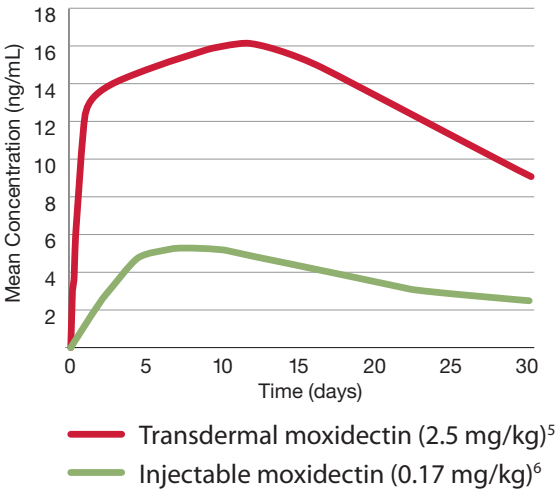
Backward protection:

Kills heartworm larvae that have established infection in the last 30 days

Forward protection:

Kills incoming heartworm larvae for the next 30 days, preventing establishment of new infection

Transdermal and Injectable Moxidectin Blood Levels[†]
(30 days after administration)



[†]The clinical significance of blood levels has not been established.

The high dose of transdermally applied moxidectin (2.5 mg/kg) was shown to be 100% efficacious for the prevention of heartworm disease when evaluated against strains considered difficult to kill (JYD-34 and MP-3).^{5,7}

Coraxis™ (moxidectin) is a new transdermal product that is FDA approved for the prevention of heartworm disease as well as the treatment and control of roundworms, hookworms and whipworms. Its transdermal formulation achieves the highest level of moxidectin available.⁵

With coverage of the most common internal parasites of concern in canine health, Coraxis™ fits perfectly into a comprehensive nematode plan without the need or cost of additional nematode control products such as pyrantel pamoate or fenbendazole.

Key Takeaways

Transdermal moxidectin (2.5 mg/kg):

- Provides 30 days of active, forward heartworm prevention by continuously killing incoming larvae
- Delivers monthly treatment *and* control of roundworms, hookworms and whipworms
 - Including immature stages of hookworms and roundworms
- Minimizes limitations associated with other routes of administration
 - Needle-free – ideal for even reactive animals
 - Not feed-dependent – no missed doses due to difficulty of giving pills
 - Easily given at home – may aid in compliance

Transdermal delivery is ideal for the delivery of high amounts of lipophilic drugs like moxidectin.

Comparison of Moxidectin Delivery Routes

Administration	Brand	mg/kg moxidectin	Dosing	Indications
Oral Tablet	ProHeart® Tablets* (moxidectin)	0.003	Monthly by pet owner	• Prevents heartworm
Injection	ProHeart® 6 (moxidectin)	0.17	Biannually by veterinarian	• Prevents heartworm • Treats hookworms present at the time of injection
Transdermal	Coraxis™ (moxidectin)	2.5	Monthly by pet owner	• Prevents heartworm • Treats and controls hookworms, roundworms and whipworms

*Not currently marketed in the U.S.

Based on label-to-label comparison.

¹Prichard R, Menez C, Lespine A. (2012). Moxidectin and the avermectins: Consanguinity but not identity. *International Journal for Parasitology: Drugs and Drug Resistance*. 2:134-153.

²Gloyd K. (2018). Heartworm prevention and treatment: Clinical recommendations in the age of resistance. *Clinician's Forum*. July:1-8.

³Freedom of Information Summary, NADA: 141-417.

⁴Bowman DD, Grazette AR, Basel C, Wang Y, Hostetler JA. (2016). Protection of dogs against canine heartworm infection 28 days after four monthly treatments with Advantage Multi® for dogs. *Parasites & Vectors*. 9:12.

⁵Data on file, Bayer, Shawnee Mission, KS.

⁶FDA Veterinary Medicine Advisory Committee (VMAC) 2005. VMAC Meeting on ProHeart® 6. January 31, 2005.

⁷Blagburn BL, Arther RG, Dillon AR, et al. (2016). *Parasites & Vectors*. 9:191.

Coraxis™ is not approved for the treatment of adult *D. immitis*.

CAUTION: Federal (U.S.A.) law restricts Coraxis™ to use by or on the order of a licensed veterinarian. WARNING: **DO NOT ADMINISTER THIS PRODUCT ORALLY.** For the first 30 minutes after application ensure that dogs cannot lick the product from application sites on themselves or other treated animals. Children should not come in contact with the application site for two (2) hours after application. (See Contraindications, Warnings, Human Warnings and Adverse Reactions for more information.) CONTRAINDICATIONS: Do not use this product on cats.

One month of active heartworm prevention.

Zero days off.

Coraxis™ (moxidectin) Topical Solution for Dogs is transdermal moxidectin that achieves and sustains high serum levels and keeps killing susceptible stages of heartworms for 30 days. Administered monthly, Coraxis™ also treats and controls hookworms, roundworms and whipworms to work hard for your clinic and your patients.

Add the power of 30-day heartworm protection to your portfolio.
Visit coraxis.com or contact your Bayer sales representative.

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(moxidectin)

1 dose.

6 parasites.

30 days.

That's Coraxis.™

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AAHA releases new dental care guidelines

With a focus on the fundamental role of client education and effective preventive care, AAHA hopes to help veterinary professionals keep their patients healthy. *By Maureen McKinney*



Many pet owners are unaware that by age 3 most dogs and cats suffer from periodontal disease—and the pain and inflammation that go along with it. In fact, many veterinary professionals don’t appreciate the extent of the damage that periodontal disease can cause to the health and quality of life of their patients.

Enter the 2019 AAHA Dental Care Guidelines for Dogs and Cats, the latest oral healthcare recommendations from the American Animal Hospital Association. Created after a yearlong collaboration among veterinary dentists, anesthesiologists, veterinary dental technicians and practice managers, the guidelines are intended to help veterinary professionals identify and treat oral pathology in their patients and to build on their current client education efforts regarding dental disease prevention, according to an AAHA release.

The evidence-based, peer-reviewed guidelines, last released in 2013, include an illustrated protocol describing the essential steps in a comprehensive

oral health assessment, dental cleaning and periodontal therapy as well as recommendations for general anesthesia, pain management, and facilities and equipment needed to provide safe and effective dental care.

“The 2019 guidelines are not an update of the 2013 version,” Jan Bellows, DVM, DACVD, DABVP (Canine/Feline), owner of All Pets Dental in Weston, Florida, and guidelines task force member, told *dvm360*. “It is a complete rewrite with emphasis on making it immediately useful for the general practitioner.”

Several areas of new information are included for exactly that purpose:

- > An expanded and illustrated discussion of common veterinary dental procedures
- > Criteria for periodontal disease staging
- > How and why to address pain and stress in dental patients
- > Client communication tips for explaining the importance and rationale behind specific dental

and oral procedures, as well as the importance of home care.

“The guidelines also help the veterinary healthcare team effectively address the fear of anesthesia—the most commonly cited reason pet owners forego proper dental procedures—and convey the risks associated with non-anesthetic dentistry to clients,” AAHA states in the release.

“AAHA continues to support the use of general anesthesia in dental procedures to promote appropriate diagnostic capabilities and decrease patient stress, injury and risk of aspiration,” says AAHA CEO Michael Cavanaugh, DVM, DABVP, in the release. “Because home care is crucial in the support of a healthy, pain-free mouth, client communication and education remain central to these guidelines.”

Creation of the 2019 AAHA Dental Care Guidelines for Dogs and Cats was supported by educational grants from Boehringer Ingelheim Animal Health USA, Hill’s Pet Nutrition and Midmark.



CORAXIS
(moxidectin)
Topical Solution for Dogs

BRIEF SUMMARY:
Before using Coraxis™, please consult the product insert, a summary of which follows:

WARNING

- **DO NOT ADMINISTER THIS PRODUCT ORALLY**
- **For the first 30 minutes after application ensure that dogs cannot lick the product from application sites on themselves or other treated animals.**
- **Children should not come in contact with application sites for two (2) hours after application.**

(See Contraindications, Warnings, Human Warnings, and Adverse Reactions, for more information)

CAUTION:
Federal (U.S.A.) Law restricts this drug to use by or on the order of a licensed veterinarian.

INDICATIONS:
CORAXIS is indicated for the prevention of heartworm disease caused by *Dirofilaria immitis*. *CORAXIS* is also indicated for the treatment and control of the following intestinal parasites:

	Intestinal Parasite	Intestinal Stage		
		Adult	Immature Adult	Fourth Stage Larvae
Hookworm Species	<i>Ancylostoma caninum</i>	X	X	X
	<i>Uncinaria stenocephala</i>	X	X	X
Roundworm Species	<i>Toxocara canis</i>	X		X
	<i>Toxascaris leonina</i>	X		
Whipworm	<i>Trichuris vulpis</i>	X		

CONTRAINDICATIONS:
Do not administer this product orally. (See **WARNINGS**.)
Do not use this product (containing 2.5% moxidectin) on cats.

WARNINGS:
For the first 30 minutes after application: Ensure that dogs cannot lick the product from application sites on themselves or other treated dogs, and separate treated dogs from one another and from other pets to reduce the risk of accidental ingestion. Ingestion of this product by dogs may cause serious adverse reactions including depression, salivation, dilated pupils, incoordination, panting, and generalized muscle tremors. In avermectin sensitive dogs,* the signs may be more severe and may include coma and death.

* Some dogs are more sensitive to avermectins due to a mutation in the ABCB1 gene (formerly MDR1 gene). Dogs with this mutation may develop signs of severe avermectin toxicity if they ingest this product. The most common breeds associated with this mutation include Collies and Collie crosses.

† Although there is no specific antagonist for avermectin toxicity, even severely affected dogs have completely recovered from avermectin toxicity with intensive veterinary supportive care.

HUMAN WARNINGS:
Not for human use. Keep out of the reach of children.
Children should not come in contact with application sites for two (2) hours after application. Causes eye irritation. Harmful if swallowed. Do not get in eyes or on clothing. Avoid contact with skin. Exposure to the product has been reported to cause headache, dizziness, and redness, burning, tingling, or numbness of the skin. Wash hands thoroughly with soap and warm water after handling.
If contact with eyes occurs, hold eyelids open and flush with copious amounts of water for 15 minutes. If eye irritation develops or persists, contact a physician. If swallowed, call poison control center or physician immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or physician. People with known hypersensitivity to benzyl alcohol or moxidectin should administer the product with caution. In case of allergic reaction, contact a physician. If contact with skin or clothing occurs, take off contaminated clothing. Wash skin immediately with plenty of soap and water. Call a poison control center or physician for treatment advice.
The Safety Data Sheet (SDS) provides additional occupational safety information. For a copy of the Safety Data Sheet (SDS) or to report adverse reactions call Bayer Veterinary Services at 1-800-422-9674. For consumer questions call 1-800-255-6826.

PRECAUTIONS:
Do not dispense dose applicator tubes without complete safety and administration information.
Use with caution in sick, debilitated, or underweight animals. The safety of *CORAXIS* has not been established in breeding, pregnant, or lactating dogs. The safe use of *CORAXIS* has not been established in puppies and dogs less than 7 weeks of age or less than 3 lbs body weight.
Prior to administration of *CORAXIS*, dogs should be tested for existing heartworm infection. At the discretion of the veterinarian, infected dogs should be treated with an antidiarrheic to remove adult heartworms.
CORAXIS is not effective against adult *D. immitis*. (See **ANIMAL SAFETY - Safety Study in Heartworm-Positive Dogs**.)

ADVERSE REACTIONS:
Since *CORAXIS* contains 2.5% moxidectin, studies that demonstrated the safe use of a topical solution containing 2.5% moxidectin + 10% imidacloprid were acceptable to demonstrate the safety of *CORAXIS*.

Field Studies: Following treatment with a topical solution containing 2.5% moxidectin + 10% imidacloprid or an active control, dog owners reported the following post-treatment reactions:

OBSERVATION	Moxidectin + Imidacloprid n=128	Active Control n=68
Pruritus	19 dogs (14.8%)	7 dogs (10.3%)
Residue	9 dogs (7.0%)	5 dogs (7.4%)
Medicinal Odor	5 dogs (3.9%)	None observed
Lethargy	1 dog (0.8%)	1 dog (1.5%)
Inappetence	1 dog (0.8%)	1 dog (1.5%)
Hyperactivity	1 dog (0.8%)	None observed

During a field study of a topical solution containing 2.5% moxidectin + 10% imidacloprid using 61 dogs with pre-existing flea allergy dermatitis, one (1.6%) dog experienced localized pruritus immediately after product application, and one investigator noted hyperkeratosis at the application site of one dog (1.6%).

Laboratory Effectiveness Studies: One dog in a laboratory effectiveness study experienced weakness, depression and unsteadiness between 6 and 9 days after application of a topical solution containing 2.5% moxidectin + 10% imidacloprid. The signs resolved without intervention by day 10 post-application. The signs in this dog may have been related to peak serum levels of moxidectin, which vary between dogs, and occur between 1 and 21 days after product application.

The following clinical observations also occurred in laboratory effectiveness studies following application of a topical solution containing 2.5% moxidectin + 10% imidacloprid and may be directly attributed to the drug or may be secondary to the intestinal parasite burden or other underlying conditions in the dogs: diarrhea, bloody stools, vomiting, anorexia, lethargy, coughing, ocular discharge and nasal discharge. Observations at the application sites included damp, stiff or greasy hair; the appearance of a white deposit on the hair; and mild erythema, which resolved without treatment within 2 to 48 hours.

ANIMAL SAFETY:
In a controlled, double-masked, field safety study, a topical solution containing 2.5% moxidectin + 10% imidacloprid was administered to 128 dogs of various breeds, 3 months to 15 years of age, weighing 4 to 157 pounds. The moxidectin + imidacloprid topical solution was used safely in dogs concomitantly receiving ACE inhibitors, anticonvulsants, antihistamines, antimicrobials, chondroprotectants, corticosteroids, immunotherapeutics, MAO inhibitors, NSAIDs, ophthalmic medications, sympathomimetics, synthetic estrogens, thyroid hormones, and urinary acidifiers. Owners reported the following signs in their dogs after application of moxidectin + imidacloprid topical solution: pruritus, itchy/greasy residue at treatment site, medicinal odor, lethargy, inappetence and hyperactivity. (See **ADVERSE REACTIONS**.)

NADA # 141-417, Approved by FDA

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Jennifer Bruce, RVT, practice manager for Wellesley Animal Hospital in Toronto, Ontario, accepts the Practice Manager of the Year award during VMX.

Petplan bestows its 2019 Veterinary Excellence Awards

Insurance provider's annual dinner in Orlando highlights a kitten-loving volunteer—and a lot of Canadians. *By Brendan Howard*

Every industry deserves awards, and Petplan gives out several to veterinary professionals each year, unveiling them during VMX in Orlando, Florida.

This January the pet insurance provider gave awards to a pet parent, a receptionist, a practice manager, a veterinarian, a practice and, for the first time ever, gave the veterinary technician award to a “nurse,” following NAVTA’s push for the name change. Here’s who took away the kudos.

Pet parent of the year. Jill Bristow is a pet fosterer and volunteer with Winnipeg Humane Society in Manitoba, logging more than 1,300 hours of service. A video showcased Bristow’s work, especially with litters of kittens.

Receptionist of the year. Lane Kovich is a receptionist at Nanaimo Veterinary Hospital in Nanaimo, British Columbia. In the nomination, one of Kovich’s coworkers wrote, “She is the first smiling face the client sees when they walk in the door. Rain or shine, she is upbeat and happy to see everyone.”

Practice manager of the year. Jennifer Bruce, RVT, is practice manager at Wellesley Animal Hospital in Toronto, Ontario. Bruce’s colleague wrote about her multifaceted background—registered veterinary technician, cat parent, pet store experience and life in a farm family. Bruce’s

passion for pet insurance played into the nomination: “She is always thinking of ways to implement and offer our clients no-cost insurance trials and is always there to help with any insurance-related question.”

Veterinary nurse of the year. Katie Berry, RVT, is a registered veterinary technician at Montgomery Village Veterinary Clinic and Dekens House-call Services in Calgary, Alberta. Her colleague said she excels at managing team members, patients and client care: “As hard as our jobs are, she is always there to make us feel happy and make sure we are OK. She personally checks in on patients after procedures to make sure they’re OK, that they’re comfortable when leaving our practice and [their owners] fully understand any home care instructions. We would be lost without our Katie.”

Veterinarian of the year. Craig Staehle, DVM, owns Best Friends Animal Hospital and Pet Resort in Belleville, Illinois. His colleagues said he loves on the patients and manages others’ tough emotions on the job with skill: “Even on the worst days with angry pets, grumpy coworkers and right-before-you-close emergencies, he stays upbeat and positive to give the best care. It’s common to see him on the floor with a pet, offering treats and getting well-deserved licks.”

Practice of the year. Echoing remarks from award presenter Mike Cavanaugh, DVM, DABVP—CEO of the American Animal Hospital Association—that a veterinary hospital is not “the building and all the equipment,” but the passion and compassion of the team inside, a client of Stack Veterinary Hospital in Syracuse, New York, commented in writing about the team’s exceptional care of her anxious dog: “As my pup has made progress, the entire team has been fantastic cheerleaders and they celebrate his successes with me. They take the time to answer questions, use humor to defuse stressful situations and make me feel like a partner in my fur babies’ care.”

Synchrony, owner of CareCredit, purchases Pets Best

In a move that brings together loan capabilities with long-term pet health insurance coverage in one company, consumer financial services company Synchrony—owner of CareCredit—has acquired the pet health insurance company Pets Best.

“Pets Best provides CareCredit with an immediate entry point into the rapidly growing pet insurance market,” reads the press release. “This acquisition will allow CareCredit to offer a comprehensive suite of payment options for veterinarians and pet owners to help pets get access to the care they need.”

So what are the benefits to veterinarians who may be talking to pet owners about payment options?

“CareCredit will leverage Pets Best’s leading technology and strong experience in the growing pet health insurance market,” reads the release. “Pets Best will have access to CareCredit’s deep healthcare market penetration and access to veterinary practices and veterinary industry associations.”

Pets Best president Chris Middleton says the merger is a chance to raise awareness for pet insurance.

“Our primary goal is making sure economic euthanasia does not occur,” Middleton says. “Being able to partner with someone with the capabilities and reach of CareCredit will make us a total solution that includes insurance and credit.”

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Study finds new supplement supports **muscle mass retention** and earlier return to **normal weight-bearing** after TPLO

The compound, derived from fertilized egg yolk, was studied at Kansas State University. *By Theresa L. Entriiken, DVM, and Katie James*

A new supplement showed positive results for dogs with naturally occurring cranial cruciate ligament (CCL) rupture recovering from tibial plateau leveling osteotomy (TPLO) in a study conducted at Kansas State University's College of Veterinary Medicine. After undergoing a TPLO, veterinary patients often show marked muscle loss in the affected limb due to disuse atrophy. This study evaluated the impact of Fortetropin on attenuating muscle atrophy after TPLO surgery.

Principal study investigator Kenneth R. Harkin, DVM, DACVIM (SAIM), presented the study results Jan. 20 in the Discovery Theater at the 2019 VMX conference in Orlando, Florida. His presentation, "The impact of Fortetropin supplementation on dogs recovering from TPLO surgery," was sponsored by the product manufacturer, MYOS RENS Technology, a biotherapeutics and bionutrition company. The company also fully funded the study.

Here are Dr. Harkin's presentation highlights and the study's key findings:

- > This randomized, double-blinded, placebo-controlled study involved 100 dogs. As a model for recovery from surgery, TPLO was selected because of its reproducibility.

- > Fortetropin is a nonthermal, pasteurized, freeze-dried fertilized egg yolk product. Fertilized egg yolk exhibits a proteomic profile that differs in 18 proteins compared with unfertilized egg yolk.

- > Dogs in the Fortetropin and placebo (cheese powder protein) groups were evaluated at baseline and postoperatively at eight and 12 weeks. The dogs had eight weeks of forced exercise restriction postoperatively, with a gradual return to activity during weeks nine through 12.

- > The study participant evaluations

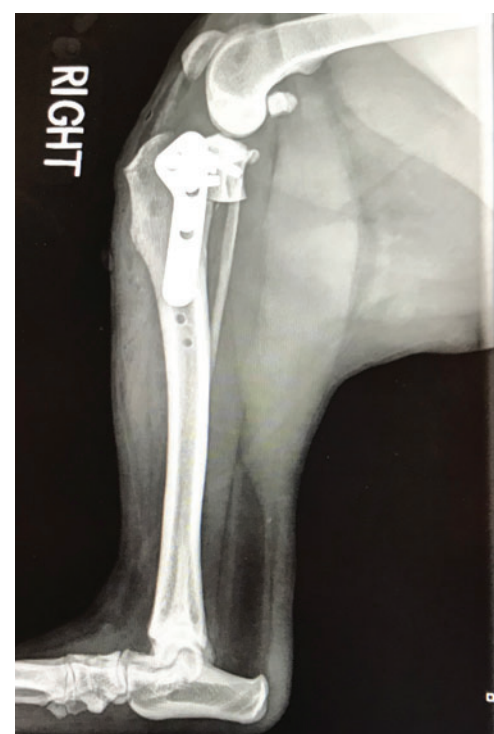
included thigh circumference measurement, stance force analysis, serum myostatin and C-reactive protein concentration measurements, ultrasonographic assessments of thigh and epaxial muscle thickness, and muscle condition scoring.

- > Dogs in the Fortetropin group showed no change in thigh circumference, which was statistically significant at the $p < 0.1$ level. This indicated that study dogs receiving Fortetropin did not exhibit disuse muscle atrophy compared with the placebo group.

- > Force plate stance analysis showed that Fortetropin-supplemented dogs had more significant improvement in percentage of weight supported by the affected limb (faster return to normal stance distribution) than did dogs in the placebo group.

- > Myostatin is a protein that prevents muscle growth and promotes muscle atrophy. Dogs that received Fortetropin showed no significant change in serum myostatin concentrations over any time period, which indicated that myostatin was inhibited in this group compared with the placebo group. Significant changes in myostatin concentrations were noted in the placebo group, indicating that myostatin was not inhibited in these dogs. The mechanism of action of fertilized egg yolk in reducing serum myostatin concentrations is unknown.

- > The study results also showed that C-reactive protein, a biomarker of inflammation, was not elevated in either group. Muscle condition scores were not significantly different between the two groups. Furthermore, the results indicated that ultrasonographic evaluation of muscle thickness may have



A postsurgery radiograph of Blitz, who underwent TPLO surgery at Kansas State University and participated in the Fortetropin study (see box below left).

been a suboptimal assessment because of interobserver variability and because the same ultrasonographer did not perform all evaluations.

In a MYOS RENS Technology press release, Dr. Harkin says, "This study demonstrates the benefits of Fortetropin in dogs with prolonged postoperative recovery periods. Restoration or maintenance of muscle mass through the reduction of serum myostatin levels with Fortetropin offers veterinarians a novel approach to in-home rehabilitation of injured dogs, including potentially improving or restoring mobility in geriatric dogs."

The company also states in its release that it believes the results of the study will enable it to expand its veterinary business and change how veterinary teams address canine muscle health. It also plans to pursue clinical trials for human rehabilitation and recovery applications.



One of the dvm360 team participated in this study!

Associate Content Specialist Katie James' dog, Blitz, tore his right CCL in March 2018 and had a TPLO repair performed at K-State. They participated in this study, and James wrote about the postsurgical recovery process. See dvm360.com/blitzCCL for more.



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Veterinarians more likely to be neurotic
> Continued from the cover



> **Agreeableness:** how well you get along with others.

> **Conscientiousness:** being able to delay gratification, work within rules, plan and organize effectively.

> **Extraversion:** drawing energy from interacting with others.

> **Neuroticism:** being less confident and comfortable with oneself; a tendency to get “ruffled” easily.

The Merck well-being study found that veterinarians are significantly more likely to be neurotic than the general population, by a noteworthy margin. “Almost all the researchers commented on the difference in levels of neuroticism,” Dr. Strand says. They’re also significantly less likely to be extraverted, open to experience and agreeable than the general population; they display about the same levels of conscientiousness.

While many of the attributes associated with neuroticism are “bummer words,” as Dr. Strand says, one positive trait is something called “depressive realism,” or a tendency to see things as they really are. “Neurotics tend to see things more realistically,” she says. “There is a risk of having an over-negative view, but in general neurotics have an advantage in this area.”

This trait can be particularly helpful in a medical professional, Dr. Strand continues. “What would you rather have in your own surgeon?” she asks. “Someone who sees things pessimistically or optimistically, or someone who sees what is actually real?”

Of course, some aspects of neuroti-

One positive trait of neuroticism is something called “depressive realism,” or a tendency to see things as they really are.

cism are detrimental to well-being, Dr. Strand says. Emotional volatility and high reactivity to stress eventually take a toll. That’s where mindfulness training comes in.

“While you can’t change the personality trait, you can change your behavior,” she says. You can learn coping skills, avoid substances (neurotics are more likely to experience substance-use disorders) and channel anxiety into a more productive outlet.

Specifically, veterinarians can work on their innate alexithymia, or difficulty putting emotions into words, by developing emotional literacy—the ability to say, “I feel angry!” instead of “What a jerk!” when someone behaves in an unpleasant way. “Research shows that the former response is better for the brain,” Dr. Strand says.

The next step is to work on psychological flexibility and strength, which flow from the following behaviors and attitudes, Dr. Strand says:

- > Being present in the moment (a core approach to mindfulness in life)
- > Knowing your values (discovering what’s important to you and making decisions accordingly)
- > Taking action (being willing to act on your values and not just react to circumstance)
- > Having self as context (seeing

yourself as essentially unchanged by time and experience)

- > Practicing defusion (the ability to have a thought but not be ruled by it)
- > Accepting what is (being willing to experience difficult thoughts and not seek to avoid or escape from them).

For those who need some tools that will help with mindfulness and mitigate neuroticism, Dr. Strand suggests the Insight Timer and Headspace apps. “Or you can participate in a Mindfulness Based Stress Reduction class, which is the program that started it all,” she says. “Google it. It’s an eight-week training course, and you can find one near you.”

To close her talk, Dr. Strand showed a picture of a nervous puppy at the top of a flight of stairs. “What would you say to this puppy?” she asked. “Would you get angry and yell at it, saying, ‘You stupid puppy! Why are you such a scaredy-pants?’ Of course not. You’d never say that to the puppy, but that’s what we say to ourselves.”

So exercise some self-compassion, Dr. Strand advises. Tell yourself it’s OK; you can do it; it will get easier. “Be kind to yourself inside your own head,” she says. “This is even more important than mindfulness. I believe self-compassion is the next wave of well-being research, and you can start right now by activating your own caregiving system.”

Mindfulness tools

If you're interested in pursuing therapy or coaching to achieve greater well-being in your life, Dr. Elizabeth Strand suggests looking for counselors or programs that encompass the following schools of thought:

- > Acceptance and Commitment Training (ACT)
- > Mindfulness Based Stress Reduction
- > Mindfulness-based cognitive treatment
- > Compassion-focused approaches

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The reception desk and the wood and tile design elements were pricey but worth every penny, says Dr. Jeffrey Davidson, owner of West Kendall Animal Hospital. The elevated ceiling with a wood slat design continues down behind the reception desk a few inches away from the wall. Pendant lighting and blue tiles around the desk tie it all together.

2019. Hospital of the Year

Small but mighty: Award-winning design in a tiny strip mall practice

West Kendall Animal Hospital in Miami, Florida, is dvm360's under-8,000-square-foot Hospital Design winner—a well-designed practice that was worth waiting for. *By Sarah A. Moser*

Coming in at only 2,100 square feet, you wouldn't think the remodel of West Kendall Animal Hospital in Miami, Florida, would be that challenging or take too long. But practice owner Jeffrey Davidson, DVM, says the process took a whopping five years from start to finish. If you ask Dr. Davidson if it was worth it, he'll give a resounding yes. Many great things came from the long drawn-out process, leading to the practice winning the dvm360 Hospital Design Competition Hospital of the Year Award for practices under 8,000 square feet.

Hospital Design Competition judges praised West Kendall Animal Hospital for great color combinations and finishes, high design standards, and a "solid" floor plan, especially in such a narrow space. One judge said it's not easy to hold a design to such high stan-

"I decided about five years before the remodel that I needed something more than just a facelift."

—Jeffrey Davidson, DVM, owner

dards when the facility is so small, but Dr. Davidson and his architecture team at Rauhaus Freedenfeld and Associates managed to do just that.

Working and waiting

One benefit of the long timeline was time to think. And to dream. And to plan. Dr. Davidson had plenty of time and put it to good use.

His story started in 1986, when he built his practice in a strip mall. The 1981 graduate of the University of Florida Veterinary School started in that leased space between two anchor tenants. He was the first business in the strip, besides the anchors. That lo-

cation served him well for many years, but it didn't stop him from keeping an eye on design trends and dreaming of a fresh space.

Exam room needs drove much of the hospital renovation. Dr. Davidson gave up boarding space in the back of the hospital to make room for an extra exam room—going from two to three exam rooms, enlarging the rooms a bit as well. And another must-have: two doors in and out of exam rooms. "In our old facility, our exam rooms were so close to the reception area that I would always get stopped coming out of a room, and it really messed with my productivity," he says.

By the numbers

West Kendall Animal Hospital

Owners: Dr. Jeffrey L. Davidson

Number of doctors: 1

Exam rooms: 3

Total cost: \$498,536

Cost per square foot: \$201.38

Square footage: 2,100

Structure type: Leasehold, renovation

Architect: Rauhaus Freedenfeld & Associates

“I decided about five years before the remodel that I needed something more than just a facelift,” says Dr. Davidson. He had done a few minor updates through the years, but this time required more.

As luck would have it, his next-door tenant didn’t need all the space his leasehold had and didn’t want to spend so much on the rent. Dr. Davidson asked his neighbor if he could have the extra space instead, and the tenant agreed. But it took five years for the landlord to get on board and present him with a new lease proposal.

“I didn’t want to do a major remodel, then have to do it again once I got the additional space,” he says. “More space would take me from an I-shaped building to an L-shaped space, opening up more options for my floor plan.”

During that delay, Dr. Davidson pored over plans, took notes of what he would want in each area of the practice, found a veterinary-specific architect and got the ball rolling on designs.

The permitting process also moved slowly. Dr. Davidson used the opportunity to fine-tune the designs his architect, Warren Freedenfeld, created: “I spent a lot of time with the plans, making changes as I would walk through each room every day, figuring out where I wanted every single little thing. Not being so rushed helped me end up with a better plan. I had time to change things, down to the details of where I wanted outlets and cables to go.”

While the delays were frustrating, Dr. Davidson says they gave him time to make the hospital the best it could be.

Working through a remodel

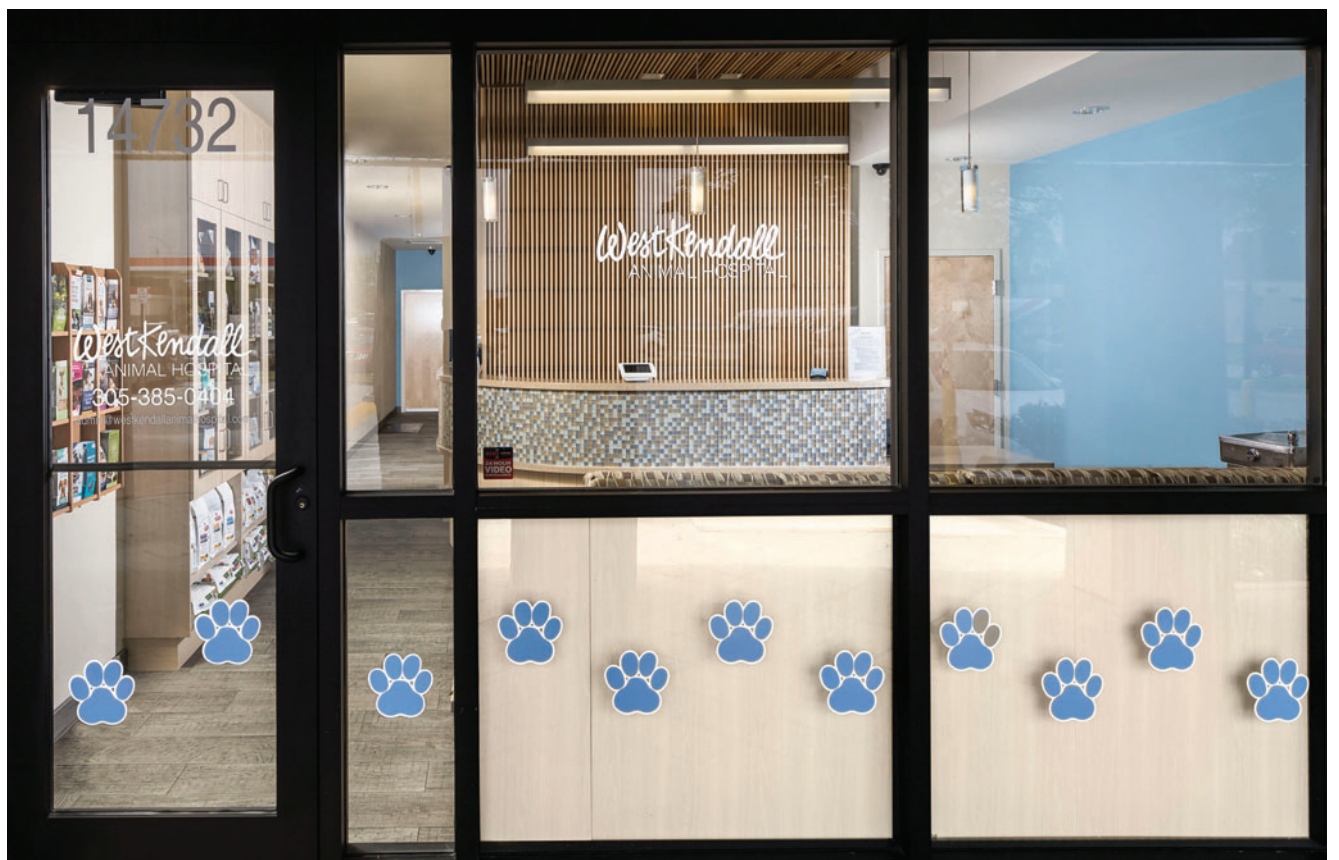
“Working while you’re constructing is the best solution, for me, if you want to stay in business,” Dr. Davidson says. But it’s not without its challenges. He considered moving into a temporary space in the shopping center during construction, but no spaces were available when he needed it. Moving to another location could have worked, but Dr. Davidson didn’t want to disrupt continuity for his clients. He even considered renting a trailer in the parking lot for space. The landlord signed off on that, but in the end, he went for a two-phase construction.

While they tore down walls—some all the way down to the studs in his existing space and in the tenant

Dr. Davidson has mastered the art of finding storage in every possible spot. Above the exam rooms is storage space that is only accessed from the corridor with a rolling ladder. Here they store light bulbs, tiles, air filters and other items often bought in bulk and not needed on a daily or even weekly basis.



The new treatment area features ICU cages along the left side, easily visible for observing critical pets while caring for others. The renovation allowed for the addition of a dedicated wet table for dentals and flushings, and another table as well. The room also has a pass-through window to surgery, a computer workstation between the two treatment tables, and a computer just for viewing radiograph images.



After 30 years in a strip mall storefront, West Kendall Animal Hospital is now presenting a fresh new look to its clients. Dr. Davidson had the front door moved from the center of the storefront to the left, allowing space for bench seating along the front windows with direct access to the reception desk. Blue pawprint decals on the windows tie in with the blue accents throughout the hospital.

space—Dr. Davidson and his team worked solely out of the front of the practice, using the reception, exam room, lab, treatment and surgery areas, while construction went on in the back of the practice and in the new tenant space. The builders converted the old kennel area and all of the newly acquired space during phase one. That gave him a new surgery suite, radiography room, treatment room and an extra bathroom.

Phase two meant moving to the

back of the hospital, walking clients down the unfinished area into a sparkling new space for a few months. “We brought clients into the treatment room, using that area as our exam room,” Dr. Davidson says. “It was hugely inconvenient, as we could only see one patient at a time, but we managed. Thankfully that phase didn’t last long, and our clients were happy to get a peek at the new construction. They were very considerate and never complained about the wait or the

mess during construction.”

Despite the long wait and the inconveniences, not to mention the cost, Dr. Davidson says it’s hard to imagine how he practiced in that space for so long before. “The work flow is better, I’m happier having more elbow room, my staff has space to put their things, and the whole place looks nicer and is so much more enjoyable,” he says.

Sarah A. Moser is a freelance writer in Lenexa, Kansas.

dvm360 Hospital Design Competition announces 2019 winners

Seventeen practices entered this year's dvm360 Hospital Design Competition, and five of them earned awards in the 2019 competition—an over-8,000-square-foot Hospital of the Year, an under-8,000-square-foot Hospital of the Year and three Merit Award winners. Here are some interesting stats about the pool of entrants:

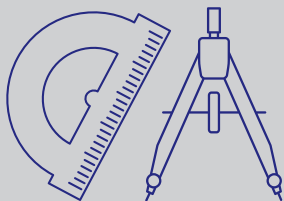
- > The average project total cost was \$2,049,702.60.

- > The average square footage of the projects was 7,070 square feet.
- > There were six renovations and 11 new construction projects.
- > There were 13 freestanding buildings and four leasehold spaces.

Keep an eye out for feature articles and gorgeous color photographs on these award-winning designs in the coming months on dvm360.com and in print in *dvm360* and *Vetted* magazines. And watch for the special

Hospital Design Supplement coming with *dvm360* magazine's May 2019 issue for more tips, tricks and ideas from all of this year's winners that you can borrow to implement in your future projects.

Check out the judges' picks for winners below and on the facing page. And check out who won when the people voted in the People's Choice Award competition at dvm360.com/peopleschoice.



Attack your project from every angle at the HospitalDesign360 conference

Plan to attend the 2019 Hospital-Design360 conference (formerly the Veterinary Economics Hospital Design Conference) in Kansas City, Missouri, Aug. 21-23.

Gather ideas, learn from the profession's most noted veterinary design experts, and compare your options for design, construction, equipment, financing and more with our exclusive hospital design exhibit hall. Visit fetchdvm360.com/hd for more information.

Bonus! Practice owners from both of this year's Hospitals of the Year will be on hand to share their secrets.



Over-8,000-square-foot Hospital of the Year



Coyne Veterinary Center: Crown Point, Indiana

Owners:	Drs. John Coyne and Jeremy Buishas	Architect:	Michael Matthys, Linden Group Architects
Number of doctors:	4	Secondary architect:	Jason Sanderson, RWE Management Company
Exam rooms:	11	Photographer:	Paul Strabbing, Paul Strabbing Photography
Total cost:	\$3,686,386	Month featured in print:	March
Cost per square foot:	\$235.80		
Square footage:	15,633		
Structure type:	Freestanding, new		

Under-8,000-square-foot Hospital of the Year



West Kendall Animal Hospital, Miami, Florida

Owner:	Dr. Jeffrey L. Davidson	Structure type:	Leasehold, renovation
Number of doctors:	1	Architect:	Rauhaus Freedenfeld & Associates
Exam rooms:	3	Secondary architect:	None
Total cost:	\$498,536	Photographer:	Craig Denis Creative
Cost per square foot:	\$201.38	Month featured in print:	April
Square footage:	2,100		

Merit Award winners



El Paso Animal Hospital Derby, Kansas

Owners: Drs. Gary D. Oehmke
and Jeffrey J. Herod
Number of doctors: 6
Exam rooms: 8
Total cost: \$3,418,820
Cost per square foot: \$288.40
Square footage: 8,878
Structure type: Freestanding, new
Architect: Paul Gladysz,
BDA Architecture
Photographer: Cody Tracy
Month featured in print: June

Goose Creek Veterinary Clinic Ashburn, Virginia

Owner: Dr. Margaret Fortier
Number of doctors: 1
Exam rooms: 3
Total cost: \$650,000
Cost per square foot: \$124
Square footage: 3,000
Structure type: Leasehold,
new construction
Architect: Charles Joch,
CHJ3 Architecture
Photographer: Margaret Fortier
Month featured in print: July



Petersen Pet Hospital Hiawatha, Iowa

Owner: Dr. Bradley D. Petersen
Number of doctors: 4
Exam rooms: 7
Total cost: \$3,328,006
Cost per square foot: \$273.86
Square footage: 9,580
Structure type: Freestanding, new
Architect: Solum Lang
Photographer: Read Photography
Month featured in print: August

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Letter to dvm360: More options for intestinal parasite control

A reader responds to Dr. Richard Gerhold's January "Just Ask the Expert" column with an additional suggestion.

In the January edition of *dvm360* magazine, "Just Ask the Expert" by Dr. Richard Gerhold discussed the problem of hookworm re-infestation of dogs receiving a monthly heartworm preventive. I would add to the discussion the option of giving the dog the heartworm preventive every two weeks instead of once a month. The environment of these animals is hopelessly contaminated with hundreds of thousands—or millions—of hookworm, roundworm and whipworm eggs that will survive for years. Dr. Gerhold neglected to mention this option, and I would propose that it is the best option for dogs with these parasites.

—Rocky Deutsch, DVM
Manassas, Virginia

Dr. Gerhold responds

Although it is doable (and extralabel use) to give two doses of a heartworm preventive that's also effective against intestinal parasites (such as hookworms) in one month to help control this problem, alternatively you could give an appropriate dose of pyrantel pamoate or fenbendazole in the middle of month. Also, alternatively, if you're using imidacloprid-moxidectin (Advantage Multi for Dogs—Bayer), the drug reaches a steady-state plasma concentration after administration for five consecutive months.¹ This would help, especially if larval leak is occurring.

Larval leak occurs when the larvae of hookworms arrest in dog muscle; they are activated once the adult parasites in the intestines are expelled due either to drug administration or worm death by other means. The larvae can continue to "leak" from muscle to the gastrointestinal lumen for some time, depending on the larval burden level in the muscle.

—Richard Gerhold, DVM, MS, PhD
University of Tennessee

Reference

1. von Samson-Himmelstjerna G, Epe C, Schimmel A, et al. Larvicidal and persistent efficacy of an imidacloprid and moxidectin topical formulation against endoparasites in cats and dogs. *Parasitol Res* 2003;90(Suppl 1):114-115.

NexGard® (afoxolaner) Chewables

CAUTION: Federal (USA) law restricts this drug to use by or on the order of a licensed veterinarian.

Description: NexGard® (afoxolaner) is available in four sizes of beef-flavored, soft chewables for oral administration to dogs and puppies according to their weight. Each chewable is formulated to provide a minimum afoxolaner dosage of 1.14 mg/lb (2.5 mg/kg). Afoxolaner has the chemical composition 1-Naphthalenecarboxamide, 4-[5-[3-chloro-5-(trifluoromethyl)-phenyl]-4, 5-dihydro-5-(trifluoromethyl)-3-isoxazolyl]-N-[2-oxo-2-[(2,2,2-trifluoroethyl)amino]ethyl].

Indications: NexGard kills adult fleas and is indicated for the treatment and prevention of flea infestations (*Ctenocephalides felis*), and the treatment and control of Black-legged tick (*Ixodes scapularis*), American Dog tick (*Dermacentor variabilis*), Lone Star tick (*Amblyomma americanum*), and Brown dog tick (*Rhipicephalus sanguineus*) infestations in dogs and puppies 8 weeks of age and older, weighing 4 pounds of body weight or greater, for one month. NexGard is indicated for the prevention of *Borrelia burgdorferi* infections as a direct result of killing *Ixodes scapularis* vector ticks.

Dosage and Administration: NexGard is given orally once a month, at the minimum dosage of 1.14 mg/lb (2.5 mg/kg).

Dosing Schedule:

Body Weight	Afoxolaner Per Chewable (mg)	Chewables Administered
4.0 to 10.0 lbs.	11.3	One
10.1 to 24.0 lbs.	28.3	One
24.1 to 60.0 lbs.	68	One
60.1 to 121.0 lbs.	136	One
Over 121.0 lbs.	Administer the appropriate combination of chewables	

NexGard can be administered with or without food. Care should be taken that the dog consumes the complete dose, and treated animals should be observed for a few minutes to ensure that part of the dose is not lost or refused. If it is suspected that any of the dose has been lost or if vomiting occurs within two hours of administration, redose with another full dose. If a dose is missed, administer NexGard and resume a monthly dosing schedule.

Flea Treatment and Prevention:

Treatment with NexGard may begin at any time of the year. In areas where fleas are common year-round, monthly treatment with NexGard should continue the entire year without interruption. To minimize the likelihood of flea reinfestation, it is important to treat all animals within a household with an approved flea control product.

Tick Treatment and Control:

Treatment with NexGard may begin at any time of the year (see **Effectiveness**).

Contraindications:

There are no known contraindications for the use of NexGard.

Warnings:

Not for use in humans. Keep this and all drugs out of the reach of children. In case of accidental ingestion, contact a physician immediately.

Precautions:

Afoxolaner is a member of the isoxazoline class. This class has been associated with neurologic adverse reactions including tremors, ataxia, and seizures. Seizures have been reported in dogs receiving isoxazoline class drugs, even in dogs without a history of seizures. Use with caution in dogs with a history of seizures or neurologic disorders (see **Adverse Reactions** and **Post-Approval Experience**).

The safe use of NexGard in breeding, pregnant or lactating dogs has not been evaluated.

Adverse Reactions:

In a well-controlled US field study, which included a total of 333 households and 615 treated dogs (415 administered afoxolaner; 200 administered active control), no serious adverse reactions were observed with NexGard.

Over the 90-day study period, all observations of potential adverse reactions were recorded. The most frequent reactions reported at an incidence of > 1% within any of the three months of observations are presented in the following table. The most frequently reported adverse reaction was vomiting. The occurrence of vomiting was generally self-limiting and of short duration and tended to decrease with subsequent doses in both groups. Five treated dogs experienced anorexia during the study, and two of those dogs experienced anorexia with the first dose but not subsequent doses.

Table 1: Dogs With Adverse Reactions.

	Treatment Group			
	Afoxolaner		Oral active control	
	N ¹	% (n=415)	N ²	% (n=200)
Vomiting (with and without blood)	17	4.1	25	12.5
Dry/Flaky Skin	13	3.1	2	1.0
Diarrhea (with and without blood)	13	3.1	7	3.5
Lethargy	7	1.7	4	2.0
Anorexia	5	1.2	9	4.5

¹ Number of dogs in the afoxolaner treatment group with the identified abnormality.

² Number of dogs in the control group with the identified abnormality.

In the US field study, one dog with a history of seizures experienced a seizure on the same day after receiving the first dose and on the same day after receiving the second dose of NexGard. This dog experienced a third seizure one week after receiving the third dose. The dog remained enrolled and completed the study. Another dog with a history of seizures had a seizure 19 days

after the third dose of NexGard. The dog remained enrolled and completed the study. A third dog with a history of seizures received NexGard and experienced no seizures throughout the study.

Post-Approval Experience (July 2018):

The following adverse events are based on post-approval adverse drug experience reporting. Not all adverse events are reported to FDA/CVM. It is not always possible to reliably estimate the adverse event frequency or establish a causal relationship to product exposure using these data.

The following adverse events reported for dogs are listed in decreasing order of reporting frequency for NexGard:

Vomiting, pruritus, lethargy, diarrhea (with and without blood), anorexia, seizure, hyperactivity/restlessness, panting, erythema, ataxia, dermatitis (including rash, papules), allergic reactions (including hives, swelling), and tremors.

Contact Information:

For a copy of the Safety Data Sheet (SDS) or to report suspected adverse drug events, contact Merial at 1-888-637-4251 or www.nexgardfordogs.com.

For additional information about adverse drug experience reporting for animal drugs, contact FDA at 1-888-FDA-VETS or online at <http://www.fda.gov/AnimalVeterinary/SafetyHealth>.

Mode of Action:

Afoxolaner is a member of the isoxazoline family, shown to bind at a binding site to inhibit insect and acarine ligand-gated chloride channels, in particular those gated by the neurotransmitter gamma-aminobutyric acid (GABA), thereby blocking pre- and post-synaptic transfer of chloride ions across cell membranes. Prolonged afoxolaner-induced hyperexcitation results in uncontrolled activity of the central nervous system and death of insects and acarines. The selective toxicity of afoxolaner between insects and acarines and mammals may be inferred by the differential sensitivity of the insects and acarines' GABA receptors versus mammalian GABA receptors.

Effectiveness:

In a well-controlled laboratory study, NexGard began to kill fleas four hours after initial administration and demonstrated >99% effectiveness at eight hours. In a separate well-controlled laboratory study, NexGard demonstrated 100% effectiveness against adult fleas 24 hours post-infestation for 35 days, and was ≥93% effective at 12 hours post-infestation through Day 21, and on Day 35. On Day 28, NexGard was 81.1% effective 12 hours post-infestation. Dogs in both the treated and control groups that were infested with fleas on Day -1 generated flea eggs at 12- and 24-hours post-treatment (0-11 eggs and 1-17 eggs in the NexGard treated dogs, and 4-90 eggs and 0-118 eggs in the control dogs, at 12- and 24-hours, respectively). At subsequent evaluations post-infestation, fleas from dogs in the treated group were essentially unable to produce any eggs (0-1 eggs) while fleas from dogs in the control group continued to produce eggs (1-141 eggs).

In a 90-day US field study conducted in households with existing flea infestations of varying severity, the effectiveness of NexGard against fleas on the Day 30, 60 and 90 visits compared with baseline was 98.0%, 99.7%, and 99.9%, respectively.

Collectively, the data from the three studies (two laboratory and one field) demonstrate that NexGard kills fleas before they can lay eggs, thus preventing subsequent flea infestations after the start of treatment of existing flea infestations.

In well-controlled laboratory studies, NexGard demonstrated >97% effectiveness against *Dermacentor variabilis*, >94% effectiveness against *Ixodes scapularis*, and >93% effectiveness against *Rhipicephalus sanguineus*, 48 hours post-infestation for 30 days. At 72 hours post-infestation, NexGard demonstrated >97% effectiveness against *Amblyomma americanum* for 30 days. In two separate, well-controlled laboratory studies, NexGard was effective at preventing *Borrelia burgdorferi* infections after dogs were infested with *Ixodes scapularis* vector ticks 28 days post-treatment.

Animal Safety:

In a margin of safety study, NexGard was administered orally to 8 to 9-week-old Beagle puppies at 1, 3, and 5 times the maximum exposure dose (6.3 mg/kg) for three treatments every 28 days, followed by three treatments every 14 days, for a total of six treatments. Dogs in the control group were sham-dosed. There were no clinically-relevant effects related to treatment on physical examination, body weight, food consumption, clinical pathology (hematology, clinical chemistries, or coagulation tests), gross pathology, histopathology or organ weights. Vomiting occurred throughout the study, with a similar incidence in the treated and control groups, including one dog in the 5x group that vomited four hours after treatment.

In a well-controlled field study, NexGard was used concomitantly with other medications, such as vaccines, anthelmintics, antibiotics (including topicals), steroids, NSAIDs, anesthetics, and antihistamines. No adverse reactions were observed from the concomitant use of NexGard with other medications.

Storage Information:

Store at or below 30°C (86°F) with excursions permitted up to 40°C (104°F).

How Supplied:

NexGard is available in four sizes of beef-flavored soft chewables: 11.3, 28.3, 68 or 136 mg afoxolaner. Each chewable size is available in color-coded packages of 1, 3 or 6 beef-flavored chewables.

NADA 141-406, Approved by FDA

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NexGard[®]
(afoxolaner) Chewables

What one little chew can do

IMPORTANT SAFETY INFORMATION: NexGard is for use in dogs only. The most frequently reported adverse reactions include vomiting, pruritus, lethargy, diarrhea and lack of appetite. The safe use of NexGard in pregnant, breeding, or lactating dogs has not been evaluated. Use with caution in dogs with a history of seizures or neurologic disorders. For more information, see the full prescribing information or visit www.NexGardClinic.com.

¹Data on file.



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Please see Brief Summary on page 22.

Why I left a Fortune 500 company for a startup

My journey from practicing veterinarian to long-time animal health company executive was a long one. But a big, fun leap for me in the past year was heading to a female-focused, working-parent-friendly new chain of clinics. *By Jill Lopez, DVM, MBA*

There was a time when I owned a Blackberry, I rented movies from Blockbuster and I called for a taxi on a landline. Like many others, I replaced those relics with an iPhone, Netflix and Uber. My needs and tastes evolved over time, along with millions of others, which put Blockbuster out of

Who runs the (veterinary) world?

In August 2018, I left a Fortune 500 animal health company to become director of marketing at Essentials PetCare. The company aims to open walk-in veterinary clinics in select locations across the U.S. offering convenient, routine healthcare for pets.

I was first drawn to the company because it was female-focused. I noticed that many women had risen to the top of the company. Christine Battista, COO, is cofounder. The construction of clinics was being overseen by another woman, Brittany Clines. The director of human resources was also female, along with much of the staff. Frankly, after years in corporate America, it was gratifying. With all this in mind, I decided to join the company.

I quickly learned that the founders, Battista and Doug Spiker, DVM, had a unique, working-parent-friendly vision for the clinics. They recognized that many caregivers and parents have a difficult time managing the demands of their children and households as well as that of the practice. By not opening

with extended hours most days. These nontraditional hours give busy pet parents the flexibility to come in on their schedule without an appointment. By offering walk-in routine care on a convenient schedule, we can usually have clients in and out in about 20 minutes. We offer online check-in, which reserves a spot in line and cuts down on the (limited) wait times.

We can do this because of what we don't do

Part of being able to offer such flexibility for team members and clients is knowing what we can help with and what we can't. To avoid pet owners accidentally coming in with serious issues, we are upfront about our offerings on the website, in brochures and over the phone. We offer only preventive care—vaccinations and wellness work—and we explain that serious or urgent health issues should be cared for at a traditional clinic. We refer those patients to full-service clinics and hospitals in the area.

I'm excited to be a part of a company whose passion for providing quality veterinary care in the walk-in

I'm excited to be a part of a company whose passion for providing quality veterinary care in the walk-in market is evolving with the changing needs of veterinarians, team members and pet parents.

clinics until 10 a.m. on weekdays and shutting down from 2 to 4 p.m. each day, clinic staff will have time to drop off or pick up children from school and attend to their other household needs.

That solves one problem for working parents in the clinic, but what about the expected demographic of pet owners for a walk-in clinic? These customers are likely working parents themselves, and in order to cater to these customers, clinics will offer walk-in service seven days a week,

market is evolving with the changing needs of veterinarians, team members and pet parents. We plan to be around for a long, long time.

Dr. Jill Lopez is director of marketing for Essentials PetCare, a chain of walk-in veterinary clinics located in Walmarts. She has worked for Fortune 500 companies, global pet product manufacturers and national not-for-profit organizations. She is a West Virginia native who now calls New Jersey home.



business, almost killed off Blackberry and made dialing a taxi service—only to hear that they were out of cars—a thing of the past. We can glean one great lesson from this: failing to evolve will lead to extinction.

While I have been out of the practice world for many years, I remember well the rigors of working at a practice: the crazy hours, early surgery appointments, working through lunch and working weekends. Years later, I'm still a veterinarian. However, I'm now a mother of three children. Not only do I juggle the demands of the workplace, I also have to navigate my children's school, ballet practice, riding lessons, swimming sessions, gymnastics and Spanish classes. You've changed. I've changed. Yet most veterinary practices have remained the same. I doubt that I could return to practice now without seriously affecting the lives of my entire family. Many veterinarians who are working parents face a similar dilemma.



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'He threatened me!'

Humane euthanasia vs. a client's denial

Here's an age-old issue worth revisiting: What does a veterinarian do when a client refuses to acknowledge that her old dog is suffering?

Mrs. Reed had lived with her dog, Remy, for 13 years. They were inseparable.

Three months ago, Remy developed a cough. She thought it was a passing cold, but the cough persisted. So Mrs. Reed took Remy to Dr. Higgins' veterinary clinic.

Dr. Higgins did a complete workup. Remy's blood profile was fairly normal for a 13-year-old Lab. The physical exam showed some posterior degenerative joint disease and mild, unexplained weight loss. Dr. Higgins proceeded to take a radiograph of Remy's chest and wasn't surprised to see metastatic lung lesions or, as he called it, "popcorn chest." He immediately requested a radiology consultation, and

within the hour Remy was diagnosed with metastatic lung disease.

Dr. Higgins knew Mrs. Reed would be devastated to learn her dog had lung cancer. When she returned later to pick up Remy, Dr. Higgins spoke to her at length about the condition and its poor prognosis. He was sensitive but honest with his longtime client. He suggested Remy be put on palliative medications that would make him more comfortable and possibly slow the cancer's progression. He went on to tell her that Remy had approximately two to four months before the cancer would take its toll.

Mrs. Reed sat stoically and listened. She didn't believe it. She suggested that the weight loss was a result of

Remy not liking his dog food. She was in complete denial.

Nevertheless she wanted Remy to receive the very best treatment considerations. She wanted to see an oncologist and begin an appropriate chemotherapy protocol. She insisted that Remy was a special dog and had always beaten the odds in the past. Dr. Higgins assisted her in arranging an oncological appointment.

After extensive testing, the oncologist confirmed that metastatic disease was present in several of Remy's organs. The oncologist offered a chemotherapeutic protocol that would hopefully extend Remy's life but wouldn't cure him. Mrs. Reed pursued this course of treatment.



More dilemmas

Looking for ideas for a team meeting? Check out the scenarios at dvm360.com/rosenberg, read them together and discuss how your team would handle the situations.

Mrs. Reed used Dr. Higgins to implement the oncologist's chemo protocol and periodically visited the specialist for treatment assessments. Soon after treatment began, Remy started experiencing some side effects of the treatment along with progressive deterioration secondary to the aggressive cancer.

The next time Mrs. Reed came to his veterinary hospital, Dr. Higgins took a moment to counsel her. He explained that his goal as a practitioner was twofold—to treat his patients' disease but also to minimize their suffering. He emphasized that his patients were never frightened or in pain when the time came.

But Mrs. Reed refused to listen.

She ignored his comments and instead mentioned how Remy was enjoying his new treats more than the cheese snaps she'd been giving to him prior. And while Dr. Higgins understood the role denial plays in the grief process, it was his job to advocate for his patients. It was his professional opinion that the dog's weight loss, respiratory distress and general discomfort clearly fell into the category of suffering. He told Mrs. Reed that the time had come. It wasn't fair to Remy and she needed to make the decision to put him to sleep.

Mrs. Reed didn't react well.

She told Dr. Higgins that she didn't like being threatened, that she was going home and that she would speak to him later. Within two hours, Dr. Higgins received several calls. One was from Mrs. Reed's friend. The other was from her clergyman. At first both were defensive on behalf of Mrs. Reed. But after Dr. Higgins explained the situation, they understood his position and agreed to assist. Later that evening, Mrs. Reed returned to the clinic with her friend, her pastor and Remy.

She'd decided to put Remy to sleep.

But she was also distraught and angry. Through her tears she uttered, "No more dogs for me." She said she couldn't return to Dr. Higgins's clinic. The memories were too traumatic.

Clearly, Dr. Higgins acted on behalf of his patient. But did he wait too long? Did he handle Mrs. Reed appropriately? Was he too aggressive—or should he have been more aggressive?

How would you have handled this case with Mrs. Reed and Remy? Let us know at dvmnews@ubm.com.

Dr. Rosenberg's response

Every veterinarian has encountered this scenario. Understanding the stages of grief that pet owners experience when dealing with the death of a pet is critical. It's also important to never forget that we are first advocates for our patients. It's always better to err on the humane side rather than wait too

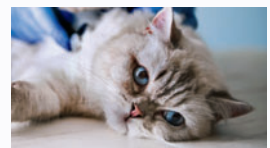
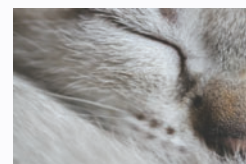
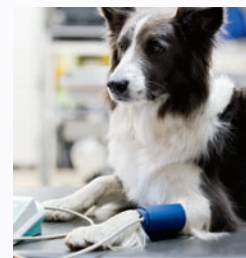
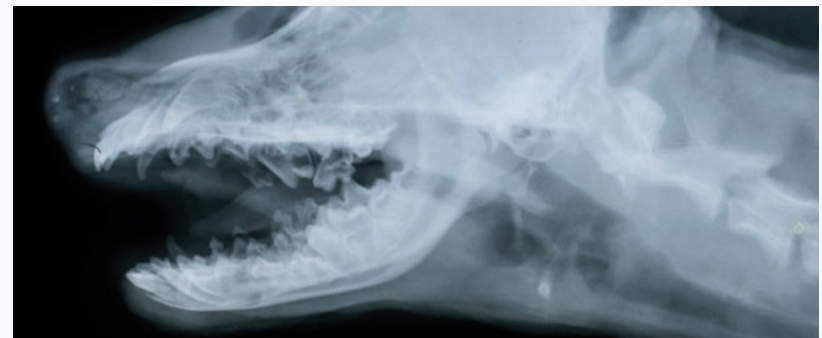
long to make a necessary recommendation. We always hope that pet owners can make the euthanasia decision in a proper and timely manner. When they can't, the veterinarian has to step in.

I think Dr. Higgins may have been too emotionally involved, but he ultimately made the right decision, even at the risk of being perceived unfairly.

Dr. Marc Rosenberg is director of the Voorhees Veterinary Center in Voorhees, New Jersey. Although many of the scenarios Dr. Rosenberg describes are based on real-life events, the veterinary practices, doctors and employees described are fictional. Share your comments on this article at dvm360.com/RosenbergEuth.

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Can't we just **sit tight** sometimes?

When it comes to providing optimal care for veterinary patients, sometimes the best action is no action at all. *By Mike Paul, DVM*

When presented with a problem, it's human nature to want to take action. For medical and veterinary healthcare providers, the urge to "do something" when a patient's health seems out of sync is compelling. All too often patients and pet owners also expect something to be done anytime they or their pet experiences the slightest symptom or sign. Illness and pain are frightening and surely something must be done, right? Nobody wants to hear, "Let's wait and see what happens."

Hurry up and slow down

No action is taken in a vacuum. Every intervention we undertake has clinical consequences with potential negative effects on the course of a case, and we must weigh those consequences against the potential benefits of our actions. Instead of rushing to take action, I invite you to consider the following admonishments: "Don't just do something; stand there!" and "Hurry up and slow down."

I have always believed that sometimes the best thing to do is nothing. Of course, I'm not recommending ignoring clinical signs and client complaints but rather keeping them in perspective. Observe, monitor and respond instead of taking immediate action. Every illness is important, but not every illness is urgent. All disease has an initial moment of onset—the first cough or missed meal or gastrointestinal upset—but we have all been presented with patients so early in the course of an illness that a real diagnosis was neither possible nor indicated. Yet we tend to react to client expectations and do something right away.

Blood tests are an indication of health at one moment in time, but is it the relevant moment? Radiographs often lag behind the course of a condition. Will radiographs obtained on day three reveal more than they did on day



one? The rapidly-out-of-control cost of care is a direct result of our sometimes unbridled urgency to gather diagnostics, ordering batteries of tests as a matter of course before initial results are even available.

While some caregivers are reflex doers, for others doing nothing initially is the primary way of thinking. If the patient is doing fine right now, why rock the boat? Given appropriate support, many conditions will resolve without the possible—and even likely—chance that we will do more harm than good. I recently learned a phrase for this approach termed "clinical inertia" that refers to "right care."

Primum non nocere

First, do no harm. It's the most basic tenet of medicine. At a close second is preventing clinical harm. In veterinary medicine today our first instinct is to submit blood or perform some other diagnostic test. Don't get me wrong, there are clearly indications—sometimes urgent—for invasive and non-invasive procedures to be conducted when a sick patient is presented. But there is a "time to every purpose." Eighteenth-century French philosopher Voltaire said, "The art of medicine

consists of amusing the patient while nature cures the disease."

Early in my veterinary education I was told by one of my professors that we have far less impact on clinical outcomes than we think. Most of the time if we don't make a situation worse it will improve on its own. Sometimes there is nothing we can do that will help. And other times—far less than half, I think—we have a definitive positive effect and the patient truly responds because of our actions rather than in spite of them. In other words, if you don't screw it up, it probably will be fine. The challenge is knowing which group your patient falls into.

Some years ago a chiropractor told me he saw his primary role in patient care as supervising the recovery of patients who were going to get better if they didn't get worse. By "adjusting" them every few days he could remind them to give it time. "If it hurts when you do that, don't do that," he told them. Maybe he was onto something.

Dr. Michael Paul is the former executive director of the Companion Animal Parasite Council and a former AAHA president. He is retired from practice and lives in Anguilla, British West Indies.

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¹ Grosenbaugh DA, De Luca K, Durand P-Y et al. Characterization of recombinant OspA in two different *Borrelia* vaccines with respect to immunological response and its relationship to functional parameters. *BMC Veterinary Research*. 2018;14:312. <https://doi.org/10.1186/s12917-018-1625-7>. Accessed November 7, 2018.

² Rice Conlon JA, Mather TN, Tanner P. Efficacy of a nonadjuvanted outer surface protein A, recombinant vaccine in dogs after challenge by ticks naturally infected with *Borrelia burgdorferi*.* *Vet Ther*. 2000;1(2):98-107.



Will your **employee handbook** come back to bite you?

A vaguely worded handbook may result in a tangle of litigation. Here's what you need to know before presenting one to your team members.

Frequently, when I discuss employment contracts with associates, they tell me they're not concerned about termination language because "I live in an 'at-will' state, so that term is unenforceable, right?"

I've heard this enough times that I think a brief explanation of at-will doctrine is in order. Employment at will is a fundamental legal principle that essentially puts an employer in the driver's seat. The idea is that a boss can fire anyone at any time for any reason (or no reason) without concern for le-

gal consequences imposed by government or threat of an employee lawsuit. But over time, the doctrine has been carved up with many exceptions as a result of legislation, case law and administrative mandates. Among them:

- > Employment is subject to unemployment insurance laws; businesses pay an economic penalty when a fired worker successfully claims.
- > Employees subject to collective bargaining (unions) ordinarily cannot be fired at will.
- > Firings that involve workers who

are members of a "suspect" class (older workers, minority workers and a number of others) may avail themselves of anti-discrimination laws that are contrary to the at-will doctrine.

> Key to our discussion here: Employment contracts may alter or reverse the impact of the at-will doctrine.

What this means for associate contracts

It seems like everybody believes that the at-will doctrine supports their chosen position. Employers think they



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can fire an associate at any time, with impunity, regardless of their contractual promise to provide 60 days’ notice. Associates think that if they’re fired for no reason, their noncompete is null and void because they’re free to take employment at will.

Long story short, employment under a written contract often limits the applicability or impact of the at-will doctrine. With that in mind, let’s have a look at employee handbooks.

Are employee manuals legally binding?

So why would a veterinary practice spend the time and money to develop an employee handbook in the first place? Some believe it’s simply a nice thing to do; they feel that a handbook fosters a sense of fairness and egalitarian treatment toward workers and therefore improves morale.

Clinic owners also say these handbooks keep them from having to answer the same questions over and over again, like “Where can I smoke?” and “Do I get a discount on pet food?” If it’s all written down, it’s less of a pain for management.

But there’s an important question to consider before drafting or distributing an employee handbook: By issuing this document, have you created a legally binding contract that cuts into your theoretical at-will rights? Under

I’m a firm believer in employee handbooks, but they have to be smart, they have to be kept current and their limitations must be clearly understood.

some circumstances, and in some jurisdictions, the answer may be “yes.” Here’s how this can happen:

If it looks like a duck ...

Is it crazy to think an employee might see an employee handbook as a contract containing promises the veterinary hospital is legally obligated to honor? First, it probably was written or reviewed by an attorney. Second, it probably incorporates important legal rights of the employee, spelling out the harassment policy, the smoking policy and so on. That sure sounds like it could be a legally binding stack of papers.

Also, the boss requires employees to sign a document saying, at minimum, that they acknowledge having received the handbook, and possibly that they agree to abide by its terms. Later, in court, is it such a reach for a judge to say the employee reasonably believed the handbook to constitute a contract? It looks, smells and quacks like a contract, so any employee “obligations” stated therein may be, in fact, obligations.

How to preserve the employer's at-will rights

Don’t misunderstand. I’m a firm believer in employee handbooks, but they have to be smart, they have to be kept current and their limitations must be clearly understood.

There is one critical item that needs to be included in the handbook: the statement that it’s not a contract. If this language is included, it may help rebut an employee’s eventual assertion that the manual is a contract with the employer or close enough that the employer is obligated to follow its terms.

Case law throughout the United States tells us not only that it’s vital to state that these handbooks are not contracts, but the wording must be “conspicuous” and “explicit.” So if you bury the contract disclaimer halfway down page 32 and don’t use distinctive print, the disclaimer may well be ineffectual. You want the wording in bold print, in a large font and placed at a location where the employee is likely to actually see it, like on the cover or near the spot where they must sign indicating receipt of the handbook.

The risks that come with 'progressive discipline'

One common area where employers assume unanticipated risk in formulating an employee handbook is in the provisions providing for “progressive discipline.” This is where, for example, the veterinary clinic manual states that on the first occurrence of an episode of bad behavior, the punishment will be a verbal warning. Second time, a written warning. Third time, dismissal from employment.

This sounds innocuous enough, but look at it from a litigator’s perspective. By establishing a protocol for progressive discipline, there is a conceivable interpretation that the employee is entitled to the position currently held, and that only if an employer finds cause to discharge an employee may a firing take place. If you are a practice owner, you do not want this. It implies a sense of entitlement, and not only does this create legal risks, it may also influence some employees’ conduct negatively—they may feel that their best efforts are really not required in order to have job security.

If a veterinary hospital elects to memorialize such a progressive discipline policy, the language should be carefully drafted, and it should definitely be accompanied by a clearly identifiable contract disclaimer.

Fix your book before the lawsuit is filed

Employment attorneys will tell you that, by far, the most common time for them to be contacted to review and revise an employment handbook is immediately after a company has been drawn into litigation. Best practice with respect to these documents is to be judicious about the topics covered as well as the specificity with which they’re addressed. Before you distribute one of these handbooks, do your best to brainstorm how it could come back to bite you later on. If you have doubts, get professional advice. The law has become much more complicated since the invention of employment-at-will doctrine.

Dr. Christopher J. Allen is president of the Associates in Veterinary Law PC, which provides legal and consulting services exclusively to veterinarians. He can be reached via email at info@veterinarylaw.com.

Brief Summary: Before using please consult the product insert, a summary of which follows.

ANADA 200-595, Approved by FDA

Carprieve® (carprofen) Chewable Tablets

Non-steroidal anti-inflammatory drug

For oral use in dogs only

CAUTION: Federal law restricts this drug to use by or on the order of a licensed veterinarian.

INDICATIONS: Carprieve is indicated for the relief of pain and inflammation associated with osteoarthritis and for the control of postoperative pain associated with soft tissue and orthopedic surgeries in dogs.

CONTRAINDICATIONS: Carprieve should not be used in dogs exhibiting previous hypersensitivity to carprofen.

WARNINGS: Keep out of reach of children. Not for human use. Consult a physician in cases of accidental ingestion by humans. **For use in dogs only.** Do not use in cats.

All dogs should undergo a thorough history and physical examination before initiation of NSAID therapy. Appropriate laboratory tests to establish hematological and serum biochemical baseline data prior to, and periodically during, administration of any NSAID should be considered. **Owners should be advised to observe for signs of potential drug toxicity.**

PRECAUTIONS: As a class, cyclooxygenase inhibitory NSAIDs may be associated with gastrointestinal, renal, and hepatic toxicity. The most frequently reported effects have been gastrointestinal signs. Events involving suspected renal, hematologic, neurologic, dermatologic, and hepatic effects have also been reported. Patients at greatest risk for renal toxicity are those that are dehydrated, on concomitant diuretic therapy, or those with renal, cardiovascular, and/or hepatic dysfunction. Concurrent administration of potentially nephrotoxic drugs should be approached cautiously with appropriate monitoring. Concomitant use of carprofen with other anti-inflammatory drugs, such as other NSAIDs or corticosteroids, should be avoided because of the potential increase of adverse reactions, including gastrointestinal ulcerations and/or perforations.

Carprieve is not recommended for use in dogs with bleeding disorders (e.g., Von Willebrand's disease), as safety has not been established in dogs with these disorders. The safe use of Carprieve in animals less than 6 weeks of age, pregnant dogs, dogs used for breeding purposes, or in lactating bitches has not been established.

Due to the liver flavoring contained in Carprieve chewable tablets, store out of the reach of dogs and in a secured area.

INFORMATION FOR DOG OWNERS: Carprieve, like other drugs of its class, is not free from adverse reactions. Owners should be advised of the potential for adverse reactions and be informed of the clinical signs associated with drug intolerance. Adverse reactions may include decreased appetite, vomiting, diarrhea, dark or tarry stools, increased water consumption, increased urination, pale gums due to anemia, yellowing of gums, skin or white of the eye due to jaundice, lethargy, incoordination, seizure, or behavioral changes. **Serious adverse reactions associated with this drug class can occur without warning and in rare situations result in death (see Adverse Reactions). Owners should be advised to discontinue Carprieve therapy and contact their veterinarian immediately if signs of intolerance are observed.**

ADVERSE REACTIONS: During investigational studies for the caplet formulation with twice daily administration of 1 mg/lb, no clinically significant adverse reactions were reported. Some clinical signs were observed during field studies (n=297) which were similar for carprofen caplet- and placebo-treated dogs. Incidences of the following were observed in both groups: vomiting (4%), diarrhea (4%), changes in appetite (3%), lethargy (1.4%), behavioral changes (1%), and constipation (0.3%). The product vehicle served as control. There were no serious adverse events reported during clinical field studies with once daily administration of 2 mg/lb. The following categories of abnormal health observations were reported. The product vehicle served as control.

Observation	Percentage of Dogs with Abnormal Health Observations Reported in Clinical Field Study (2 mg/lb once daily)	
	Carprofen (n=129)	Placebo (n=132)
Inappetence	1.6	1.5
Vomiting	3.1	3.8
Diarrhea/Soft stool	3.1	4.5
Behavior change	0.8	0.8
Dermatitis	0.8	0.8
PUPD	0.8	--
SAP increase	7.8	8.3
ALT increase	5.4	4.5
AST increase	2.3	0.8
BUN increase	3.1	1.5
Bilirubinuria	16.3	12.1
Ketonuria	14.7	9.1

Clinical pathology parameters listed represent reports of increases from pre-treatment values; medical judgment is necessary to determine clinical relevance. During investigational studies of surgical pain for the caplet formulation, no clinically significant adverse reactions were reported. The product vehicle served as control.

Percentage of Dogs with Abnormal Health Observations Reported in Surgical Pain Field Studies with Caplets (2 mg/lb once daily)

Observation*	Carprofen (n=148) Placebo (n=149)	
	10.1	13.4
Vomiting	6.1	6.0
Diarrhea/Soft stool	2.7	0
Ocular disease	1.4	0
Inappetence	2.0	1.3
Dermatitis/Skin lesion	0.7	0
Dysrhythmia	1.4	0
Apnea	1.4	0
Oral/Periodontal disease	0.7	1.3
Pyrexia	1.4	1.3
Urinary tract disease	1.4	0
Wound drainage	1.4	0

* A single dog may have experienced more than one occurrence of an event.

During investigational studies for the chewable tablet formulation, gastrointestinal signs were observed in some dogs. These signs included vomiting and soft stools. Post-Approval Experience:

Although not all adverse reactions are reported, the following adverse reactions are based on voluntary post-approval adverse drug experience reporting. The categories of adverse reactions are listed in decreasing order of frequency by body system.

Gastrointestinal: Vomiting, diarrhea, constipation, inappetence, melena, hematemesis, gastrointestinal ulceration, gastrointestinal bleeding, pancreatitis.

Hepatic: Inappetence, vomiting, jaundice, acute hepatic toxicity, hepatic enzyme elevation, abnormal liver function test(s), hyperbilirubinemia, bilirubinuria, hypoalbuminemia. Approximately one-fourth of hepatic reports were in Labrador Retrievers.

Neurologic: Ataxia, paresis, paralysis, seizures, vestibular signs, disorientation.

Urinary: Hematuria, polyuria, polydipsia, urinary incontinence, urinary tract infection, azotemia, acute renal failure, tubular abnormalities including acute tubular necrosis, renal tubular acidosis, glucosuria.

Behavioral: Sedation, lethargy, hyperactivity, restlessness, aggressiveness.

Hematologic: Immune-mediated hemolytic anemia, immune-mediated thrombocytopenia, blood loss anemia, epistaxis.

Dermatologic: Pruritus, increased shedding, alopecia, pyotraumatic moist dermatitis (hot spots), necrotizing panniculitis/vasculitis, ventral ecchymosis.

Immunologic or hypersensitivity: Facial swelling, hives, erythema.

In rare situations, death has been associated with some of the adverse reactions listed above.

To report a suspected adverse reaction call 1-866-591-5777.

DOSAGE AND ADMINISTRATION: Always provide Client Information Sheet with prescription. Carefully consider the potential benefits and risk of Carprieve and other treatment options before deciding to use Carprieve. Use the lowest effective dose for the shortest duration consistent with individual response. The recommended dosage for oral administration to dogs is 2 mg/lb of body weight daily. The total daily dose may be administered as 2 mg/lb of body weight once daily or divided and administered as 1 mg/lb twice daily. For the control of postoperative pain, administer approximately 2 hours before the procedure. **See product insert for complete dosing and administration information.**

STORAGE: Store 25 mg and 75 mg Carprieve chewable tablets at 59-86°F (15-30°C). Store 100 mg Carprieve chewable tablets at controlled room temperature, 68-77°F (20-25°C). Use half-tablet within 30 days.

HOW SUPPLIED: Carprieve chewable tablets are scored, and contain 25 mg, 75 mg, or 100 mg of carprofen per tablet. Each tablet size is packaged in bottles containing 30, 60, or 180 tablets.

Made in the UK.

Manufactured by: Norbrook Laboratories Limited, Newry, BT35 6PU, Co. Down, Northern Ireland

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Norbrook®

101 March 2017



PALATABLE. PROFITABLE. PROVEN.

CARPRIEVE® (carprofen) CHEWABLE TABLETS FOR DOGS

Man's best friend deserves readily accepted and effective pain management. In a recent study¹, Carprieve® Chewable Tablets were found to be equally accepted by dogs as Rimadyl® (carprofen) Chewable Tablets. Additionally, a survey of veterinarians², 100% rated Carprieve® Chewable Tablets as either similar in palatability or more palatable than their currently recommended chewable NSAID.

Discover Carprieve® Chewable Tablets – an FDA-approved, liver-flavored NSAID to help you maintain your practice's high standards of care at a reduced cost to you and your clients.

To read the full study or for more information on Carprieve®, visit norbrook.com or call (866) 591-5777.

Please see Brief Summary on page 32.

MilbeGuard™

(milbemycin oxime)

Flavored Tablets

INFORMATION FOR DOSING DOGS

The once-a-month tablet that prevents heartworm disease, controls adult hookworm, and removes and controls adult roundworm and whipworm infections in dogs and puppies.

Caution: Federal (USA) law restricts this drug to use by or on the order of a licensed veterinarian. Keep this and all drugs out of the reach of children.

Description: MILBEGUARD (milbemycin oxime) Flavored Tablets are available in four tablet sizes in color-coded packages for oral administration to dogs and puppies. Each tablet is formulated to provide a minimum of 0.23 mg/lb (0.5 mg/kg) body weight of milbemycin oxime. Milbemycin oxime consists of the oxime derivatives of 5-didehydromilbemycins in the ratio of approximately 80% A₄ (C₃₂H₄₅NO₇, MW 555.71) and 20% A₃ (C₃₁H₄₃NO₇, MW 541.68).

Package color	Milbemycin oxime tablet
Yellow	2.3 mg*
Blue	5.75 mg
Purple	11.5 mg
Red	23.0 mg

*for dogs only

Indications: MILBEGUARD Flavored Tablets are indicated for use in the prevention of heartworm disease caused by *Dirofilaria immitis*, the control of adult *Ancylostoma caninum* (hookworm), and the removal and control of adult *Toxocara canis* and *Toxascaris leonina* (roundworms) and *Trichuris vulpis* (whipworm) infections in dogs and in puppies four weeks of age or greater and two pounds body weight or greater.

Dosage: MILBEGUARD Flavored Tablets are given orally, once a month, at the recommended minimum dosage rate of 0.23 mg milbemycin oxime per pound of body weight (0.5 mg/kg).

Recommended Dosage Schedule for Dogs

Body Weight	MilbeGuard Flavored Tablets
2-10 lbs.	One tablet (2.3 mg)
11-25 lbs.	One tablet (5.75 mg)
26-50 lbs.	One tablet (11.5 mg)
51-100 lbs.	One tablet (23.0 mg)

Dogs over 100 lbs. are provided the appropriate combination of tablets.

Administration: MILBEGUARD Flavored Tablets are dual-purpose and may be offered in food or administered as other tablet medications. Watch the dog closely following dosing to be sure the entire dose has been consumed. If it is not entirely consumed, redose once with the full recommended dose as soon as possible.

MILBEGUARD Flavored Tablets must be administered monthly, preferably on the same date each month. The first dose should be administered within one month of the dog's first exposure to mosquitoes and monthly thereafter until the end of the mosquito season. If a dose is missed and a 30-day interval between dosing is exceeded, administer MILBEGUARD Flavored Tablets immediately and resume the monthly dosing schedule.

If MILBEGUARD Flavored Tablets replaces diethylcarbamazine (DEC) for heartworm prevention, the first dose must be given within 30 days after the last dose of DEC.

Precautions: Do not use in puppies less than four weeks of age or less than two pounds of body weight. Prior to initiation of the MILBEGUARD Flavored Tablets treatment program, dogs should be tested for existing heartworm infections. Infected dogs should be treated to remove adult heartworms and microfilariae prior to initiating treatment with MILBEGUARD Flavored Tablets. Mild, transient hypersensitivity reactions manifested as labored respiration, vomiting, salivation and lethargy, have been noted in some treated dogs carrying a high number of circulating microfilariae. These reactions are presumably caused by release of protein from dead or dying microfilariae.

Adverse Reactions: The following adverse reactions have been reported following the use of MILBEGUARD Flavored Tablets: Depression/lethargy, vomiting, ataxia, anorexia, diarrhea, convulsions, weakness and hypersalivation.

Efficacy: MILBEGUARD Flavored Tablets eliminate the tissue stage of heartworm larvae and the adult stage of hookworm (*Ancylostoma caninum*), roundworms (*Toxocara canis*, *Toxascaris leonina*) and whipworm (*Trichuris vulpis*) infestations when administered orally according to the recommended dosage schedule. The anthelmintic activity of milbemycin oxime is believed to be a result of interference with invertebrate neurotransmission.

Safety: Milbemycin oxime has been tested safely in over 75 different breeds of dogs, including collies, pregnant females, breeding males and females, and puppies over two weeks of age. In well-controlled clinical field studies, 786 dogs completed treatment with milbemycin oxime. Milbemycin oxime was used safely in animals receiving frequently used veterinary products such as vaccines, anthelmintics, antibiotics, steroids, flea collars, shampoos and dips.

Two studies in heartworm-infected dogs were conducted which demonstrated mild, transient hypersensitivity reactions in treated dogs with high microfilaremia counts (see Precautions for reactions observed). Safety studies in pregnant dogs demonstrated that high doses (1.5 mg/kg = 3X) of milbemycin oxime given in an exaggerated dosing regimen (daily from mating through weaning), resulted in measurable concentrations of the drug in milk. Puppies nursing these females which received exaggerated dosing regimens demonstrated milbemycin-related effects. These effects were directly attributable to the exaggerated experimental dosing regimen. The product is normally intended for once-a-month administration only. Subsequent studies included using 3X daily from mating to one week before weaning and demonstrated no effects on the pregnant females or their litters. A second study where pregnant females were dosed once at 3X the monthly use rate either before, on the day of or shortly after whelping resulted in no effects on the puppies.

Some nursing puppies, at 2, 4, and 6 weeks of age, given greatly exaggerated oral milbemycin oxime doses (9.6 mg/kg = 19X) exhibited signs typified by tremors, vocalization and ataxia. These effects were all transient and

puppies returned to normal within 24 to 48 hours. No effects were observed in puppies given the recommended dose of milbemycin oxime (0.5 mg/kg). This product has not been tested in dogs less than 1 kg weight.

A rising-dose safety study conducted in rough-coated collies, manifested a clinical reaction consisting of ataxia, pyrexia and periodic recumbency, in one of fourteen dogs treated with milbemycin oxime at 12.5 mg/kg (25X monthly use rate). Prior to receiving the 12.5 mg/kg dose (25X monthly use rate) on day 56 of the study, all animals had undergone an exaggerated dosing regimen consisting of 2.5 mg/kg milbemycin oxime (5X monthly use rate) on day 0, followed by 5.0 mg/kg (10X monthly use rate) on day 14 and 10.0 mg/kg (20X monthly use rate) on day 32. No adverse reactions were observed in any of the collies treated with this regimen up through the 10.0 mg/kg (20X monthly use rate) dose.

How supplied: MILBEGUARD Flavored Tablets are available in four tablet sizes (see Dosage section), formulated according to the weight of the dog. Each tablet size is available in color-coded packages of 6 tablets each, which are packaged 10 per display carton.

Storage conditions: MILBEGUARD Flavored Tablets should be stored at room temperature, between 68° and 77°F (20-25°C).

INFORMATION FOR DOSING CATS

The once-a-month tablet that prevents heartworm disease and removes adult roundworms and hookworms in cats and kittens.

Caution: Federal (USA) law restricts this drug to use by or on the order of a licensed veterinarian. Keep this and all drugs out of the reach of children.

Description: MILBEGUARD Flavored Tablets for Cats are available in three tablet sizes in color-coded packages for oral administration to cats and kittens. Each tablet is formulated to provide a minimum of 0.9 mg/lb (2.0 mg/kg) body weight of milbemycin oxime. Milbemycin oxime consists of the oxime derivatives of 5-didehydromilbemycins in the ratio of approximately 80% A₄ (C₃₂H₄₅NO₇, MW 555.71) and 20% A₃ (C₃₁H₄₃NO₇, MW 541.68).

Indications: MILBEGUARD Flavored Tablets for Cats are indicated for use in the prevention of heartworm disease caused by *Dirofilaria immitis*, and the removal of adult *Ancylostoma tubaeforme* (hookworm) and *Toxocara cati* (roundworm) in cats and kittens six weeks of age or greater and 1.5 lbs. body weight or greater.

Dosage: MILBEGUARD Flavored Tablets for Cats are given orally, once a month, at the recommended minimum dosage rate of 0.9 mg milbemycin oxime per pound of body weight (2.0mg/kg).

Recommended Dosage Schedule for Cats

Body Weight	MilbeGuard Flavored Tablets
1.5-6 lbs.	One tablet (5.75 mg)
6.1-12 lbs.	One tablet (11.5 mg)
12.1-25 lbs.	One tablet (23.0 mg)

Cats over 25 lbs. are provided the appropriate combination of tablets.

Administration: MILBEGUARD Flavored Tablets for Cats may be offered in food or administered as other tablet medications. The tablets can be broken for ease of administration. Watch the cat closely following dosing to be sure the entire dose has been consumed. If it is not entirely consumed, redose once with the full recommended dose as soon as possible.

MILBEGUARD Flavored Tablets for Cats must be administered monthly, preferably on the same date each month. The first dose should be administered within one month of the cat's first exposure to mosquitoes and monthly thereafter until the end of the mosquito season. If a dose is missed and a 30-day interval between dosing is exceeded, administer MILBEGUARD Flavored Tablets for Cats immediately and resume the monthly dosing schedule. It is recommended that cats be tested for existing heartworm infection prior to starting treatment with MILBEGUARD Flavored Tablets for Cats (See Precautions).

Precautions: Do not use in kittens less than six weeks of age or less than 1.5 lbs. body weight. Safety in heartworm positive cats has not been established. Safety in breeding, pregnant, and lactating queens and breeding toms has not been established.

Efficacy: MILBEGUARD Flavored Tablets for Cats eliminate the tissue stage of heartworm larvae and hookworm (*Ancylostoma tubaeforme*) and roundworm (*Toxocara cati*) infections when administered orally according to the recommended dosage schedule. The anthelmintic activity of milbemycin oxime is believed to be a result of interference with invertebrate neurotransmission.

Safety: Milbemycin oxime has been tested safely in over 8 different breeds of cats. In well-controlled clinical field studies 141 cats completed treatment with milbemycin oxime. Milbemycin oxime was used safely in animals receiving frequently used veterinary products such as vaccines, anthelmintics, anesthetics, antibiotics, steroids, flea collars, shampoos and dips.

Safety studies were conducted in young cats and kittens and doses of 1X, 3X and 5X the minimum recommended dose of 2.0 mg/kg demonstrated no drug-related effects. Tolerability studies at exaggerated doses of 10X also demonstrated no drug-related adverse effects in kittens and young adult cats.

How supplied: MILBEGUARD Flavored Tablets for Cats are available in three tablet sizes (see Dosage section), formulated according to the weight of the cat. Each tablet size is available in color-coded packages of 6 tablets each, which are packaged 10 per display carton.

Storage conditions: MILBEGUARD Flavored Tablets for Cats should be stored at room temperature, between 68° and 77°F (20-25°C).

Manufactured for:

Ceva Animal Health, LLC

Lenexa, KS 66215

Made in Canada.

ANADA #200-629, Approved by FDA



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MEDICINE | Animal welfare



Over the past decade several untoward health events related to juvenile spay/neuter surgery have come to light, including cancer and behavioral problems. Do other benefits of early spaying and neutering outweigh these risks?

Reexamining the early spay-neuter paradigm in dogs

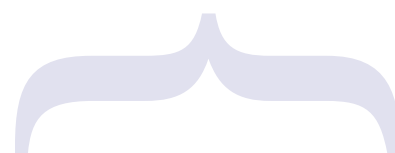
Two veterinarians respectfully discuss their disagreements about the medical and societal need for early spays and neuters in America's canines.

By Michael Petty, DVM, CVPP, CVMA, CCRT, CAAPM

Many of the clinical choices veterinarians make are so deeply ingrained that we often practice medicine without stopping to wonder why we do things the way we do, who decided it should be done that way and whether we are potentially causing our patients harm. Consider dewclaw removal in dogs. Many veterinarians perform this procedure on puppies based on the desire of either the breeder to improve aesthetics or the owner to guard against some possible future trauma

that might injure the dewclaw. Yet those in the agility/sporting world not only understand the importance of this digit during athletic events, but they also know that osteoarthritis in the carpal joint develops in many dogs that have this digit removed as a puppy. The dewclaw is attached to and helps stabilize many of the carpal tendons and ligaments. Without this stabilization, carpal osteoarthritis might ensue, especially in canine athletes.

The decision to refuse dewclaw removal should be a relatively easy one, then, as the only issue to consider is educating breeders and owners about the dangers of the procedure; no larger



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societal issues are at play. If only that were the case when it comes to the timing of spay/neuter surgery.

Juvenile gonadectomy and canine health concerns

Since the start of my career 40 years ago, prepubertal spay/neuter has been the norm in the United States, usually performed in dogs about 6 months of age. I was told at the time that spayed female dogs had a 90% lower incidence of mammary tumors compared with intact females. As this practice became the norm for spay surgeries, neutering at the same age followed with no real reasoning behind it. It wasn't until I became certified in canine rehabilitation 10 years ago that I became part of a discussion about the negative impact of prepubertal spay/neuter on canine conformation.

Puberty initiates a release of hormones that help close the epiphyseal plates on long bones. Absent this signal, the long bones grow beyond their intended length and interfere with the normal size and mechanical relationship between bone and joint.¹ This abnormal relationship can lead to a variety of orthopedic issues, including an increased incidence of cranial cruciate ligament rupture,²⁻⁴ hip dysplasia⁵ and patellar luxation.⁶ I can almost always predict whether a purebred dog was spayed or neutered prior to puberty based on conformational differences.

Over the past decade several other untoward health events related to juvenile spay/neuter surgery have come to light, including cancer and behavioral problems.^{4,7} Female golden retrievers spayed at an early age have a higher incidence of mast cell tumor, for example, and neutered male golden retrievers have a higher incidence of lymphosarcoma.⁴ Another study showed an increase in several types of cancer in Vizslas, including mast cell tumors, lymphoma and hemangiosarcoma.⁷ Interestingly, this same study also showed an increased incidence of behavioral disorders, including fear of storms. Results from another study showed up to a 38% increase in vaccine reactions in spayed and neutered dogs compared with intact dogs, but the age at which spay/neuter surgery occurred was not considered.⁸

Now that we know that there is a potential relationship between juvenile gonadectomy and health issues, I

suspect that even more problems will be found as researchers examine different populations to compare dogs that undergo early and late spay/neuter with intact dogs.

These issues need to be considered against the backdrop of the unfortunate number of healthy and treatable animals that must be euthanized every year in this country, often due to indiscriminate breeding and a lack of resources to treat and place these animals. For comment on this I reached out to Mark Goldstein, DVM, former head of the San Diego Humane Society and SPCA, whose book *Lions and Tigers and Hamsters* will be available later this year.

By Mark Goldstein, DVM

Veterinarians must always be open minded and ready to challenge the status quo when new information comes to light challenging how we practice. Just 10 years ago, declawing cats was considered routine in most practices. Today a plethora of available information documents the short- and long-term damage of this practice to our feline friends, rendering it for many an inhumane procedure.

It is imperative that how we practice medicine evolves as people become more responsible pet owners. Having said that, I don't believe there is conclusive evidence to suggest that prepubertal spays and neuters result in more harm than good. In fact, I would argue that the benefit of early sterilization to control overpopulation and the subsequent risk of having to euthanize dogs outweighs the increased chance of potential orthopedic, developmental or neoplastic problems.

These studies also have to compare the incidence of health and behavioral problems associated with prepubertal spay/neuter against the incidence in intact dogs; such concerns may include pyometra, dealing with a dog in heat in a household, and the desire of intact males to roam. The answer, of course, is not as simple as sterilizing them when they are older because in many regions of the country post-adoption sterilization of shelter animals simply does not occur. That is why various jurisdictions in the United States have laws that require sterilization before dogs are adopted from shelters.

Just a few decades ago, 13 to 15 million healthy and treatable dogs and cats were euthanized each year in shelters nationwide.⁹ Today, that number is much closer to 1.5 to 2 million—still a tragic number but one that shows great strides. Proactive sterilization of shelter animals before they are adopted is considered the single greatest reason for this achievement.¹⁰ Shelter programs that incentivize people to sterilize their pet after adoption, including contracts with local veterinarians and deposits for later spay/neuter surgery, have been proven largely ineffective nationwide.

If one accepts that the best chance for a dog to be sterilized is before it leaves the shelter, then a study from the University of Georgia demonstrates why completing the procedure before adoption—regardless of age—is critical. After analyzing the records of over 80,000 male and female canine patients, the investigators demonstrated that sterilized dogs have a longer life expectancy than nonsterilized dogs⁹:

- > Mean age of death of intact dogs: 7.9 years
- > Mean age of death of sterilized dogs: 9.4 years
- > Increased life expectancy in sterilized male dogs: 13.8%
- > Increased life expectancy in sterilized female dogs: 26.3%

Literature reports that suggest health or behavioral issues from prepubertal spay/neuter surgery should be interpreted cautiously, as several issues may cast doubt on the conclusions:

- > Many variables, such as diet, weight, lifestyle and the economic ability of the owner to seek out medical intervention, cannot be controlled in retrospective studies.
- > Research from referral hospitals or universities may include population bias because the study populations are already filtered.
- > Association does not prove cause and effect.
- > Many studies use relatively small patient numbers compared with the general population.
- > Results from one breed study cannot be extrapolated to all breeds or to mixed breeds.⁹
- > Studies from different countries and cultures present another set of variables and should not be used to draw conclusions about all dogs in the U.S. For example, there are significant



A guided view

Hear the thoughts of Dr. Philip Bushby, a member of the task force that created the Association of Shelter Veterinarians' guidelines on spay-neuter programs, at dvm360.com/whentospay.

regional variations in the number and breed of dogs entering our shelters.

The art of practicing medicine ultimately dictates that the veterinarian consider all relevant variables, including the client's goals and means, when making recommendations about sterilization timing for individual animals.¹⁰

By Michael Petty, DVM, CVPP, CVMA, CCRT, CAAPM

I concur with most of Dr. Goldstein's points. I suspect that we haven't found issues with other breeds simply because we haven't looked, but time will tell if and when someone looks at a larger variety of breeds. And he is right, at this early stage we cannot know whether these statistical differences have a causal effect from early spay/neuter. Although the numbers of dogs in the University of Georgia study are impressive, other studies have shown the opposite is true. For example, one study¹¹ showed that intact female Rottweilers had a threefold increase in longevity over spayed Rottweilers.

One of the things we absolutely agree on is that perhaps the real answer to overpopulation lies in our attitude about how people in this country approach the problem of strays and overpopulation compared with elsewhere. Let's compare the spaying and neutering of dogs and cats in the United States with two Nordic countries, Norway and Finland.

In Norway, it is against the law to spay or neuter a dog except for medical reasons or reasons of socialization (documented cases usually involve male dogs that are considered aggressive due to an overactive sex drive). Under the Norwegian Animal Welfare Act, no cosmetic surgical procedure of any kind (ears, tails and dewclaws included) is to be used to adapt animals to the needs of humans, unless strictly necessary. Despite the fact that virtually no animals are spayed or neutered in Norway, the country's homeless dog population is nonexistent. In fact, the single humane society/animal shelter in all of Norway has a capacity for fewer than 25 animals!

Although Finland does not have a law against spaying and neutering dogs, the majority of dogs there are intact. I learned this during a conversation with a veterinarian in Finland.

When I asked her what humane societies were like in her country, she responded by asking, "What is a humane society?" When I explained that they were for stray dogs, she said there are no stray dogs in Finland. "Sure, dogs get lost," she said, "and if someone sees a strange dog hanging around their house, they call the police who capture the dog, check it for a microchip and either return it to their owner or find a new home for it." I was flabbergasted. Most animals in both Finland and Norway are microchipped, and owners have a sense of responsibility for their animal's behavior, care and well-being that just isn't seen in the United States. Statistics are similar for Sweden and Denmark as well.

In the United States, by contrast, up to 2 million dogs and cats are euthanized in animal shelters every year. I do not understand the underlying attitudinal differences between U.S. and Nordic pet owners that make the euthanasia and homeless numbers so large in the United States and virtually nonexistent in Scandinavia, but it clearly isn't wholly reliant on sterilization of the pet population. Societal attitudes toward animal care are simply better there.

In the end, it really falls on the veterinary community to educate pet owners about responsible pet care and overpopulation. We need to discuss responsible pet care with clients, including the avoidance of unwanted pregnancies. When clients want to spay or neuter their dog, it is within our power to ask them to delay the procedure until after puberty. This has been the policy in my clinic for the past 10 years, and not a single client's dog has had an accidental pregnancy to date. Of course, we can't influence those dog owners who never come to see us, but we can help our own patients avoid unnecessary pain and suffering that potentially comes with early spay/neuter and do our part to reduce the homeless pet population.

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Dr. Michael Petty, CVPP, CVMA, CCRT, CAAPM, owns Arbor Pointe Veterinary Hospital in Canton, Michigan, and is a frequent speaker at the Fetch dvm360 conferences. Dr. Mark Goldstein has experience working in private practice as well as with zoos and local shelters.



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A reminder postcard for your heartworm protocols

With new treatment guidelines out, it's time to revisit your strategies for heartworm prevention and treatment for cats and dogs. *By Christopher Rehm, DVM*



Whether you practice in Alabama, Arizona, California or Connecticut, chances are you have a protocol in place for routine heartworm screening and prevention as well as a plan to treat heartworm-positive dogs. But the American Heartworm Society (AHS), which continually monitors the latest studies, has recently updated its guidelines.

Preventives: Assessing risk

The AHS heartworm guidelines call for year-round administration of heartworm preventives and practical steps to reduce mosquito exposure (for example, eliminating standing water and keeping dogs indoors during peak mosquito times) as the backbone of any prevention protocol. However, added risk may mean additional preventive steps are needed. Factors that constitute high risk include:

- > **Heartworm prevalence.** The relative risk of heartworm infection where you practice may vary both from year to year and season to season. Take a year-over-year look at the number of heartworm cases you've been diagnosing. Has the number risen? The presence of heartworm-positive dogs along with environmental and climate conditions that favor the proliferation of mosquitoes—either seasonally or year-round—can increase the risk of heartworm transmission.

- > **Client compliance.** The efficacy of

a prevention program is impaired by poor or inconsistent compliance. This also increases risk.

If the relative risk of heartworm transmission is high or client compliance is less than desirable, consider adding an EPA-approved repellent/ectoparasiticide. This will help control mosquitoes and interrupt the chain of transmission by reducing transmission from infected mosquitoes to dogs and infected dogs to mosquitoes.

Testing: The how and when of heat treatment

Heat treatment of serum samples prior to antigen testing can improve testing accuracy when antigen blocking produces false-negative results on in-clinic heartworm tests. While acknowledging that this added step has value when active clinical disease is suspected in the absence of a positive antigen test, the AHS does not recommend this step for routine in-clinic screening.

Why not? The available heartworm tests are highly sensitive and accurate. Heat treatment of samples is contrary to label instructions for in-house tests and may interfere with the accuracy of both heartworm tests and combination tests designed to detect antibodies of other infectious agents.

Suspected serum samples should be sent to a veterinary reference lab or a college of veterinary medicine's parasitology department.

Treatment: Make the AHS protocol your go-to

The step-by-step AHS heartworm treatment protocol—which includes administering a macrocyclic lactone to kill juvenile worms and doxycycline to eliminate *Wolbachia* species bacteria prior to melarsomine administration—is designed to help reduce the severity of complications from adulticide therapy. The protocol includes a one-month waiting period between antibiotic and adulticide administration to allow more time for effects of the doxycycline to reduce worm biomass, reduce *Wolbachia* species metabolites and prevent microfilariae from maturing.

The AHS argues that this should be the default heartworm treatment. It's true that alternative non-arsenical protocols have been studied in the U.S. and Europe because of the need in cases where melarsomine treatment can't be used. However, the length of time required to kill adult worms, the uncertainty of "slow kill" treatment in resistance, the increased pathology, and the unknown restriction requirements with these protocols make them less than ideal for most patients and less predictable in outcomes. More studies are definitely needed.

Dr. Christopher Rehm is president of the American Heartworm Society and owner of Rehm Animal Hospitals in Mobile, Alabama.



More on heartworms
Find out how not to take "no" for an answer at dvm360.com/heartwormno and how to counter cost concerns at dvm360.com/heartwormcost.

New initiative aims to spread heartworm awareness, action

With its monthly Top 10 Cities Heartworm Report, CAPC hopes to boost awareness of the growing threat.

The spread of heartworm disease is linked to four factors:

> Mosquito microclimates and changing weather patterns:

Mosquitoes can thrive in the worst of weather and any locale. “No matter the temperature, mosquitoes can thrive in sewers, stormwater drains, crawl spaces, alleys and other warm spaces where they survive and feed through winter months,” says Craig Prior, BVSc, CVJ, past president of the Companion Animal Parasite Council (CAPC) board of directors, in a press release from the organization.

> Increasing pet travel. Pet owners in our increasingly mobile society travel extensively, often with four-legged friends in tow, increasing exposure to both mosquito-friendly climates and potentially infected animals.

> Rescue dog transport. The “adopt, don’t shop” mentality of pet acquisition means more adoptable animals are being shipped across the country, often from areas of higher heartworm prevalence to areas of lower prevalence, with many of these animals untested or untreated for heartworm.

> Noncompliance with preventives. Many pet owners, particularly cat owners and those who live in areas that historically have seen very little heartworm disease, don’t protect their pets year-round against heartworm.

CAPC hopes its new monthly report, along with monthly parasite forecast maps, will spark conversations in the clinic about heartworm prevention. “The Top 10 Cities report is a narrative about the spread of heartworms into areas that otherwise have not seen a lot of heartworm cases,” Dr. Prior told *dvm360*. “And it’s a call to action!”

Heartworm disease, which is easy and cost-effective to prevent, can be devastating to pets, causing lifelong

Top 10 Cities Heartworm Report

Rank	January	February
1	Cincinnati, OH	Salt Lake City, UT
2	Stockton, CA	Alexandria, VA
3	Amarillo, TX	Riverside, CA
4	San Diego, CA	Topeka, KS
5	Lexington-Fayette, KY	El Paso, TX
6	Springfield, MA	Paterson, NJ
7	Fort Collins, CO	Chesapeake, VA
8	Newark, NJ	Reno, NV
9	Spokane, WA	Modesto, CA
10	Seattle, WA	Boise, ID

damage to their pulmonary arteries and potentially shortening life expectancy, Dr. Prior says. And it’s expensive to treat.

“Most people consider their pets as family members and wouldn’t knowingly expose them to infection with a potentially fatal disease that can ultimately compromise the length and quality of their lives. Yet millions who fail to protect their pets every month from heartworm infection are doing just that,” Dr. Prior says. “The risk just isn’t worth it. Heartworm preventives are affordable, safe and effective. This is why CAPC recommends all pets, no matter where they live, be tested annually and placed on heartworm preventives 12 months of the year.”



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Laser therapy dosing explained

Welcome to laser therapy 101—covering the basics of treatment areas, treatment time and dosages. *By Matthew Brunke, DVM, DACVSMR, CCRP, CVPP, CVA*

So you’ve read about therapy lasers and decided to buy one for your practice. The rep comes in and trains your staff on how to use the laser. The built-in settings seem nice and practical, but you want to learn how to operate the equipment on your own. Here are a few things you need to know about your laser and patient to get started:

Treatment time. Your laser output is measured in watts (W). One watt is a joule per second (J/s). This determines the length of treatment.

Treatment area. This is measured in centimeters squared (cm²). A standard-size playing card is 57 cm². So for reference, I keep a card with my laser to help measure the treatment area. Your treatment area will vary based on the patient.

Dosing guidelines. Keeping the above parameters in mind, let’s figure out what we’re treating. Treatment can be categorized by: a) deep or superficial, b) analgesic vs. anti-inflammatory and c) acute vs. chronic.

The guidelines for doses, which are based on these categories and academic research, are listed in Table 1 below.

Now let’s put this into practice. Say you have a treatment area of 300 cm². Your dose is 10 J/cm² for arthritis. So:

$$300\text{ cm}^2 \times 10\text{ J/cm}^2 = 3,000\text{ J}$$

Let’s say your laser puts out 12 W, or

12 J, per second. This means:

$$3,000/12 = 250\text{ seconds,}$$

or just over four minutes

Since you don’t want to deliver all 3,000 J to one aspect of the treatment area, I suggest using an overlapping grid technique (what would look like graph paper) to evenly distribute the 3,000 J in as many dimensions to that area as possible. For wounds this may be two dimensions, but for arthritic joints this can often be three dimensions. As you are doing this, keep an eye on your laser’s timer to ensure that you’re treating all planes and dimensions equally.

The condition’s chronicity will also determine how often you repeat those 3,000 J. For acute conditions, this would ideally be once a day for three days, then every other day for three treatments, then twice a week until goals are met. This may also sync well with your wound care and bandage change schedule.

With more chronic conditions, I recommend three treatments during the first week, then twice a week until goals are met, then once a week. After that, I would continue to taper to the lowest effective dose. If an arthritis flare occurs, treat as an acute condition and then taper back down.

All of this information should be entered into the patient’s medical

Higher doses, better outcomes?

A recent study shows that laser therapy increased the scar scale score, improved cosmetic healing by day 7 and continued to significantly increase on day 21 compared to control dogs.¹ The dose in the study was 8 J/cm².

Another study showed regularly scheduled laser therapy at 10-20 J/cm² per joint for six weeks improved lameness and pain scores and lowered NSAID requirement in canine elbow osteoarthritis patients.²

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record for proper tracking. Calculations for dosing photobiomodulation appropriately can be done quickly and easily and should correlate to the settings on your machine.

Dr. Matthew Brunke practices rehab, acupuncture and pain management at Veterinary Orthopedic & Sports Medicine Group (VOSM) in Annapolis Junction, Maryland.

Table 1: Laser therapy dosage by application

Superficial	Deep	Analgesic	Anti-inflammatory	For osteoarthritis	For neurological
2-6 J/cm²	8-10 J/cm²	Muscle: 2-4 J/cm² for acute 4-8 J/cm² for chronic Joint: 4-6 J/cm² for acute 4-8 J/cm² for chronic	1-4 J/cm² for acute and subacute	8-10 J/cm²	Central: 10-30 J/cm² Peripheral: 2-8 J/cm²

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† Although there is no specific antagonist for avermectin toxicity, even severely affected dogs have completely recovered from avermectin toxicity with intensive veterinary supportive care.
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HUMAN WARNINGS: Not for human use. Keep out of the reach of children. Dogs: Children should not come in contact with the application sites for two (2) hours after application. Cats: Children should not come in contact with the application site for 30 minutes after application. Causes eye irritation. Harmful if swallowed. Do not get in eyes or on clothing. Avoid contact with skin. Wash hands thoroughly with soap and warm water after handling. If contact with eyes occurs, hold eyelids open and flush with copious amounts of water for 15 minutes. If eye irritation develops or persists, contact a physician. If swallowed, call poison control center or physician immediately for treatment advice. Have person sip a glass of water if able to swallow. Do not induce vomiting unless told to do so by the poison control center or physician. People with known hypersensitivity to benzyl alcohol, imidacloprid, or moxidectin should administer the product with caution. In case of allergic reaction, contact a physician. If contact with skin or clothing occurs, take off contaminated clothing. Wash skin immediately with plenty of soap and water. Call a poison control center or physician for treatment advice. The Safety Data Sheet (SDS) provides additional occupational safety information. For a copy of the Safety Data Sheet (SDS) or to report adverse reactions call Bayer Veterinary Services at 1-800-422-8874. For consumer questions call 1-800-255-8626.
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ADVERSE REACTIONS: Heartworm Negative Dogs: The most common adverse reactions observed during field studies were pruritus, redness, medicinal odor, lethargy, inappetence and hyperactivity. **Heartworm Positive Dogs:** The most common adverse reactions observed during field studies were cough, lethargy, vomiting, diarrhea (including hemorragic), and inappetence. **Cats:** The most common adverse reactions observed during field studies were lethargy, behavioral changes, discomfort, hypersalivation, polydipsia and coughing and gagging. **Ferrets:** The most common adverse reactions observed during field studies were pruritus/scratching, scabbing, redness, wounds and inflammation at the treatment site, lethargy, and chemical odor.
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Dangerous new tick species migrating to North America

An international report indicates that a new species of tick is on the move throughout North America. According to spatial epidemiologist Ram Raghavan, BSc, MS, PhD, a professor at Kansas State University College of Veterinary Medicine and lead author of the report, invasive populations of *Haemaphysalis longicornis*—longhorned ticks—are expected to become established in many parts of the North America.

Indeed, the invasion has already begun, with the species newly discovered in many U.S. states, including New Jersey, New York, West Virginia, Virginia, North Carolina, Maryland, Connecticut, Pennsylvania and Arkansas.

Using spatial distribution models, Dr. Raghavan and his team evaluated the likelihood of this dangerous tick migrating to other areas of the continent.

“We have identified vast areas of North America—particularly the southeastern U.S., the West Coast and broad areas of the northwestern U.S., as well as central and southern Mexico—as climatically suitable for establishment of this species,” says Dr. Raghavan in a K-State press release.

Native to Japan, China, Korea and eastern Russia, the species has so far become well established in Australia, New Zealand and on several Pacific Islands. Female longhorned ticks can reproduce asexually—a rare trait that allows for rapid population spread—and the species can thrive under diverse climatic conditions.

Although the longhorned tick is currently considered largely a livestock pest, it has been known to parasitize humans as well, causing severe fever with thrombocytopenia syndrome as well as other diseases.

According to Stephen Barker, BSc, PhD, parasitologist at the University of Queensland and a study coauthor, invasion of *H. longicornis* in the U.S.

“would carry a significant economic burden and potential human suffering, especially since this tick is capable of transmitting a variety of pathogens such as those that cause Lyme disease.”

Tick migration is facilitated by travel, with livestock, dogs and people all potential unwitting carriers. “We feel

there is a need for strict inspection and quarantine of cattle, other livestock and pet animals, particularly dogs, about to be transported from the current focus areas of this tick,” Dr. Raghavan says. “High levels of interstate movement of livestock and other animals occur each day. Cattle are moved

slowly across the nation, stopping at multiple places—potentially dropping off female ticks. The movement of ticks via livestock and other domestic animals is not currently monitored or regulated, so it is only a matter of time, in our opinion, that this species will spread further in North America.”

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Our clients hate the ER hospital. I say, 'Get over it!'

This practice manager pleads the case for specialty and emergency veterinary centers—they charge what they have to.

I manage a mom-and-pop veterinary practice. In fact, it's my own mom and pop's practice. My parents (both veterinarians) started our "shop" in 1978. If asked, I'd say our philosophy is, "Take care of the customers and they'll take care of you."

We've never advertised; our primary source of new business is word of mouth (72 percent, to be specific). The rest comes from people searching and reading online reviews and from those who drive by and see our facility. We trust referrals, and we refer to local veterinary specialists and emergency centers on a daily basis.

We've noticed something recently. In the past few years, our customers have had rather honest and sometimes harsh things to say about the specialty

and emergency centers in our area. Keep in mind that we're located in what used to be a farm town, which now more commonly grows housing developments, situated along the I-95 corridor in the middle of New Jersey. It's a well-off area, for the most part. The median home value in our zip code is around \$425,000, and loads of people who live here travel to either New York or Philadelphia each day to their well-paying jobs.

It's hard to understand, for that reason, why our customers seem to think that when they take their pet to an emergency clinic at 3 a.m. on a Saturday, it shouldn't cost more than \$150. They seem astonished when the \$600 bill for that gash on Rocky's snout is placed on the counter in front of

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They don't understand why Spanky's MRI-assisted laser surgery in a sterilized surgery suite under a roof housing advanced medical equipment could possibly cost 10 grand.

them and the friendly associate asks, "Will that be cash or charge?"

We hear them in our waiting room. "I had Buddy over there a few months ago—he cracked his nail and Doc wasn't open (it's always that we weren't open). They charged me three hundred bucks. For a cracked nail!"

They also don't understand why Spanky's MRI-assisted laser surgery in a sterilized surgery suite under a roof housing the most advanced medical equipment and well-trained professionals for miles around could possibly cost 10 grand. After all, it's just a run-of-the-mill CCL repair. Isn't this stuff cheap by now?

I've been a part of these conversations too many times to count. I've stepped back and thought about it from both sides. And I have to say, I can't side with the customer on this one. The customer is not always right.

The tipping point, for me, was when a woman walked into our appointment-only veterinary clinic with dog in hand, bluntly asking, "How much for a blood panel?"

I wanted to answer "For what?" but my training told me not to. "We should discuss your pet's needs," I said, "but a complete blood count and chem panel along with a comprehensive exam, which is necessary before we can complete any medical procedure such as a blood draw, will cost in the area of \$182."

Honestly, I've seen many an invoice from other local clinics, and that's a good rate, even for less-inflated parts of the country. But we try to keep it reasonable. Again, "Take care of your customers and they'll take care of you." Well, apparently Mrs. Knowsalot hadn't seen those same invoices.

"You've got to be f---ing kidding me!" (I kid you not, she said the f-word.) "Two hundred dollars for a blood screen? I'm a human and I don't pay anywhere near that for my own blood screens."

Ah. This is the point where I felt like I was floating on a cloud. Or no—sitting on a throne, grapes in one hand

and dozens of gold chains in the other.

"Well, of course you don't. Health insurance covers most of your expenses. Do you have pet insurance?"

There was a long silence.

"No."

"Well, the charge without insurance is \$182. With pet insurance, you'd likely receive roughly 80 percent of that back from your provider."

She didn't end up booking the dog's bloodwork with us. Perhaps I made her feel unprepared. Or maybe, just maybe, I brought to her attention something most pet owners need to hear. Pets aren't cheap. The total cost of a pet's healthcare from birth to death is \$17,700 if pet owners follow top-level care recommendations, according to AAHA and the AVMA.

It's not our industry driving up these costs—no, we're simply keeping up with the demands of pet owners. They're expecting more. They're providing more (seriously, it seems like more dogs eat gluten-free than people these days). Unfortunately for us, pet owners are also blaming more.

They take their frustrations out on us because we charge them for our services. We're supposed to be the "compassionate" industry. Sorry, folks, but compassion doesn't pay back \$200,000 in student loans, \$1 million in facility costs, \$4,000 to \$5,000 annually in license and CE fees, tremendous amounts for insurance and the thousands needed to stock our shelves with the same products you turn around and buy at Walmart. When you walked in, you knew this was a business. Get over it.

So I say, good for you, 24/7 emergency centers. Build your incredible hospitals, bring your amazingly smart and passionate team with you, and charge for it. Because you deserve to be just as happy as the pets you treat.

Brent Dickinson is practice manager at Dickinson-McNeill Veterinary Clinic in Chesterfield, New Jersey.



ER mistakes to avoid

For those critical cases you keep in your hospital or need to stabilize before referral, review these reminders at dvm360.com/6ERMistakes.

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Bisphosphonates:

A dense issue in equine care

A look at the use of this bone-modifying drug in horses. *By Ed Kane, PhD*

Bone is a dynamic organ—always changing, constantly being reshaped, old cells removed and replaced with new.

“Bone remodeling is the process by which bone changes its shape, structure and strength in response to the strain, or exercise, that is applied to it,” says Patty Hogan, VMD, DACVS, of Hogan Equine in Cream Ridge, New Jersey. “To do this, the bone actually develops tiny microfractures in response to training, and the osteoclasts and osteoblasts are called in to remodel and rebuild, resulting in a stronger structure. It is an expected and welcomed effect of gradual and progressive training in the racehorse.”

But the requirements of race training can put too much stress on the process. “The bone cannot keep up with the training requirements and it enters a stage of inappropriate or ‘stress’ bone remodeling, where we begin to see distinct clinical stress fractures, such as in the tibia and humerus, and the stress remodeling response commonly observed in shins, third carpal bones and the distal cannon bones (condyles) known as sclerosis,” says Dr. Hogan.

Susan Stover, DVM, PhD, a professor at the University of California, Davis, builds on the importance of bone remodeling. “Remodeling is also critical in growing animals, where it’s responsible for converting calcified cartilage to bone. It’s a finely tuned balance between resorption of damaged bone and replacement by healthy bone as well as for resorption of rapidly deposited, but relatively weak, woven bone and replacement by higher-strength lamellar bone—important for bone’s adaptation to increasing levels of exercise. And further, remodeling is key to the culmination of fracture healing.”

In thoroughbreds, this bone regeneration is needed to develop healthy bones to meet the demands of racing. “When you have a young horse that doesn’t experience load or exercise, their bones are not as durable or as strong as they need to be to withstand the rigors of training and racing,” says Jeff Blea, DVM, of



Von Bluecher, Blea, Hunkin in Southern California and chairman of the Association of American Equine Practitioners (AAEP) Racing Committee. “In the same vein, when you have a horse that’s recovering from any type of musculoskeletal injury and is limited in its exercise or load, that bone won’t remodel the same way that it would if you had the ability to provide load to that bone structure.”

It’s known that young horses confined to stalls will develop bone degradation due to lack of movement (and load pressure), with bone gradually becoming thinner. Thus, it’s important that young horses be given outdoor exercise and not be totally confined.

“A good example is turning a horse out for a four-month interim into a 14-by-14-ft pen versus turning a horse out for four months into a five-acre paddock,” Dr. Blea explains. “That horse in that five-acre paddock, he’s going to remodel, strengthen his bone, while the horse in the 14-by-14-foot pen is not going to be able to remodel his bone the same way.”

Enter the bisphosphonates

Bisphosphonates are a class of bone-modifying drugs that have been used as an adjunctive treatment for specific bone disorders in human medicine for the past 20 years. “The mechanism of action of the bisphosphonates in the bone comes from studies in rodents,

rabbits and humans, and I would expect it to be similar in horses,” says Dr. Stover. “There might be some differences among species, but in general they’re likely to behave similarly.”

“Basically, bisphosphonates work specifically at the cellular level and act to block a certain type of bone cell called an osteoclast,” says Dr. Hogan. “Osteoclasts are a very important spoke in the wheel of bone remodeling in that they essentially act as ‘garbage collectors’ to first clean up any diseased, weakened or damaged bone before any new bone can be brought in and laid down by the osteoblasts, the ‘bone builders.’”

The FDA’s Center for Veterinary Medicine licensed the bisphosphonates Tildren (tiludronate disodium) and Osphos (clodronate disodium), which are intended to control the clinical signs of navicular syndrome. Prior to this time, tiludronate disodium had been used as a treatment for lameness in multiple locations in horses, but in May 2014, its use in the United States was restricted to treat navicular disease. Clodronate disodium was a new drug, so at the time it had no previous history for its use.

In 2014, there was limited evidence as to the benefits of tiludronate disodium and clodronate disodium to treat navicular disease and other lameness issues in horses. Though there were noted concerns, equine practitioners



The Kane scrutiny

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*BRAVECTO kills fleas and prevents flea infestations for 12 weeks. **BRAVECTO Topical Solution for Cats** kills ticks (black-legged tick) for 12 weeks and American dog ticks for 8 weeks.

¹BRAVECTO Topical Solution for Cats [prescribing information]. Madison, NJ: Merck Animal Health; 2016.

IMPORTANT SAFETY INFORMATION:

BRAVECTO Topical Solution for Cats: The most common adverse reactions recorded in clinical trials were vomiting, itching, diarrhea, hair loss, decreased appetite, lethargy, and scabs/ulcerated lesions. BRAVECTO has not been shown to be effective for 12-weeks' duration in kittens less than 6 months of age. BRAVECTO is not effective against American dog ticks beyond 8 weeks of dosing. For topical use only. Avoid oral ingestion. The safety of BRAVECTO has not been established in breeding, pregnant and lactating cats. Use with caution in cats with a history of neurologic abnormalities. Neurologic abnormalities have been reported in cats receiving BRAVECTO, even in cats without a history of neurologic abnormalities.

See full Prescribing Information on page 40.



(fluralaner topical solution) for Cats

Caution:
Federal (USA) law restricts this drug to use by or on the order of a licensed veterinarian.

Description:
Each tube is formulated to provide a minimum dose of 18.2 mg/lb (40 mg/kg) body weight. Each milliliter contains 280 mg of fluralaner.

The chemical name of fluralaner is (±)-4-[5-(3,5-dichlorophenyl)-5-(trifluoromethyl)-4,5-dihydroisoxazol-3-yl]-2-methyl-N-[2-oxo-2-(2,2,2-trifluoroethylamino)ethyl]benzamide. Inactive ingredients: dimethylacetamide, glycofuro, diethyltoluamide, acetone

Indications:
Bravecto kills adult fleas and is indicated for the treatment and prevention of flea infestations (*Ctenocephalides felis*) and the treatment and control of *Ixodes scapularis* (black-legged tick) infestations for 12 weeks in cats and kittens 6 months of age and older, and weighing 2.6 pounds or greater.

Bravecto is also indicated for the treatment and control of *Dermacentor variabilis* (American dog tick) infestations for 8 weeks in cats and kittens 6 months of age and older, and weighing 2.6 pounds or greater.

Dosage and Administration:
Bravecto should be administered topically as a single dose every 12 weeks according to the **Dosage Schedule** below to provide a minimum dose of 18.2 mg/lb (40 mg/kg) body weight.

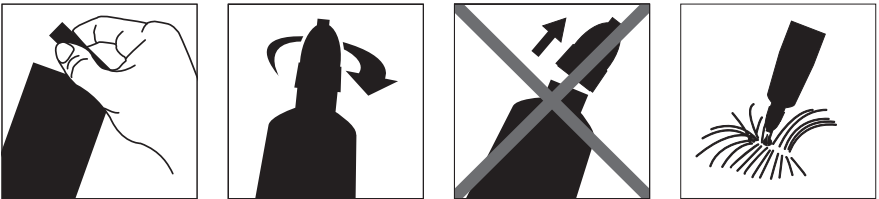
Bravecto may be administered every 8 weeks in case of potential exposure to *Dermacentor variabilis* ticks (see **Effectiveness**).

Dosage Schedule:

Body Weight Ranges (lb)	Fluralaner content (mg/tube)	Tubes Administered
2.6 – 6.2	112.5	One
>6.2 – 13.8	250	One
>13.8 – 27.5*	500	One

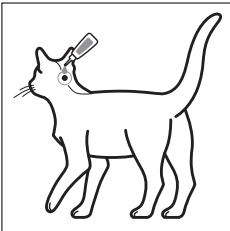
* Cats over 27.5 lb should be administered the appropriate combination of tubes.

Step 1: Immediately before use, open the pouch and remove the tube. Hold the tube at the crimped end with the cap in an upright position (tip up). The cap should be rotated clockwise or counter clockwise one full turn. The cap is designed to stay on the tube for dosing and should not be removed. The tube is open and ready for application when a breaking of the seal is felt.



Step 2: The cat should be standing or lying with its back horizontal during application. Part the fur at the administration site. Place the tube tip vertically against the skin at the base of the skull of the cat.

Step 3: Squeeze the tube and gently apply the entire contents of Bravecto directly to the skin at the base of the skull of the cat. Avoid applying an excessive amount of solution that could cause some of the solution to run and drip off of the cat. If a second spot is needed to avoid run off, then apply the second spot slightly behind the first spot.



Treatment with Bravecto may begin at any time of the year and can continue year round without interruption.

Contraindications:
There are no known contraindications for the use of the product.

WARNINGS

Human Warnings:
Not for human use. Keep this and all drugs out of the reach of children.

Do not contact or allow children to contact the application site until dry.

Keep the product in the original packaging until use in order to prevent children from getting direct access to the product. Do not eat, drink or smoke while handling the product. Avoid contact with skin and eyes. If contact with eyes occurs, then flush eyes slowly and gently with water. **Wash hands and contacted skin thoroughly with soap and water immediately after use of the product.**

The product is highly flammable. Keep away from heat, sparks, open flame or other sources of ignition.

Precautions:
For topical use only. Avoid oral ingestion. (see **Animal Safety**).

Use with caution in cats with a history of neurologic abnormalities. Neurologic abnormalities have been reported in cats receiving Bravecto, even in cats without a history of neurologic abnormalities (see **Adverse Reactions**).

Bravecto has not been shown to be effective for 12-weeks duration in kittens less than 6 months of age. Bravecto is not effective against *Dermacentor variabilis* ticks beyond 8 weeks after dosing (see **Effectiveness**).

The safety of Bravecto has not been established in breeding, pregnant and lactating cats.

Adverse Reactions:
In a well-controlled U.S. field study, which included a total of 161 households and 311 treated cats (224 with fluralaner and 87 with a topical active control), there were no serious adverse reactions.

Percentage of Cats with Adverse Reactions (AR) in the Field Study

Adverse Reaction (AR)	Bravecto Group: Percent of Cats with the AR During the 105-Day Study (n=224 cats)	Control Group: Percent of Cats with the AR During the 84-Day Study (n=87 cats)
Vomiting	7.6%	6.9%
Pruritus	5.4%	11.5%
Diarrhea	4.9%	1.1%
Alopecia	4.9%	4.6%
Decreased Appetite	3.6%	0.0%
Lethargy	3.1%	2.3%
Scabs/Ulcerated Lesions	2.2%	3.4%

In the field study, two cats treated with fluralaner topical solution experienced ataxia. One cat became ataxic with a right head tilt 34 days after the first dose. The cat improved within one week of starting antibiotics. The ataxia and right head tilt, along with lateral recumbency, reoccurred 82 days after administration of the first dose. The cat recovered with antibiotics and was redosed with fluralaner topical solution 92 days after administration of the first dose, with no further abnormalities during the study. A second cat became ataxic 15 days after receiving its first dose and recovered the next day. The cat was redosed with fluralaner topical solution 82 days after administration of the first dose, with no further abnormalities during the study.

In a European field study, two cats from the same household experienced tremors, lethargy, and anorexia within one day of administration. The signs resolved in both cats within 48-72 hours.

In a European field study, there were three reports of facial dermatitis in humans after close contact with the application site which occurred within 4 days of application.

For technical assistance or to report a suspected adverse drug reaction, or to obtain a copy of the Safety Data Sheet (SDS), contact Merck Animal Health at 1-800-224-5318. Additional information can be found at www.bravecto.com. For additional information about adverse drug experience reporting for animal drugs, contact FDA at 1-888-FDA-VETS or online at <http://www.fda.gov/AnimalVeterinary/SafetyHealth>.

Clinical Pharmacology:
Peak fluralaner concentrations are achieved between 7 and 21 days following topical administration and the elimination half-life ranges between 11 and 13 days.

Mode of Action:
Fluralaner is for systemic use and belongs to the class of isoxazoline-substituted benzamide derivatives. Fluralaner is an inhibitor of the arthropod nervous system. The mode of action of fluralaner is the antagonism of the ligand-gated chloride channels (gamma-aminobutyric acid (GABA)-receptor and glutamate-receptor).

Effectiveness:
In a well-controlled European laboratory study, Bravecto killed 100% of fleas 8 hours after treatment and reduced the number of live fleas on cats by > 98% within 12 hours after treatment or post-infestation for 12 weeks. In well-controlled laboratory studies, Bravecto demonstrated > 94% effectiveness against *Ixodes scapularis* 48 hours post- infestation for 12 weeks. Bravecto demonstrated > 98% effectiveness against *Dermacentor variabilis* 48 hours post-infestation for 8 weeks, but failed to demonstrate ≥ 90% effectiveness beyond 8 weeks.

In a well-controlled U.S. field study, a single dose of Bravecto reduced fleas by ≥99% for 12 weeks. Cats with signs of flea allergy dermatitis showed improvement in erythema, alopecia, papules, scales, crusts, and excoriation as a direct result of eliminating flea infestations.

Animal Safety:
Margin of Safety Study: In a margin of safety study, Bravecto was administered topically to 11- to 13-week (mean age 12 weeks)-old-kittens at 1, 3, and 5X the maximum labeled dose of 93 mg/kg at three, 8-week intervals (8 cats per group). The cats in the control group (OX) were treated with mineral oil.

There were no clinically-relevant, treatment-related effects on physical examination, body weights, food consumption, clinical pathology (hematology, clinical chemistries, coagulation tests, and urinalysis), gross pathology, histopathology, or organ weights. Cosmetic changes at the application site included matting/clumping/spiking of hair, wetness, or a greasy appearance.

Oral Safety Study: In a safety study, one dose of Bravecto topical solution was administered orally to 6- to 7-month-old- kittens at 1X the maximum labeled dose of 93 mg/kg. The kittens in the control group (OX) were administered saline orally. There were no clinically-relevant, treatment-related effects on physical examination, body weights, food consumption, clinical pathology (hematology, clinical chemistries, coagulation tests, and urinalysis), gross pathology, histopathology, or organ weights. All treated kittens experienced salivation and four of six experienced coughing immediately after administration. One treated kitten experienced vomiting 2 hours after administration.

In a well-controlled field study Bravecto was used concurrently with other medications, such as vaccines, anthelmintics, antibiotics, steroids and sedatives. No adverse reactions were observed from the concurrent use of Bravecto with other medications.

Storage Conditions:
Do not store above 77°F (25°C). Store in the original package in order to protect from moisture. The pouch should only be opened immediately prior to use.

How Supplied:
Bravecto is available in three strengths for use in cats (112.5, 250, and 500 mg fluralaner per tube). Each tube is packaged individually in a pouch. Product may be supplied in 1 or 2 tubes per carton.

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Rev. 09/16



were optimistic about their use for treating lameness issues that were recalcitrant to all other treatments and those of the lower leg and hoof in horses, as it was shown that bisphosphonates modified the action of osteoclasts.

Current concerns about bisphosphonate use

In 2017, the British Racing Authority outlawed the use of bisphosphonates in horses younger than 3.5 years of age and restricted them to products licensed in the U.K. And as of 2018, the Association of Racing Commissioners International (ARCI) has been concerned that the use of bisphosphonates may go too far. How so? There is limited information on the use of bisphosphonates, their efficacy and side effects in young horses that receive the drug before or during initial training. It is also an off-label use in young horses since these products are labeled for older horses.

Dr. Blea also raises the issue that there are no longitudinal studies on bisphosphonates regulating what happens in young growing bone or mature bone over the long term. “We do know that they stay in the bone a long time. And we can identify them for about 26 to 27 days in blood and urine,” he says. “That’s why the British Horseracing Authority has a 30-day standdown time.”

The concern? Dr. Blea says there have been anecdotal reports of yearlings and young horses in training receiving bisphosphonates. “We don’t know what that is doing to the bone today, next month, next year or years after administration,” he says.

Dr. Stover looks to the genesis of the drug in the first place. “Bisphosphonates were developed for use in humans who have an imbalance in bone resorption and formation, where bone resorption exceeds bone formation and results in diseases like osteoporosis,” she says. “Slowing osteoclastic activity in these individuals makes sense. Bisphosphonates were not developed for healthy horses that have innately balanced bone resorption and formation. Disturbing that balance does not make sense.”

Dr. Stover thinks that bisphosphonates used in immature animals could lead to disturbed growth and joint development as well as the accumulation of microdamage in the bone tissues. “Because some growth plates

do not close until 3.5 years of age in racehorses, there is the potential for adverse effects in racehorses that are still growing and fully developing skeletal structures,” she says.

And Dr. Blea sees another angle that’s even more concerning, especially on the racetrack, since bisphosphonates are used to mitigate pain in humans. He says if you factor in potential pain mitigation with the use of bisphosphonates on young horses in addition to their ability to improve soundness and improve lameness, yet don’t know the effect on bone, “I think that’s a dangerous situation.”

Dr. Blea only recommends bisphosphonates for administration to older horses being turned out for a specific problem, and he does so infrequently. “Within the thoroughbred industry, we’ve got to be careful with their use,” he says. “Because we don’t know their effects, we have to be careful how we’re using these off-label in young horses.”

Dr. Blea says there are rumors of bisphosphonate use on the racetrack, but he doesn’t think this is the case in thoroughbreds. “I polled the AAEP Racing Committee and we don’t feel so,” he says. “I think a lot of it is rumor. It may have been used to see if they could be used to treat various diseases or injuries and they didn’t see any benefits. I do not think they’re being overly used on the thoroughbred racetrack.”

Dr. Stover’s take on the issue? “I am concerned about the potential adverse effects of bisphosphonates on bone’s internal remodeling process for staying healthy and being able to adapt to increasing intensity of training. Further, there is some evidence that bisphosphonates relieve pain, and so I have concern about racehorses with mild injuries continuing to train and race, which increases the potential for mild injuries to become catastrophic. Further, I am concerned about the potential longevity of bisphosphonates’ effect relative to fetal growth and development in racehorses that become broodmares.”

FDA approval of bisphosphonates

So how did the FDA CVM approve these drugs with the scarcity of scientific data available about use in horses?

“I don’t have access to all the evidence that the FDA used to assess Tildren and Osphos,” says Dr. Stover. “However, the published clinical evi-

“Bisphosphonates were not developed for healthy horses that have innately balanced bone resorption and formation. Disturbing that balance does not make sense.”

—Dr. Susan Stover

dence for the use of bisphosphonates in navicular disease is based on only a few small studies. Unfortunately, the marketing of bisphosphonates and ‘star quality’ of newer drugs has resulted in significant off-label use that does not have a physiologic basis.”

Dr. Hogan says that at the racetrack, bisphosphonates are largely being used to ameliorate the clinical signs of the painful stress remodeling response, or sclerosis. “The working theory is that by blocking the action of the osteoclasts, then stress remodeling will cease and the bone will not progress to develop an actual stress fracture,” she says. But she says this is not the case at all, noting there is recent concern based on research in people and other species that bone placed under high strain rates becomes weaker and more susceptible to a stress fracture with bisphosphonate use.

“The lack of racehorse-specific research in the use of the bisphosphonates should give anyone considering using these drugs great pause, if for no other reason than for the inherent legal liabilities that choice may carry,” cautions Dr. Hogan. “Extrapolating results from human research in elderly and/or sedentary osteoporotic people and applying it to 2- and 3-year-old thoroughbred racehorses traveling at 35 mph is, at the very least, scientifically unsound. Much of the use of bisphosphonates in racehorses today is off-label—most horses that are treated are less than 4 years of age and they do not have navicular disease. To go one step further and explore the possibilities of the potential for a catastrophic bone injury in a racehorse that had been administered a bisphosphonate, resulting in human injury or loss of life, one should consider the dearth of scientific and clinical evidence available for the defense of its use. There simply is none.”

Dr. Hogan has been skeptical since bisphosphonates first entered the equine market. Then she started to observe an unusual trend in horses with relatively simple, routine fractures that she had repaired. “I noticed that

some of these horses that were referred from barns that I knew were heavily using bisphosphonates, particularly tiludronate, had incredibly bizarre healing responses—delayed healing, unusual zones of bone lysis associated with the fracture lines. So as a surgeon, the use of the bisphosphonates in the racehorse just seemed to defy everything I had come to know about bone healing for the last 20 years, and some of the clinical cases I personally came in contact with seemed to bear out that concern.”

AAEP bisphosphonate research

“The bisphosphonate research wheels have been set in motion,” Dr. Blea confirms. Although there is some pharmacological testing ongoing now at UC-Davis, the main research thrust will be an AAEP think tank chaired by Jeffrey Berk, VMD, current AAEP president-elect. Their objective will be to begin to understand the uses of bisphosphonates and to examine their effects in young horses on bone long-term. Hopefully in due time they will generate significant scientific data and answer a lot of questions of unknowns now on bisphosphonates.

Completion of the work will take some time. “We’re going to look at developing research to examine the effect of administration of bisphosphonates to young horses on bone, as they are exposed to training and racing,” says Dr. Blea. “That hopefully will give us an understanding of what is occurring with their use long-term.”

The end goal is to educate equine practitioners regarding ethical and moral uses of bisphosphonates in the thoroughbred racing environment. “We are going to try to provide a resource to the industry that is nonpolitical,” Dr. Blea says. “We’re going to find out the things we know and don’t know about bisphosphonates.”

Ed Kane, PhD, is an author and editor on nutrition, physiology and veterinary medicine. Kane is based in Seattle.



Video killed the consulting star?

Can you get a practice management consultant's advice without bringing in the consultant? One company is giving it a go. Plus, a few other products that caught our eye at VMX and WVC. *By Brendan Howard*

Most great business consultants want to figure out how to scale their advice. Can the sometimes-pricey experience their clients get when they visit for a few days at a time and build an ongoing relationship for advice be translated into a book or a series of books or a series of videos or taught and disseminated by other “junior” teachers?

Aspire Vet's Randy Hall—a veteran of Pfizer sales, an executive coach and a Fortune 500 leadership educator—is trying the online course route with a veterinarian's help and some funding from AAHA.

His business partner, Julie Reck, DVM, was so thrilled with his coaching work that she paid for his expertise to help the team members at her practice. Now, the hope is that practice owners, managers and other leaders in veterinary hospitals will pay \$129 a month (\$109 for AAHA members) to watch

the company's online leadership and management videos, all of which are approved by the Veterinary Hospital Managers Association for CVPM credit. The courses include quizzes and materials to make sure you can put what you learn into practice. Current courses include:

- > “Attracting and hiring exceptional talent”
- > “Stop the drama! Eliminating conflict in your practice”
- > “Mastering difficult client conversations”
- > “Developing a vision to create the practice you want”
- > “Managing your practice, leading your team.”

Hall told *dvm360* he's got a whiteboard with more than 100 additional ideas for upcoming courses, so he says he thinks he's got a solid pipeline.

There's a free 30-day trial, and you can check out Hall's podcasts and blog posts on aspirevet.com.

A few other companies we were curious about from VMX and WVC:

- > Bingle Vet Clinics (binglevetclinics.com) unveiled a new franchise for future practice owners looking for a different business model for their hospital. Pay Bingle \$39,500 and an ongoing 6 percent cut, and you get all the Houston practices' manuals, procedures and practice management approach.

- > Looking for locum doctors? Looking for locum work? You could try out DVMschdlr (dvmschdlr.com). Worth a try in this associate shortage, right?

- > Instinct (instinct.vet) is a digital workflow-organizing software built for critical-care settings as well as busy outpatient environments. It's snazzy-looking and carefully merges operations from the front desk to outpatient visits to inpatient treatment sheets to boarding to real-time and automatic invoice auditing. If you're curious about new workflow solutions, set up a demo.



Vet product news

To keep up with all the latest product news in the veterinary world, visit dvm360.com/products360. Then check out the products themselves at dvm360.com/products.

New orthotic gets injured horses **moving faster**

The FastTrack, with its high-grade metal, heat-formed pad and 'golden dial,' lets equine veterinarians choose the movement that's right for a horse recovering from a soft-tissue injury. *By Brendan Howard*

You know those sci-fi animals with bionics and cybernetic implants and stuff? This isn't that, but it's still pretty cool.

Images of Horsepower Technologies' FastTrack—which bills itself as the first rehabilitative orthotic for horses—caught our eye in its look as it supports and limits the movement of injured horses in a unique way. One of FastTrack's biggest advocates—the company's CEO, Mouli Ramani—says it started with a thought in the minds of a disappointed equine practitioner, Dr. Wendy Drumm.

"She had to euthanize one of her horses," Ramani says. "And she thought, why? Like an injured human, maybe the horse wouldn't run as fast or as hard again, but it didn't need to be euthanized."

The special device takes the weight off the injured flexor apparatus and limits movement to the adjustable angle the veterinarian wants to see in the rehabilitation process.

"What typically happens is a horse owner leaves the horse in the stall and waits for recovery," Ramani says. "The horse hates it, the people hate it."

"The fundamental concept is, take away the stresses and strains that come down on the horse's flexor apparatus down the back of the horse's limb and redirect that through our structure onto the horse's bones."

Like human ski boots you get fitted for in store, the FastTrack sports a specialized thermal pad (you can buy or rent the device to mold the pad) that make a snug and abrasion-avoiding fit on the horse's limb.

"We thought pads, like the memory foam in a cushion, would work," Ramani says, "but in fact testing and advice from veterinarians said that wouldn't be sufficient."

Ramani is impressed with the structure itself, especially the "aircraft-grade aluminum and steel to support a fetlock the size of my wrist on a 1,500-pound horses."

In addition to support, the orthotic also gives the ability for riders and veterinarians to get the horse moving soon, while still restricting the horse's movement to avoid further injury.

"When the horse is injured, you won't start trotting right away, you'll start with a slow walk," Ramani says. "But how do you get the horse to move at the speed you want it to move? With the gold dial, you restrict the fetlock angle and can dial in a walk, a trot or a canter."

Ramani says the weird restriction doesn't seem to freak out the horse either: "Almost all of the horses have almost no problem after 30 seconds or a minute of walking with it," he says. "We've not had any horses reject the devices."

The biggest challenge so far to an equine veterinary community excited about a powerful support for injured horses is explaining the limitations of what looks like a real miracle device.

"It's designed for horses with soft-tissue injuries," he says. "We've had horse owners come to us with degenerative bone issues, a fetlock that's dropped completely, and we can't do anything to help that horse. We explain what it's good for and what it's not good for. We provide support and comfort during rehabilitation."

Misuse of the device is part of the reason Horsepower Technologies doesn't



sell the FastTrack direct to nonveterinarians. They are sold only in pairs, at a cost of \$2,000, because, of course, you don't want the horse overcompensating with its unbraced leg.



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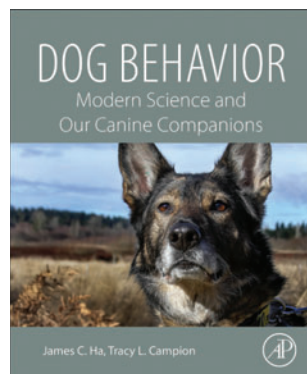
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Elsevier Animal behavior resource

Dog Behavior: Modern Science and Our Canine Companions by James Ha and Tracy Campion provides readers with a better understanding of canine science, including evolutionary concepts, ethograms, brain structures and development, sensory perspectives, the science of emotions, social structure and the natural history of the species. The book also analyzes relationships between humans and dogs and how the latter has evolved. This resource is suited for researchers, students and veterinarians seeking further information on dog behavior and social temperament.

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Trupanion Expanded coverage

Trupanion has removed minimum age restrictions in its medical insurance policies for cats and dogs, allowing puppies and kittens to be covered from birth. Trupanion's expanded age bracket now lets pet owners enroll cats and dogs from 0-7 weeks old throughout the U.S. and Canada. When pet owners enroll their pets from day one, they no longer need to worry about a condition arising before coverage begins. Trupanion encourages members to enroll pets as puppies and kittens so they remain in that pricing category for the lifetime of the pet.

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Waggle Altruistic alternative payment option

Launched in October, Waggle is a pioneering crowdfunding source dedicated to helping sick or injured pets regain good health. Waggle's goal is to prevent economic euthanasia resulting from a pet owner's inability to afford medical treatment and must make a decision to let a pet go. Waggle guarantees that donations go directly to the veterinary hospital performing the services, providing complete transparency.

For fastest response visit waggle.org



Dog Nerds Client behavior resource

Dog Nerds is a client-facing distance-learning company designed to bring science-based behavior modification treatment to people without access to resources for treating their dogs. While a course can't replace a high-quality dog training professional, Dog Nerds—which features the expertise of Lisa Radosta, DVM, DACVB—hopes to fill the gaps so pet owners can get quality treatment for their animals no matter where they live. Dog Nerds focuses solely on addressing serious behavior problems through scientifically based behavior modification treatment advice.

For fastest response visit dognerds.thinkific.com



SynDaver Synthetic cadavers

SynDaver, a biotechnology company that creates synthetic animals for medical testing and training, recently unveiled new equine and feline models. The SynDaver Synthetic Feline, dubbed "CopyCat," is a full-bodied replica of the feline anatomy complete with synthetic muscles, tendons and bones and is intended to replace the use of cat cadavers in educational laboratory environments. The SynDaver Synthetic Equine is both a task trainer and a surgical model, providing equine veterinarians-in-training and practicing veterinarians with hands-on experience using realistic replicas.

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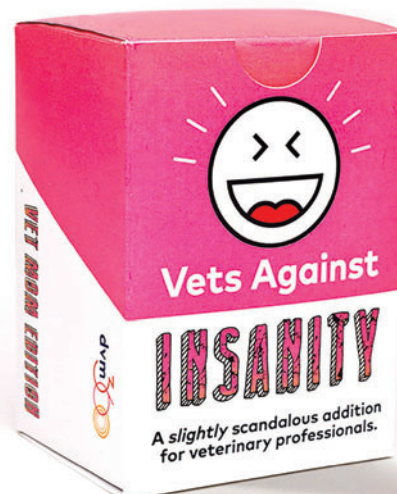
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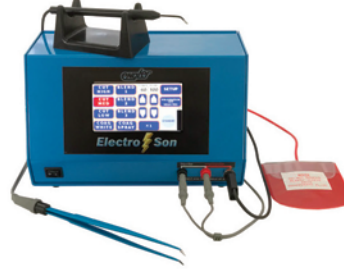


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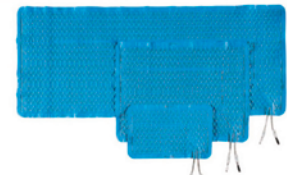
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The future of veterinary medicine

Lying awake in the wee hours of the morning, Dr. Brock considers what's in store for his chosen profession.

February 11, 2019, was a Monday. I know this because our entire family had been anxiously awaiting this day for almost a year. At 7 a.m., veterinary residency match posting would be revealed.

My daughter Abbi (large animal surgery specialty) and son-in-law Zach (radiology specialty) were waiting to find out if they matched at all, and if they did, whether they'd be at the same university. All this after spending a year apart during their internships—Abbi in California and Zach in North Carolina.

In 1988, a wealthy donor gave an ultrasound machine to the veterinary school. It was as big as a Volkswagen, had a screen the size of a large iPhone that displayed about four shades of gray, and cost \$450,000.

As is often the case in the life of an equine veterinarian, I was called out to do a colic surgery that night and didn't get home until 5 a.m., just two hours before residencies were supposed to be posted. Naturally, I couldn't sleep. During those two hours awake in bed, I considered this profession that has blessed me so deeply and all the things that have changed in the last 30 years.

The first thing that came to mind was 1988. I was a fourth-year veterinary student at Texas A&M, and a wealthy donor gave an ultrasound machine to the vet school. It was a really big deal; the technology was new and hadn't been used much in veterinary medicine. When the ultrasound machine arrived, it was as big as a Volk-

swagen. It had a screen about the size of a large iPhone that displayed four shades of gray, and it cost \$450,000.

I was on clinics, and all we did was stand there and watch the clinician rub the probe on a digital flexor tendon for hours. He didn't know what he was looking at and neither did we. This went on for days. I remember thinking it was a waste of my time and there was no way I was ever going to be able to afford one of those things in West Texas.

Now my clinic has four ultrasound units with a billion shades of gray, all in a package the size of laptop. We have radiography equipment that can deliver a detailed, beautiful image in three seconds—no dipping vat and waiting 24 hours to dry. We also have an MRI that's the size of a trailer house and are looking into getting a CT scanner.

In 30 short years, a mixed animal veterinary clinic in the middle of nowhere has better imaging and diagnostic capabilities than any institution in the entire world had in 1988. And we know how to use them to benefit animals like never before.

I went on thinking about the students of today. Every generation seems to call the next generation lazy and entitled. I remember people my grandfather's age telling me how the kids my age didn't know how to work. I can remember thinking that all I ever *did* was work. I wasn't sure if there were more hours in a day when my grandfather was young or what.

We have a number of students come through our clinic each year. Just like when I was a kid, some of them are lazy and entitled, but most of them work like sled dogs and are so eager to

learn that we have to slow them down.

I thought about the education process—the new veterinary schools and how they're making an effort to shift the emphasis off perfect scholastics to common sense experience combined with didactic ability. Over the years, the emphasis on perfect grades as the major criteria for choosing future veterinarians has helped the application pool change considerably since the early to mid '80s when I applied.

I thought about how much surgery has advanced since I became a doctor. In the early '80s, there were only a handful of veterinarians who had ever stuck a scope in a horse joint. They were ridiculed by their predecessors, who said the arthroscope would never be as good as or replace an arthrotomy.

As I waited for 7 a.m. to arrive, I decided that we are in a good place here in the veterinary world. We are making changes to meet the needs of modern-day clients. Our profession is full of caring people who are replete with common sense. We are innovative, having found a use for everything from shirt buttons that can be used as a stent to hold a laceration together to highly advanced medicated implants in the very delicate eye for uveitis.

I haven't quit smiling since 7 a.m. that Monday morning. Abbi and Zach both matched at Texas A&M, so they'll be together and learning from some of the brightest veterinarians in the world.

Dr. Bo Brock owns Brock Veterinary Clinic in Lamesa, Texas. His latest book is Crowded in the Middle of Nowhere: Tales of Humor and Healing From Rural America.

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Mycequin™ is a targeted probiotic containing NMXAAD™, a proprietary blend of *Saccharomyces boulardii*, a type of yeast, and beta-glucan to support intestinal health.

- CONTAINS 10 BILLION CFUs* OF SACCHAROMYCES BOULARDII
- UNLIKE BACTERIA-BASED PROBIOTICS, YEAST-BASED PROBIOTICS ARE NOT AFFECTED BY ANTIBIOTICS
- CONTAINS BETA-GLUCAN TO SUPPORT IMMUNE FUNCTION
- TASTY CHEWABLE TABLETS FOR DOGS
- VETERINARY EXCLUSIVE PACKAGING - NOT AVAILABLE ONLINE



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- Roundworm
- Whipworm

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IDEXX

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Canine Cruciate Disease

MMP for TTA

Patella Luxation

RidgeStop™

Fracture Repair

SOP™ Locking Plates

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2019

“

We understand
that your future
success in
orthopedics relies
on our innovation,
education & trust.”



Innovative solutions

for the most commonly seen orthopedic procedures



MMP

for Canine Cruciate Disease

RidgeStop™

for Patella Luxation

SOP™

for Fracture Repair



Canine Cruciate Disease

MMP - A progression of the TTA procedure for treatment of hindlimb lameness caused by cranial cruciate ligament insufficiency

Benefits of MMP

- ✓ MMP is suitable for referral and primary-care veterinary surgeons
- ✓ Suitable for a wide range of dogs from small to large
- ✓ Complication rates are acceptably low
- ✓ Shorter surgery time
- ✓ Shorter convalescence
- ✓ Simpler, cost-effective surgery




Patient: Happy **Surgeon:** Tommy Hargittai DVM MRCVS **Practice:** Anderson Veterinary Group

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Course Content

The Modified Maquet Procedure (MMP) is an evolution of the traditional TTA procedure for treatment of lameness due to cranial cruciate disease.

Canine cranial cruciate ligament disease is the most common cause of lameness seen in canines and this course will cover many of the current controversies surrounding this subject. You will then learn about the rationale behind the development of the MMP procedure, how to perform it then followed by a practical session.

Course Agenda

- Canine cruciate ligament disease and it's treatment
- Cranial cruciate controversies
- Cruciate surgery outcomes
- An introduction to MMP and OrthoFoam™
- How to perform the MMP procedure with confidence
- Clinical experience and publications

Key Learning Objectives

By the end of this course delegates will have an understanding of:

- Why we developed another cruciate surgical technique
- Controversies surrounding cruciate failure and the surgeries available
- Biomechanics and theoretical foundation of the MMP procedure
- Ability to perform the MMP procedure

Course Locations & Dates

San Antonio:

April 25th

Chicago:

April 27th, September 14th

Philadelphia:

April 29th

Orange (CA), Improve Intl:*

June 1st-2nd

Phoenix:

June 3rd

DC:

July 12th

Toronto:

July 14th

Nashville:

July 14th

Atlanta:

September 12th

Dallas:

September 16th

Miami, Improve Intl:*

October 10th-11th

Las Vegas, Oquendo Center:*

November 14th

Denver:

December 5th

Seattle:

December 7th

RACE No. 844-15586

6 hours CE credits for the full day course
(Canine Cruciate Disease & Patella Luxation)

\$600.00*

(Canine Cruciate Disease + Patella Luxation)

or \$900 for Fracture Repair + Canine Cruciate Disease + Patella Luxation

* Different pricing for Oquendo Center and Improve International courses
* Denotes Wet-lab



Patella Luxation

RidgeStop™ - An innovative surgical technique and novel implant for treatment of patella luxation

Benefits of RidgeStop™

- ✓ Removes the need for an aggressive sulcoplasty
- ✓ Minimally traumatic
- ✓ Minimally invasive
- ✓ Minimal joint interference
- ✓ Implant is made from medical grade UHMW polyethylene




Patient: Vader **Surgeon:** Rafael Garrido Ldo Veterinaria MRCVS **Practice:** Vets4Pets Sidcup

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Course Content

This surgical technique is a simple alternative to an aggressive sulcoplasty and uses a medical-grade implant that can be used alone or as an adjunct to re-alignment operations. The course explains the pathogenesis and treatment selection in patella luxation as well as a review of current surgical treatment options available. This will then be followed by an introduction to RidgeStop™ - the implant and surgical technique, followed by a practical session.

Course Agenda

- Overview of patella luxation pathophysiology
- Diagnosis and current surgical treatments for patella luxation
- Classifying the degree of luxation and associated deformities
- The development and rationale of RidgeStop™
- The RidgeStop™ procedure

Key Learning Objectives

By the end of the course, delegates will have an understanding of:

- Diagnosis and classifying degree of patella luxation
- Treatment selection in patella luxation
- The concept of RidgeStop™
- Ability and confidence to carry out the RidgeStop™ procedure



Course Locations & Dates

San Antonio:

April 25th

Chicago:

April 27th, September 14th

Philadelphia:

April 29th

Orange (CA), Improve Intl:*

June 1st-2nd

Phoenix:

June 3rd

DC:

July 12th

Toronto:

July 14th

Nashville:

July 14th

Atlanta:

September 12th

Dallas:

September 16th

Miami, Improve Intl:*

October 10th-11th

Las Vegas, Oquendo Center:*

November 14th

Denver:

December 5th

Seattle:

December 7th

RACE No. 844-15587

6 hours CE credits for the full day course
(Canine Cruciate Disease & Patella Luxation)

\$600.00*

(Canine Cruciate Disease + Patella Luxation)

or \$900 for Fracture Repair + Canine Cruciate Disease + Patella Luxation

* Different pricing for Oquendo Center and Improve International courses
* Denotes Wet-lab

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- ✔ Diplomate speaker
- ✔ State-of-the-art facilities
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- ✔ Premier learning facility for veterinary education
- ✔ Confidence to perform surgery
- ✔ Learn the techniques and the approach



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Las Vegas Oquendo Center Wet-lab

November 2019:

- 14th - Canine Cruciate Disease
- Patella Luxation
- 15th - Fracture Repair

Single Day \$1000.00

Canine Cruciate Disease + Patella Luxation
or
Fracture Repair

Both Days \$1800.00

Canine Cruciate Disease + Patella
Luxation + Fracture Repair



Orange (CA) Improve International Wet-lab

June 1st-2nd 2019:

- Canine Cruciate Disease
- Patella Luxation
- Fracture Repair

Hilton Hotel Anaheim (Day 1)
Irvine University (Day 2)

Miami Improve International

October 10th-11th 2019:

- Canine Cruciate Disease
- Patella Luxation
- Fracture Repair

Miami Airport Marriott (Day 1)
Miller School of Medicine (Day 2)

Both Days \$1800.00

Canine Cruciate Disease + Patella
Luxation + Fracture Repair



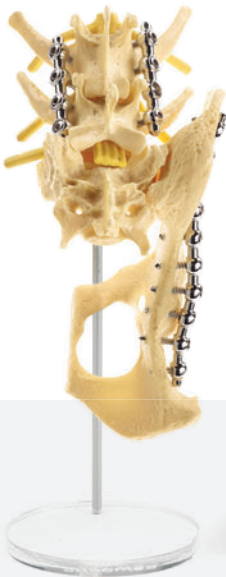


Fracture Repair

SOP™ - A locking plate system with great flexibility and multiple applications

Benefits of SOP™

- ✓ Available in 3 sizes: (2.0mm, 2.7mm and 3.5mm)
- ✓ Greater plate pull-out force
- ✓ Uses standard cortical screws
- ✓ Exact contouring not required
- ✓ A cost effective system




Patient: Dave **Surgeon:** Scott Rutherford BVMS CertSAS DipECVS MRCVS RCVS

Practice: frank. Pet Surgeons.

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Course Content

The SOP™ (String of Pearls) was designed to serve as a locking plate system that can be thought of mechanically as an internal – external fixator.

The course will teach you how this versatile plate system differs from other conventional locking plate systems and demonstrate the wide range of applications that it can be used for.

Course Agenda

- Fracture repair systems – the flaws and failings
- Locking plate technology
- Features and biomechanics of the SOP™ system
- Where and how to use it
- Case reviews
- Publication overview
- Half a day practical session using a variety of anatomical sawbones

Key Learning Objectives

By the end of the course, delegates will have an understanding of:

- Why SOP™ is a unique system for fracture repair
- Advantages over conventional plates
- Case selection and clinical applications of SOP™
- The technical ability to use the SOP™ system in a range of applications



Course Locations & Dates

San Antonio:

April 26th

Chicago:

April 28th, September 15th

Philadelphia:

April 30th

Orange (CA), Improve Intl:*

June 1st-2nd

Phoenix:

June 4th

DC:

July 13th

Toronto:

July 15th

Nashville:

July 17th

Atlanta:

September 13th

Dallas:

September 17th

Miami, Improve Intl:*

October 10th-11th

Las Vegas, Oquendo Center:*

November 15th

Denver:

December 6th

Seattle:

December 8th

RACE No. 844-15588

6 hours CE credits for the full day course
 (Fracture Repair)

\$400.00*

for the full day course (Fracture Repair)

or \$900 for Fracture Repair + Canine Cruciate Disease + Patella Luxation

* Different pricing for Oquendo Center and Improve International courses
 * Denotes Wet-lab

About Us



About Orthomed

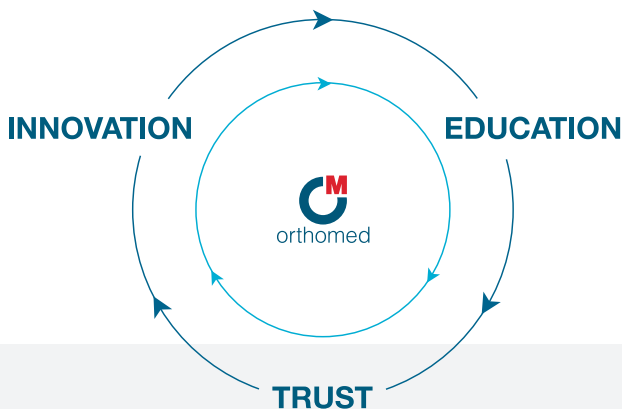
Orthomed has been established in the global veterinary market for over 15 years

We provide surgeons across every continent with systems and implants to successfully treat thousands of patients a year suffering from orthopedic trauma.

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- ✓ Leaders in innovation
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- ✓ Aftersales support
- ✓ Advanced on-going R & D




Patient: Bruno **Surgeon:** Robert White BVetMed PGCertSAS MRCVS **Practice:** Donaldson's Vets **Surgery Type:** RidgeStop™

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Malcolm Ness

BVetMed, CertSAO, DipECVS, FRCVS and European Specialist in Surgery

Malcolm Ness is recognized globally as a specialist in Small Animal Surgery by RCVS and ECVS. With hundreds of presentations made across the globe as an invited speaker, Dr Ness also has; over 20 first author papers in veterinary

peer reviewed journals, commissioned editorials and numerous commissioned articles in open access veterinary and lay magazines and periodicals. His clinical interests include most aspects of orthopedic and spinal surgery and Dr Ness is actively engaged in the research and development of novel implants and orthopedic surgical techniques.



Scott Rutherford

BVMS, CertSAS, DipECVS, MRCVS
 RCVS Recognised and European Specialist in Small Animal Surgery

After graduating from Glasgow University in 2001, Scott spent six years in general practice before moving to Croft Veterinary Hospital in Northumberland in 2007 where he completed

an ECVS residency in Small Animal Surgery in 2012. Scott became a European Veterinary Specialist in Small Animal Surgery in 2013 and an RCVS Recognized Specialist in 2014. He spent two years at both North Downs Specialist Referrals and then Willows Referral Services. He is a co-founder and director of frank. Pet Surgeons. Scott is actively involved in clinical research and teaching and he recently became an Associate Tutor at Chester University.



Dr. Karl Kraus

DVM, MS, Diplomate ACVS

Dr. Kraus is Chief of Small Animal Surgery at Lloyd Veterinary Medical Center at Iowa State University and diplomate of the American College of Veterinary Surgeons. He graduated from Kansas State University in 1985, completed residency training at University

of Missouri-Columbia in 1989 and was professor of surgery at Tufts University from 1989 to 2007. He also held a joint appointment at Harvard University where he helped develop neurosurgical procedures on humans at Brigham and Women's Hospital from 1989 to 1998. His major areas of interest include fracture repair, external fixation, ACL repair, spinal stabilization, and neurosurgery.



Peter Early

Clinical Professor, Neurology and Neurosurgery, DVM, ACVIM

Dr. Early is a graduate of the University of Florida, College of Veterinary Medicine. He spent two years at Cornell University, where he first completed a small animal rotating internship, followed by a second year as a

staff veterinarian. He completed a Neurology/Neurosurgery residency at North Carolina State University and is a Diplomate of the American College of Veterinary Internal Medicine. He presently serves as a Clinical Associate Professor in Neurology and Neurosurgery at NCSU and provides regular locum work at multiple university and specialty hospitals throughout the country. Dr. Early's special interests include neurosurgery, specifically decompression and stabilization techniques.



Robert L. Bergman

DVM, MS, Diplomate ACVIM (Neurology)

Dr. Bergman received his DVM from the University of Georgia. Following internship, he pursued a residency in neurology and neurosurgery at the Virginia-Maryland Regional College of Veterinary Medicine. Concurrently, he completed a Master's Degree at Virginia

Tech with a focus on neuroscience and cerebrospinal fluid analysis. He became a diplomate of ACVIM specialty of neurology in 2001. Dr. Bergman recently served 5 years and was chair of the ACVIM Neurology Certification Exam Committee. While busy in private practice, he enjoys teaching neurosurgery to residents and those interested in the advancement of veterinary neurosurgery. He has a particular interest in spinal fusion, spinal trauma and neuro-oncology.

Locations & dates

Course Locations

United States and Canada




- | | | | | |
|-----------|---------------|-----------|----------------|---------------|
| 1 Atlanta | 3 Las Vegas | 5 Miami | 7 Philadelphia | 9 San Antonio |
| 2 Chicago | 4 Orange (CA) | 6 Orlando | 8 Phoenix | 10 Toronto |

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January	February	March
April	May	June
San Antonio 25th - Canine Cruciate Disease (Sawbone) - Patella Luxation (Sawbone) 26th - Fracture Repair (Sawbone)		Orange (CA), Improve International* 1st-2nd - Canine Cruciate Disease (Wet-lab) - Patella Luxation (Wet-lab) - Fracture Repair (Wet-lab)
Chicago 27th - Canine Cruciate Disease (Sawbone) - Patella Luxation (Sawbone) 28th - Fracture Repair (Sawbone)		Phoenix 3rd - Canine Cruciate Disease (Sawbone) - Patella Luxation (Sawbone) 4th - Fracture Repair (Sawbone)
Philadelphia 29th - Canine Cruciate Disease (Sawbone) - Patella Luxation (Sawbone) 30th - Fracture Repair (Sawbone)		
July	August	September
DC 12th - Canine Cruciate Disease (Sawbone) - Patella Luxation (Sawbone) 13th - Fracture Repair (Sawbone)		Atlanta 12th - Canine Cruciate Disease (Sawbone) - Patella Luxation (Sawbone) 13th - Fracture Repair (Sawbone)
Toronto 14th - Canine Cruciate Disease (Sawbone) - Patella Luxation (Sawbone) 15th - Fracture Repair (Sawbone)		Chicago 14th - Canine Cruciate Disease (Sawbone) - Patella Luxation (Sawbone) 15th - Fracture Repair (Sawbone)
Nashville 16th - Canine Cruciate Disease (Sawbone) - Patella Luxation (Sawbone) 17th - Fracture Repair (Sawbone)		Dallas 16th - Canine Cruciate Disease (Sawbone) - Patella Luxation (Sawbone) 17th - Fracture Repair (Sawbone)
October	November	December
Miami, Improve International* 10th-11th - Canine Cruciate Disease (Wet-lab) - Patella Luxation (Wet-lab) - Fracture Repair (Wet-lab)	Las Vegas, Oquendo Center* 14th - Canine Cruciate Disease (Wet-lab) - Patella Luxation (Wet-lab) 15th - Fracture Repair (Wet-lab)	Denver 5th - Canine Cruciate Disease (Sawbone) - Patella Luxation (Sawbone) 6th - Fracture Repair (Sawbone)
		Seattle 7th - Canine Cruciate Disease (Sawbone) - Patella Luxation (Sawbone) 8th - Fracture Repair (Sawbone)

* Denotes Wet-lab

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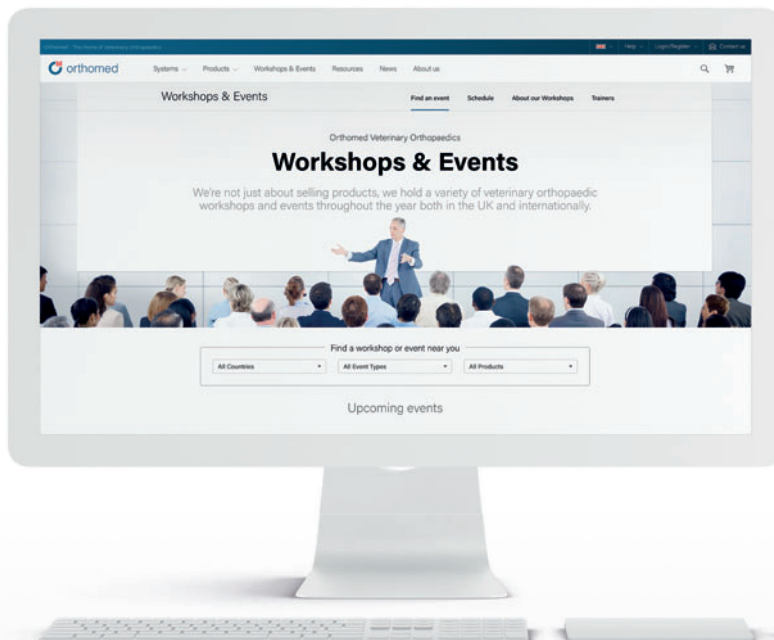
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Chris Stevens, Dodge City Veterinary Hospital

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