Veterinary Practice News®

THE INFORMATION LEADER FOR VETERINARY PRACTICE AND BUSINESS

July 2025 ● Volume 37/Number 7 ● VeterinaryPracticeNews.com

NEXT-LEVEL PROTECTION FOR NEXT-LEVEL BONDS.

ONE-AND-DONE, MONTHLY PARASITE PROTECTION FOR DOGS

FLEAS | TICKS | HEARTWORM DISEASE | ROUNDWORMS | HOOKWORMS

Now approved by the FDA for the prevention of Lyme infections as a direct result of killing black-legged ticks.

NexGard® PLUS
(afoxolaner, moxidectin, and pyrantel chewable tablets)

IMPORTANT SAFETY INFORMATION: *NexGard*® PLUS chews are for for use in dogs only. The most frequently reported adverse reactions reported in clinical trials were diarrhea, vomiting, lethargy, and itching. *NexGard* PLUS contains afoxolaner, a member of the isoxazoline class, which has been associated with neurologic adverse reactions including tremors, ataxia, and seizures in dogs with or without a history of seizures. Use with caution in dogs with a history of seizures or neurologic disorders. The safe use of *NexGard* PLUS has not been evaluated in breeding, pregnant, or lactating dogs. Dogs should be tested for existing heartworm infection prior to starting a heartworm disease preventive. For more information, see full prescribing information or visit NexGardPLUSClinic.com.

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GENETICS STUDY ADVANCES CAT HEALTH

PHOTO COURTESY HILL'S PET NUTRITION

By Jennifer Radosevich, PhD

Feline-focused research, including continued work on the feline genome, helps empower veterinary teams with the knowledge and resources needed to provide exceptional care for cats.

Feline genetics, Page 12

VETS' ROLE IN ANIMAL CRUELTY CASES

By Kris Otteman, DVM, Dipl. ABVP Shelter Medicine, CAWA; Linda Fielder, CAWA, and Emily Lewis, Esq. MSEL

This feature empowers veterinarians to confidently apply their skills in every aspect of animal cruelty prevention, from advocacy to forensics.

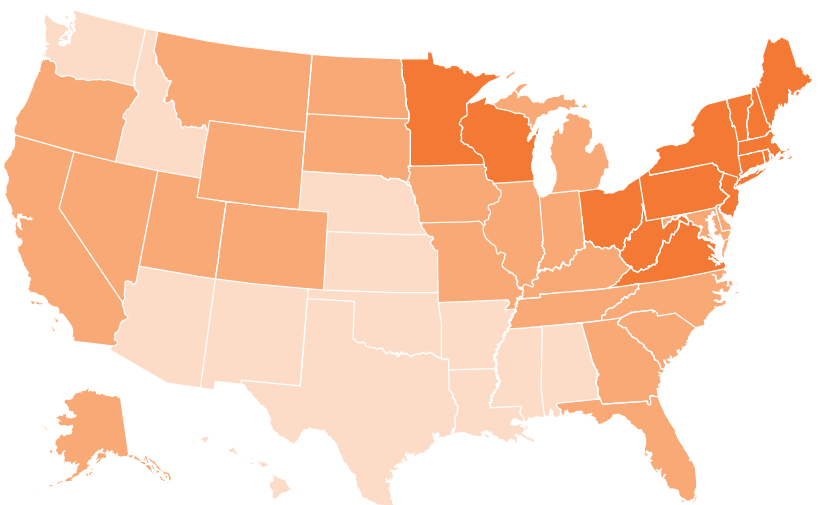
Animal cruelty, Page 34

PHOTO COURTESY OREGON HUMANE SOCIETY

BITE BACK AGAINST LYME WITH NEXT-LEVEL PROTECTION

NEW CLAIM!

***NexGard*® PLUS chews are now approved by the FDA for the prevention of Lyme infections as a direct result of killing black-legged ticks.**



LYME DISEASE IS SPREADING

According to the CAPC Parasite Prevalence maps, Lyme disease is the most commonly diagnosed tick-borne disease in dogs in the US.[1]

PROVEN RESULTS AGAINST *B. burgdorferi* TRANSMISSION[2]

Detection of *Borrelia burgdorferi* infection	Untreated Control Group	*NexGard* PLUS-treated Group
Lyme Quant C6® & SNAP® 4Dx® Plus	ALL dogs tested positive	ALL dogs tested negative
PCR	ALL dogs tested positive	ALL dogs tested negative
		100% PROTECTED*

* All dogs in this study treated with *NexGard* PLUS were protected from *Borrelia burgdorferi* infections, as a direct result of killing black-legged ticks.

1. Parasite Prevalence Maps. Companion Animal Parasite Council website. https://capcvet.org/maps/#/2024/all-year/lyme-disease/dog/united-states. Accessed April 16, 2025.
2. *NexGard*® PLUS (afoxolaner, moxidectin, and pyrantel chewable tablets) [Freedom of Information Summary; NADA 141-554]. Duluth, GA: Boehringer Ingelheim Animal Health USA Inc.; 2025.

IMPORTANT SAFETY INFORMATION: *NexGard*® PLUS chews are for use in dogs only. The most frequently reported adverse reactions reported in clinical trials were diarrhea, vomiting, lethargy, and itching. *NexGard* PLUS contains afoxolaner, a member of the isoxazoline class, which has been associated with neurologic adverse reactions including tremors, ataxia, and seizures in dogs with or without a history of seizures. Use with caution in dogs with a history of seizures or neurologic disorders. The safe use of *NexGard* PLUS has not been evaluated in breeding, pregnant, or lactating dogs. Dogs should be tested for existing heartworm infection prior to starting a heartworm disease preventive. For more information, see full prescribing information or visit NexGardPLUSClinic.com.

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PETS, VETS, AND ONE HEALTH

A look at how companion animals signal emerging infectious disease risks

By Michelle Evason, BSc, DVM, DACVIM, MRCVS

Veterinary professionals play a vital role in the One Health approach as climate change and global travel impact infectious disease risks. Through routine screening and client education, we help protect both pets and their caregivers by recognizing our patients as sentinels for emerging health threats.

One Health, Page 32

GENETICS STUDY ADVANCES CAT HEALTH

PHOTO COURTESY HILL'S PET NUTRITION

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Feline-focused research, including continued work on the feline genome, helps empower veterinary teams with the knowledge and resources needed to provide exceptional care for cats.

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Animal cruelty, Page 34

PHOTO COURTESY OREGON HUMANE SOCIETY

Table 2: Arithmetic mean (± standard deviation) pimobendan plasma pharmacokinetic parameters after a 5 mg (0.29 – 0.41 mg/kg) oral administration of VETMEDIN Solution to male and female Beagle dogs in a laboratory bioequivalence study.

Parameter	Estimate	N
C_{max} (ng/mL)	24.0 ± 18.3	48
T_{max}[a](h)	0.75 (0.25 – 3)	48
AUC_{last} (h*ng/mL)	38.8 ± 26.2	48
AUC_{inf} (h*ng/mL)	39.0 ± 26.5	47
$t_{½}$ (h)	0.9 ± 0.4	47

[a] Median (Range)

C_{max} = maximum plasma concentration

T_{max} = time to maximum plasma concentration

AUC_{last} = area under the curve from the time of dosing to the last quantifiable plasma concentration

AUC_{inf} = area under the curve from the time of dosing extrapolated to infinity

$t_{½}$ = half-life

N = observations

The bioequivalence study also demonstrated similar AUC and C_{max} of the active metabolite between VETMEDIN Solution and VETMEDIN Chewable Tablets. Pimobendan is oxidatively demethylated to a pharmacologically active metabolite, which is then conjugated with sulfate or glucuronic acid and excreted mainly via feces.

The AUC_{last} of VETMEDIN Solution is 37% lower and the C_{max} is 39% lower in the fed state compared to the fasted state (N=12 dogs). Statistical comparisons, where appropriate, were made using natural log transformed data and geometric means.

Effectiveness:
The effectiveness of VETMEDIN Solution was established by demonstrating bioequivalence with VETMEDIN Chewable Tablets. (See **Clinical Pharmacology**).

In a double-masked, multi-site, 56-day field study, 355 dogs with modified New York Heart Association‡ (NYHA) Class II, III, or IV CHF due to MMVD or DCM were randomly assigned to either the active control (enalapril maleate) or the VETMEDIN Chewable Tablets treatment group. Of the 355 dogs, 52% were male and 48% were female; 72% were diagnosed with MMVD and 28% were diagnosed with DCM; 34% had Class II, 47% had Class III, and 19% had Class IV CHF. Dogs ranged in age and weight from 1 to 17 years and 3.3 to 191 lbs, respectively. The most common breeds were mixed breed, Doberman Pinscher, Cocker Spaniel, Miniature/Toy Poodle, Maltese, Chihuahua, Miniature Schnauzer, Dachshund, and Cavalier King Charles Spaniel.The 180 dogs (130 MMVD, 50 DCM) in the active control group received enalapril maleate (0.5 mg/kg once or twice daily), and all but 2 received furosemide. Per protocol, all dogs with DCM in the active control group received digoxin.The 175 dogs (126 MMVD, 49 DCM) in the VETMEDIN Chewable Tablets group received pimobendan (0.5 mg/kg/ day divided into 2 portions that were not necessarily equal, and the portions were administered approximately 12 hours apart), and all but 4 received furosemide. Digoxin was optional for treating supraventricular tachyarrhythmia in either treatment group, as was the addition of a ß-adrenergic blocker if digoxin was ineffective in controlling heart rate.After initial treatment at the clinic on Day 1, dog owners were to administer the assigned product and concurrent medications for up to 56±4 days.

The determination of effectiveness (treatment success) for each case was based on improvement in at least 2 of the 3 following primary variables: modified NYHA classification, pulmonary edema score by a masked veterinary radiologist, and the investigator's overall clinical effectiveness score (based on physical examination, radiography, electrocardiography, and clinical pathology). Attitude, pleural effusion, coughing, activity level, furosemide dosage change, cardiac size, body weight, survival, and owner observations were secondary evaluations contributing information supportive to product effectiveness and safety.

Based on protocol compliance and individual case integrity, 265 cases (134 VETMEDIN Chewable Tablets, 131 active control) were evaluated for treatment success on Day 29. See Table 3 for effectiveness results.

Table 3: Effectiveness Results for the 56-Day Field Study

	VETMEDIN Chewable Tablets Group	Active Control Group
Treatment Success on Day 29	80.7% n = 134	76.3% n = 131
	88 of 101 dogs with MMVD	77 of 100 dogs with MMVD
	20 of 33 dogs with DCM	23 of 31 dogs with DCM
Treatment Success on Day 56	71.1% n = 113	67.2% n = 110
	66 of 85 dogs with MMVD	56 of 85 dogs with MMVD
	13 of 28 dogs with DCM	17 of 25 dogs with DCM
No increase in furosemide dose between Day 1 and Day 29	78.3% n = 130	68.6% n = 126

At the end of the 56-day study, dogs in the VETMEDIN Chewable Tablets group were enrolled in an unmasked field study to monitor safety under extended use, without restrictions on concurrent medications.

VETMEDIN Chewable Tablets were used safely in dogs concurrently receiving furosemide, digoxin, enalapril, atenolol, spironolactone, nitroglycerin, hydralazine, diltiazem, antiparasitic products (including heartworm disease prevention), antibiotics (metronidazole, cephalexin, amoxicillin-clavulanate, fluoroquinolones), topical ophthalmic and otic products, famotidine, theophylline, levothyroxine sodium, diphenhydramine, hydrocodone, metoclopramide, and butorphanol, and in dogs on sodium-restricted diets.

‡ The modified NYHA classification was historically used to stage dogs with heart disease.

A dog with modified NYHA Class II heart failure has fatigue, shortness of breath, coughing, etc. apparent when ordinary exercise is exceeded.

A dog with modified NYHA Class III heart failure is comfortable at rest, but exercise capacity is minimal.

A dog with modified NYHA Class IV heart failure has no capacity for exercise and disabling clinical signs are present even at rest.

Target Animal Safety: The safety of VETMEDIN Solution was established by demonstrating bioequivalence with VETMEDIN Chewable Tablets. (See **Clinical Pharmacology**).

In a laboratory study, VETMEDIN Chewable Tablets were administered to 6 healthy Beagles per treatment group at 0 (control), 1, 3, and 5 times the recommended dosage for 6 months. See Table 4 for cardiac pathology results. The cardiac pathology/ histopathology noted in the 3X and 5X dose groups is typical of positive inotropic and vasodilator drug toxicity in normal dog hearts, and is associated with exaggerated hemodynamic responses to these drugs. None of the dogs developed signs of heart failure and there was no mortality.

Table 4: Incidence of Cardiac Pathology/ Histopathology in the Six-month Safety Study

Severe left ventricular hypertrophy with multifocal subendocardial ischemic lesions	One 3X and two 5X dogs[a]
Moderate to marked myxomatous thickening of the mitral valves	Three 5X dogs
Myxomatous thickening of the chordae tendineae	One 3X and two 5X dogs
Endocardial thickening of the left ventricular outflow tract	One 1X, two 3X and two 5X dogs
Left atrial endocardial thickening (jet lesions) in 2 of the dogs that developed murmurs of mitral valve insufficiency	One 3X and one 5X dog
Granulomatous inflammatory lesion in the right atrial myocardium	One 3X dog

[a] Most of the gross and histopathologic findings occurred in these three dogs

Murmurs of mitral valve insufficiency were detected in one 3X (Day 65) and two 5X dogs (Days 135 and 163). These murmurs (grades II-III of VI) were not associated with clinical signs. Indirect blood pressure was unaffected by VETMEDIN Chewable Tablets at the label dose (1X). Mean diastolic blood pressure was decreased in the 3X group (74 mmHg) compared to the control group (82 mmHg). Mean systolic blood pressure was decreased in the 5X group (117 mmHg) compared to the control group (124 mmHg). None of the dogs had clinical signs of hypotension.

On 24-hour Holter monitoring, mean heart rate was increased in the 5X group (101 beats/min) compared to the control group (94 beats/min). Not counting escape beats, the 3X and 5X groups had slightly higher numbers of isolated ventricular ectopic complexes (VEs). The maximum number of non-escape VEs recorded either at baseline or in a control group dog was 4 VEs/24 hours. At either Week 4 or Week 20, three 3X group dogs had maximums of 33, 13, and 10 VEs/24 hours, and two 5X group dogs had maximums of 22 and 9 VEs/24 hours. One 1X group dog with no VEs at baseline had 6 VEs/24 hours at Week 4 and again at Week 20. Second-degree atrioventricular heart block was recorded in one 3X group dog at Weeks 4 and 20, and in one dog from each of the 1X and 5X groups at Week 20. None of the dogs had clinical signs associated with these electrocardiogram changes.

Treatment was associated with small differences in mean platelet counts (decreased in the 3X and 1X groups), potassium (increased in the 5X group), glucose (decreased in the 1X and 3X groups), and maximum blood glucose in glucose curves (increased in the 5X group). All individual values for these variables were within the normal range. Three 1X and one 5X group dogs had mild elevations of alkaline phosphatase (less than two times normal).

Loose stools and vomiting were infrequent and self-limiting.

Storage Information: Store at or below 77°F (25°C) with excursions permitted up to 86°F (30°C). Once the bottle is opened, use the contents within 8 weeks.

How Supplied:
VETMEDIN Solution (pimobendan oral solution): Available as 1.5 mg/mL, 50 mL fill volume, is supplied in a 60 mL amber glass bottle sealed with a white cap, an orange in-use cap with integrated plastic plug, and an orange dosing syringe.

NDC 0010-4131-01

Approved by FDA under NADA # 141-575

Marketed by:
Boehringer Ingelheim Animal Health USA Inc.
Duluth, GA 30096

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Revised 12/2023

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vetmedin® solution
(pimobendan oral solution)

NEWLY AVAILABLE

You can give your **Stage C & D CHF** *patients*

more life to love

- **Newly available oral solution** *makes administration easy for dogs who prefer liquid medication and delivers just the right dose they need*
- *The* **only oral solution product approved by the FDA** *for treating myxomatous mitral valve disease and dilated cardiomyopathy in dogs*
- *Unique dual mode of action* **demonstrated increased survival time and improved quality of life** *compared to ACE inhibitors*[1,2]
- **ACVIM-consensus recommended** *as a first-line therapy for dogs in heart failure**[3]

Scan to learn more about the oral solution presentation

*ACVIM Specialty of Cardiology consensus panel guidelines

1. Lombard CW, Jöns O, Bussadori CM; for the VetSCOPE Study. Clinical efficacy of pimobendan versus benazepril for the treatment of acquired atrioventricular valvular disease in dogs. *J Am Anim Hosp Assoc*. 2006;42(4):249–261. **2.** Häggström J, Boswood A, O'Grady M, et al. Longitudinal analysis of quality of life, clinical, radiographic, echocardiographic, and laboratory variables in dogs with myxomatous mitral valve disease receiving pimobendan or benazepril: the QUEST study. *J Vet Intern Med*. 2013;27(6):1441–1451. **3.** Keene BW, Atkins CE, Bonagura JD, et al. ACVIM consensus guidelines for the diagnosis and treatment of myxomatous mitral valve disease in dogs. *J Vet Intern Med*. 2019; 33: 1127-1140.

IMPORTANT SAFETY INFORMATION: VETMEDIN® Solution (pimobendan oral solution) is for use in dogs with clinical evidence of heart failure only. The most common side effects reported in field studies were poor appetite, lethargy, diarrhea, dyspnea, azotemia, weakness, and ataxia. VETMEDIN should not be given in case of hypertrophic cardiomyopathy, aortic stenosis, or any other clinical condition where an augmentation of cardiac output is inappropriate for functional or anatomical reasons. **For more information, see full prescribing information or visit VETMEDIN.com.**

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vetmedin®-CA1
(pimobendan) CHEWABLE TABLETS

You can give your Stage B2 MMVD patients

more life to love

- B2 *Conditionally approved to* **delay the onset of CHF in dogs with Stage B2** *preclinical myxomatous mitral valve disease (MMVD)*
- *Can give canines up to an average of* **15.6 more months** *of symptom-free life*[1]
- *Helps you manage MMVD even earlier and* **maximize the therapeutic benefit** *for your patients*
- **ACVIM-consensus recommended** *therapeutic treatment for dogs with Stage B2 preclinical MMVD**

Scan to learn more about the conditional approval

*ACVIM Specialty of Cardiology consensus panel guidelines

1. Keene BW, Atkins CE, Bonagura JD, et al. ACVIM consensus guidelines for the diagnosis and treatment of myxomatous mitral valve disease in dogs. *J Vet Intern Med.* 2019; 33: 1127-1140.

IMPORTANT SAFETY INFORMATION: Adverse reactions not related to disease progression in dogs receiving VETMEDIN®-CA1 (pimobendan) included diarrhea, vomiting, pain, lameness, arthritis, urinary tract infection, and seizure. The safe use of VETMEDIN-CA1 has not been evaluated in dogs younger than 6 months of age, dogs with congenital heart defects, dogs with diabetes mellitus or other serious metabolic diseases, dogs used for breeding, or pregnant or lactating bitches. **It is a violation of Federal law to use this product other than as directed in the labeling. Conditionally approved by the FDA pending a full demonstration of effectiveness under application number 141-556.** For more information, refer to the package insert.

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Preclinical Mitral Valve Disease in Dogs: A Practical Approach

Wendy A. Ware, DVM, MS, Dipl. ACVIM (Cardiology)

vetmedin® (pimobendan)

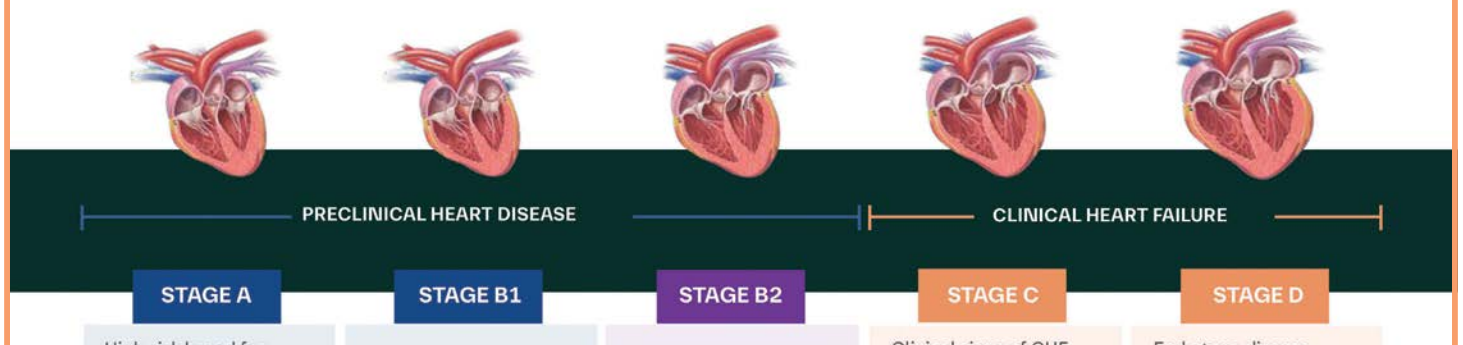
Myxomatous (degenerative) mitral valve disease (MMVD) is the most common cardiac disease in dogs, especially affecting small to medium-size breeds. Valvular changes develop gradually, eventually causing mitral (± tricuspid) regurgitation and subsequent left heart enlargement. Although many affected dogs never experience congestive heart failure (CHF), an estimated 30-40% eventually do.

The first clinical clue of MMVD is a mitral regurgitation (MR) murmur (systolic, heard best over the left apical region). Early recognition of preclinical MMVD not only provides opportunities for increasing owner awareness and education (starting when MR is first detected), it also can promote better patient monitoring and more effective management as the disease progresses.

What is MMVD Staging?

The ACVIM[a] staging system provides a framework for categorizing MMVD disease severity and guiding management.

Figure 1: The ACVIM[a] staging system



Why is it important to differentiate Stage B1 from B2 in dogs with preclinical MMVD?

Stage B1 represents relatively early disease. It advances slowly (over years), and CHF might never develop. No cardiac medication is recommended at Stage B1. However, recheck exams, including thoracic radiographs, every 12 (or sometimes 6-9) months to monitor progression, as well as periodic at-home resting respiratory rate (RRR) monitoring, are advised at this stage. In contrast, Stage B2 represents more advanced MMVD, with substantial left atrial (LA) and ventricular (LV) enlargement. The risk of developing CHF increases, warranting medical intervention and closer monitoring. Pimobendan[b] is indicated in Stage B2 because it can significantly delay the onset of CHF, and therefore, meaningfully can extend quality of life.

What criteria are used to identify dogs with Stage B2 MMVD?

Echocardiography is the gold standard test, recommended whenever possible; generally accepted Stage B2 criteria include LA/Ao (aortic root) dimension ratio ≥1.6, and normalized LV internal diastolic dimension ≥1.7.[1] But thoracic radiography is often the most accessible test. Baseline radiographs are recommended when a MR murmur is first detected, particularly when of moderate or louder intensity (≥3/6). Important measurements include vertebral heart size (VHS; Figure 2) and vertebral LA size (VLAS; Figure 3). Figure 4 outlines a suggested approach to dogs with preclinical MMVD.

a. American College of Veterinary Internal Medicine **b.** VETMEDIN®-CA1

1. Keene BW, Atkins CE, Bonagura JD, et al. ACVIM consensus guidelines for the diagnosis and treatment of myxomatous mitral valve disease in dogs. *J Vet Intern Med* 2019;33:1127-1140. **2.** Boswood A, Haggstrom J, Gordon SG, et al. Effect of Pimobendan in Dogs with Preclinical Myxomatous Mitral Valve Disease and Cardiomegaly: The EPIC Study - A Randomized Clinical Trial. *J Vet Intern Med* 2016;30:1765-1779. **3.** Atkins CE, Keene BW, Brown WA, et al. Results of the veterinary enalapril trial to prove reduction in onset of heart failure in dogs chronically treated with enalapril alone for compensated, naturally occurring mitral valve insufficiency. *J Am Vet Med Assoc* 2007;231:1061-1069. **4.** Reynolds CA, Brown DC, Rush JE, et al. Prediction of first onset of congestive heart failure in dogs with degenerative mitral valve disease: the PREDICT cohort study. *J Vet Cardiol* 2012;14:193-202. **5.** Boswood A, Gordon SG, Haggstrom J, et al. Temporal changes in clinical and radiographic variables in dogs with preclinical myxomatous mitral valve disease: The EPIC study. *J Vet Intern Med* 2020;34:1108-1118. **6.** Plumb's Veterinary Drugs (online database), Tulsa, OK: Brief Media; 2024. Accessed April 15, 2024..

Some Additional Resources www.cardiaceducationgroup.org | **Relevant cardiology chapters in:** *Kirk and Bonagura's Current Veterinary Therapy XVI,* Scansen BA & Bonagura JD, editors. Elsevier, 2025 | *Cardiovascular Disease in Companion Animals,* 2nd ed., Ware WA & Bonagura JD. CRC Press/Taylor & Francis, 2022.

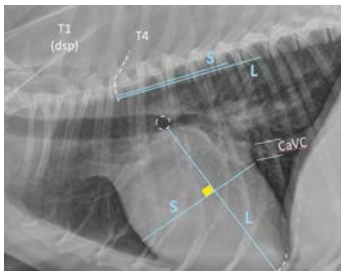


Figure 2: Vertebral heart size measurement. In this example, L = 6.5v, S = 5.1v, and the VHS = 11.6v. CaVC, caudal vena cava; L, cardiac long axis dimension; S, cardiac short axis dimension; T1 & T4, 1st & 4th thoracic vertebra, respectively; VHS, vertebral heart size (sum, score).

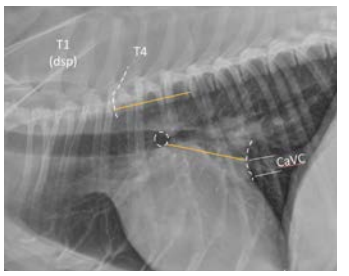


Figure 3: Vertebral left atrial size (VLAS) measurement. The VLAS = 3v in this example. See Fig. 2 legend for other abbreviations.

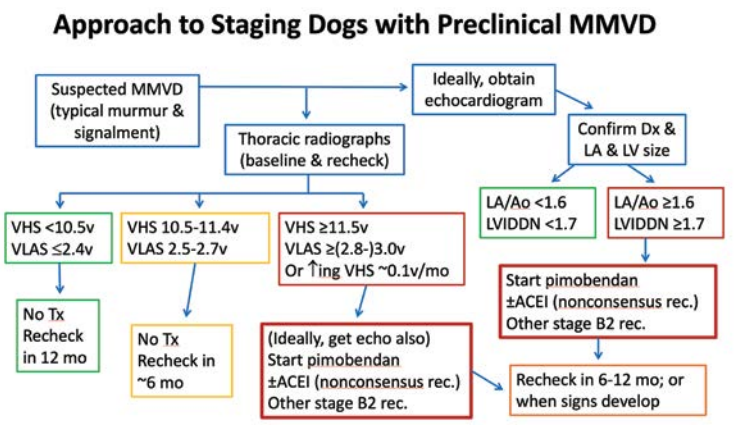


Figure 4: Suggested approach to staging dogs with preclinical MMVD. ACEI, angiotensin converting enzyme inhibitor; Ao, aortic root; Dx, diagnosis; LVIDDN, normalized LV internal diastolic dimension; rec, recommendation(s); Tx, treatment; ing, increasing. See Fig. 1-3 legends for other abbreviations.

How do I measure VHS and what cut-off value should be used?

Use a lateral view (right or left, just be consistent). Measure the cardiac long axis (L), from the ventral border of the carina to the cardiac apex. Measure the short axis (S), perpendicular to L within the central 1/3 of heart (widest area). Compare L and S lengths to the spine, beginning at the cranial edge of T4. The VHS = L + S, to nearest 0.1 vertebra (v). Because normal dogs of several breeds can have a VHS >10.5v, a VHS ≥11.5v is considered "clear evidence" for cardiomegaly.[1]

How do I measure VLAS and what indicates significant LA enlargement?

Use the same lateral view as for VHS. Measure from the center-ventral border of the carina to where the caudal LA edge meets the caudal vena cava's dorsal border. Compare the length of this line to the spine, beginning at the cranial edge of T4. Although VLAS >2.7v suggests at least moderate LA enlargement, VLAS values ≥3.0v are recommended as most specific.

What are the recommendations for dogs with Stage B2 MMVD?

Two main goals are to: 1) delay the onset of CHF for as long as possible and 2) be alert for early CHF signs. Toward goal 1, pimobendan[b] is indicated (0.25 mg/kg PO q12 hr). In a previous study, pimobendan was shown to delay median time to CHF onset by an average of up to 15.6 months, compared to placebo.[2] Other drugs have yielded no or only modest delays in CHF onset (e.g., in advanced Stage B2, an angiotensin converting enzyme inhibitor might delay CHF by ~4 months).[3]

Toward goal 2, at-home RRR monitoring (ideally, during sleep) is a powerful tool. A persistent rise in RRR can signal early pulmonary edema. Respiratory rates in dogs with normal lungs typically are <25 breaths/min during sleep, and <30 breaths/min during quiet rest. Because some dogs have a relatively low RRR (e.g. 12-16 breaths/min), it is important to identify each individual's normal baseline RRR (for reference), preferably before CHF develops. More frequent RRR monitoring is indicated as MMVD advances.

What factors suggest increased risk for CHF onset (Stage C)?

In general, the bigger the left heart the greater the risk. A VHS >12v and NT-proBNP ≥1500 pmol/L were identified as independent risk factors for CHF onset within 3-6 months.[4] The greatest rate of increase in VHS (and echocardiographic left heart size) occurs during the 6-12 months preceding CHF onset.[5] Also, at-home RRRs were found to increase markedly during the 1-2 months before overt CHF develops.[5] Closer patient observation and more frequent RRR monitoring help identify CHF early, so therapy can be instituted before an emergency situation develops.

What happens to dogs in Stage D?

Stage D describes end-stage CHF that has become refractory to treatment.[1] Without surgical valvular repair, therapeutic goals focus on supporting cardiac functioning and preserving the patient's comfort and quality of life. Severely affected dogs require hospitalization for supplemental oxygen therapy, parenteral medications [Figure 5: Dosage adjustments for dogs in Stage D CHF], and possibly ventilatory support. Arterial blood pressure, renal values, and cardiac rhythm (electrocardiogram) should be closely monitored. Once stabilized, at-home treatment involves medication dosing adjustments (considering comorbidities, like decreased renal function), antitussives, bronchodilators, and a reduced-sodium diet. Periodic recheck examinations are recommended to reassess chemistry and electrolyte values and determine therapeutic response. Dogs that develop ascites or pleural effusion may benefit from intermittent abdominocentesis or thoracocentesis to improve comfort.

IMPORTANT SAFETY INFORMATION: VETMEDIN® (pimobendan) Chewable Tablets and VETMEDIN® Solution (pimobendan oral solution) are for use in dogs with clinical evidence of heart failure only. The most common side effects reported in field studies were poor appetite, lethargy, diarrhea, dyspnea, azotemia, weakness, and ataxia. VETMEDIN should not be given in case of hypertrophic cardiomyopathy, aortic stenosis, or any other clinical condition where an augmentation of cardiac output is inappropriate for functional or anatomical reasons. For more information, see full prescribing information.

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Resting (sleeping) respiratory rate measurement

While the dog is quietly sleeping or resting, and without disturbing him, count the number of breaths over 30 seconds. Inspiration + expiration = 1 breath cycle. Multiply the number of breaths by 2 for the respiratory rate/minute.

Use a RRR monitoring app such as "My Pet's Heart2Heart", or record RRRs in a calendar or logbook to track over time.

Whenever possible, determine the dog's normal baseline RRR before signs of CHF ever develop. Count RRRs several times over a few weeks to identify the baseline rate.

Persistent increases of approximately 20-25% above that dog's normal baseline RRR, could indicate early pulmonary congestion/edema. Higher RRRs, especially ≥40 breaths/min, are of increasing concern for CHF.

General recommendations for initial CHF therapy*

Furosemide (usual 1st choice diuretic); dosage depends on severity of clinical CHF signs

- **For early/mild pulmonary edema:**
  1-2 mg/kg PO every 12 hours might be adequate
- **For acute/severe CHF:**
  2 mg/kg IV, IM, SC initial dose; then 1-4 mg/kg IV every 1 to 4 hours until RR is decreasing and diuresis begins; then decrease to 1-4 mg/kg every 6 to 12 hours
- **If inadequate response to initial boluses, consider constant rate infusion:** 0.66 to 1 mg/kg/hr for ~6 to 12 hours until RR decreases

Maintenance therapy:
2.5 mg/kg PO every 12 hours of VETMEDIN® (pimobendan) or VETMEDIN® Solution (pimobendan oral solution) every 12 hours

Benazepril or enalapril:
0.5 mg/kg PO every 12 to 24 hours; usually initiate after patient is breathing easily and eating

(3)Spironolactone:
1-2 mg/kg PO every 24 hours (or divided and given every 12 hours); target 2 mg/kg/day; often added at 1st recheck exam

Dosage adjustments for dogs in Stage D CHF1,†

Figure 5:
Dosage adjustments for dogs in Stage D CHF

	In-hospital	At home
Furosemide	2 mg/kg IV bolus, followed by 0.66 to 1 mg/kg/hour IV, CRI until respiratory distress decreases (maximum 4 hours)	8 mg/kg PO daily; adjust dosage as needed to control pulmonary edema, ascites and pleural effusion
Torsemide	For dogs refractory to Furosemide: 0.1 to 0.2 mg/kg every 12 to 24 hours	0.1 to 0.2 mg/kg PO daily (or divided and given twice daily)
Sodium nitroprusside and/or Dobutamine	For afterload reduction (nitroprusside) and inotropic support (dobutamine): 1.0 mcg (***not mg***)/kg/minute IV, CRI (titrate upward every 15 to 30 minutes to a maximum dosage of 10 to 15 mcg (***not mg***)/kg/minute) for 12 to 48 hours	N/A
Hydralazine[6]	To reduce afterload: 0.5 to 3.0 mg/kg PO twice daily	N/A
Amlodipine[6]	0.3 mg/kg PO every 8 hours	N/A
Pimobendan	0.3 mg/kg PO every 8 hours‡	0.3 mg/kg PO every 8 hours‡
Spironolactone	N/A	2 mg/kg PO daily

†Dogs previously receiving an ACE inhibitor or beta blocker should continue to receive these medications; dosage adjustments may be indicated
‡This dosing recommendation is the opinion of the author and does not match the per FDA labeling dose of pimobendan.

GIVING DOGS MORE LIFE TO LOVE

Dogs can enjoy a prolonged, symptom-free period with early diagnosis and treatment of myxomatous mitral valve disease (MMVD) at Stage B2 with VETMEDIN®-CA1 (pimobendan) Chewable Tablets. VETMEDIN-CA1 Chewable Tablets have a dual mode of action, relaxing the blood vessels carrying blood to and from the heart, and improving heart muscle function to help the heart work more efficiently.

vetmedin®
(pimobendan)

IMPORTANT SAFETY INFORMATION: VETMEDIN®-CA1 (pimobendan) is for use only in dogs with preclinical MMVD that have a moderate or loud mitral murmur due to mitral regurgitation and cardiomegaly. Adverse reactions not related to disease progression in dogs receiving VETMEDIN®-CA1 included diarrhea, vomiting, pain, lameness, arthritis, urinary tract infection, and seizure. The safe use of VETMEDIN®-CA1 has not been evaluated in dogs younger than 6 months of age, dogs with congenital heart defects, dogs with diabetes mellitus or other serious metabolic diseases, dogs used for breeding, or pregnant or lactating dogs. **It is a violation of Federal law to use this product other than as directed in the labeling. Conditionally approved by FDA pending a full demonstration of effectiveness under application number 141-556.** For complete product information, see the full prescribing information.

vetmedin®
(pimobendan) CHEWABLE TABLETS

You can give your **Stage C & D CHF** *patients*

more life to love

- **Tablet product approved by the FDA** *for treating myxomatous mitral valve disease and dilated cardiomyopathy in dogs*
- *Unique dual mode of action* **demonstrated increased survival time and improved quality of life** *compared to ACE inhibitors*[1,2]
- **ACVIM-consensus recommended** *as a first-line therapy for dogs in heart failure**[3]
- **Beef-flavored chewable tablets** *are half-scored to meet each patient's dosing needs*

Scan to learn more about patient selection and administration

*ACVIM Specialty of Cardiology consensus panel guidelines

1. Lombard CW, Jöns O, Bussadori CM; for the VetSCOPE Study. Clinical efficacy of pimobendan versus benazepril for the treatment of acquired atrioventricular valvular disease in dogs. *J Am Anim Hosp Assoc.* 2006;42(4):249–261. **2.** Häggström J, Boswood A, O'Grady M, et al. Longitudinal analysis of quality of life, clinical, radiographic, echocardiographic, and laboratory variables in dogs with myxomatous mitral valve disease receiving pimobendan or benazepril: the QUEST study. *J Vet Intern Med.* 2013;27(6):1441–1451. **3.** Keene BW, Atkins CE, Bonagura JD, et al. ACVIM consensus guidelines for the diagnosis and treatment of myxomatous mitral valve disease in dogs. *J Vet Intern Med.* 2019; 33: 1127-1140.

IMPORTANT SAFETY INFORMATION: VETMEDIN® (pimobendan) Chewable Tablets are for use in dogs with clinical evidence of heart failure only. The most common side effects reported in field studies were poor appetite, lethargy, diarrhea, dyspnea, azotemia, weakness, and ataxia. VETMEDIN should not be given in case of hypertrophic cardiomyopathy, aortic stenosis, or any other clinical condition where an augmentation of cardiac output is inappropriate for functional or anatomical reasons. **For more information, see full prescribing information or visit VETMEDIN.com.**

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159637-004

VETMEDIN®

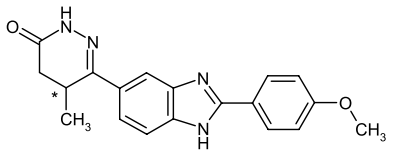
(pimobendan)

Chewable Tablets

Cardiac drug for oral use in dogs only

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

Description: VETMEDIN (pimobendan) is supplied as oblong half-scored chewable tablets containing 1.25, 2.5, 5 or 10 mg pimobendan per tablet. Pimobendan, a benzimidazole-pyridazinone derivative, is a non-sympathomimetic, non-glycoside inotropic drug with vasodilatative properties. Pimobendan exerts a stimulatory myocardial effect by a dual mechanism of action consisting of an increase in calcium sensitivity of cardiac myofilaments and inhibition of phosphodiesterase (Type III). Pimobendan exhibits vasodilating activity by inhibiting phosphodiesterase III activity. The chemical name of pimobendan is 4,5-dihydro-6-[2-(4-methoxyphenyl)-1H-benzimidazole-5-yl]-5-methyl-3(2H)-pyridazinone. The structural formula of pimobendan is:



Indications: VETMEDIN (pimobendan) is indicated for the management of the signs of mild, moderate, or severe congestive heart failure in dogs due to clinical myxomatous mitral valve disease (MMVD) or dilated cardiomyopathy (DCM). VETMEDIN is indicated for use with concurrent therapy for congestive heart failure (e.g., furosemide, etc.) as appropriate on a case-by case basis.

Dosage and Administration: VETMEDIN should be administered orally at a total daily dose of 0.23 mg/lb (0.5 mg/kg) body weight, using a suitable combination of whole or half tablets. The total daily dose should be divided into 2 portions that are not necessarily equal, and the portions should be administered approximately 12 hours apart (i.e., morning and evening). The tablets are scored and the calculated dosage should be provided to the nearest half tablet increment.

Contraindications: VETMEDIN should not be given in cases of hypertrophic cardiomyopathy, aortic stenosis, or any other clinical condition where an augmentation of cardiac output is inappropriate for functional or anatomical reasons.

Warnings:

User Safety Warnings: Not for use in humans. Keep this and all medications out of reach of children. Consult a physician in case of accidental ingestion by humans.

Animal Safety Warnings: Keep VETMEDIN in a secure location out of reach of dogs, cats, and other animals to prevent accidental ingestion or overdose.

Only for use in dogs with clinical evidence of heart failure. At 3 and 5 times the recommended dosage, administered over a 6-month period of time, pimobendan caused an exaggerated hemodynamic response in the normal dog heart, which was associated with cardiac pathology **(See Target Animal Safety).**

Precautions: The safety of VETMEDIN has not been established in dogs with asymptomatic heart disease or in heart failure caused by etiologies other than MMVD or DCM. The safe use of VETMEDIN has not been evaluated in dogs younger than 6 months of age, dogs with congenital heart defects, dogs with diabetes mellitus or other serious metabolic diseases, dogs used for breeding, or pregnant or lactating bitches.

Adverse Reactions:

Pre-Approval Experience: Clinical findings/adverse reactions were recorded in a 56-day field study of dogs with congestive heart failure (CHF) due to MMVD (256 dogs) or DCM (99 dogs). Dogs were treated with either VETMEDIN (175 dogs) or the active control enalapril maleate (180 dogs). Dogs in both treatment groups received additional background cardiac therapy (See Effectiveness for details and the difference in digoxin administration between treatment groups).

The VETMEDIN group had the following prevalence (percent of dogs with at least one occurrence) of common adverse reactions/new clinical findings (not present in a dog prior to beginning study treatments): poor appetite (38%), lethargy (33%), diarrhea (30%), dyspnea (29%), azotemia (14%), weakness and ataxia (13%), pleural effusion (10%), syncope (9%), cough (7%), sudden death (6%), ascites (6%), and heart murmur (3%).

Prevalence was similar in the active control group.

The prevalence of renal failure was higher in the active control group (4%) compared to the VETMEDIN group (1%).

Adverse reactions/new clinical findings were seen in both treatment groups and were potentially related to CHF, the therapy of CHF, or both. The following adverse reactions/new clinical findings are listed according to body system and are not in order of prevalence: CHF death, sudden death, chordae tendineae rupture, left atrial tear, arrhythmias overall, tachycardia, syncope, weak pulses, irregular pulses, increased pulmonary edema, dyspnea, increased respiratory rate, coughing, gagging, pleural effusion, ascites, hepatic congestion, decreased appetite, vomiting, diarrhea, melena, weight loss, lethargy, depression, weakness, collapse, shaking, trembling, ataxia, seizures, restlessness, agitation, pruritus, increased water consumption, increased urination, urinary accidents, azotemia, dehydration, abnormal serum electrolyte, protein, and glucose values, mild increases in serum hepatic enzyme levels, and mildly decreased platelet counts.

See Table 1 for mortality due to CHF (including euthanasia, natural death, and sudden death) and for the development of new arrhythmias (not present in a dog prior to beginning study treatments) by treatment group and type of heart disease (MMVD or DCM) in the 56-day field study.

Table 1: CHF Death and New Arrhythmias in the 56-Day Field Study

	VETMEDIN® Group	Active Control Group
Dogs that died due to CHF	14.3% n = 175	14.4% n = 180
	9 of 126 dogs with MMVD	16 of 130 dogs with MMVD
	16 of 49 dogs with DCM	10 of 50 dogs with DCM
Dogs that developed new arrhythmias[a]	39.4% n = 175	45.0% n = 180
	45 of 126 dogs with MMVD	59 of 130 dogs with MMVD
	24 of 49 dogs with DCM	22 of 50 dogs with DCM

[a] New arrhythmias included supraventricular premature beats and tachycardia, atrial fibrillation, atrioventricular block, sinus bradycardia, ventricular premature beats and tachycardia, and bundle branch block

Following the 56-day masked field study, 137 dogs in the VETMEDIN group were allowed to continue on VETMEDIN in an open-label extended-use study without restrictions on concurrent therapy. The adverse reactions/new clinical findings in the extended-use study were consistent with those reported in the 56-day study, with the following exception: One dog in the extended-use study developed acute cholestatic liver failure after 140 days on VETMEDIN and furosemide.

Post-Approval Experience (2023): The following adverse events are based on post-approval adverse drug experience reporting for VETMEDIN. 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 in dogs, are listed in decreasing order of reporting frequency: Diarrhea, lethargy, anorexia, emesis, cough, tachycardia, ataxia, dyspnea, convulsion, elevated liver enzymes (ALT, ALP), increased BUN and/or creatinine, tremors, hyperactivity, pruritus, syncope, allergic reactions (including allergic edema/facial edema, erythema, and hives), hypotension, hypertension, coagulation abnormalities (including thrombocytopenia, hemorrhage and petechia), and hyperglycemia (with or without diabetes mellitus). Death has been reported in some cases.

Contact Information: To report suspected adverse reactions, to obtain a Safety Data Sheet (SDS), or for technical assistance, contact Boehringer Ingelheim Animal Health USA Inc. at 1-888-637-4251. For additional information about adverse drug experience reporting for animal drugs, contact the FDA at 1-888-FDA-VETS or at www.fda.gov/reportanimalae.

Clinical Pharmacology: Pimobendan is oxidatively demethylated to a pharmacologically active metabolite which is then conjugated with sulfate or glucuronic acid and excreted mainly via feces. The mean extent of protein binding of pimobendan and the active metabolite in dog plasma is >90%. Following a single oral administration of 0.25 mg/kg VETMEDIN tablets the maximal mean (± 1 SD) plasma concentrations (Cmax) of pimobendan and the active metabolite were 3.09 (0.76) ng/ml and 3.66 (1.21) ng/ml, respectively. Individual dog Cmax values for pimobendan and the active metabolite were observed 1 to 4 hours post-dose (mean: 2 and 3 hours, respectively). The total body clearance of pimobendan was approximately 90 mL/min/kg, and the terminal elimination half-lives of pimobendan and the active metabolite were approximately 0.5 hours and 2 hours, respectively. Plasma levels of pimobendan and active metabolite were below quantifiable levels by 4 and 8 hours after oral administration, respectively. The steady-state volume of distribution of pimobendan is 2.6 L/kg indicating that the drug is readily distributed into tissues. Food decreased the bioavailability of an aqueous solution of pimobendan, but the effect of food on the absorption of pimobendan from VETMEDIN tablets is unknown.

In normal dogs instrumented with left ventricular (LV) pressure transducers, pimobendan increased LV dP/dtmax (a measure of contractility of the heart) in a dose dependent manner between 0.1 and 0.5 mg/kg orally. The effect was still present 8 hours after dosing. There was a delay between peak blood levels of pimobendan and active metabolite and the maximum physiologic response (peak LV dP/dtmax). Blood levels of pimobendan and active metabolite began to drop before maximum contractility was seen. Repeated oral administration of pimobendan did not result in evidence of tachyphylaxis (decreased positive inotropic effect) or drug accumulation (increased positive inotropic effect). Laboratory studies indicate that the positive inotropic effect of pimobendan may be attenuated by the concurrent use of a β-adrenergic blocker or a calcium channel blocker.

Effectiveness: In a double-masked, multi-site, 56-day field study, 355 dogs with modified New York Heart Association‡ (NYHA) Class II, III, or IV CHF due to MMVD or DCM were randomly assigned to either the active control (enalapril maleate) or the VETMEDIN (pimobendan) treatment group. Of the 355 dogs, 52% were male and 48% were female; 72% were diagnosed with MMVD and 28% were diagnosed with DCM; 34% had Class II, 47% had Class III, and 19% had Class IV CHF. Dogs ranged in age and weight from 1 to 17 years and 3.3 to 191 lb, respectively.

The most common breeds were mixed breed, Doberman Pinscher, Cocker Spaniel, Miniature/Toy Poodle, Maltese, Chihuahua, Miniature Schnauzer, Dachshund, and Cavalier King Charles Spaniel. The 180 dogs (130 MMVD, 50 DCM) in the active control group received enalapril maleate (0.5 mg/kg once or twice daily), and all but 2 received furosemide. Per protocol, all dogs with DCM in the active control group received digoxin. The 175 dogs (126 MMVD, 49 DCM) in the VETMEDIN group received pimobendan (0.5 mg/kg/day divided into 2 portions that were not necessarily equal, and the portions were administered approximately 12 hours apart), and all but 4 received furosemide. Digoxin was optional for treating supraventricular tachyarrhythmia in either treatment group, as was the addition of a β-adrenergic blocker if digoxin was ineffective in controlling heart rate. After initial treatment at the clinic on Day 1, dog owners were to administer the assigned product and concurrent medications for up to 56±4 days.

The determination of effectiveness (treatment success) for each case was based on improvement in at least 2 of the 3 following primary variables: modified NYHA classification, pulmonary edema score by a masked veterinary radiologist, and the investigator's overall clinical effectiveness score (based on physical examination, radiography, electrocardiography, and clinical pathology). Attitude, pleural effusion, coughing, activity level, furosemide dosage change, cardiac size, body weight, survival, and owner observations were secondary evaluations contributing information supportive to product effectiveness and safety.

Based on protocol compliance and individual case integrity, 265 cases (134 VETMEDIN, 131 active control) were evaluated for treatment success on Day 29. See Table 2 for effectiveness results.

Table 2: Effectiveness Results for the 56-Day Field Study

	VETMEDIN® Group	Active Control Group
Treatment Success on Day 29	80.7% n=134	76.3% n=131
	88 of 101 dogs with MMVD	77 of 100 dogs with MMVD
	20 of 33 dogs with DCM	23 of 31 dogs with DCM
Treatment Success on Day 56	71.1% n=113	67.2% n=110
	66 of 85 dogs with MMVD	56 of 85 dogs with MMVD
	13 of 28 dogs with DCM	17 of 25 dogs with DCM
No increase in furosemide dose between Day 1 and Day 29	78.3% n=130	68.6% n=126

At the end of the 56-day study, dogs in the VETMEDIN group were enrolled in an unmasked field study to monitor safety under extended use, without restrictions on concurrent medications.

VETMEDIN was used safely in dogs concurrently receiving furosemide, digoxin, enalapril, atenolol, spironolactone, nitroglycerin, hydralazine, diltiazem, antiparasitic products (including heartworm disease prevention), antibiotics (metronidazole, cephalexin, amoxicillin-clavulanate, fluoroquinolones), topical ophthalmic and otic products, famotidine, theophylline, levothyroxine sodium, diphenhydramine, hydrocodone, metoclopramide, and butorphanol, and in dogs on sodium-restricted diets.

‡The modified NYHA classification was historically used to stage dogs with heart disease.

A dog with modified NYHA Class II heart failure has fatigue, shortness of breath, coughing, etc. apparent when ordinary exercise is exceeded.

A dog with modified NYHA Class III heart failure is comfortable at rest, but exercise capacity is minimal.

A dog with modified NYHA Class IV heart failure has no capacity for exercise and disabling clinical signs are present even at rest.

Palatability: In a laboratory study, the palatability of VETMEDIN was evaluated in 20 adult female Beagle dogs offered doses twice daily for 14 days. Ninety percent (18 of 20 dogs) voluntarily consumed more than 70% of the 28 tablets offered. Including two dogs that consumed only 4 and 7% of the tablets offered, the average voluntary consumption was 84.2%.

Animal Safety: In a laboratory study, VETMEDIN chewable tablets were administered to 6 healthy Beagles per treatment group at 0 (control), 1, 3, and 5 times the recommended dosage for 6 months. See Table 3 for cardiac pathology results. The cardiac pathology/histopathology noted in the 3X and 5X dose groups is typical of positive inotropic and vasodilator drug toxicity in normal dog hearts, and is associated with exaggerated hemodynamic responses to these drugs. None of the dogs developed signs of heart failure and there was no mortality.

Table 3: Incidence of Cardiac Pathology/Histopathology in the Six-month Safety Study

Severe left ventricular hypertrophy with multifocal subendocardial ischemic lesions	One 3X and two 5X dogs[a]
Moderate to marked myxomatous thickening of the mitral valves	Three 5X dogs
Myxomatous thickening of the chordae tendineae	One 3X and two 5X dogs
Endocardial thickening of the left ventricular outflow tract	One 1X, two 3X, and two 5X dogs
Left atrial endocardial thickening (jet lesions) in 2 of the dogs that developed murmurs of mitral valve insufficiency	One 3X and one 5X dog
Granulomatous inflammatory lesion in the right atrial myocardium	One 3X dog

[a] Most of the gross and histopathologic findings occurred in these three dogs

Murmurs of mitral valve insufficiency were detected in one 3X (Day 65) and two 5X dogs (Days 135 and 163). These murmurs (grades II-III of VI) were not associated with clinical signs.

Indirect blood pressure was unaffected by VETMEDIN at the label dose (1X). Mean diastolic blood pressure was decreased in the 3X group (74 mmHg) compared to the control group (82 mmHg). Mean systolic blood pressure was decreased in the 5X group (117 mmHg) compared to the control group (124 mmHg). None of the dogs had clinical signs of hypotension.

On 24-hour Holter monitoring, mean heart rate was increased in the 5X group (101 beats/min) compared to the control group (94 beats/min). Not counting escape beats, the 3X and 5X groups had slightly higher numbers of isolated ventricular ectopic complexes (VEs). The maximum number of non-escape VEs recorded either at baseline or in a control group dog was 4 VEs/24 hours. At either Week 4 or Week 20, three 3X group dogs had maximums of 33, 13, and 10 VEs/24 hours, and two 5X group dogs had maximums of 22 and 9 VEs/24 hours. One 1X group dog with no VEs at baseline had 6 VEs/24 hours at Week 4 and again at Week 20. Second-degree atrioventricular heart block was recorded in one 3X group dog at Weeks 4 and 20, and in one dog from each of the 1X and 5X groups at Week 20. None of the dogs had clinical signs associated with these electrocardiogram changes.

Treatment was associated with small differences in mean platelet counts (decreased in the 3X and 1X groups), potassium (increased in the 5X group), glucose (decreased in the 1X and 3X groups), and maximum blood glucose in glucose curves (increased in the 5X group). All individual values for these variables were within the normal range. Three 1X and one 5X group dogs had mild elevations of alkaline phosphatase (less than two times normal).

Loose stools and vomiting were infrequent and self-limiting.

Storage Information: Store at 20° to 25°C (68° to 77°F), excursions permitted between 15° and 30°C (between 59° and 86°F).

How Supplied:

VETMEDIN® (pimobendan) Chewable Tablets:
Available as 1.25, 2.5, 5 and 10 mg oblong half-scored chewable tablets - 50 tablets per bottle.

NDC 0010-4480-01 - 1.25 mg - 50 tablets
NDC 0010-4481-01 - 2.5 mg - 50 tablets
NDC 0010-4482-01 - 5 mg - 50 tablets
NDC 0010-4479-01 - 10 mg - 50 tablets

Approved by FDA under NADA # 141-273

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Veterinary medicine: Old dogs vs. new tricks

Marty Becker, DVM

At a large veterinary meeting recently, the human/veterinary equivalent of the Grey Muzzle organization met together over cocktails—all Social Security and Medicare recipients. One of the table mates came up with the brilliant conversation starter: "Let's say that all of us here at this table started again. We're in our 20s again, and we are applying to veterinary school. How would we, our classmates, our education experience, and future employment and careers look different?"

The premise: Let's compare the past and the future (Class of 1980 vs. Class of 2030). The promise: While the tools, support systems, and expectations have changed, the heart of the profession remains the same over five decades. We are all united by a calling to care for animals and support the people who care for and love them.

The past

Starting veterinary school 50 years ago, nobody gave us an introductory talk on the first day of our education, telling us to enjoy the process, to look after our emotional health, and that everyone would graduate. Less stress? Pffft. More stress. More competition than we had ever faced came in waves like surfing. There was no white coat ceremony or leadership/teamwork retreats. Professors did not provide lecture notes, there were zero free meals to choose from with competing noon events, and end-of-semester parties were legendary.

Oh, I almost forgot, we did have a mental health counselor available at all hours. Jack. Jack Daniels.

With little or no student debt, we found jobs by going back to the area we grew up in or looking at listings in the back of the *Journal of the American Veterinary Medical Association (JAVMA)*. Like everyone before us, we knew we had to hit the ground running. We would be expected to match the practice owner, partner, or other vets, and work 60 hours per week. Plus, emergencies. With the probability of being a practice partner, we had a great chance of "doing well by doing good."

For veterinary students starting their education in 2025, a laundry list of resources will be outlined for students. Poignant White Coat ceremonies will foreshadow a prestigious career. An emphasis will be placed on both students' physical and emotional health, professors will provide lecture notes, and students can eat 10,000 calories per week courtesy of the animal health, animal nutrition, and group practices that provide food to get derrieres in chairs.

Most schools have robust mental health services (I really applaud this!) and recruitment can start as early as the sophomore year. Group practice recruiters bellow many of the same promises to potential hires: a) under 40 hours per week, b) often three-four days per week, c) mentorship, d) generous benefits packages, e) generous CE package, and f) mental health counseling available. Each student will have multiple job offers to work in almost any zip code in the U.S. Student debt is, well, almost unfathomably high.

Let me lay out the results of the table conversation among us veterinarians who were close to or retired, and I encourage you to add your opinions on the differences in education, experience, and financial and emotional success.

Ease around animals

Most of my classmates were from farms/ranches in rural areas. We had handled large animals and companion animals and had seen births and deaths multiple times. While rough around the edges, we had experience and muscle memory regarding animal handling. Today's veterinary students typically do not come from rural backgrounds, have minimal experience handling a wide variety of animals, do a lot more with simulation and models vs. live animals, and have not witnessed both animal births and deaths.

PHOTOS COURTESY DR. MARTY BECKER

A young Dr. Marty Becker (top) vaccinates a Schnauzer puppy. Like many veterinarians, Becker's love for animals started early. In his case demonstrated by him participating in fundraising events for local shelters when he was a youngster (below).

Simple vs. advanced diagnostics

You must remember to walk before you run with diagnostics. You walk through a major veterinary convention today, and you see booth after booth touting artificial intelligence (AI) to help read radiographs, skin scrapings, urinalysis and fecal samples, and blood smears. I still practice, and I really think that this is an amazing advancement. What has been the result of an almost knee-jerk reliance on routine, big-bore, shotgun diagnostics? Veterinary costs that are too high for far too many pet parents, and veterinarians with greatly diminished basic diagnostic skills.

There is not enough focus on and respect for a comprehensive physical exam and consultation. A practitioner should be highly trained in using all his/her senses to detect diseases or conditions in their earliest phases.

Let's take the venerable stethoscope. It is not the stereotypical symbol of a doctor that all must wear, an accouterment, or as one recently called, "neck candy." It would be eye-opening to have a class of 1980 veterinarians and a class of 2010 veterinarians examine the same pet and compare S.O.A.P.s.

The veterinarian getting social security benefits would have used their eyes, nose, ears, and touch to do a *Star Trek* scan of the pet. Looked at the tip-of-the-nose to the tip-of-the-tail. Looked at the nostrils, eyes, deep in the mouth, inside ears, etc. We would have closely listened to the heart, chest, and abdomen. Skilled hands would cover the entire body, feeling for anything (lumps, lesions, tenderness, excessive heat, painful areas), or things that are enlarged. We would routinely sniff out skin issues and routinely catch arthritic joints early on.

If things continue as they are in vet med, the 2030 graduate will poo-poo a really good history and will trade great in-the-trenches diagnostic skills for ordering a barrage of tests and/or referring to specialists.

Jack/Jill of All Trades

In practicality, we, "Michael Jackson vets" (he had the most Billboard #1 '80s hits, with nine) knew when we went out into practice that we had no backstop for medical or surgical cases other than more experienced folks in the practice, our books, or very occasional calls with a professor from vet school. There were no specialty practices, VIN, or Google or YouTube to help you in a pickle. *Mea culpa* time.

As an average or even below-average veterinarian (when you combine all diagnostic and surgical skills), I did cruciate repair, spinal surgery, whole limb amputations, splenectomies, perineal urethrostomies, end-to-end anastomosis to remove a necrotic section of gut, even ophthalmologic surgeries. I was not a great surgeon, but the results were not that bad. Paralyzed dachshunds walked, cats no longer strained at the litter box, three-legged dogs kept on moving on, and for dogs that had had an intestinal obstruction, chow started moving from north to south.

We were the ultimate doctors (my sister is an MD), treating multiple species, multiple breeds, all age groups, internists, surgeons, radiologists, pharmacists, you name it. Practicing veterinary medicine was delightfully challenging, white-knuckle exhilarating; never predictable or boring. Too many of today's students graduate thinking—knowing—they will routinely refer to specialists, and do very little surgeries than the most routine.

Relationship vs. average client charge

I was taught by my mentor, Ross Clark, DVM, to not think of what a client was willing or able to spend today, but rather, what that client would spend over—not just a lifetime of care for the pet in front of me—generations of family pets. Future lifetime value. Too many of today's veterinarians (and the group practices that push them) are transactional and focus on the average client charge like it is the North Star of a successful career.

Let me illustrate this with a perfect example. I have had ownership in eight veterinary practices and have literally led and/or mentored hundreds of veterinarians. As Dr. Clark taught me, I called back every single client. One call for routine things, such as vaccinations, dentals, or spay/neuter; two calls for intermediate problems, such as vomiting dogs or plugged cats, with three calls for animals that had been hit by a car, mauled, had spinal surgery, limb amputation, etc. I made calls from the practice with noise in the background, so people knew I was still there.

As I was taught to be truthful, I would typically preface the call with something like, "I was just getting ready to go into an exam room, go into surgery, consult with a colleague, or go to lunch/home…but I wanted to call and see how ___ was doing." This is how you build a deep, trusting relationship with clients. Class of 2030 vets will be taught to delegate callbacks to vet techs or other team members. This is transactional vet med, where clients are more like a number than a brick in the building.

The future

So, speaking directly to veterinary students or those who recently graduated, here are five things you can do to capture some of the old-school magic we possess:

1) Work-life balance. While I don't think you should work 60-80 hours a week, like many of us vets with more back hair than hair on our heads did, working the 30-hour/four-day-per-week schedule common with group practices is never, ever, going to let you generate enough income to thrive

2) See more patients. I'm shocked to hear in many group practices, you only have to see eight to 10 patients per day. What? One of the most popular, productive, and talented veterinarians I know, Jeff Werber, DVM, of Los Angeles, Calif., sees more than 40 patients a day and routinely brings in $14-16K/day. Yeah, multiply your 20 percent by those figures and determine how much you can make.

PHOTO COURTESY DR. JEFF WERBER

After 40 years of practice, Dr. Jeff Werber has established long-term relationships with his clients. His patients/clients come from word-of-mouth referrals. He now cares for the grandchildren of his original clients from the '80s.

Is Dr. Werber overpriced? Not at all, in fact, his fees are more reasonable (read value; benefits/price = value) than all other practices in his market area. Where do his clients/patients come from? Not from advertising, but from word-of-mouth referrals from the relationships he has developed and maintained.

Werber recently shared with me that now, after 40 years of practice, he is caring for the grandchildren of many of his original clients from the '80s. I applaud and cheer the fact Werber measures his success not by how much money he makes but by the strength and number of long-term relationships he's made over the years. Want shorthand? Werber is "financially successful and emotionally wealthy."

3) When they turn right…you turn left. When I graduated from veterinary school, almost every practice was open 8-5 M-F and maybe 9-12 on Saturday. We knew convenience was becoming king and operated what we promoted as EZ Pet Hours: 7-7-7 days per week 365 days per year. Others struggled, and we soared. If I was a new veterinary student mired in dept but hungry for radical success, I will try and work from 7 p.m. to 7 a.m. four to five days per week. Pet parents constrained by regular practice hours and not willing to stomach the wait and high fees of emergency would pack your practice like sardines. You could charge fees 20 percent higher than daytime hours and still give extreme value. I predict you would have vet techs clamoring to work with you. Why? I have traveled extensively for years and night shift employees at hotels love it…primarily because it fits in with two income households and childcare issues.

4) Partnership or ownership. Even today, buying a house vs. renting is the best way to create wealth. Same with practice. Buying into a practice or starting one from scratch is the best way to create wealth.

5) Master mentorship. Most group practices have good mentor programs, but I'm talking about something else here. I have nearly traveled to 100 countries, and in many parts of the world, tribal elders, village elders, and family elders are revered, consulted with, and taught.

As a 2030 veterinary school graduate, how would you like to have someone like Dr. Werber, who could be the poster child for finding "financial success and emotional wealth" teach you to do the same? To never be bored, seldom stressed, to love what you do for 50 years, send dozens of team members to vet school, and help pets, people, and the profession to get to a level you never thought possible. Getting the right mentor is not just possible; it's probable. Dreams with deadlines, if you will.

Let me close with this thought. Another mentor of mine, practice management guru Don Dooley, said, "As a veterinarian, you can have anything you want in life, but not everything." When I asked him to explain, he broke it into two branches: One, if you want to retire from student debt and put aside money for a house (or buy into a practice), you can, but at the same time, you cannot have two car payments and spend too much on toys.

Likewise, if you want more time with family, you can work less and budget to get by with less, but if you want to make a really good living as a veterinarian, pay off debt quickly, have two dependable cars, go on vacation, and start saving for the kid's college…this, too, is possible. You will just have to work 60 hours a week, see 15-20 patients per day, or work that 7 p.m. to 7 a.m. shift, four days per week I was talking about. ●

Marty Becker, DVM, is a Sandpoint, Idaho practitioner and founder of the Fear Free initiative. For more information about the organization or to register for certification, visit http://fearfree.com/. Columnists' opinions do not necessarily reflect those of Veterinary Practice News.

BRAIN TEASER

Can you solve this puzzle?

By Kendra Freeman, DVM, MS, DACVS (Large Animal/Small Animal)

PRESENTATION

A three-year-old female spayed Doberman Pinscher is presented for chronic left hind limb lameness.

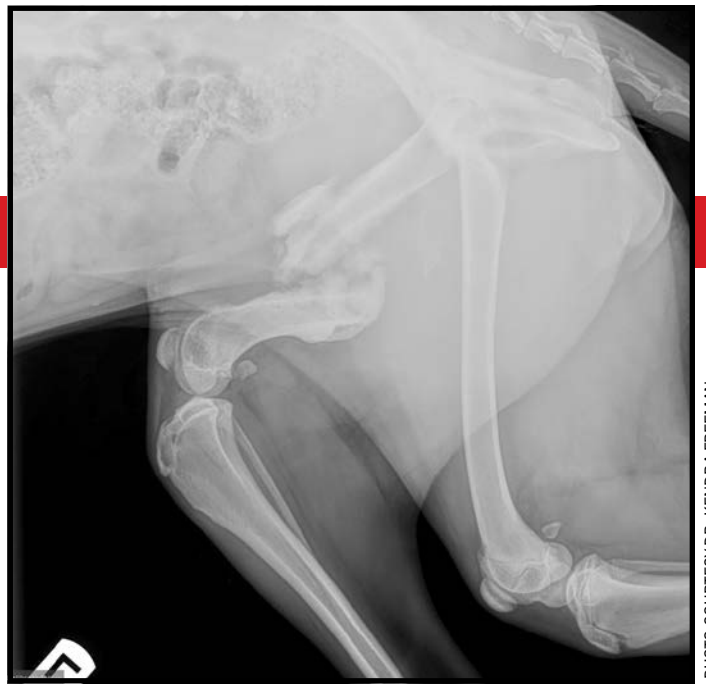

PHOTO COURTESY DR. KENDRA FREEMAN

CHALLENGE

1) A simple transverse femur fracture is ideal for fixation with an intramedullary pin and cerclage wire.
a. True
b. False

2) The fracture is best described as
a. Well-healed
b. Delayed union
c. Malunion

3) Which of the following are risk factors for development of delayed or non-union fractures?
a. Older age
b. Comminuted fracture
c. Surgical site infection
d. Implant failure
e. All of the above

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2. Palmer, R. H. (2015) "Nonunion, Delayed Union, and Malunion", *Mechanisms of Disease in Small Animal Surgery (3rd Edition)*. Available at: https://www.ivis.org/library/mechanisms-of-disease-small-animal-surgery-3rd-ed/nonunion-delayed-union-and-malunion (Accessed: 16 February 2025).

Check your answers at VeterinaryPracticeNews.com/BrainTeaser-July-2025

Connecting the pieces

EDITOR'S MESSAGE

Therese M. Castillo

There's something endlessly fascinating about a well-made crime documentary. Whether it's the haunting narration of *Forensic Files* or the gripping tension of newer true crime series, I find myself pulled into the story every time—even if I've already seen it. There's a particular thrill in watching the clues come together, the evidence slowly unraveling the truth. I marvel at how experts—whether forensic scientists, detectives, or medical examiners—use their training and tools to solve complex cases. Every piece matters. Every detail could be the breakthrough.

That same methodical and investigative mindset feels surprisingly familiar when I think about veterinary medicine. A pet walks into the clinic with a vague symptom: limping, lethargy, a persistent rash. A seemingly clueless and panicked owner. The mystery begins. We ask questions, run diagnostics, consider the possibilities, and slowly start connecting the dots. Just like in the documentaries, it's not always about the dramatic reveal—it's about piecing together the evidence to bring comfort and healing to those that can't speak for themselves (aka your beloved patients).

That brings me to invite you to check out this month's feature exploring veterinarians' critical role in animal cruelty investigations, written by Kris Otteman, DVM, Dipl. ABVP Shelter Medicine, CAWA; Linda Fielder, CAWA; and Emily Lewis, Esq. MSEL. The authors shine a light on a lesser known but vitally important aspect of veterinary work: serving as advocates, forensic experts, and frontline defenders in cases of animal abuse and neglect.

The authors write, "From advocacy to your state representatives to performing forensic examinations to preventing neglect before it occurs, the vital role of veterinarians cannot be understated. By explaining all the dimensions of veterinary involvement and how your existing training and skills serve you well at every turn, by the conclusion of this feature, you should feel emboldened to step into these heroic positions."

Whether you've always had a passion for justice or are just beginning to see how your veterinary career could intersect with advocacy, this article offers both inspiration and practical guidance. Check out the feature on page 34.

We invite you to dive into this powerful piece and be reminded of the good work you do in and out of the four walls of your clinics. Also in this issue, we tackle the potential emergence and range expansion of several parasite pathogens, and how practicing One Health is more critical now than ever.

As always, we're here to connect, collaborate, and cover the issues that matter most to veterinary professionals. Let us know what's on your mind—drop me a message at tcastillo@veterinarypracticenews.com.

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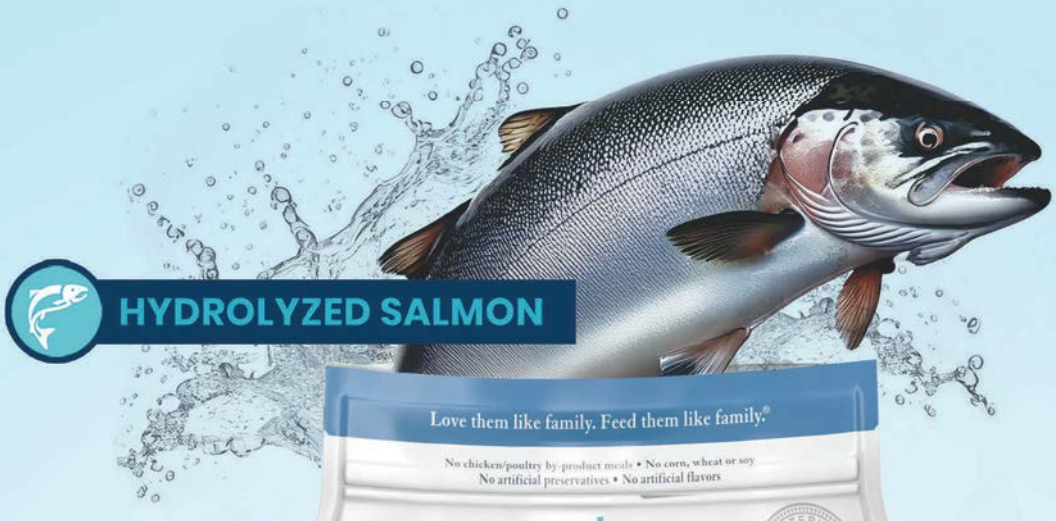

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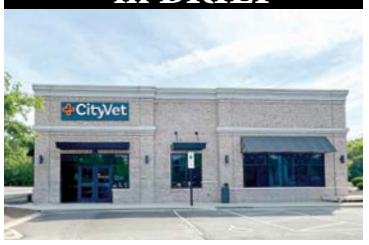
News in BRIEF



■ **CityVet**, a network of 59 veterinarian-owned practices, has announced the opening of its second Charlotte Metro clinic in Marvin, N.C., on May 27, 2025. Led by Sandra Welsh, DVM, the clinic will offer comprehensive veterinary services and grooming. Located at 9923 Rea Rd, the clinic emphasizes compassionate care, with a special focus on senior pets and creating a stress-free environment for feline patients.

■ **PetCure Oncology** has marked its 10th anniversary, highlighting a decade of innovation in veterinary cancer treatment. Since opening its first location in Gilbert, Ariz., in 2015, the network has reportedly treated more than 6,000 pets and introduced stereotactic radiation therapy (SRS) to the general veterinary market. PetCure now operates eight facilities nationwide and continues research into broader therapeutic uses, anticipating its 10,000th patient milestone later this year.

■ **Mars Inc.** has opened a new 450,000-square-foot Royal Canin facility in Lewisburg, Ohio, expanding its U.S. pet food manufacturing capacity. The $450 million plant is expected to create up to 270 full-time jobs over five years and produce enough dry pet food to feed four million pets annually. Now the largest dry pet food facility globally for the brand, the site features standardized production systems and has earned LEED Silver certification for sustainable building and operational practices.

■ Massapequa Hospital for Animals in New York is now home to **Dermatology for Animals Long Island,** a new specialty clinic dedicated to diagnosing and treating complex skin conditions in pets. Opened in partnership with Thrive Pet Healthcare and Dermatology for Animals, the clinic aims to meet the rising demand for veterinary dermatology services in the region. Using advanced diagnostics—including skin scrapes, cytology, and biopsies—specialists will collaborate with primary care veterinarians to develop customized treatment plans for allergies, infections, and other chronic skin issues.

■ **Texas A&M University Veterinary Medical Teaching Hospital** has partnered with **CareCredit** as its preferred financing service provider, expanding the health and wellness credit card's presence to all 29 U.S. public veterinary university hospitals. The partnership broadens payment options for clients of one of the nation's largest veterinary referral centers. With CareCredit, pet owners can access a range of financing plans for veterinary services, including real-time pre-qualification and application decisions without impacting their credit scores.

■ **Nestlé Purina PetCare Company** recently held its 24th annual Purina Cares Day, mobilizing more than 2,800 employees across 34 U.S. cities to complete more than 5,000 volunteer hours. This year's effort was especially significant following a devastating EF-3 tornado in St. Louis, Mo., home to Purina's headquarters. Projects included tornado relief, youth engagement, veteran support, environmental cleanup, and pet welfare initiatives. In St. Louis, volunteers distributed supplies to pets and people, and the company donated more than $50,000 and organized a supply drive for recovery efforts.

■ **Hill's Pet Nutrition,** in collaboration with **Harvard T.H. Chan School of Public Health researcher Curtis Huttenhower, PhD,** has launched a web portal for the One Health Microbiome Resource (OHMR; www.onehealthmicrobiome.org). Designed to promote collaboration, the site offers standardized protocols and computational tools to support research on how gut microbes influence pet health and disease. Additionally, the site hosts the first centralized database of pet microbiome studies, featuring more than 2,000 samples across a range of clinical conditions and demographics. This shared resource aims to drive scientific discovery and inform future nutritional and therapeutic approaches.

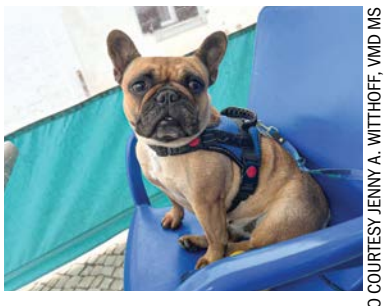


PHOTO COURTESY JENNY A. WITTHOFF, VMD MS

■ **Apierion,** a global healthcare fintech firm, has developed the first digital medical twin (DMT) for a dog, marking a step forward in streamlining international pet travel. The platform, PetDT, uses blockchain to securely store and authenticate health records, including vaccinations and travel clearances. Successfully piloted with a dog named Zita, the system aims to address inconsistent animal travel regulations and reduce disease transmission. Apierion is reportedly working with veterinary networks and agencies to expand the platform's global reach.

■ **Bionote USA** has partnered with **Not One More Vet (NOMV)** to support mental health initiatives for veterinary professionals. As part of Mental Health Awareness Month in May, Bionote sponsored NOMV's Race Around the World, a global wellness event. The company also launched fundraising efforts at major industry conferences earlier this year. NOMV offers peer support, financial resources, and educational programs aimed at improving mental health across the veterinary field.

CHEWY HEALTH

■ Clay County officials, alongside **Chewy Health** and **Lincoln Memorial University (LMU),** held a groundbreaking ceremony for a new Animal Services facility in Middleburg, Fla. As part of the event, Chewy Health and LMU announced a $1M donation to create the Chewy Health & LMU Applied Learning Center, a dedicated space for veterinary students' hands-on training. The specialized room aims to provide a "real-world shelter environment" to help veterinary students learn and hone their skills in shelter medicine. The facility, set to open in 2026, will also expand veterinary services and help improve care for shelter animals in the region.

■ **Small Door Inc.** has expanded into Virginia with the opening of a new veterinary clinic in McLean at 6224C Old Dominion Drive. The tech-enabled, membership-based provider now operates 10 practices, including four in the Washington, DC area and several in New York City and Boston. Small Door seeks AAHA accreditation for all locations and offers membership perks, such as annual exams, 24/7 telehealth, and priority appointments. ●

Avi Solomon has been appointed CASCO Pet's first chief technology officer, bolstering the company's executive team amid global expansion. Solomon has more than 20 years of experience in veterinary care innovation, having served as a founding member of Modern Animal, a product manager at IDEXX, and a veterinary nurse. In his new role, he will lead the development of CASCO Pet's technology ecosystem, focusing on AI, data analytics, and connected devices.


Avi Solomon

Doug Mader, DVM, MSc, DABVP (Canine/Feline), DABVP (Reptile/Amphibian), DECZM (Herpetology), a 1986 graduate of UC Davis, was honored with the university's Lifetime Achievement Award at the 52nd Alumni Awards gala in May. A triple board-certified veterinary specialist and internationally recognized expert in exotic animal medicine, Dr. Mader has published extensively and mentored UC Davis veterinary students. He continues to support the university as a guest lecturer and adjunct associate clinical professor at the School of Veterinary Medicine.


Doug Mader

Scenthound has appointed **Josh Lyon** as chief operating officer amid the company's continued national expansion. Lyon, who has been with the dog wellness franchise for four years and most recently served as VP of operations, has more than 15 years of leadership experience. A certified franchise executive and current Scenthound franchisee, Lyon will focus on scaling operations, supporting franchisee success, and accelerating new center openings while reinforcing the company's mission to make dog wellness services routine and accessible.


Josh Lyon

Rebecca Windsor, DVM, DACVIM, has been named director of Veterinary Affairs of Gallant. In this role, Dr. Windsor will lead the veterinary education initiatives as the company seeks FDA approval for its off-the-shelf stem cell therapy targeting refractory feline chronic gingivostomatitis (FCGS). Windsor recently led the neurology department at Wheat Ridge Animal Hospital and was recognized in 2024 as a "Best in Colorado Top Doctor."


Rebecca Windsor

Zoetis Inc. elected **Mark Stetter DVM, Dipl. ACZM,** to its Board of Directors, effective May 21, 2025. A leader in veterinary medicine, Dr. Stetter currently serves as dean of the UC Davis School of Veterinary Medicine and brings broad experience across companion animals, livestock, wildlife, and research. At Zoetis, he will contribute his expertise as a member of the board's quality and innovation committee.


Mark Stetter

Robert VanHimbergen has been appointed Elanco Animal Health's executive vice president and chief financial officer, effective July 7, 2025. VanHimbergen currently serves as senior vice president and chief financial officer of Hillenbrand, Inc., and previously held senior roles at Johnson Controls and Pricewaterhouse Coopers LLP.


Mark Stetter

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Tech goes to the dogs and cats at global summit

By Elizabeth Anderson Lopez

The technology behind the alphabet soup of AI, ML, and IoT can make anyone's head spin. For two days, attendees learned about how these technologies—and many more—can affect their daily clinical practice and the future of veterinary medicine.

Technologically Empowered Veterinary Care was the topic at the Purina Institute Global Summit 2025, April 30-May 1, featuring 20 speakers from different countries and companies, plus session moderators, to give a comprehensive look at how technology can be used. In keeping with the technology theme, translations for 32 different languages were available for virtual attendees around the world.

Natalia Wagemans, MD, PhD, global head of the Purina Institute based in St. Louis, Mo., summed up in her closing remarks, "We are standing with one leg in the present and one leg in the future."

The four-legged varieties were the most discussed, with many speakers diving deep into feline—and canine-specific ailments and opportunities. *Veterinary Practice News* was present, and below are some of the highlights, especially for small animal veterinarians.

Speakers on "Applying Big Data, Machine Learning, and AI to Improve Nutrition and Health" presented how those three technologies can shed light on the causes and consequences of aging in the real world, using the Golden Retriever Lifetime Study and the Dog Aging Project (DAP). AI and ML are statistical tools that use big data.

The DAP uses big data through its biobank, which includes tens of thousands of biospecimens that are also available to the research community, according to Julia Labadie, DVM, MSPH, PhD, of the Morris Animal Foundation. "These technologies empower the profession to move from reactive to proactive care, unlocking insights that can inform more effective nutritional and health interventions," Dr. Labadie says.

Daniel Promislow, DPhil (Zoology), whose credentials include co-founding the DAP, said the machine learning studies both genetics and environment-caused factors. "My hope is for a future veterinary specialty in geriatrics just like dermatology, cardiology, [etc.]" he adds.

What's in the box?!

Several speakers addressed the power of litter box monitors. "The litter box is a window into cat health and behavior," says Ragen T.S. McGowan, PhD, with Nestlé Purina PetCare, St. Louis, Mo. She cited the monitor's ability to help identify early indicators and save critical time toward diagnosis. The litter box goes on top of the monitor, so clients can use whatever style of box they prefer.

Dr. McGowan explains several core AI models were developed to enable tracking of the weight and elimination patterns of individual cats, and the technology uses algorithms to determine which cat is using the box in multi-cat households. The monitor can determine: Cat weight, visiting frequency, weight of output, type of elimination, time of day patterns, and more.

She pointed out the monitor shows owners how data changes over time, and what it means for the cat, allowing vets to create personalized treatment plans based on the data.

Two speakers in the same group elaborated on the benefits of monitors for two feline conditions: chronic kidney disease (CKD) and feline idiopathic cystitis (FIC).

Jessica Quimby, DVM, PhD, DACVIM, of The Ohio State University in Columbus, Ohio, says litter box monitoring devices may also be particularly helpful in managing feline CKD, specifically addressing the importance of monitoring defecation frequency. "Cats with CKD have increased risk of presenting for constipation," Dr. Quimby says, adding the monitor offers more than the obvious signs of straining, vocalization, and vomiting.

In the Q&A at the end of this session, speaker Ashlie Saffire, DVM, DABVP (Feline), with Faithful Friends Veterinary Clinic & Cat Specialty Center in Dublin, Ohio, adds litter box monitors "have been absolutely lifesaving for some of my patients" with FIC. Dr. Saffire adds the technology helps pet parents see the progress being made with their efforts; "They can see in two weeks how the cat is doing."

In keeping with the summit's objective, "We are focused on the science, not on products or product claims," says Dr. Wagemans, no brands were specifically mentioned. *Veterinary Practice News* got a look at the Smart Litter Box Monitor System by Petivity, powered by Purina, at the end of day one at The Purina Institute, along with some of the other smart devices currently in development to help track the health and behavior of pets.

Wear the pets are

Speaking of which, multiple sessions focused on wearables and other smart devices to help with general diagnoses, as well as specifically achieving pet weight loss goals. Speaking on "Smarter Tools, Smarter Care – Redefining Veterinary Medicine with Internet of Things (IoT), AI, and Telemedicine," Timokleia Kousi, DVM, MSc, with the Center for Biomedical Studies, at the University of BERN in Switzerland, says, "They focus on managing chronic conditions or monitoring postop care. We are not just adding gadgets for the sake of novelty – they target real needs."

Dr. Kousi explains the wearables include smart collars that track activity levels. The IoT with veterinary applications feeding stations monitoring dietary patterns, and room sensors detecting environmental changes. "The Internet of Things connected devices can collect, exchange, and act on data," Kousi adds. She cites smart homes and smart phones as items using similar technology that clients and vet staff are already familiar with.

These devices "Can detect small changes and behavior, such as activity level or water consumption that a caregiver might not notice," Kousi says.

Plus, smart devices have long-term memories. During day two's closing recap session by the moderators, Lisa Radosta, DVM, DACVB, points out, "How often am I asking a client about something they did with their cat a month ago?"

From low-tech to high-tech, obesity remains an issue in veterinary medicine, and Jenessa A. Winston, DVM, PhD, DACVIM (Small Animal) with The Ohio State University College of Veterinary Medicine, says smart devices such as automatic feeders, cameras, and activity trackers on collars can help—both in losing weight and compliance.

She cited a 12-week study on cats using four sources of technology to assist with weight loss and says automatic feeders specifically made it more likely for cats to lose weight successfully. Compliance may also be boosted; Dr. Winston says the owners liked the engagement of using the devices.

As another source of human engagement and support, she suggested having a dedicated vet tech within the clinic be the contact person for weekly check-ins from clients who share the data collected from the smart devices.

Trust, but verify

While the focus was on looking at technology such as AI as a friend rather than a foe, some cautionary points were made during the summit. During "Flowers for Algorithm," Eli B. Cohen, DVM, DACVR, founder of Dragonfly Imaging, in Cary, N.C., acknowledges the line between diagnoses and practicing medicine is getting blurry. "At the end of the day, it's your license if you're using these tools," he says.

The idea is to create supercharged pet parents, which is very different than Dr. Google, he adds. "Used correctly, it creates a closer relationship between them and veterinarians."

Cohen, who is also a member of the American Veterinary Medical Association (AVMA) committee on emerging technology, points out there are no current requirements for FDA regulations on wearable medical devices for pets like there are for humans.

As for the common concern across all jobs that AI will replace us, Candice Chu, DVM, PhD, DACVP, assistant professor with the department of veterinary pathobiology at Texas A&M University, has some words of potential reassurance: "AI will not replace you, but the coworker who uses AI will." ●

For a complete list of sessions and speakers, and registration to watch the sessions On Demand, visit https://globalsummit2025.purinainstitute.com/

Daniel Promislow, DPhil (Zoology), co-founder of the Dog Aging Project, speaks at the Purina Global Summit 2025 in St. Louis, Mo.

Dr. Ragen T.S. McGowan highlights how AI-powered litter box monitors provide vital insights into feline health, enabling early intervention and tailored care, even in multi-cat households.

PHOTOS COURTESY THE PURINA INSTITUTE

Dr. Timokleia Kousi discusses how IoT, AI, and telemedicine tools—like smart collars and feeding stations—are redefining veterinary care by addressing real clinical needs through continuous, data-driven monitoring.

2025 X-RAY CONTEST

19TH ANNIVERSARY

They Ate What?!

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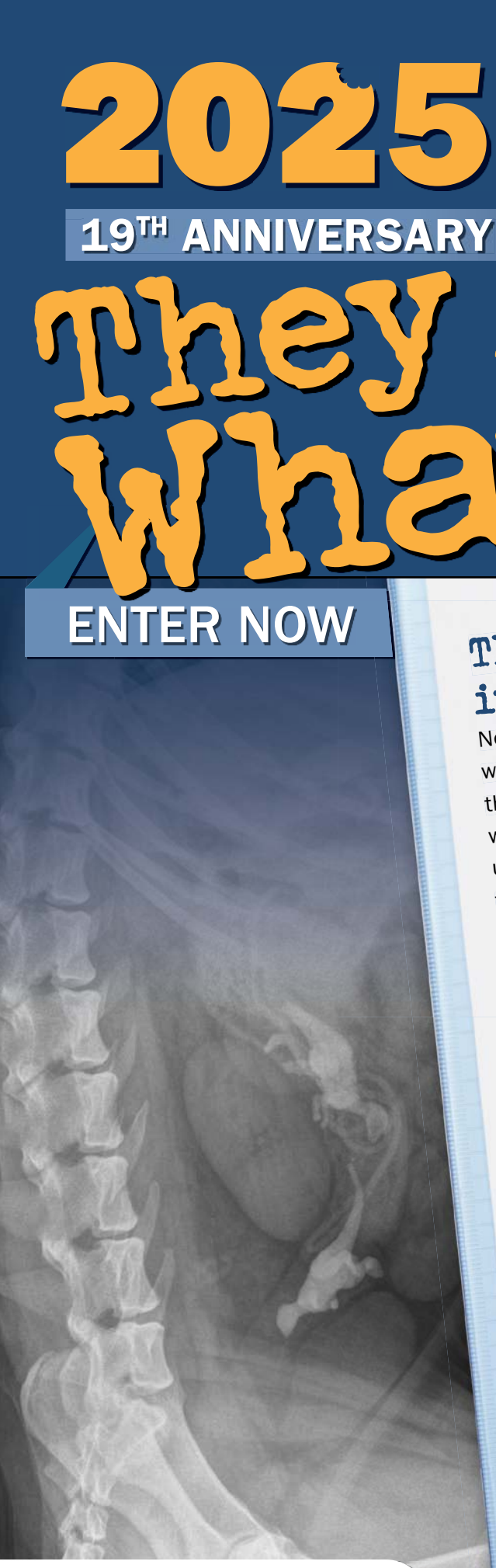


Think you've seen it all? Think again!

No two days in the clinic are ever the same, and just when you think you have seen it all, a case comes through the door that proves otherwise. Especially when radiographs reveal the wild and downright unbelievable things pets manage to swallow. Sure, toys, socks, and the occasional trinket are familiar finds, but some items are so bizarre they defy explanation—until you see the X-ray.

Now's your chance to showcase those unforgettable moments: Enter the 19th They Ate What?! X-ray contest and share your most extraordinary and mind-boggling cases with *Veterinary Practice News* and the veterinary community.

Our panel of veterinarians will decide the winner, who will receive a $500 Visa gift card.

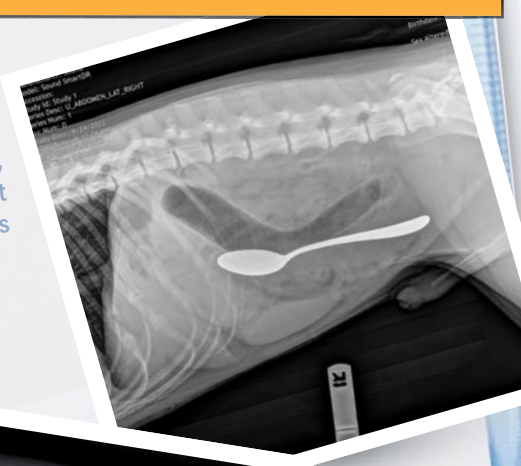
How to enter:

1. Go to **VeterinaryPracticeNews.com/xraycontest** and log in or register to enter.
2. Upload high-resolution images—large files reproduce best—and fill in your name, clinic name and address, telephone number, and a short explanation of the case, including the outcome.
3. If available, include images of the patient and the recovered item(s).

2024 WINNER

Submitted by Pam Venezuela, Dallas Animal Urgent Care

2024 RUNNERS-UP



Submitted by Amanda Audo, Great Lakes Pet Emergencies

Submitted by Megan Puwalowski, Richmond Veterinary Hospital

Presented by

Veterinary Practice News

The submission deadline is August 28.

The winner and honorable mentions will be unveiled in the November issue of *Veterinary Practice News*.

NO PURCHASE NECESSARY TO ENTER. Contest is open to legal residents of the 50 United States or the District of Columbia, age 18 or older, who are licensed veterinary professionals. Entries must be received between 12:00:01 AM ET on 6/22/2025 and 11:59:59 PM ET on 8/28/2025. See Official Rules at **VeterinaryPracticeNews.com/xraycontestrules.** Void where prohibited by law.

Report: Misinformation, misconceptions can make pet obesity discussions difficult

By Don Vaughan

A recent report from Royal Canin[1] provides a deep dive into the roles misinformation and misconceptions play in the global pet obesity crisis, with more than a quarter of pet owners surveyed, saying they lack understanding of what a healthy pet weight is.

The issue is exacerbated by growing misinformation regarding pet weight management. Seventeen percent of pet owners say misinformation is one of the biggest barriers to keeping their pets at a healthy weight. A third of veterinary professionals reported this negative influence creates challenges when having conversations with pet owners about managing a healthy pet weight.

A look at the status quo

A 2022 study published in the *Journal of the American Veterinary Medical Association* (*JAVMA*) confirmed these and other barriers to conducive conversations about nutrition during healthy pet visits, which also included client resistance to changing brands, time constraints, and keeping up with products.[2]

The Royal Canin study of more than 14,000 pet owners and 1,750 veterinary professionals across eight countries revealed nearly one in five pet owners turn to social media platforms, such as Facebook and Instagram, for information and advice regarding nutrition, healthy weight, and obesity in pets. Unsurprisingly, the percentage is highest among younger pet owners, with 55 percent of Gen Zers turning to social media rather than their veterinarian for advice.

"I don't believe anyone on social media is trying to cause harm; they do it out of love, and because they feel they know what's best," says Lindsey Bullen, DVM, DACVIM (Nutrition), co-founder of Peak Veterinary Specialists in Raleigh, N.C.

"Social media is an echo chamber that makes people feel more solid in their beliefs, even if incorrect, but the misinformation on social media causes so much stress and mistrust within the veterinary community."

According to the Royal Canin report, 44 percent of veterinary professionals believe pet obesity has increased in the last few years, and nearly half (45 percent) agree pet owners underestimate the risks associated with overweight and obesity in pets.

When asked about factors contributing to pet obesity, 41 percent of pet owners said they give their pets special treats when they seem sad, bored, or lonely. Three in four feed their pets human food, with 31 percent believing doing so causes no harm.

Breaking through the noise

None of this is a surprise to America's veterinarians, who deal daily with the consequences of client misinformation and misconceptions. Breaking through the noise can be difficult, but it is imperative veterinarians make the effort.

Understanding where misinformation comes from is a good first step. As the Royal Canin report notes, social media is rapidly replacing veterinarians as a primary source of pet information, and the result can adversely affect an animal's health. For example, pet owners who rely on social media may actually be unaware their pet is overweight, despite the obvious signs, says Laura Gaylord, DVM, DACVIM (Nutrition), founder of Whole Pet Provisions.

"We've gotten used to viewing overweight dogs and cats as normal," says Dr. Gaylord. "As a result, when people have a dog that is at its ideal body weight or lean in the healthy range, people may think it's too skinny, and that's just wrong. We have to do a better job educating pet owners on proper body weight and body condition, and what that looks like."

Ernie Ward, DVM, CVFT, founder of the Association for Pet Obesity Prevention (APOP), agrees: "Misinformation starts with a misunderstanding and acceptance that obesity is somehow cute, charming, and normal. That's very dangerous misinformation. People trivialize the issue and almost treat it as fun."

The terminology pet owners use when seeking information or advice on social media is also important, Dr. Ward adds. "When we looked at the types of terms people used on social media when describing obesity in cats and dogs, we found more endearing, less offensive terminology," he says. "People were quicker to pronounce judgment on bad pet parenting in dogs with obesity than in cats."

Gaylord advises pet owners should be aware of what a healthy dog or cat's body should look like. This conversation should start with the first kitten or puppy visit. However, a variety of issues can make body condition scoring difficult for laypeople, especially dog owners.

One issue is the wide variety of dog breeds, all of which look completely different and all of which have their own unique body score. Thick or shaggy fur can also complicate matters because the owner cannot easily see their pet's body.

"We have found in our surveys cat owners are a little more tightly clustered around what a normal body condition looks like," says Ward, "but that's because there isn't much breed variation, and they are used to seeing what a cat should look like. They are instantly able to identify obesity in cats, whereas with dogs we see some gradations."

IMAGE GENERATED USING IMAGEFX BY GOOGLE LABS

The causes of overweight and obesity among pets are another common area of misinformation and misconceptions among pet owners.

"There are so many choices when it comes to pet foods, as well as an explosion in the number of treats, many of which are very high-calorie," says Gaylord. "Overfeeding is often the result of a lack of understanding of the calories contained in pet food and how much they should feed their pets daily. In addition, we're more sedentary, so lack of exercise can also play a role in pets becoming overweight or obese."

Veterinarians' vital role

Ward acknowledges the role of diet and exercise but encourages veterinarians to look at pet obesity from a multifactorial perspective. "Too often, I think, veterinary professionals focus on the calorie in/calorie out part of the equation, which is understandable, but there can be other factors, such as genetics, hormonal disruptions, and even lifestyle issues, such as people living in urban areas who can't properly exercise their pet," he says. "If we reduce it down to just saying you're overfeeding or under-exercising, then we're ignoring the vast majority of pet parents out there who don't know what to do, and they will feel frustrated."

A conversation about pet nutrition and its role in keeping a pet at a healthy weight can be difficult, especially when the client has turned to social media for advice and information. It's important the veterinary team assures the client they are in a safe and nonjudgmental space and gives them the opportunity to explain their beliefs.

"There are ways to communicate with our clients that instill trust and confidence without making them feel like they're being attacked," Dr. Bullen says. "I encourage my students and mentees to close their mouths and listen so they have an understanding of where their clients are coming from and can better address their concerns."

After putting a client at ease, Bullen asks them about their specific concerns and how the two of them can work together to ensure their pet stays healthy. "I tell them we have to have this dialog so I can understand how best to help their pet," Bullen says.

"Sometimes I see a client take a deep breath and deflate. I had one client say, 'Well, I know you're going to tell me to feed Brand X,' and I said, 'I might, but I also might not, and I would love if you could explain further your feelings on Brand X. I'd love to know what your thoughts are, and we can address that.' Then we pull apart each of their preconceived notions. By the end of it, I usually have them convinced to do what I feel is medically best."

There's one issue around the pet nutrition conversation conundrum that the Royal Canin report doesn't touch on, and that's the dearth of certified veterinary nutritionists teaching in American veterinary schools. "The majority of the veterinarians who graduate every year have no experience or expertise in nutrition or body condition scoring," Dr. Bullen notes. "If they don't feel confident or competent, they will ignore the problem. In addition, these same veterinarians, once in practice, are seeing 20 appointments a day, so they'll only talk about nutrition when weight becomes a problem, and then it's too late."

While teaching at the North Carolina State University College of Veterinary Medicine, it has been Bullen's experience that veterinary students come to appreciate the importance of nutrition, which influences almost all aspects of veterinary care, once they understand its role. She asked her third-year students to list three things they learned in her nutrition class that they thought they would take with them into practice. The response was surprising.

"The majority wrote multiple paragraphs talking about their misconceptions about what the class entailed, and how they had no idea nutrition was involved in every single specialty, including anesthesia," Bullen says.

The rubber hits the road during clinical visits regarding nutrition and healthy weight management. Gaylord encourages practitioners to take a thorough diet history early on and ask basic questions at every visit. Among them: What are you feeding your pet, and how often? Do you also feed your pet commercial treats? Who in the family is in charge of feeding the pet? These and other questions can help practitioners understand how much awareness the client has regarding their pet's nutrition.

Ward would also like to see practitioners include body scoring in every exam. "It creates a historical record, a trend line," he explains. "The more data we gather, the greater the benefit."

Nutrition misinformation and misconceptions stemming from social media are not going to go away. As long as people have computers literally at their fingertips, they will turn to the like-minded for information and support. To combat it, veterinarians must present a united front. "When it comes to misinformation, we can make a difference," Bullen concludes, "but we must do it together. In addition to educating clients, we must make sure that accurate information is taught at a base level, so that we're preparing the next generation of practitioners once they're out in the world." ●

Don Vaughan is an award-winning writer who frequently writes about veterinary-related topics.

References

1. Royal Canin Consumer Multi-Market Survey conducted with Censuswide, 2025.
2. Small animal general practitioners discuss nutrition infrequently despite assertion of indication, citing barriers by Elizabeth E. Alvarez, Kelly K. Schultz, et al. *JAVMA* October 2022/Vol 260/No. 13.

Feline genetics, from Cover

Cats, our enigmatic companions, captivate us with their independent spirits and often puzzling behaviors. Despite their prominent place in our homes and hearts, our scientific understanding of feline health lags significantly behind that of their canine counterparts.

This knowledge gap is often most apparent in a clinical setting, where veterinarians and cat owners seek answers to pressing health concerns. As scientists, we see research is lacking and recognize the need for more comprehensive knowledge, sharing in the desire for a deeper understanding of feline health.

This disparity in knowledge is not a reflection of disinterest in feline health, but rather a consequence of historical underinvestment in feline-specific research. Traditionally, funding for genetic research has prioritized human health, with dogs receiving additional attention because they evolved along with humans to serve several specific economic functions, such as herding, guarding, and hunting, as well as their easy-to-read expressions.

With their unique biology and often-misinterpreted aloofness, cats have frequently been overlooked in the scientific community. However, a new era in feline health is here, fueled by the collective passion of cat lovers, the unique power of community science, and the collaborative spirit of researchers, veterinarians, and pet owners.

A collaborative journey of discovery

The Darwin's Cats initiative, a partnership between nonprofit Darwin's Ark, Hill's Pet Nutrition, UMass Chan Medical School, and the Broad Institute, is poised to reshape the landscape of feline genetic research. Born from a shared recognition of the critical need for more robust feline genetic research, this collaboration combines the expertise of institutions with the power of community science.

Darwin's Ark brings its expertise in engaging pet owners and collecting large-scale data sets, while Hill's Pet Nutrition provides crucial funding and expertise in applying genetic research to improve pet health. UMass Chan Medical School contributed its medical and comparative genomics research capabilities, while the Broad Institute brought its genomic technologies and computational biology expertise.

Together, the partnership aims to build the largest open-access database of feline genetic and behavioral information. This data will inform the development of more effective diagnostic tools, preventive strategies, and targeted therapies, with the intention to create healthier, happier lives for our feline companions.

The power of community

Recognizing the invaluable knowledge held by pet owners, we empower them to become active participants in scientific discovery. Who knows a cat better than their owner? Through short, easily digestible online surveys, Darwin's Cats gathers crucial data about cats' appearances, behaviors, health conditions, and lifestyles from the ones that know them best. Currently, more than 13,000 cats are enrolled, and nearly a million survey responses have been collected. The partnership is aiming to enroll 100,000 cats and obtain 5,000 DNA sequences by the end of 2026.

The initiative's genetic data collection method is equally innovative and cat-friendly. Leveraging the simple act of grooming, owners gather DNA samples with a quick comb of the fur, which is used for whole-genome sequencing. This noninvasive method eliminates the need for stressful veterinary visits or potentially traumatic procedures like cheek swabs or blood draws.

Combining large-scale genetic data and detailed surveys provides researchers with a resource for understanding the complex factors influencing feline health. The longitudinal nature of data collection, facilitated by ongoing engagement with the community, allows the organizations to track changes in cats' health and behavior over a long period. This helps researchers identify emerging trends and better understand the factors contributing to disease development and progression. Engaging pet owners directly in this manner will significantly advance understanding of cats compared to traditional research methods involving a limited number of animals studied over a short duration.

Reframing perceptions: Cats as valuable research partners

Historically, cats have also been perceived as more difficult to research than dogs due to their independent nature. This misperception has limited research into feline-specific disease and thus the development of effective treatments. Darwin's Cats is actively challenging this outdated assumption, demonstrating the immense importance of understanding cats better and the potential for groundbreaking discoveries. By engaging cat owners as citizen scientists, we are overcoming the myriad barriers associated with traditional research methods and collecting data on a scale never before possible.

Early findings from Darwin's Cats surveys are already challenging long-held stereotypes about cats, revealing their deep affection for their human companions and their diverse social behaviors. For example, researchers have found cats are not inherently more aloof than dogs but are instead highly affectionate, especially with their human family members. These at-home insights are crucial for better understanding cat-human bonds and enhancing feline health.

Transforming veterinary practice

The partnership's scientific approach focuses on advancing foundational research on the cat genome with the long-term goal of translating that knowledge into targeted disease treatments and interventions. By correlating genetic data with detailed owner-reported information, Darwin's Cats researchers aim to:

- **Improve diagnostic accuracy:** Identify genetic markers associated with specific feline diseases, enabling earlier and more accurate diagnoses, leading to more timely and effective interventions.
- **Develop targeted therapies:** Uncover the genetic mechanisms underlying feline diseases, paving the way for the

PHOTOS COURTESY HILL'S PET NUTRITION

Every cat has a unique genetic story to tell, contributing valuable information to groundbreaking research.

Cats with similar appearances help researchers study genetic variations, offering insights into feline traits when owners participate in the Darwin's Cats initiative.

Nutrition plays a critical role in feline health research, helping scientists understand how food impacts genetic expression in cats.

development of novel, targeted interventions that address the root causes of illness.

- **Enhance preventive strategies:** Identify genetic predispositions to common feline health conditions, allowing for proactive interventions and personalized preventive care plans that mitigate risk and improve long-term health outcomes.
- **Optimize drug selection and dosage:** Understand individual variations in drug response based on genetic factors, leading to more effective and safer drug therapies, minimizing adverse reactions, and maximizing therapeutic benefits.

We don't yet understand as much about feline genetics as we do canine, but an initiative with a powerful community science model can help significantly accelerate the pace of discovery. This is particularly crucial for addressing multifactorial health conditions, such as kidney disease, diabetes, and certain cancers, which arise from complex interactions between genetics, environment, and nutrition.

By collecting comprehensive data on all these contributing factors, Darwin's Cats is uniquely positioned to unravel these complexities and develop more effective management strategies. This comprehensive approach promises to yield transformative insights, revolutionizing our understanding of feline health.

Key partners in feline genetic discovery

This feline-focused research, including continued work on the feline genome, empowers veterinary healthcare teams with the knowledge and resources they need to provide exceptional care for cats, and Darwin's Cats is a continuation of this work.

Veterinarians are essential partners in this ongoing research. By encouraging clients to enroll their cats in Darwin's Cats, you will be contributing directly to the growth of the database and the acceleration of research and discovery.

As genetic testing becomes increasingly integrated into veterinary medicine, access to comprehensive genetic information will empower veterinarians to make more informed diagnostic and treatment decisions, leading to better outcomes for their feline patients and enhancing the quality of care we provide. Together, we can bridge the knowledge gap, challenge outdated assumptions, unlock the secrets of the cat genome, and ultimately, improve the lives of cats everywhere. ●

Jennifer Radosevich, PhD, is the senior vice president of Research and Innovation at Hill's Pet Nutrition. Dr. Radosevich completed her PhD in Biochemistry, Molecular Cellular and Developmental Biology at Iowa State University. She is a former chair of the American Feed Industry Association and current chair of the BioKansas organization. Radosevich has more than 25 years of industry experience leveraging innovation to further business goals in the agribusiness, human, and pet food markets.

To enroll cats in the database, go to **https://darwinsark.org/** and click the "Sign up now" button.

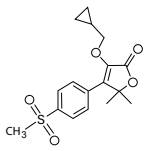
EquiCoxib™
(firocoxib)
Oral Solution for Horses

Non-steroidal anti-inflammatory drug for oral use in horses only.

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

Description:

EquiCoxib™ (firocoxib) belongs to the coxib class of non-narcotic, non-steroidal anti-inflammatory drugs (NSAIDs). Firocoxib is a white crystalline compound described chemically as 3-(cyclopropylmethoxy)-4-(4-(methylsulfonyl)phenyl)-5,5-dimethylfuranone. The empirical formula is $C_{17}H_{20}O_5S$, and the molecular weight is 336.4. The structural formula is shown below:



Indications:

EquiCoxib Oral Solution is administered for up to 14 days for the control of pain and inflammation associated with osteoarthritis in horses.

Dosage and Administration:

Always provide the Client Information Sheet with the prescription. The recommended dosage of EquiCoxib (firocoxib) for oral administration in horses is 0.045 mg/lb (0.1 mg/kg) of body weight once daily for up to 14 days. In target animal safety studies, toxicity was seen at the recommended dose when the duration of treatment exceeded 30 days. **Only administer EquiCoxib with the provided dosing syringe.**

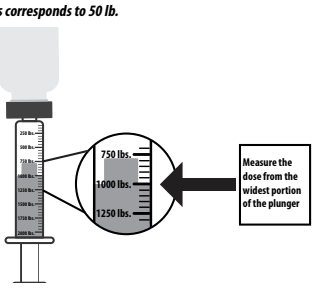
Each 1.25 mL volume will treat 250 pounds of body weight and each additional 0.25 mL volume corresponds to approximately a 50 lb weight increment. The provided dosing syringe is calibrated so that each line corresponds to a 50 lb weight increment. To deliver the correct dose, round the horse's body weight up to the nearest 50 pound increment (if the body weight is an exact 50 pound increment, do not round up).

FOR ORAL USE ONLY. DO NOT INJECT EQUICOXIB. ONLY ADMINISTER WITH THE PROVIDED DOSING SYRINGE.

EquiCoxib Oral Dosing Guide

Body Weight (lb)	Dose Volume (mL)
250	1.25 mL
500	2.5 mL
750	3.75 mL
1000	5 mL
1250	6.25 mL

1) Remove draw-off cap. Peel off the foil-backed seal from the bottle.
2) Screw the draw-off cap tightly back on the bottle.
3) Remove the seal from the top of the cap exposing the cross-hatched opening in the center of the silicone liner.
4) Remove the provided oral dosing syringe from its plastic cover.
5) Insert the oral dosing syringe firmly into the cross-hatched opening of the cap's silicone liner.
6) Turn the bottle with attached syringe upside down. Pull back the syringe plunger until the widest portion of the plunger lines up with the line that corresponds with the animal's weight. Each line between the 250 lb increments corresponds to 50 lb.



7) Turn the bottle with attached syringe right side up and separate the dosing syringe from the bottle.
8) Give orally according to your veterinarian's instructions.
DO NOT INJECT.

Contraindications:

Horses with hypersensitivity to firocoxib should not receive EquiCoxib Oral Solution.

Warnings:

For oral use in horses only. Do not use in horses intended for human consumption.

Human Warnings: Not for use in humans. Keep this and all medications out of the reach of children. Wash hands with soap and water after use. Consult a physician in case of accidental ingestion by humans.

Animal Safety: Clients should be advised to observe for signs of potential drug toxicity and be given a Client Information Sheet with each prescription.

Keep EquiCoxib in a secure location out of reach of dogs, cats, and other animals to prevent accidental ingestion or overdose.

To report suspected adverse drug events, for technical assistance or to obtain a copy of the Safety Data Sheet (SDS), contact Aurora Pharmaceutical at 1-888-215-1256 or www.aurorapharmaceutical.com. For additional information about adverse drug experience for animal drugs, contact FDA at 1-888-FDA-VETS or online at www.fda.gov/reportanimalae.

Precautions:

Horses should undergo a thorough history and physical examination before initiation of NSAID therapy. Appropriate laboratory tests should be conducted to establish hematological and serum biochemical baseline data before and periodically during administration of any NSAID. Clients should be advised to observe for signs of potential drug toxicity and be given a Client Information Sheet with each prescription. See **Information for Owner or Person Treating Horse** section of this package insert.

Treatment with EquiCoxib should be terminated if signs such as inappetance, colic, abnormal feces, or lethargy are observed. As a class, cyclooxygenase inhibitory NSAIDs may be associated with gastrointestinal, renal, and hepatic toxicity. Sensitivity to drug-associated adverse events varies with the individual patient. Horses that have experienced adverse reactions from one NSAID may experience adverse reactions from another NSAID. Patients at greatest risk for adverse events are those that are dehydrated, on diuretic therapy, or those with existing renal, cardiovascular, and/or hepatic dysfunction. Concurrent administration of potentially nephrotoxic drugs should be carefully approached or avoided. NSAIDs may inhibit the prostaglandins that maintain normal homeostatic function. Such anti-prostaglandin effects may result in clinically significant disease in patients with underlying or pre-existing disease that has not been previously diagnosed. Since many NSAIDs possess the potential to produce gastrointestinal ulcerations and/or gastrointestinal perforation, concomitant use of EquiCoxib Oral Solution with other anti-inflammatory drugs, such as NSAIDs or corticosteroids, should be avoided. The concomitant use of protein bound drugs with EquiCoxib Oral Solution has not been studied in horses. The influence of concomitant drugs that may inhibit the metabolism of EquiCoxib Oral Solution has not been evaluated. Drug compatibility should be monitored in patients requiring adjunctive therapy. The safe use of EquiCoxib Oral Solution in horses less than one year in age, horses used for breeding, or in pregnant or lactating mares has not been evaluated. Consider appropriate washout times when switching from one NSAID to another NSAID or corticosteroid.

Adverse Reactions:

In controlled field studies, 127 horses (ages 3 to 37 years) were evaluated for safety when given firocoxib at a dose of 0.045 mg/lb (0.1 mg/kg) orally once daily for up to 14 days. The following adverse reactions were observed. Horses may have experienced more than one of the observed adverse reactions during the study.

Adverse Reactions Seen in U.S. Field Studies

Firocoxib was safely used concomitantly with other therapies, including vaccines, anthelmintics, and antibiotics, during the field studies. The safety data sheet (SDS) contains more detailed occupational safety information.

To report suspected adverse drug events, for technical assistance, or to obtain a copy of the Safety Data Sheet (SDS), contact Aurora Pharmaceutical Inc. at 1-888-215-1256 or www.aurorapharmaceutical.com. For additional information about adverse drug experience reporting for animal drugs, contact FDA at 1-888-FDA-VETS, or online at www.fda.gov/reportanimalae.

Adverse Reactions	Firocoxib n=127	Active Control n=125
Abdominal pain	0	1
Diarrhea	2	0
Excitation	1	0
Lethargy	0	1
Loose stool	1	0
Polydipsia	0	1
Urticaria	0	1

Information for Owner or Person Treating Horse:

You should give a Client Information Sheet to the person treating the horse and advise them of the potential for adverse reactions and the clinical signs associated with NSAID intolerance. Adverse reactions may include erosions and ulcers of the gums, tongue, lips and face, weight loss, colic, diarrhea, or icterus. Serious adverse reactions associated with this drug class can occur without warning and, in some situations, result in death. Clients should be advised to discontinue NSAID therapy and contact their veterinarian immediately if any of these signs of intolerance are observed. The majority of patients with drug-related adverse reactions recover when the signs are recognized, drug administration is stopped, and veterinary care is initiated.

Clinical Pharmacokinetics / Pharmacodynamics:

Pharmacokinetics: When administered as a 0.045 mg/lb (0.1 mg/kg) dose in oral paste to adult horses with normal access to roughage, feed, and water, the absolute bioavailability of firocoxib from oral paste is approximately 79%. Following oral administration, drug peak concentration (Cmax) of 0.08 mcg/mL can be reached at 4 hours (Tmax) post-dosing. However, in some animals, up to 12 hours may be needed before significant plasma concentrations are observed. Little drug amount distributes into blood cells. The major metabolism mechanism of firocoxib in the horse is decyclopropylmethylation followed by glucuronidation of that metabolite. Based upon radiolabel studies, the majority of firocoxib is eliminated in the urine as the decyclopropylmethylated metabolite. Despite a high rate of plasma protein binding (98%), firocoxib exhibits a large volume of distribution (mean Vd(ss) = 1652 mL/kg). The terminal elimination half-life ($T_{1/2}$) in plasma averages 30-40 hours after IV or oral paste dosing. Therefore, drug accumulation occurs with repeated dose administrations and steady state concentrations are achieved beyond 6-8 daily oral doses in the horse. Dose linearity exists from 1X-2X of 0.1 mg/kg/day.

Mode of action: EquiCoxib (firocoxib) is a cyclooxygenase-inhibiting (coxib) class, non-narcotic, non-steroidal anti-inflammatory drug (NSAID) with anti-inflammatory, analgesic and antipyretic activity[1] in animal models. Based on in vitro horse data, firocoxib is a selective inhibitor of prostaglandin biosynthesis through inhibition of inducible cyclooxygenase-2-isoenzyme (COX-2)[2]. Firocoxib selectivity for the constitutive isoenzyme, cyclooxygenase-1 (COX-1) is relatively low. However, the clinical significance of these in vitro selectivity findings has not been established.

Effectiveness:

Two hundred fifty-three client-owned horses of various breeds, ranging in age from 2 to 37 years and weighing from 595 to 1638 lbs, were randomly administered firocoxib oral paste or an active control drug in multi-center field studies. Two hundred forty horses were evaluated for effectiveness and 252 horses were evaluated for safety. Horses were assessed for lameness, pain on manipulation, range of motion, joint swelling, and overall clinical improvement in a non-inferiority evaluation of firocoxib oral paste compared to an active control. At study's end, 84.4% of horses treated with firocoxib oral paste were judged improved on veterinarians' clinical assessment, and 73.8% were also rated improved by owners.
Horses treated with firocoxib oral paste showed improvement in veterinarian-assessed lameness, pain on manipulation, range of motion, and joint swelling that was comparable to the active control.

Animal Safety:

In a target animal safety study, firocoxib was administered orally to healthy adult horses (two male castrates and four females per group) at 0, 0.1, 0.3 and 0.5 mg firocoxib/kg body weight (1, 3 and 5X the recommended dose) for 30 days. Administration of firocoxib at 0.3 and 0.5 mg/kg body weight was associated with an increased incidence of oral ulcers as compared to the control group but, no oral ulcers were noted with 0.1 mg/kg. There were no other drug-related adverse findings in this study.

In another target animal safety study, firocoxib was administered orally to healthy adult horses (four males or male castrates and four females per group) at 0, 0.1, 0.3 and 0.5 mg firocoxib/kg body weight (1, 3 and 5X the recommended dose) for 42 days. Administration of firocoxib at 0.1, 0.3 and 0.5 mg/kg body weight was associated with delayed healing of pre-existing oral (lip, tongue, gingival) ulcers. In addition, the incidence of oral ulcers was higher in all treated groups as compared to the control group.

Clinical chemistry and coagulation abnormalities were seen in several horses in the 0.5 mg/kg (5X) group. One 5X male horse developed a mildly elevated BUN and creatinine over the course of the study, prolonged buccal mucosal bleeding time (BMBT), and a dilated pelvis of the right kidney. Another 5X male had a similar mild increase in creatinine during the study but did not have any gross abnormal findings. One female in the 5X group had a prolonged BMBT, bilateral tubulointerstitial nephropathy and bilateral papillary necrosis. Tubulointerstitial nephropathy occurred in one 3X female, two 3X male horses, and the 5X female horse discussed above with the prolonged BMBT. Papillary necrosis was present in one 1X male horse and the 5X female horse discussed above. Despite the gross and microscopic renal lesions, all of the horses were clinically healthy and had normal hematology, clinical chemistry and urinalysis values.

In another target animal safety study, firocoxib was administered orally to healthy adult horses (three females, two male castrates and one male per group) at 0, 0.25 mg/kg, 0.75 mg/kg and 1.25 mg/kg (2.5, 7.5 and 12.5X the recommended dose of 0.1 mg/kg) for 92 days. An additional group of three females, two male castrates and one male per group, was dosed at 1.25 mg/kg for 92 days but was monitored until Days 147-149. There were treatment-related adverse events in all treated groups. These consisted of ulcers of the lips, gingiva and tongue and erosions of the skin of the mandible and head. Gross and microscopic lesions of the kidneys consistent with tubulointerstitial nephropathy were seen in all treated groups. Papillary necrosis was seen in the 2.5X and 12.5X groups. In addition, several 12.5X horses had elevated liver enzymes (GGT, SDH, AST and ALT). One 2.5X horse had increased urine GGT and urine protein levels which was due to renal hemorrhage and nephropathy. Gastric ulcers of the margo plicatus and glandular area were more prevalent in the 2.5X and 7.5X groups, but not seen in the 12.5X group. The group of horses that were monitored until Days 147-149 showed partial to full recovery from oral and skin ulcers, but no recovery from tubulointerstitial nephropathy.

Storage Information:

Store below 77°F (25°C). Brief excursions up to 104°F (40°C) are permitted.

How Supplied:

EquiCoxib is available in 90 mL bottles, sufficient to treat a 1250 lb. horse for up to 14 days, and 400 mL bottles, sufficient to treat four 1250 lb. horses for up to 14 days.

References:

[1]McCann ME, Rickes EL, Hora DF, Cunningham PK et al. In vitro effects and in vivo efficacy of a novel cyclooxygenase-2 inhibitor in cats with lipopolysaccharide-induced pyrexia. Am J Vet Res. 2005 Jul;66 (7):1278-84

[2]McCann ME, Anderson DR, Brideau C et al. In vitro activity and in vivo efficacy of a novel COX-2 inhibitor in the horse. Proceedings of the Academy of Veterinary Internal Medicine. 2002. Abstract 114, p.789.

Marketed by: Aurora Pharmaceutical, Inc.
Northfield, MN 55057

Approved by FDA under ANADA # 200-766

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Rev No. 04/2024

How to get clients to submit online forms

Wendy S. Myers, CVJ

When pet owners complete online health forms before appointments, veterinary teams benefit. Veterinarians and technicians can save up to 10 to 15 minutes of history taking at the start of appointments. They ask follow-up questions, zeroing in on chief complaints and enjoying more efficient exam time.

Use these strategies to get more clients to complete forms in advance:

Let clients know when to expect forms

At the end of scheduling calls, summarize appointment details and when to expect the next communication. Say, "We will see <pet name> for a wellness appointment with Dr. <Name> on <date, time>. Please bring a stool sample for an intestinal parasite screen. You will get a text/email confirmation shortly. Two days before <pet name>'s appointment, you will get a link to an online health form to complete and submit before the appointment. These are important health questions to help our medical team prepare for your pet's appointment. We look forward to seeing you and <pet name>."

Immediately upon booking appointments or procedures, clients should receive automated confirmations through your practice information management system (PIMS) or third-party client communication platform. Two days before visits, pet owners will receive another confirmation with the health form based on the reason for the visit. (Figure 1)

If clients book same-day appointments, they will receive confirmations and forms at the same time.

When clients schedule procedures, use benefit statements to reinforce the importance of completing anesthetic consents in advance. (Figure 2)

Say, "We will see <pet name> for a surgical admission appointment on <date, time>. Two days before the procedure, you will receive fasting instructions and an anesthetic consent form to review and complete on the day before <pet name>'s procedure. This will help our medical team prepare for your pet's procedure and let us know how to contact you on the day of surgery."

Create forms based on the reason for visit

The appointment type will trigger confirmations with corresponding forms through your PIMS or third-party client communication platform. A dog owner with a wellness appointment will receive a canine adult wellness form, while a cat owner with a dental procedure will get an anesthetic consent.

Team up in creating forms for a better workflow (See: "Forms that work").

Figure 1

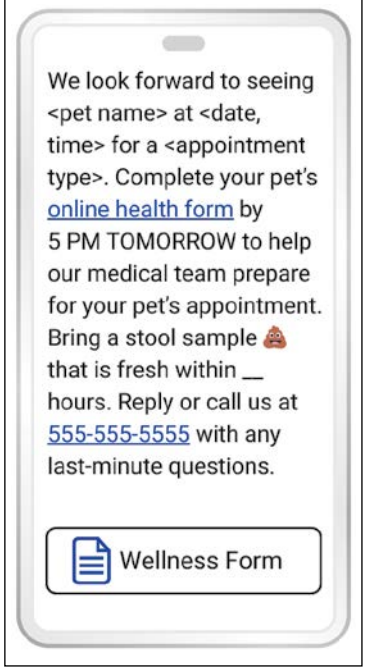
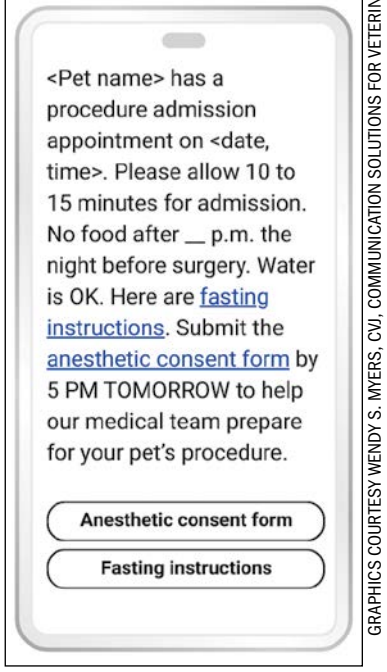


Figure 2



GRAPHICS COURTESY WENDY S. MYERS, CVJ, COMMUNICATION SOLUTIONS FOR VETERINARIANS

Make forms easy to complete

Include hyperlinks and buttons in text and email confirmations that link to corresponding forms on your website. Buttons increase click-through rates by 15 percent over hyperlinks.[1] Many clients will complete forms on cell phones, so have mobile-friendly designs. Use checkboxes with an option to check all that apply.

When asking, "Have you noticed any health changes or concerns with your pet?" give clients an easy-to-skim list, such as increase in appetite, decrease in appetite, bad breath, vomiting, diarrhea, urination issues, difficulty rising, skin masses, etc. Have a comment box where clients can share details of symptoms and when they started.

Ask permission to use photos and videos on social media with yes or no checkboxes. Share your financial policy and cancellation/late/no-show policy with a checkbox of "I have read and understand."

Have a prominent "submit" button at the end of forms. Depending on your third-party provider, forms may be sent to a clinic email, such as records@, or may write back to your PIMS.

Call clients who have not submitted forms on the day before appointments or procedures

Client service representatives (CSRs) should call during the morning and explain the benefits of completing forms, such as a smoother check-in, better communication with the medical team, or faster access to care.

Forms that work

Have doctors and technicians collaborate to create forms for appointment types, such as:

- Canine adult wellness appointments
- Canine senior wellness appointments
- Feline adult wellness appointments
- Feline senior wellness appointments
- Progress exams
- Puppy appointments
- Kitten appointments
- New client appointments
- Technician appointments
- Sick patient appointments
- Urgent care appointments
- Anesthesia/surgical consent
- Quality of life consultation

THE Lighter SIDE

By Greg Bishop, DVM

"I can't give you a diagnosis from a photo of vomit"

"The Lighter Side" is a monthly cartoon feature by Greg Bishop, DVM, which highlights the humorous and light-hearted perspectives in the world of animals and veterinary care. Visit **sasquatchpaw.com** for more of Dr. Bishop's work.

Say, "This is <name> with <hospital name>. Dr. <Name> asked me to call you because we have not received your completed form for <appointment type/procedure>, which has important questions for our medical team to prepare to deliver care. Please complete and submit your form by __ p.m. today. I will text you the link now. If you need help completing the form or have questions, please call us at 555-555-5555."

Give clients a deadline of two hours before your hospital closes today. This gives CSRs time to save completed forms to patient records before the end of the workday, so details are available for morning appointments and admissions. Some forms may automatically write back to your PIMS depending on the third-party provider. Use the doctor's name to bring authority to the call and urgency to the request.

Because 67 percent of people do not listen to voicemails, send texts as backup communication.[2] Send this text: "<Pet name> has an appointment/procedure tomorrow at <time>. Please complete and submit this online health form by X p.m. today so Dr. <Name> and our medical team may prepare to deliver care. Please call us with questions at 555-555-5555. We are open until X p.m. today."

Consider an option to complete forms on tablets upon arrival

If clients arrive a few minutes early, CSRs could say, "Hello, <client name> and <pet name>. Here is a tablet with the online health form for your <appointment type>. Please take a seat and answer the questions so Dr. <Name> may ask you follow-up questions. When you are finished, click the submit button and return the tablet to me. I will let Dr. <Name> and the technician know that you have arrived and are completing the questionnaire."

If clients are technology challenged or visually impaired, offer to have staff help them. If CSRs can step away from the desk for a few minutes, they can escort clients to seating areas and interview them to complete and submit forms. As a last resort, the technician takes a verbal history at the beginning of the exam.

With automated confirmations and courtesy reminders, you will increase the likelihood of clients returning online forms. As a result, you will streamline history taking and have more time for engaging exam conversations. ●

Wendy Myers, CVJ, knows the right words will lead clients to accept your medical advice, driving patient and practice health. As founder of Communication Solutions for Veterinarians, she teaches practical skills through online courses, conferences, and onsite consulting. Myers' experience as a partner in a specialty and emergency hospital helped her understand issues that owners and managers face. Learn how she can train your team at csvetscourses.com.

References

1. Data on file. Otto. https://otto.vet
2. 22 Business Phone Statistics. Numa. https://www.numa.com/blog/22-business-phone-statistics. Accessed May 21, 2025.

Send forms two days before appointments or procedures. Ask clients to complete and submit forms 24 hours ahead. Use all caps to emphasize deadlines.

8 steps to level up team training

VETERINARY TEAM INSIGHTS

Rebecca Rose, CVT

Remember those first few nerve-wracking days as the newbie? Perhaps you were swiftly handed ill-fitting scrubs and thrusted into a complex procedure, leaving you feeling overwhelmed and potentially hindering the team's efficiency. Now, as a trainer, you possess the power to transform that experience for the next new hire, making their onboarding and skill development a resounding success.

Practices that recognize the value of structured team phase training and robust onboarding often discover hidden gems within their staff–veterinary professionals who possess a genuine passion for teaching and nurturing the growth of others. When you identify this rare breed, be it an assistant, technician, manager, or veterinarian, seize their training aptitude and empower them. Their innate desire to support colleagues in advancing their communication prowess, the delivery of exceptional medicine, and overall career trajectory is an invaluable asset. Leverage their talents.

Drawing from practical experience in training within veterinary hospitals and similar animal care organizations, here are eight essential tips to ensure training success and cultivate a thriving, skilled team:

Teams training together build trust, the foundation of all relationships, engaging with each other in a safe space.

PHOTOS COURTESY REBECCA ROSE

Practice makes progress when role-playing difficult conversations, building muscle memory in responding gracefully.

1) Know the job description: Your training blueprint

Every new team member arrives with a unique blend of experience and expectations. Before the first training session, meticulously review the job description with your manager (See: "Know what to look for in a job description"). This crucial step ensures alignment between your training objectives and the specific responsibilities of the role. Why reinvent the wheel when perfectly good ones already exist? Several online platforms offer comprehensive job descriptions for veterinary professionals, including:

- Veterinary Career Network (VetNet). Operated by the American Veterinary Medical Association (AVMA), VetNet provides detailed and tailored job descriptions specific to various veterinary roles.
- State veterinary medical associations. Many state associations host job boards showcasing diverse job descriptions relevant to the region.
- Specialty veterinary organizations. When crafting descriptions for specialized roles, explore the websites of relevant veterinary and technician specialty groups.
- NAVTA Career Center: The National Association of Veterinary Technicians in America (NAVTA)'s career center offers insights into job requirements and announcements for veterinary technicians.

Leveraging these resources will equip you with a solid understanding of the role's expectations, ensuring your training is targeted and effective.

2) Utilizing written and visual SOPs

While the employee handbook provides a broad overview of how to engage in the small business with expectations in employment, well-defined and visually engaging standard operating procedures (SOPs) are indispensable for consistent practice, efficient time management, and successful training. Implementing effective SOPs offers benefits, including:

- Eliminating ambiguity regarding responsibilities.
- Providing clear, step-by-step guidance for tasks.
- Serving as an invaluable training resource for new hires.
- Protecting both staff and clients by outlining best practices.
- Incorporating essential safety protocols.
- Establishing and maintaining high standards of care and client service.

3) Mastering the art of gradual instruction

As a seasoned team member, you are likely to execute tasks with effortless speed and precision. However, when training a new hire, patience is paramount. Break down each procedure into manageable steps:

- Step 1: Demonstrate the final outcome (*e.g.* a correctly assembled surgical pack).
- Step 2: Deconstruct the process, explaining the purpose and placement of each component.
- Step 3: Have the trainee replicate the process while articulating each step back to you.
- Step 4: Encourage the trainee to teach the skill to another team member, reinforcing their understanding.

Do not hesitate to tap into the expertise of other team members who excel in specific skills. Remember, your role is to oversee the training process, not necessarily to be the sole instructor for every aspect.

4) Tracking progress and providing support

During the initial weeks, establish regular "check-in" meetings to monitor the new hire's progress and address any questions or concerns. These check-ins may occur multiple times a week in the beginning, gradually transitioning to weekly reviews as the orientation progresses. Prepare an agenda for each meeting to ensure productive and focused discussions. Implement "check-offs" for specific skills, requiring the trainee to demonstrate competency before moving on to more complex tasks.

5) Nurturing confidence and growth

Reflect on your own early experiences–feedback can significantly impact a trainee's confidence. Strive to provide constructive feedback that is both objective and encouraging. Instead of delivering harsh criticism, frame corrections in a positive and supportive manner:

- Ineffective: "You did this wrong."
- Effective: "You did a great job on [specific part of the task]. To improve it further, let's try [adjustment]."

Avoid using the word "but" as it can negate any preceding

Know what to look for in a job description

Check out these details to include in a job description to help ensure your training is targeted and effective:

- Job title: Clearly defining the position (*e.g.* Associate Veterinarian, Registered Veterinary Technician, Veterinary Assistant).
- Clinic/hospital overview: Providing context about the practice's mission, values, and patient focus.
- Responsibilities: A comprehensive breakdown of expected tasks and duties, tailored to the specific role (*e.g.* diagnostics for veterinarians, surgical assistance for technicians, animal handling for assistants, client communication for receptionists).
- Qualifications: Outlining necessary education, certifications, licenses (*e.g.* DVM, RVT/LVT/LVMT/CVT), experience, and essential skills. Remember the importance of hiring truly credentialed veterinary technicians.
- Skills: Highlighting desired abilities, such as communication, compassion, technical proficiency, problem-solving, and teamwork.
- Work environment: Describing typical working conditions, hours, and team dynamics.
- Benefits: Detailing salary, health insurance, paid time off, continuing education opportunities, and other perks.
- How to apply: Providing clear instructions for submitting applications.

positive statements. Always conclude feedback sessions on a positive note, acknowledging specific achievements and offering encouragement, such as, "The veterinarian specifically mentioned your efficiency during the anesthetic monitoring – keep up the excellent work!"

6) Tailoring your approach

New hires are adult learners operating within a professional environment. In the *Principles of Andragogy: Theory, Examples, and Implementation,*[1] Althea Storm writes about the principles of adult learning:

a. Self-concept. Cater to the sense of individuals with life experiences and self-directed
b. Experience. Knowledge in learning and what may work best for them
c. Readiness. Relevant learning materials that are relatable, achievable, and applicable
d. Orientation. Goal-oriented, aware of the consequences of their actions in learning (or not learning)
e. Motivation. Sense of accomplishment, cheering onward

By understanding these principles in training, veterinary professionals can create teachable moments, generate ideas for developing a plan to best support the trainee, and broaden curiosity in a productive manner, serving all involved.

7) Emphasizing communication

Strong communication skills are fundamental to success in any veterinary role. Actively help your trainee develop effective communication strategies for interacting with colleagues, clients, and industry professionals. Use role-playing scenarios to prepare them for real-world challenges, such as handling difficult client interactions, resolving conflicts within the team, and navigating sensitive conversations.

8) Continue honing your training skills

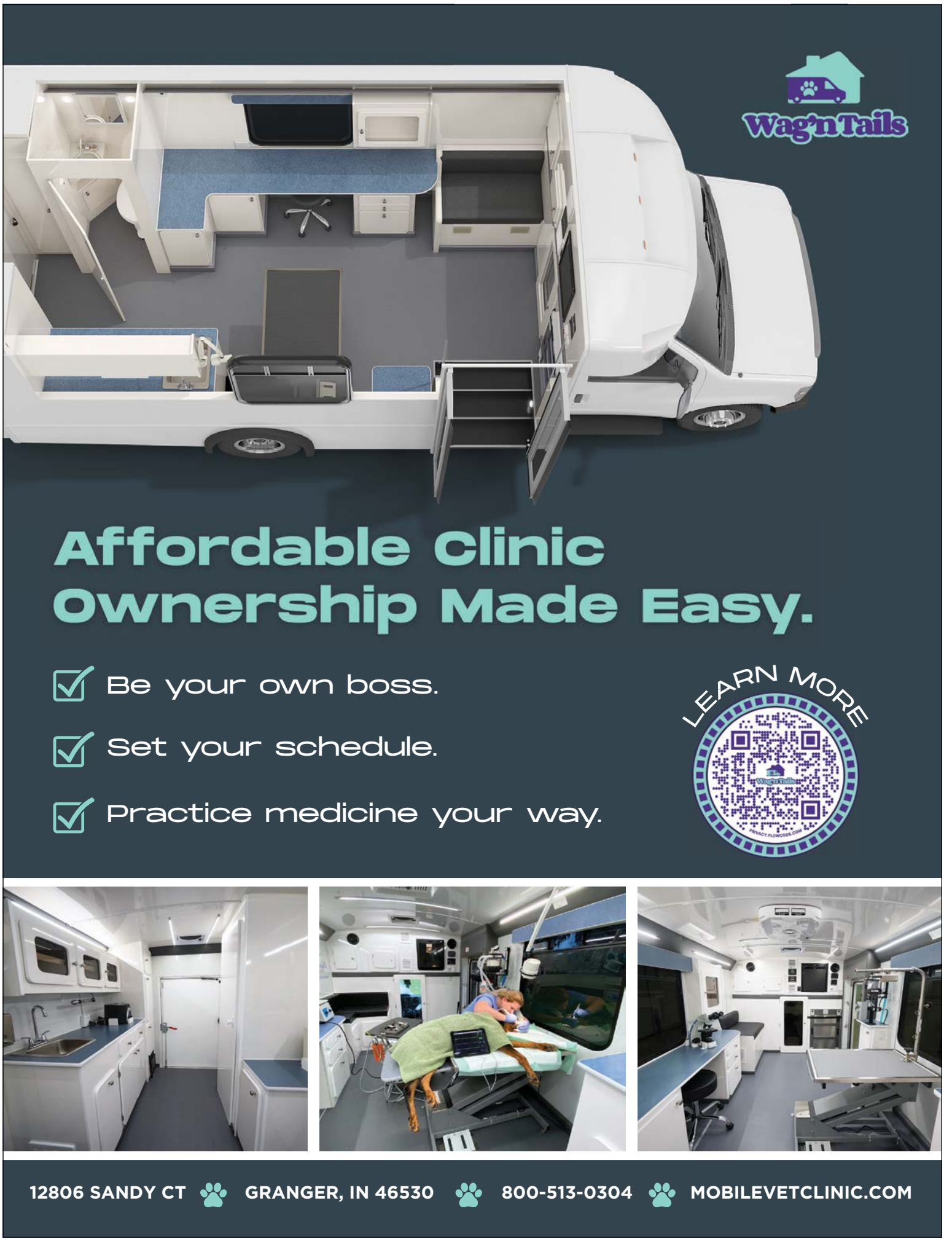
Exceptional trainers are lifelong learners. Continuously seek opportunities to enhance your training abilities by exploring education in areas such as empathy development, middle management techniques, and understanding generational differences in the workplace. Regularly engage in self-evaluation to identify your strengths and weaknesses, striving to become an even more effective and impactful trainer.

By embracing these eight training success tips, you can cultivate a structured, supportive, and highly effective learning environment within your veterinary practice. This investment in your new hires will not only empower their individual growth but will also strengthen the entire team, ultimately elevating the quality of care and service provided to your valued patients and clients. ●

Rebecca Rose, RVT, CCC (certified career coach), CPEP (certified peaceful euthanasia professional), has a diverse background serving the veterinary community as a credentialed team member and leader, with more than 38 years of experience. Rose has worked in and managed veterinary clinics, collaborates with industry partners, authors articles and books, and facilitates engaging team workshops. She was recently appointed to the Colorado State Board of Veterinary Medicine as one of the first RVT members.

Reference

1. Storm, A. (2023, June 21). Principles of andragogy: Theory, examples, and implementation. Thinkific Blog. Retrieved from https://www.thinkific.com/blog/principles-andragogy/



Meeting clinical and educational standards in veterinary operating room design

By Jamie Morgan, MAEd, CVT, RVT, CPEP, FFCP

A well-designed veterinary operating room is essential for patient safety, successful surgical procedures, and workflow efficiency.

Veterinary externship students (both veterinary and veterinary technicians) are becoming a mainstay at many practices today. Clinics that serve as externship sites play a vital role in meeting high standards of care and supporting educational goals.

Further, these facilities must ensure they comply with the American Veterinary Medical Association (AVMA) Committee on Veterinary Technician Education and Activities (CVTEA) guidelines.

The dual purpose OR: Treatment and teaching

Clinics that host externs must be mindful of maintaining a fully functional surgical suite and creating an environment that fosters effective learning.

The OR is traditionally a high-stakes, high-efficiency zone where sterility, precision, and timeliness are priorities. However, when students—whether veterinary or veterinary technicians—enter the picture, the OR becomes a shared space of treatment and training.

At its core, the OR must support safe and successful surgical outcomes for our patients. This includes:

- Maintaining an unobstructed traffic flow for sterile and nonsterile procedures.
- Functional layout for easy access to equipment, anesthesia machines, suction, and monitoring systems.
- Strict sterility protocols, which cannot be compromised by student presence and participation.
- Efficient communication, especially in emergency situations.

Clinics must adapt their design and workflow to enhance educational access to successfully turn the OR into a dual-purpose space. This can be accomplished by providing additional space to accommodate observers or assistants without compromising sterility. This may mean slightly wider rooms or a thoughtful layout of the surgical table and equipment.

Additional considerations would include defining roles for students, such as anesthetic monitoring, charting, or assisting the surgeon. It is important for the surgeon to master the teaching aspects of explaining steps, showing anatomy, and asking/answering questions when appropriate. Surgical teams need to be both proficient and prepared to engage with learners while keeping the clinic flow optimal.

Some design features that support learning and comprehension include:

- Glass viewing panels or mounted cameras that allow those outside the OR to observe and learn without risking contamination.
- Color-coded or labeled instruments to help students learn names and uses quickly.
- Documentation aids such as surgical checklists, anesthesia charts, or procedure posters to reinforce comprehension.

Essentially, when a clinic hosts externs, the OR becomes more than a workspace–it becomes a learning lab. Facilities that proactively design and operate the ORs with this in mind are far better suited to meet not only the expectations of the students, but also the AVMA CVTEA.

CVTEA standards: What are they really looking for in an OR?

When a clinic is being considered for hosting externs, focus is placed on that clinic providing functional, safe equipment, standards of cleanliness, opportunities for structured learning, and a productive environment.

CVTEA identifies the gold standard as those clinics where students are guided through hands-on skill development and comprehension in real clinical cases.

While clinics must meet certain CVTEA standards to serve as externship sites, the responsibility falls to the veterinary or veterinary technology program to evaluate and approve each site to ensure it supports the required learning outcomes and essential skills recognized and required by CVTEA.

Some of the parameters examined in the OR include:

- OR is separate from other areas of the hospital.
- Anesthesia machines are operational, have been serviced recently, and pass a safety leak check.
- The anesthetic vaporizer has been serviced and calibrated recently.
- Isoflurane or sevoflurane is being utilized as an anesthetic inhalant.
- Monitoring equipment (pulse oximeter, capnometer, ECG, blood pressure monitor) is present and operational.
- A variety of basic surgical instruments are available and sterilized appropriately.
- OR has a designated, adjustable surgical table and appropriate lighting.
- Resuscitation equipment (crash cart, resuscitation bag) is available and operational.
- Safety and PPE compliance.

Above all, CVTEA and the program affiliates are not just evaluating the space–they are evaluating the clinic's role as an educational partner.

Features that impress evaluators and support learning

The AVMA CVTEA does not require flashy renovations or "state-of-the-art" design and features, but they do look for thoughtful OR spaces that create a teaching-friendly clinical

PHOTOS COURTESY JAMIE MORGAN

A clean and well-equipped OR, featuring an adjustable stainless steel exam table, anesthesia machine, IV fluid pump, vital signs monitor, and overhead surgical light. This is as an example of a simple design feature that supports the learning environment.

An OR with glass walls provides an outside view and helps promote student observation and learning.

environment. Here are some things evaluators tend to notice–and appreciate:

- Defined sterile and non-sterile zones that are marked by barriers, signage, or floor lines.
- Limited entry points to control contamination risk.
- Logical and functional placement of equipment, supplies, and staff in the OR that promote smooth patient movement.
- Adjustable lighting and surgical tables that ensure students can see and assist comfortably.
- Uncluttered layout that allows externs to position themselves safely without disrupting the sterile field.
- Using clearly labeled drawers and shelves for surgical instruments and supplies.
- Having a dedicated anesthesia station.
- Non-slip flooring for safety during long surgical procedures.
- Climate control and ventilation, especially when using inhalant anesthetics.

Common pitfalls that may raise flags during evaluation

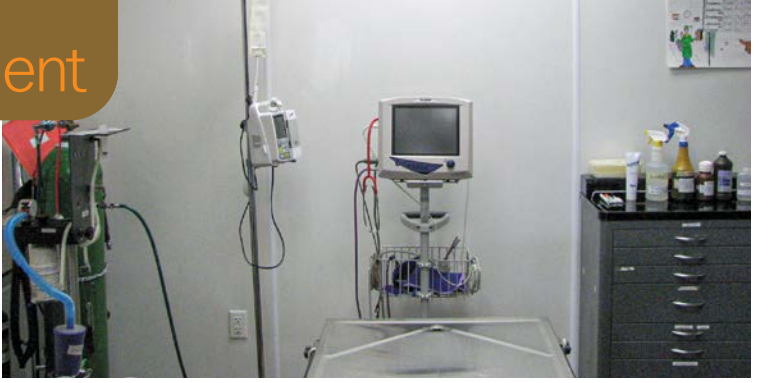
Even well-meaning clinics with busy surgical caseloads can fall short during an OR evaluation, often not because of poor care or design, but because teaching and CVTEA expectations are not fully addressed or documented.

Program site evaluators are trained to look for certain red flags that may indicate a mismatch between the OR experience and program outcomes. Here are some of the most common pitfalls observed during OR evaluations and how to avoid them:

- Surgical and monitoring equipment is present, but not used or accessible to students.
- There is no clear student supervision in the OR. Thus, students are present but not actively participating.
- Inconsistent or poor aseptic practices not only endanger the patient but also undermine the professional examples that externships are meant to provide.
- Inadequate space or unsafe conditions, which can include a visibly disorganized, overcrowded, or poorly maintained surgical area, especially if student safety is compromised.

CVTEA is not looking for perfection—they are looking for intentionality, a safe environment, and structured learning in the OR. When the OR is clean, functional, and staffed by professionals who see students as part of the learning process, even modest operating rooms can be outstanding teaching sites. ●

Jamie Morgan, MAEd, CVT, RVT, CPEP, FFCP, is a veterinary technologist certified in Illinois and North Carolina. She has more than 19 years of teaching experience in American Veterinary Medical Association (AVMA)-accredited veterinary technology programs.



With easy-to-clean work surfaces and walls, clutter is kept to a minimum in the OR. This area is ready to provide safe and sterile care for patients.

L6472

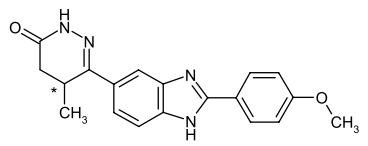
Vetmedin® Solution
(pimobendan oral solution)
1.5 mg/mL
Cardiac drug for oral use in dogs only

Boehringer Ingelheim

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

Description: VETMEDIN® Solution (pimobendan oral solution) is a clear to yellow to slightly green to slightly brown aqueous solution containing 1.5 mg/mL pimobendan. Pimobendan, a benzimidazole-pyridazinone derivative, is a non-sympathomimetic, non-glycoside inotropic drug with vasodilatative properties. The chemical name of pimobendan is 4,5-dihydro-6-[2-(4-methoxyphenyl)-1H-benzimidazole-5-yl]-5-methyl-3(2H)-pyridazinone.

The structural formula of pimobendan is:

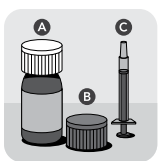


Indications: VETMEDIN Solution (pimobendan oral solution) is indicated for the management of the signs of mild, moderate, or severe congestive heart failure in dogs due to clinical myxomatous mitral valve disease (MMVD) or dilated cardiomyopathy (DCM). VETMEDIN Solution is indicated for use with concurrent therapy for congestive heart failure (e.g., furosemide, etc.) as appropriate on a case-by-case basis.

Dosage and Administration: Always provide the Client Information Sheet to the dog owner with each prescription. VETMEDIN Solution should be administered orally at a total daily dose of 0.23 mg/lb (0.5 mg/kg) body weight. The total daily dose should be divided into 2 equal portions administered approximately 12 hours apart (i.e., morning and evening).

The syringe is calibrated to deliver the appropriate morning or evening dose when drawn to the dog's nearest weight in pounds.

VETMEDIN Solution should be administered directly into the mouth. Do not mix into food.



- VETMEDIN Solution includes an amber glass bottle sealed with a white cap (A), an orange cap with integrated plastic plug (B), and an orange dosing syringe (C).
- **Do not shake** the bottle before or during use to avoid foaming.

VETMEDIN Solution should be administered using the orange dosing syringe provided in the package. At the time of first use, the white cap should be removed and discarded. Once the orange cap has been screwed onto the bottle and the integrated plastic plug is in place, the dosing syringe fits onto the plug. The dosing syringe has 1 pound incremental marks. Each dose should be rounded to the nearest 1 pound increment (e.g., a dose for a dog 5.5 lb or greater should be rounded up to 6 lb).

An in-use video demonstration can be found using the URL https://go.boehringer.com/q7lKE or the QR code below.

Close the bottle tightly using the orange cap. After administration, clean the outside of the syringe by wiping with a clean, dry cloth or tissue after each use. If the syringe clogs, rinse without removing the plunger by using water and wiping the outside of the syringe dry with a clean cloth or tissue.

Contraindications: VETMEDIN Solution should not be given in cases of hypertrophic cardiomyopathy, aortic stenosis, or any other clinical condition where an augmentation of cardiac output is inappropriate for functional or anatomical reasons.

Warnings:
User Safety Warnings: Not for use in humans. Keep this and all medications out of reach of children. Consult a physician in case of accidental ingestion by humans.

Wash hands after use. This product may cause eye irritation. Avoid contact with eyes. In case of contact, flush affected eye(s) immediately and thoroughly with water. If wearing contact lenses, flush the eyes first with water and then remove the lens(es) and continue to flush thoroughly with water. If eye irritation continues, seek medical advice and provide this product information to the physician.

Exposure to product may induce a local or systemic allergic reaction in sensitized individuals.

Animal Safety Warnings: Keep VETMEDIN Solution in a secure location out of reach of dogs, cats, and other animals to prevent accidental ingestion or overdose.

Only for use in dogs with clinical evidence of heart failure. At 3 and 5 times the recommended dosage, administered over a 6-month period of time, pimobendan caused an exaggerated hemodynamic response in the normal dog heart, which was associated with cardiac pathology (See **Target Animal Safety**).

Precautions: The safety of VETMEDIN Solution has not been established in dogs with asymptomatic heart disease or in heart failure caused by etiologies other than MMVD or DCM. The safe use of VETMEDIN Solution has not been evaluated in dogs younger than 6 months of age, dogs with congenital heart defects, dogs with diabetes mellitus or other serious metabolic diseases, dogs used for breeding, or pregnant or lactating bitches.

Adverse Reactions: The safety and effectiveness of VETMEDIN Solution was established by demonstrating bioequivalence with VETMEDIN Chewable Tablets. (See **Clinical Pharmacology**).

Pre-Approval Experience: Clinical findings/adverse reactions were recorded in a 56-day field study of dogs with congestive heart failure (CHF) due to MMVD (256 dogs) or DCM (99 dogs). Dogs were treated with either VETMEDIN Chewable Tablets (175 dogs) or the active control enalapril maleate (180 dogs). Dogs in both treatment groups received additional background cardiac therapy (See **Effectiveness** for details and the difference in digoxin administration between treatment groups).

The VETMEDIN Chewable Tablets group had the following prevalence (percent of dogs with at least one occurrence) of common adverse reactions/new clinical findings (not present in a dog prior to beginning study treatments): poor appetite (38%), lethargy (33%), diarrhea (30%), dyspnea (29%), azotemia (14%), weakness and ataxia (13%), pleural effusion (10%), syncope (9%), cough (7%), sudden death (6%), ascites (6%), and heart murmur (3%). Prevalence was similar in the active control group.

The prevalence of renal failure was higher in the active control group (4%) compared to the VETMEDIN Chewable Tablets group (1%).

Adverse reactions/new clinical findings were seen in both treatment groups and were potentially related to CHF, the therapy of CHF, or both. The following adverse reactions/new clinical findings are listed according to body system and are not in order of prevalence: CHF death, sudden death, chordae tendineae rupture, left atrial tear, arrhythmias overall, tachycardia, syncope, weak pulses, irregular pulses, increased pulmonary edema, dyspnea, increased respiratory rate, coughing, gagging, pleural effusion, ascites, hepatic congestion, decreased appetite, vomiting, diarrhea, melena, weight loss, lethargy, depression, weakness, collapse, shaking, trembling, ataxia, seizures, restlessness, agitation, pruritus, increased water consumption, increased urination, urinary accidents, azotemia, dehydration, abnormal serum electrolyte, protein, and glucose values, mild increases in serum hepatic enzyme levels, and mildly decreased platelet counts.

See Table 1 for mortality due to CHF (including euthanasia, natural death, and sudden death) and for the development of new arrhythmias (not present in a dog prior to beginning study treatments) by treatment group and type of heart disease (MMVD or DCM) in the 56-day field study.

Table 1: CHF Death and New Arrhythmias in the 56-Day Field Study

	VETMEDIN Chewable Tablets Group	Active Control Group
Dogs that died due to CHF	14.3% n = 175	14.4% n = 180
	9 of 126 dogs with MMVD	16 of 130 dogs with MMVD
	16 of 49 dogs with DCM	10 of 50 dogs with DCM
Dogs that developed new arrhythmias[a]	39.4% n = 175	45.0% n = 180
	45 of 126 dogs with MMVD	59 of 130 dogs with MMVD
	24 of 49 dogs with DCM	22 of 50 dogs with DCM

[a] New arrhythmias included supraventricular premature beats and tachycardia, atrial fibrillation, atrioventricular block, sinus bradycardia, ventricular premature beats and tachycardia, and bundle branch block.

Following the 56-day masked field study, 137 dogs in the VETMEDIN Chewable Tablets group were allowed to continue on VETMEDIN Chewable Tablets in an open-label extended-use study without restrictions on concurrent therapy. The adverse reactions/new clinical findings in the extended-use study were consistent with those reported in the 56-day study, with the following exception: One dog in the extended-use study developed acute cholestatic liver failure after 140 days on VETMEDIN Chewable Tablets and furosemide.

Post-Approval Experience (2023):
The following adverse events are based on post-approval adverse drug experience reporting for VETMEDIN Chewable Tablets. 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 in dogs are listed in decreasing order of reporting frequency: Diarrhea, lethargy, anorexia, emesis, cough, tachycardia, ataxia, dyspnea, convulsion, elevated liver enzymes (ALT, ALP), increased BUN and/or creatinine, tremors, hyperactivity, pruritus, syncope, allergic reactions (including allergic edema/facial edema, erythema, and hives), hypotension, hypertension, coagulation abnormalities (including thrombocytopenia, hemorrhage and petechia), and hyperglycemia (with or without diabetes mellitus). Death has been reported in some cases.

Contact Information:
To report suspected adverse reactions, to obtain a Safety Data Sheet (SDS), or for technical assistance, contact Boehringer Ingelheim Animal Health USA Inc. at 1-888-637-4251. For additional information about adverse drug experience reporting for animal drugs, contact the FDA at 1-888-FDA-VETS or at https://www.fda.gov/reportanimalae.

Information for Dog Owners: Always provide the Client Information Sheet with each prescription and review it with the dog owner or person responsible for care of the dog. Advise dog owners about signs of disease progression and possible adverse reactions with use of VETMEDIN Solution.

Clinical Pharmacology:
Mechanism of Action: Pimobendan exerts a stimulatory myocardial effect by a dual mechanism of action consisting of an increase in calcium sensitivity of cardiac myofilaments and inhibition of phosphodiesterase (Type III). Pimobendan exhibits vasodilating activity by inhibiting phosphodiesterase III activity.

Pharmacodynamics: In normal dogs instrumented with left ventricular (LV) pressure transducers, pimobendan increased LV dP/dt_{max} (a measure of contractility of the heart) in a dose dependent manner between 0.1 and 0.5 mg/kg orally. The effect was still present 8 hours after dosing. There was a delay between peak blood levels of pimobendan and active metabolite and the maximum physiologic response (peak LV dP/dt_{max}). Blood levels of pimobendan and active metabolite began to drop before maximum contractility was seen. Repeated oral administration of pimobendan did not result in evidence of tachyphylaxis (decreased positive inotropic effect) or drug accumulation (increased positive inotropic effect). Laboratory studies indicate that the positive inotropic effect of pimobendan may be attenuated by the concurrent use of a ß-adrenergic blocker or a calcium channel blocker.

Pharmacokinetics: VETMEDIN Solution was compared to VETMEDIN Chewable Tablets in a randomized, masked, four-period, two-sequence single-dose full replicative cross-over bioequivalence study. Twenty-four Beagle dogs (12 male/12 female), ranging in age from 1 to 10 years and weighing between 9.0 and 16.5 kg at enrollment were administered a 5 mg total dose of VETMEDIN Solution and VETMEDIN Chewable Tablets on two separate occasions. Using the mixed scaling approach, reference-scaled average bioequivalence (RSABE) was demonstrated. Mean pharmacokinetic parameters from this study are provided in Table 2.

VETMEDIN®-CA1

(pimobendan)

Chewable Tablets

Cardiac drug for oral use in dogs only

This Client Information Sheet contains important information about VETMEDIN-CA1 (pimobendan) Chewable Tablets. You should read this information before you start giving VETMEDIN-CA1 and review it each time the prescription is refilled as there may be new information. This sheet does not take the place of instructions from your veterinarian. Talk with your veterinarian if you do not understand any of this information or if you want to know more about VETMEDIN-CA1.

VETMEDIN-CA1 is conditionally approved by the FDA, and full demonstration of effectiveness (how well the drug works) is dependent on completion of a clinical trial. The use of conditionally approved new animal drugs is limited to a specific use, which can be found on the package insert. Additional information on conditional approval can be found at https://www.fda.gov/animalca.

Your veterinarian has decided to include VETMEDIN-CA1 as a part of his/her treatment plan for your dog's heart disease. Be sure to speak with your veterinarian for any questions regarding your dog's diagnosis or treatment plan.

What is VETMEDIN-CA1 and why has my veterinarian prescribed it?
VETMEDIN-CA1 contains pimobendan which helps the heart to relax and contract (pump) more effectively and it dilates blood vessels which reduces the amount of pressure the heart needs to pump blood.

Your veterinarian has prescribed VETMEDIN-CA1 because your dog has been diagnosed with myxomatous mitral valve disease (MMVD) at a stage known as B2 (see table below). Although your dog does not have any clinical signs of heart disease, VETMEDIN-CA1 can be used to delay the progression of MMVD to heart failure.

MMVD is the most common heart disease in small breed dogs but can also affect larger breeds. Early in MMVD, veterinarians may hear abnormal heart sounds (heart murmurs). MMVD is the primary cause of heart murmurs in older pets. Further testing will be needed to diagnose the stage of the disease and determine if the dog's heart is enlarged. The table below describes the stages of MMVD and the differences in possible treatments your veterinarian may prescribe.

Description of MMVD Stages and Treatments

Stage	Description	Medical Treatment
B1	• Abnormal heart sounds (murmurs) can be heard. • The dog's heart is not enlarged. • There are no outward signs of heart disease.	Medications are not currently recommended.
B2	• Abnormal heart sounds (murmurs) can be heard. • The dog's heart is enlarged (sign of disease progression). • There are still no outward signs of heart disease.	VETMEDIN-CA1 is conditionally approved for use in Stage B2.
C/D	• Stages C and D means the dog has been diagnosed with congestive heart failure (dog has fluid accumulation in the lungs). • Abnormal heart sounds (murmurs) can be heard. • The dog's heart is enlarged. • Outward signs of heart failure can be seen, such as labored breathing, increased resting respiratory rates, fainting, abnormal heart rhythms, and significant coughing.	VETMEDIN is FDA approved for use in dogs diagnosed with congestive heart failure. Additional medications may also be prescribed to treat the outward signs or to treat the fluid in the dog's lungs.

Talk to your veterinarian if you have any questions regarding your dog's heart disease diagnosis.

Is VETMEDIN-CA1 the same as VETMEDIN?
Both products are physically identical and contain the same amount of active ingredient, pimobendan.

The differences are the stage of MMVD they are used to treat and their approval status with FDA.

- VETMEDIN-CA1 is conditionally approved by the FDA to delay the onset of congestive heart failure in dogs diagnosed with Stage B2 MMVD. Further testing is being conducted to confirm effectiveness (how well the drug works).
- VETMEDIN is fully approved by the FDA to manage the outward signs of congestive heart failure. VETMEDIN is fully approved because effectiveness in dogs diagnosed with congestive heart failure has already been confirmed and no further testing is required to evaluate how well it works for that use.

Talk to your veterinarian if you have any questions about your dog's heart disease and the use of VETMEDIN-CA1.

What should I tell my veterinarian about my dog before starting VETMEDIN-CA1?
- Tell your veterinarian about other medications your pet is taking, including prescription drugs, over the counter drugs, heartworm preventives, flea & tick products, and vitamins and supplements, including herbal medications.
- Tell your veterinarian if your dog is pregnant, nursing, or you intend to breed him/her.
- Tell your veterinarian if your dog has any other serious health conditions.
- Tell your veterinarian if your dog has or develops any signs of disease progression, such as labored breathing, increased resting respiratory rates, fainting, abnormal heart rhythms, and coughing.

Talk to your veterinarian about the risks and benefits of giving VETMEDIN-CA1 to your dog.

What are some of the possible side effects of VETMEDIN-CA1?
VETMEDIN-CA1 may cause side effects, even at the prescribed dose. Contact your veterinarian immediately if your dog develops a serious or concerning medical problem or side effect while taking VETMEDIN-CA1.

The most common side effects seen in dogs with Stage B2 MMVD while taking VETMEDIN-CA1 Chewable Tablets are cough, vomiting, diarrhea, lethargy (lack of energy), and localized pain (such as in the neck or legs).

Coughing can be a sign that your dog's heart disease is progressing. Contact your veterinarian if your dog develops worsening coughing or any other sign of disease progression, including labored breathing, increased resting respiratory rates, fainting, and abnormal heart rhythms.

To report suspected adverse reactions (side effects), to obtain a Safety Data Sheet (SDS), or for technical assistance, contact Boehringer Ingelheim Animal Health USA Inc. at 1-888-637-4251. For additional information about reporting adverse drug experiences for animal drugs, contact FDA at 1-888-FDA-VETS or at http://www.fda.gov/reportanimalae.

How do I give VETMEDIN-CA1 to my dog?
VETMEDIN-CA1 should be given to your dog in their mouth (orally) twice a day, about 12 hours apart. The tablets are scored so that a combination of whole or half tablets may be given to your dog. Because of differences in tablet sizes and dog sizes, the dose you are prescribed to give your dog in the morning may be the same or different from the evening dose. Please give VETMEDIN-CA1 as directed by your veterinarian.

If your dog vomits after being given VETMEDIN-CA1, please contact your veterinarian and unless directed otherwise, do not give additional tablets again until the next scheduled dose.

What if my dog receives more VETMEDIN-CA1 than what is prescribed?
Contact your veterinarian as soon as possible.

What else should I know about VETMEDIN-CA1?
VETMEDIN-CA1 is not for use in humans. Keep this and all medications out of reach of children.

Consult a physician in case of accidental ingestion by humans. It is important to show the treating physician a copy of the package insert, label, or this client information sheet. VETMEDIN-CA1 is a non-sympathomimetic, non-glycoside inotropic drug with vasodilatative properties.

Keep VETMEDIN-CA1 in a secure location out of reach of dogs, cats, and other animals to prevent accidental ingestion or overdose.

This client information sheet contains a summary of important information about VETMEDIN-CA1. For more detailed information about VETMEDIN-CA1, talk with your veterinarian.

Storage Statement: VETMEDIN-CA1 should be stored at room temperatures between 68° to 77°F (20° to 25°C). Temperature as low as 59° F (15°C) and as high as 86°F (30°C) can be acceptable for short periods of time.

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Boehringer Ingelheim

Marketing 101: Do you have a strategy in place?

By Katie Robertson

Opening a business in the veterinary field requires an incredible background in the industry and a variety of specialized knowledge centered around animal health. It does not require a degree in marketing.

Despite this, leaders in veterinary businesses still find themselves responsible for promoting their new enterprise to get it off the ground. Marketing serves as a catalyst between a great idea and the people who will pay for it, and an effective strategy can drive financial success.

In her book, *Spin Sucks: Communication and Reputation Management in the Digital Age*, Gini Dietrich identifies four kinds of marketing materials: paid, earned, shared and owned, and lays them out in an acronym and strategic framework known as the PESO Model.[1] Integrating all four into a marketing plan is a surefire way to build brand awareness and generate qualified leads.

1) Paid: Invest in success

Traditional advertising is often the first image that comes to mind when people think of marketing. While every ad is unique, there are a few components that form the essential building blocks:

- Images
- Copy
- Brand
- Call to action (CTA)

Images and copy are self-explanatory. These are the elements that make the ad look good and sound good, respectively. Companies often want to put as much information as they can into an ad, listing all the benefits of their business and including images of each service they offer. However, an ad that focuses on one or two key messages is more impactful. Think of an ad like a movie trailer. It reveals the stronger selling points without giving the entire plot away, thus encouraging the audience to seek out more information and ultimately watch the movie.

A service or product's brand is another key component of an ad. It acts like a signature, informing the audience who or what is marketing the product or service. The easiest and most used element of a brand is a logo, but other choices, such as using the same fonts and colors, can reinforce recognizability. Whatever a business does to implement a brand, consistency is key. If ads can easily be associated with each other and in frequency across multiple forms of media, viewers build on their positive impression of the brand and are more likely to move forward with the business.

How they move forward is determined by the final key element of an ad, the call to action (CTA). "Call now," "Click here," and "Contact us today" are all common examples of a CTA. This lays out a clear next step for people to follow, depending on the purpose of the ad.

In addition to the specific action, details are also important to include. If the goal is to promote a clinic open house or other event, the ad should list the time, date, location, and any necessary registration information. If it is spreading awareness about a special offer, it should provide a phone number and/or email address people can use to take advantage of the offer. There is no shortage of options for where paid ads can be placed, including:

- Print and digital publications
- Broadcast networks
- Billboards
- Promoted social media posts
- Email marketing
- Trade show programs

Some businesses utilize one medium, others use them all and more. Regardless, the best fit for an ad is the medium that best aligns with the target audience.

2) Earned: Get your name out there

In addition to being bought, media placements can be earned through public relations (PR). PR content is nearly always non-promotional in nature, focusing more on informing important audiences than selling to them. While the definition of "earned" media is arguably the broadest of the four, much of it can be sorted into two primary categories: company news and thought leadership.

Company news is what most people think of when they hear the term "public relations." These are the stories published in press releases and sent out to make headlines across various media channels. Brands often get caught up thinking that if a story is not going to be front-page news, it should not be sent to the press. However, most media outlets offer space on more than just the front page, giving brands numerous opportunities to garner positive attention.

PR coverage can be leveraged for new hires, promotions, the addition of advanced technology to a clinic, recognitions, mergers and acquisitions, partnerships, and more.

Thought leadership utilizes a company's unique expertise to share useful insight with the target audience. Appearing on a TV news program to educate owners about pet safety, interviewing on a podcast about new technology in the veterinary industry, or even authoring an article about marketing tips for veterinarians are all examples of thought leadership PR.

Unlike paid advertising, which explicitly touts the brand or its benefits, this method earns the audience's trust as a qualified, informed source they can turn to with future needs.

3) Shared: Are you #trending?

The most modern of the four, shared media offers veterinary clinics and other industry companies the opportunity to connect and converse with their audiences. Each social channel has its unique features that make it ideal for sharing different types of content with different audiences.

Facebook, Instagram, TikTok, and X, formerly known as Twitter, are the most widely used social channels for companies that sell directly to a consumer audience. The tone of these sites is more familiar and friendly, and posts showcase more of the brand's personality.

Audience age is a prime differentiator between these platforms. Facebook tends to cater to an older audience, while X, Instagram, and TikTok hit increasingly younger demographics.

Along with the differences in audiences, the content for these platforms is generally published in different formats. Facebook and X place more emphasis on copy, while Instagram leans heavily on images and TikTok on video. The tone, content, and goal of each post should be matched to the platform.

LinkedIn is widely used for companies that sell directly to other businesses, such as diagnostic equipment manufacturers that market to veterinary clinics. Content on this platform is more educational and informative, with the expectation that the audience will be more knowledgeable and engaged. While employee birthdays might make great Facebook and Instagram posts, industry knowledge such as "10 Ways to Reduce Pet Anxiety at the Vet" and other thought leadership content is better suited for LinkedIn.

More is not always better on social media. While a regular posting cadence is important, higher content volume is not the only way to drive engagement. As the name would imply, social media is all about personal connections, and posts about people tend to do better than stagnant product shots. Clinics can also share open houses, new programs, and additional actionable items to promote events and campaigns. Tagging other accounts, when relevant, and encouraging followers to

PHOTOS COURTESY LEPOIDEVIN MARKETING

Ads that effectively compose and lay out the four key elements are engaging and build positive impressions.

Changing the way the content is packaged to fit different social media platforms does not mean you have to change your key messages.

"comment below," along with other interactions, can also boost performance.

In addition, brands should be participating in the exact engagement they are looking to grow. Likes, comments, and shares from a company's social page can help improve its presence on a platform and drive positive results.

4) Owned: It's all yours

The other three kinds of media rely on outside parties or platforms to complete the publication process. Owned media is completely controlled by the brand. In the veterinary industry, many businesses utilize their physical space to spread marketing messaging, such as flyers in a clinic or signage in a storefront. Newsletters sent out to current and prospective customers by mail or email are another, more direct example that offers businesses full control over messaging. However, the most influential owned media for most businesses is their website.

In today's digital age, the importance of an effective website cannot be overstated. According to a PR Newswire report, 76 percent of consumers look at online presence before physically visiting a business.[2]

If a veterinary business only has the capacity for one marketing push, it should be creating and maintaining a solid online presence. Websites should be visually enticing and easy for users to navigate to find what they need. Regular updates for any changes to the business are important to make sure information is not out of date.

Many sites offer a contact form as an easy way for prospective pet parent clients or customers to connect with the business. If utilized, these should be regularly monitored to ensure messages are answered promptly.

Veterinary businesses with more marketing capabilities can take website upkeep a step further with keywords. These are the terms customers enter into search engines to find products and services. When someone types in what they are looking for, proper keyword preparation matches the words on the site to the words used in the search and brings the site to the top of the results list.

Selecting keywords specific to the audience is critical. Using just the word "veterinary" when building a site for an oncology clinic in Boston will generate a lot of traffic, but much of it will be people looking for other specialties or geographic areas. The keywords "veterinary oncology in Boston" will reach fewer people, but it will reach the right people.

Implementing these website strategies, as well as the tips laid out in other sections, is a great start in boosting traffic and creating more leads. However, truly cashing in on the PESO model requires an integrated approach that blends all four kinds of media along with other content that does not fit perfectly into just one bucket. Whether staff go at it alone or bring in an agency for support, there is no question strategic marketing is a complex, involved, multifaceted, and worthwhile endeavor. ●

Katie Robertson is an account manager for LePoidevin Marketing, a full-service marketing agency focused on the veterinary market. She can be reached at katie@lepoidevinmarketing.com.

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2. https://www.prnewswire.com/news-releases/76-of-consumers-look-at-online-presence-before-physically-visiting-a-business-301272462.html

Is the clinic inventory controlling you?

By Cade Wilson, DVM

PHOTOS COURTESY DR. CADE WILSON

Do other practice owners and managers hate the inventory circus as much as I do? It is a constant game of checking products, expiration dates, what is moving, what is not, what is new, and what is losing favor. I opened my practice from scratch nearly 20 years ago, and while I have gotten better at inventory control, it remains a giant pain.

Choosing inventory and then controlling it is not a science; it is an art form. Everyone has their own style, taste, and abilities. Your inventory can be a wonderful asset, but it can also ruin you. There is no easy way to learn how it should and will work. If there was a class about it in veterinary school, I must have taken a "mental health" fishing day, but I bet there was not.

I have worked with inventory experts and sat in on countless CE opportunities, but they are focused on keeping up with what you have, not aiding you in what you should be carrying. One thing I know is you cannot have everything, and you should not. I have made plenty of inventory mistakes, so let my experience help you think through what will work best for you. After all, I have earned this gray beard.

The prevention paradox

First off, there are so many preventative options for our four-legged friends. It is ridiculous when you really try to take them all in. The flea and flea and tick preventatives, heartworm products, combination products, and mega combos that seem to prevent everything except an emergency visit. Walk through your local pet store or farm supply and take in all the over-the-counter products. It is crazy. Most of these are similar products, with the same active generic ingredients packaged with trendy new names, just hoping for new life. I recommend practice owners or managers walk through those stores and evaluate what is available and what price point you are competing with. Then, check out the online competition and look at what you are up against, too.

There are several OTC products that may work well in pets with no underlying issues if used correctly. For more years than I would like to admit, I have carried several of these OTC products. The same ones clients could buy right up the street in the big stores that have much longer hours than my office. Then one day, I decided there had to be a better way, and I took a different direction in my office. I decided not to pick fights I could never win. Those products that could be bought without a prescription somewhere else, they could have them. Nothing was more frustrating to me than throwing out preventatives because they expired. I would no longer worry about the low profit they provided when trying to compete. Plus, if we lost any stock due to dating, that profit was gone anyway.

Yes, there are companies that give us rebate pads and "deals" only we veterinary offices can get, but I always felt they were just trying to keep me in the game.

At this time, I decided a more scientific approach was needed for what my hospital would have on hand. Given where my practice is located, what would best suit my clients and patients? I think sometimes we get carried away with what is available and neglect to evaluate what should be available.

In my area, depending on where my patients reside, we have nearly all the North American parasites: heartworms, fleas, ticks, hookworms (even the resistant variety), roundworms, whips, tapes—the list goes on and on. There is an obvious need to carry several products, but which ones?

The evaluation was of my clientele, the patients, and their varied habits. We have apartment dwellers where pets hardly ever touch the actual earth, family pets that go for neighborhood walks and dog parks, to farm pets that get into everything. This was not going to be a one-size-fits-all situation.

Other things I continually evaluate are my clients' abilities. Some of my clients, especially in the older generation, have a difficult time administering oral medications for their pets. While my personal belief is oral medications seem to be more effective, especially over a long period, I want the patient to be on something. If the pet's health warrants it, then topical medication it is.

In the exam room setting, I talk with each client about their pet's lifestyle and point out the potential threats to their pet. This helps the owner understand why certain medications would be the best solution. It also gives ample time to generate questions and talk through choices. A great example here in my office is that we carry three possibilities for pets concerning flea/tick/heartworm prevention. We have an oral combination medication covering all three, a topical combination option, a separate flea/tick oral, and a heartworm/deworming oral. Will these options cover every single pet we see as a patient? No, but it covers well more than 95 percent of them, and the stock turns over in a timely fashion.

When we get a patient with specific needs not covered in-house, we script them out.

Do not fall into the trap of having something on hand and ready to go for every single patient. You cannot please everyone, so use those online pharmacies to your advantage. The products we have on hand have evolved over the last several decades and will continue to change. I continue to stick true to my three options: an oral combo, a topical combo, and a split option. I recommend you evaluate that idea.

In-house 'phunny' pharm

Antibiotics, NSAIDs, and the like are not different from preventative scenarios. When I placed my first medication order for my hospital shelves, it was one part experience and multiple parts hope and prayer. It was an educated guess on medications I liked and a guess of how many patients I would need before those products expired.

Now, those orders are much more scientific, but the knowledge earned is why my hair is now gray. My recommendation to those beginning or trying to rein in the crazy would be very simple: Work through the most common ailments, illnesses, and

"Making rash or emotional decisions after a tough case, a lunch and learn, or a CE event can be extremely costly. Do your due diligence when adding medication to the cabinet, and do not be afraid to decide something is not working out."

procedures your hospital sees or performs, and make sure the necessary medications are on your shelves. Those products will be your bread and butter.

The next tier is for semi-common issues. These are your hypothyroid and seizure patients, the FIC cats, and the like. Does your patient load warrant having specific medications on hand for those, or should those be scripted medications? Only your hospital can answer that. There is no one answer that will fit all. In-house pharmacies can be a place where hospitals hold tens of thousands in a holding pattern of hope. Making rash or emotional decisions after a tough case, a lunch and learn, or a CE event can be extremely costly. Do your due diligence when adding medication to the cabinet, and do not be afraid to decide something is not working out. Throwing out hundreds or even thousands of dollars in expired stock is not a fun experience. Use local or online pharmacies to evaluate if something new is going to catch on with your practice style before putting that bottle in your cart. You will thank me eventually.

Veterinarians are people pleasers. We want to be efficient and make things easy for everyone, except maybe for ourselves sometimes. Most of us in this field have had zero business training, and it can be rough learning through the school of hard knocks. A previous mentor once stated about his business experience that he "wasn't a businessman, he was just a man in business." How true that statement has felt to me through the years. What pharmaceuticals your practice keeps on hand is a very personal and important decision. Work through it diligently, have a reason why you order, and have your staff understand that, too. This should be no different than hiring new staff members. Would you keep more staff than you have work for? No, you would not. So, why are you keeping multiple products that do the exact same thing?

At the front desk, would you have multiple receptionists sitting around, hoping to check in a client or answer the phone? No, that would be crazy. Then why do we have duplicate preventatives that do the same thing up there, as well?

These products could very well be the first impression of your practice. Having a professional answer to why you use them is paramount and will leave a lasting impression on new individuals who grace your lobby. Make great decisions for your specific practice and let those products work for you. Doing so makes it easy to control your pharmaceutical inventory and not let it control you. ●

Cade M. Wilson, DVM, is a practicing veterinarian and a three-doctor mixed-animal practice owner in Ardmore, OK. Dr. Wilson has been practicing small animal medicine for the last 20 years and has been a practice owner for the last 17 years.

"Work through the most common ailments, illnesses, and procedures your hospital sees or performs, and make sure the necessary medications are on your shelves. Those products will be your bread and butter."

Have you seen a case of 'cockleburitis'?

DENTAL PEARLS

John R. Lewis, VMD, DAVDC, FF-OMFS

Approximately 17 years ago, when I was an assistant professor at the University of Pennsylvania, Kristin Walker, DVM, DAVDC, and I saw a one-year-old male neutered golden retriever that presented with unusual oral lesions. The pattern of lesions was very interesting and left a lasting impression on me. There were multiple focal punctate raised lesions throughout the mouth, with most of the lesions concentrated in the area of the mucogingival junction. (Figures 1A, 1B). There were also multiple lesions on the dorsal surface of the tongue (Figure 2A, 2B).

It would not be wrong to assume these raised bumps were vesicles associated with autoimmune disease, such as bullous pemphigoid, pemphigus vulgaris, systemic lupus erythematosus, or discoid lupus erythematosus. However, this dog had a history of going on a long hike with his owners the weekend prior, and when we biopsied the affected areas, the pathologist saw "ulcerative pyogranulomatous stomatitis with intralesional plant material."

After discussion of this diagnosis with the owners, they mentioned the dog had picked up numerous cocklebur (*Xanthium strumarium*) that adhered to the dog's hair coat, which it tried to lick off its fur before the owners had an opportunity to remove them.

If you look at the cocklebur seed under magnification, each projection has a long, curved hook on the end. When a dog tries to lick them from its matted fur or tries to eat them, the hooks can lodge into the mucosa of the mouth, and the submerged portion of the projection breaks off beneath the mucosa.

Why are the lesions so characteristically manifested at the mucogingival line? My theory is when the seeds are chewed upon, they contact the teeth and gingiva, but since the gingiva is a specialized, durable masticatory mucosa that is keratinized, the sharp hooks do not damage it. The first spot they can lodge is the soft mucosa at the mucogingival line.

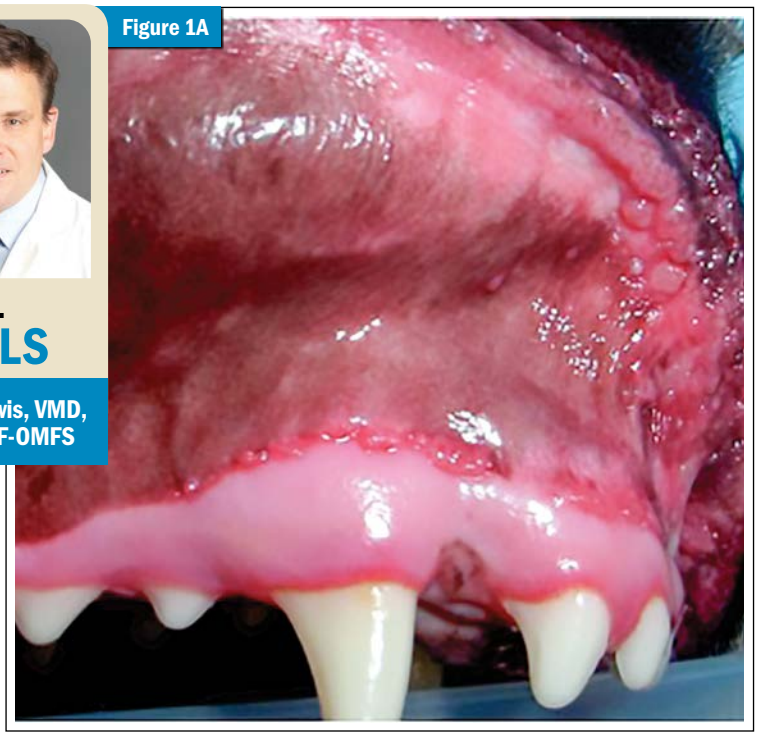

Figure 1A

Multiple raised nodules along the mucogingival line dorsal to the right maxillary canine tooth and along the mucocutaneous junction of the rostral upper lip.

Figure 1B

Multiple raised bumps of the oral mucosa at the mucogingival line dorsal to the incisors and near the mucocutaneous junction of the upper lip.

PHOTOS COURTESY DR. JOHN R. LEWIS

The penetrated mucosa tries to heal over the site of entry, and a pyogranulomatous foreign body reaction ensues.

How do we treat what I sometimes refer to as "cockleburitis"? Most of the cases I have seen have been incidental findings with no clinical signs and required no treatment other than client education. However, the patient shown in Figures 1 and 2 had clinical signs of drooling and lip smacking. This patient was placed on nonsteroidal anti-inflammatories after the biopsies, and with tincture of time, the tongue and mucosa looked much more normal at recheck.

What other kinds of plants can cause problems in the oral cavity? In my June 2024 column, I discussed the problem of chewing on sticks.[1] Sticks become lodged between the maxillary teeth and can damage the soft tissue and the periodontium. They can also get lodged in the pharynx and penetrate the esophagus. Foxtails have long been known for causing trouble in the oral cavity and elsewhere.

In a 2022 study in the *Journal of Veterinary Emergency and Critical Care*, the most common locations in dogs were the aural canal, cutaneous/subcutaneous space, and nasal canal. In cats, ocular foxtails were most common. Most cases were managed on an outpatient basis, but some cases developed life-threatening diseases that required advanced imaging, endoscopy, and/or surgery.[2]

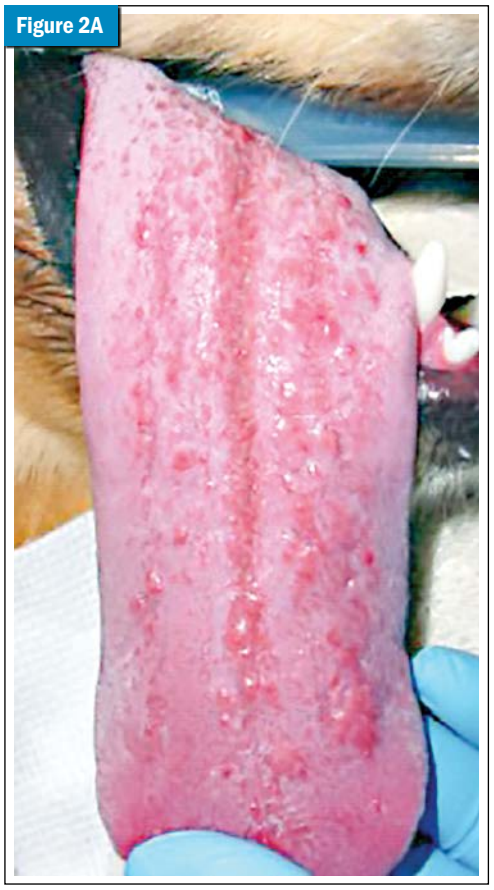

Figure 2A

Multiple raised red nodules on the dorsal surface of the tongue.

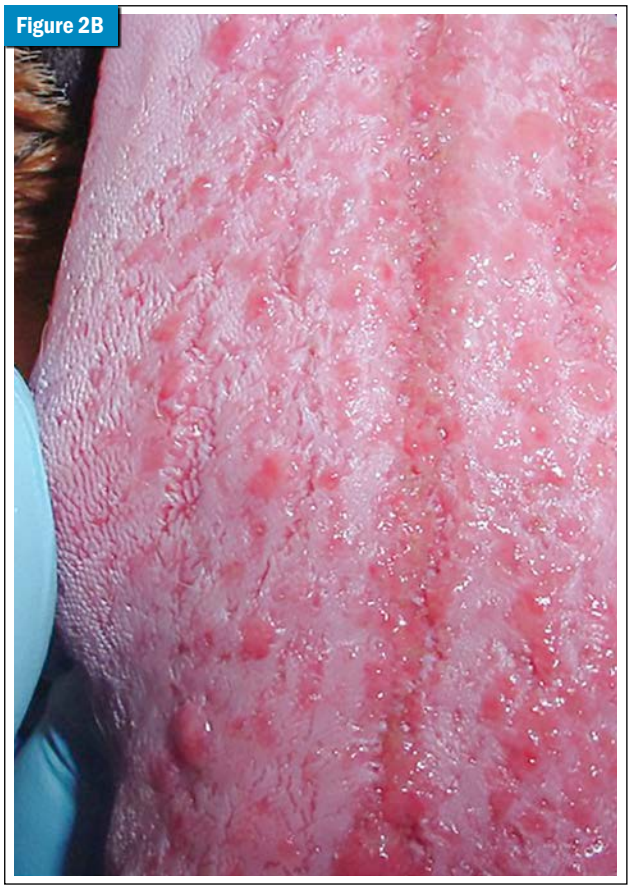

Figure 2B

Magnified view of the lesions on the dorsal surface of the tongue.

We have probably all heard or worked on patients that had to have a lung lobe removed due to a migrating foreign body in the form of a plant awn or a stick foreign body. Next time your pets go for a hike, be aware of any cockleburs or other vegetation that may have gotten caught on their fur and try to remove them before they become a source of oral inflammation or a migrating foreign body. I have only seen a handful of cases of "cockleburitis" throughout my 28-year career, which makes me wonder how common it is. If you have seen this pattern of raised bumps along the mucogingival line, send me an email at info@siloacademy.com. ●

John R. Lewis, VMD, DAVDC, FF-OMFS, practices and teaches at Veterinary Dentistry Specialists and Silo Academy Education Center in Chadds Ford, Pa.

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2. Philp HS, Epstein SE, Hopper K. Clinical and clinicopathological characteristics, treatment, and outcome for dogs and cats with confirmed foxtail foreign body lesions: 791 cases (2009-2018). *J Vet Emerg Crit Care.* 2022;32(5):653-662.

NexGard® PLUS
(afoxolaner, moxidectin, and pyrantel chewable tablets)

For oral use in dogs only.

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

Description:
NexGard® PLUS (afoxolaner, moxidectin, and pyrantel chewable tablets) is available in five sizes of beef-flavored, soft chewables for oral administration to dogs and puppies according to their weight. Each chewable is formulated to provide minimum doses of 1.14 mg/lb (2.5 mg/kg) afoxolaner, 5.45 mcg/lb (12 mcg/kg) moxidectin, and 2.27 mg/lb (5.0 mg/kg) pyrantel (as pamoate salt).

Afoxolaner is a member of the isoxazoline family of compounds. Its chemical name is 1-Naphthalene-carboxamide,4-[5-[3-chloro-5-(trifluoromethyl)-phenyl]-4,5-dihydro-5-(trifluoromethyl)-3-isoxazolyl]-N-[2-oxo-2-[(2,2,2-trifluoroethyl)amino]ethyl.

Moxidectin is a semisynthetic macrocyclic lactone derived from the actinomycete *Streptomycetes cyaneogriseus noncyanogenus.* The chemical name for moxidectin is [6R,23E,25S(E)]-5-O-Demethyl-28-deoxy-25-(1,3-dimethyl-1-butenyl)-6,28-epoxy-23-(methoxyimino) milbemycin B.

Pyrantel is a member of the tetrahydropyrimidine family of compounds. Its chemical name is (E)- 1,4,5,6-Tetrahydro-1-methyl-2-[2-(2-thienyl) vinyl] pyrimidine 4, 4' methylenebis [3-hydroxy-2-naphthoate](1:1).

Indications:
NexGard® PLUS is indicated for the prevention of heartworm disease caused by *Dirofilaria immitis* and for the treatment and control of adult hookworm (*Ancylostoma caninum, Ancylostoma braziliense,* and *Uncinaria stenocephala*) and roundworm (*Toxocara canis* and *Toxascaris leonina*) infections.
NexGard® PLUS 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), *Rhipicephalus sanguineus* (brown dog tick), *Dermacentor variabilis* (American dog tick), *Amblyomma americanum* (lone star tick), and *Haemaphysalis longicornis* (longhorned tick) infestations for one month in dogs and puppies eight weeks of age and older, weighing four pounds of body weight or greater. NexGard® PLUS is indicated for the prevention of *Borrelia burgdorferi* infections as a direct result of killing *Ixodes scapularis* vector ticks.

Dosage and Administration:
NexGard® PLUS is given orally once a month at the minimum dosage of 1.14 mg/lb (2.5 mg/kg) afoxolaner, 5.45 mcg/lb (12 mcg/kg) moxidectin, and 2.27 mg/lb (5.0 mg/kg) pyrantel (as pamoate salt).

For heartworm disease prevention, give once monthly for at least six months after last exposure to mosquitoes (see **Effectiveness).**

Dosing Schedule:

Body Weight (lbs.)	Afoxolaner Per Chewable (mg)	Moxidectin Per Chewable (mcg)	Pyrantel* Per Chewable (mg)	Chewables Administered
4 – 8	9.375	45	18.75	One
8.1 – 17	18.75	90	37.5	One
17.1 – 33	37.5	180	75	One
33.1 – 66	75	360	150	One
66.1 – 132	150	720	300	One
Over 132	Administer the appropriate combination of chewables			

*As pamoate salt.

NexGard® PLUS can be administered with or without food. Care should be taken to ensure that the dog consumes the complete dose and that part of the dose is not lost or refused. If a dose is missed, administer NexGard® PLUS and resume a monthly dosing schedule.

Heartworm Prevention:
NexGard® PLUS should be administered at monthly intervals year-round or, at a minimum, administration should start within one month of the dog's first seasonal exposure to mosquitoes and should continue at monthly intervals until at least six months after the dog's last exposure (see **Effectiveness**). When replacing another monthly heartworm preventive product, the first dose of NexGard® PLUS should be given within a month of the last dose of the former medication.

Flea Treatment and Prevention:
NexGard® PLUS should be administered year-round at monthly intervals or started at least one month before fleas become active. 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:
NexGard® PLUS should be administered year-round at monthly intervals or started at least one month before ticks become active.

Intestinal Nematode Treatment and Control:
NexGard® PLUS treats and controls adult hookworms (*Ancylostoma caninum, Ancylostoma braziliense,* and *Uncinaria stenocephala*) and roundworms (*Toxocara canis* and *Toxascaris leonina*). For the treatment of adult hookworm and roundworm infections, NexGard® PLUS should be administered as a single dose. Monthly use of NexGard® PLUS will control any subsequent infections. Dogs may be exposed to and can become infected with hookworms and roundworms throughout the year, regardless of season or climate.

Contraindications:
There are no known contraindications for the use of NexGard® PLUS.

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 for treatment advice.

Keep NexGard® PLUS in a secure location out of the reach of dogs, cats, and other animals to prevent accidental ingestion or overdose.

Precautions:
Afoxolaner, one of the ingredients in NexGard® PLUS, 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.

Treatment with fewer than six monthly doses after the last exposure to mosquitoes has not been evaluated and may not provide complete heartworm prevention.

Prior to administration of NexGard® PLUS, dogs should be tested for existing heartworm infection. At the discretion of the veterinarian, infected dogs should be treated with an adulticide to remove adult heartworms. NexGard® PLUS is not effective against adult *D. immitis.*

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

Adverse Reactions:
In a field safety and effectiveness study, NexGard® PLUS was administered to dogs for the prevention of heartworm disease. The study included a total of 272 dogs (134 administered NexGard® PLUS and 138 administered active control) treated once monthly for 11 treatments.
Over the 330-day study period, all observations of potential adverse reactions were recorded. The most frequent reactions reported in the NexGard® PLUS group are presented in the following table.

Table 1: Dogs With Adverse Reactions.

Clinical Sign	NexGard® PLUS n = 134 Number (Percentage)	Active Control n = 138 Number (Percentage)
Diarrhea	9 (6.7%)	7 (5.1%)
Vomiting	6 (4.5%)	7 (5.1%)
Lethargy	3 (2.2%)	5 (3.6%)
Itching	3 (2.2%)	3 (2.2%)
Dermatitis	2 (1.5%)	1 (0.7%)
Anorexia	1 (0.7%)	4 (2.9%)
Muscle tremor	1 (0.7%)	1 (0.7%)

One dog in the NexGard® PLUS group was reported to exhibit muscle tremors along with nausea and depression for one day after the Day 0 treatment. The dog remained in the study and muscle tremors were not reported after any subsequent treatments.

Contact Information:
For a copy of the Safety Data Sheet (SDS) or to report suspected adverse drug events, contact Boehringer Ingelheim Animal Health USA Inc. at 1-888-637-4251 or www.nexgardforpets.com.

For additional information about adverse drug experience reporting for animal drugs, contact FDA at 1-888-FDA-VETS or www.fda.gov/reportanimalae.

Clinical Pharmacology:
Mode of Action:
NexGard® PLUS (afoxolaner, moxidectin, and pyrantel chewable tablets) contains the three active pharmaceutical ingredients afoxolaner, moxidectin, and pyrantel (as pamoate salt).

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 postsynaptic 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.

Moxidectin is an endectocide in the macrocyclic lactone class. Moxidectin acts by interfering with chloride channel-mediated neurotransmission in susceptible parasites, which results in paralysis and death of the parasite.

Pyrantel is a nematocide belonging to the tetrahydropyrimidine class. Pyrantel acts as a depolarizing, neuromuscular-blocking agent in susceptible parasites, causing paralysis and death or expulsion of the parasite.

Pharmacokinetics:
Following a single oral administration of a near-final formulation of NexGard® PLUS (at mean doses of 3.9 mg/kg afoxolaner, 18.8 mcg/kg moxidectin, and 7.8 mg/kg pyrantel pamoate) in fed and fasted Beagle dogs (10 to 21 months of age), afoxolaner and moxidectin were more rapidly absorbed in the fasted state with a time to maximum concentration (Tmax) of 2 to 3 hours.

The afoxolaner mean maximum plasma concentrations (Cmax) in the fed and fasted states were 1610 and 2200 ng/mL (CV=33 and 16%) and the moxidectin mean Cmax values were 11.1 and 15.5 ng/mL (CV=39 and 24%), respectively. The area under the curve (AUC) for afoxolaner and moxidectin were similar between fed and fasted states. Post-dose pyrantel plasma concentrations were quantifiable out to 24 hours.

Following six oral administrations of NexGard® PLUS at 1, 3, and 5X the maximum exposure dose of 5 mg/kg, 24 mcg/kg, and 10 mg/kg afoxolaner, moxidectin, and pyrantel pamoate, respectively, every 28 days in 8-week-old Beagle dogs, afoxolaner and moxidectin Tmax ranged from 2 to 6 hours. The observed mean Cmax and AUC at steady state in the 1X dose group were 2230 ng/mL and 19000 days*ng/mL for afoxolaner and 14.8 ng/mL and 55.2 days*ng/mL for moxidectin, respectively. Based on mean Cmin, afoxolaner and moxidectin accumulated by less than 4-fold at steady state. Afoxolaner and moxidectin exposure increased in a dose proportional manner between the 1X and 3X dose groups but was less than dose proportional in the 5X dose group.

Pyrantel pamoate is poorly absorbed into systemic circulation. Pyrantel pamoate is intended to remain in the gastrointestinal tract to allow effective concentrations to be delivered to gastrointestinal nematodes.

Effectiveness:
Heartworm Prevention:
In two well-controlled laboratory studies, NexGard® PLUS was 100% effective against induced *D. immitis* infections when administered for six consecutive months.

In a well-controlled US field study consisting of 120 dogs administered NexGard® PLUS and 124 administered an active control, no dogs treated with NexGard® PLUS tested positive for heartworm disease. All dogs treated with NexGard® PLUS were negative for *D. immitis* antigen and blood microfilariae at study completion on Day 330.

Flea Treatment and Prevention:
In a well-controlled laboratory study, NexGard® PLUS demonstrated ≥99.8% effectiveness against adult fleas 24 hours after weekly infestations for one month.

In a separate well-controlled laboratory study, afoxolaner alone began to kill fleas four hours after initial administration and demonstrated >99% effectiveness at eight hours.

In an additional well-controlled laboratory study, afoxolaner alone 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, afoxolaner alone was 81.1% effective 12 hours post-infestation. Dogs in both the afoxolaner-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 afoxolaner-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 afoxolaner-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 afoxolaner alone against fleas on the Day 30, 60, and 90 visits compared with baseline was 98.0%, 99.7%, and 99.9%, respectively. In a second 90-day US field study, the effectiveness of afoxolaner alone against fleas on the Day 30, 60, and 90 visits compared with baseline was 97.5%, 99.7%, and 99.9%, respectively. Dogs in the second study with signs of Flea Allergy Dermatitis (FAD) showed improvement in erythema, alopecia, papules, scales, crusts, and excoriation following treatment, as a direct result of eliminating fleas.

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

Tick Treatment and Control:
In well-controlled laboratory studies, NexGard® PLUS demonstrated ≥97% effectiveness against *Amblyomma americanum* 72 hours post-infestation, for one month.

In well-controlled laboratory studies, a chewable containing afoxolaner alone, one of the active ingredients in NexGard® PLUS, demonstrated effectiveness against *Ixodes scapularis, Rhipicephalus sanguineus*, and *Dermacentor variabilis* at 48 hours post-infestation, and against *Haemaphysalis longicornis* at 72 hours post-infestation, for one month.

In two additional well-controlled laboratory studies, NexGard® PLUS was effective at preventing *Borrelia burgdorferi* infections after dogs were infested with *Ixodes scapularis* vector ticks 28 days post-treatment.

Intestinal Nematode Treatment and Control:
Elimination of adult roundworms (*Toxocara canis* and *Toxascaris leonina*) and hookworms (*Ancylostoma caninum, Ancylostoma braziliense,* and *Uncinaria stenocephala*) was demonstrated in well-controlled laboratory studies.

Target Animal Safety:
Margin of Safety:
NexGard® PLUS was administered orally at 1, 3, and 5X the maximum exposure doses at approximately 28-day intervals for six treatments to 8-week-old Beagle puppies. Dogs in the control group were sham-dosed. There were no clinically relevant, treatment-related effects on body weights, food consumption, clinical pathology (hematology, coagulation, serum chemistry, and urinalysis), gross pathology, histopathology, organ weights, or ophthalmic examinations. Mild, self-limiting diarrhea (with and without blood) was possibly related to treatment, as there were more incidences in the NexGard® PLUS groups than the control group throughout the study, including within 48 hours after treatment.

Avermectin-Sensitive Collie Safety:
NexGard® PLUS was administered orally at 1, 3, and 5X the maximum label dose to MDR1-deficient Collies once on Day 0, with a second administration to the 1X group on Day 28. Dogs in the control group were sham-dosed on Days 0 and 28. No clinical signs of avermectin toxicity were noted in any dog at any time during the study. Vomiting was observed in some dogs in the 3X and 5X groups and resolved without treatment. Diarrhea, with or without blood, was observed in some dogs in all of the NexGard® PLUS groups and resolved without treatment.

Heartworm-Positive Safety:
NexGard® PLUS was administered orally at 1X and 3X the maximum exposure doses at approximately 28-day intervals for three treatments to Beagle dogs with adult heartworm infections and circulating microfilariae. Dogs in the control group were sham-dosed. Diarrhea was observed in one dog in the 1X group and in three dogs in the 3X group, and vomiting was observed in two dogs in the 3X group. No signs of avermectin toxicity were observed at any time during the study. There were no clinical signs associated with death of the microfilariae observed in any of the dogs.

Field Safety:
In a well-controlled field study, NexGard® PLUS was used concurrently with other medications such as vaccines, antibiotics, non-steroidal anti-inflammatory drugs (NSAIDs), anesthetics, sedatives, analgesics, steroids, anthelmintics, antiemetics, and antipruritics. No adverse reactions were associated with the concurrent use of NexGard® PLUS and other medications.

How Supplied:
NexGard® PLUS is available in five strengths of beef-flavored soft chewables formulated according to the weight of the dog (see **Dosage and Administration**). Each chewable size is available in color-coded packages of 1, 3, or 6 chewables.

Storage Information:
Store in original package at or below 25°C (77°F) with excursions permitted up to 40°C (104°F).

Approved by FDA under NADA # 141-554

Marketed by: Boehringer Ingelheim Animal Health USA Inc., Duluth, GA 30096

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Boehringer Ingelheim

Beyond surgery: A multimodal approach to managing osteoarthritis (OA) pain

SURGICAL INSIGHTS

Kendra Freeman, DVM, MS, DACVS (Large Animal), DACVS (Small Animal)

Osteoarthritis (OA) remains the most common joint concern diagnosed in veterinary medicine. It is estimated 61 percent of cats six years and older will have evidence of osteoarthritis.[1]

According to the World Health Organization (WHO), OA starts in human patients 40-50 years of age. In veterinary medicine, we often see osteoarthritis in younger patients, with 40 percent of canine patients aged eight months to four years presenting radiographic evidence of this disease.[2] The degenerative condition is characterized by inflammation of the synovial structures, ultimately leading to erosion of the cartilage, thinning of the joint fluid, and osteophyte formation. In our patients, the stifles, hips, and elbows are some of the most commonly affected joints. Management of OA may vary from prevention, minimizing progression, and treatment of clinically affected patients. Identifying which of our patients are at risk is key to limiting the effects of this common concern in our patient population.

Treatment of underlying disease

As a surgeon, a good portion of my practice is identifying young patients at risk of developing OA. Young patients with developmental orthopedic diseases (dysplasia, angular limb deformity, joint incongruity, and osteochondritis dissecans) are at risk for developing the disease at a young age.

Treating the primary problem can minimize the development of osteoarthritis in these young patients in the future. Arthroscopic removal of a cartilage flap from the caudal humeral head can minimize the progression of OA in the shoulder joint with OCD. Surgical management of elbow dysplasia (specifically medial coronoid disease) improves patient comfort. The effect of surgery on osteoarthritis in the elbow remains debated. (Figure 1)

Patients with hip dysplasia will eventually develop osteoarthritis. If the hip dysplasia is identified at a very young age (<20 weeks), surgical intervention with a juvenile pubic symphysis procedure can improve joint congruity. This is a simple procedure that requires minimal equipment. If the dysplasia is not identified early and patients are allowed to reach skeletal maturity, the surgical options are limited to salvage procedures, such as total hip arthroplasty or femoral head and neck excision. Identifying these dysplastic patients while they are very young offers less invasive options with good outcomes.

Cranial cruciate ligament (CCL) injuries and medial patella luxation are common orthopedic conditions seen at our practice. Kim *et al.* determined 47 percent of patients with medial patella luxation have cartilage erosion at the time of surgery.[3] Unfortunately, many patients with cranial cruciate ligament injury also have evidence of osteoarthritis at the time of surgery. (Figure 2) Stabilizing the affected stifles with a tibia plateau leveling osteotomy (TPLO) or surgical correction of the medial patella luxation can improve patient comfort and has the potential to limit or at least slow down the progression of osteoarthritis in the future.

Even after successful recovery from these surgical procedures, these patients will need lifelong management of osteoarthritis.

Management

Osteoarthritis cannot be undone except through joint replacement surgery. Management often requires a multimodal approach, using a combination of lifestyle changes, medications, and supplements throughout the patient's life.

Treating inflammation remains central to the management of osteoarthritis. This can be achieved in several ways:

- Non-steroidal anti-inflammatory drugs (NSAIDs) remain one of the most effective treatments for pain and inflammation associated with osteoarthritis. With several FDA-approved NSAIDs on the market, patient tolerance and cost play a role in which medication to choose.

Carprofen is generally well tolerated, with minimal side effects noted after two months of administration.[4] Carprofen has the advantage of the availability of generic forms making it reasonably affordable for pet owners.

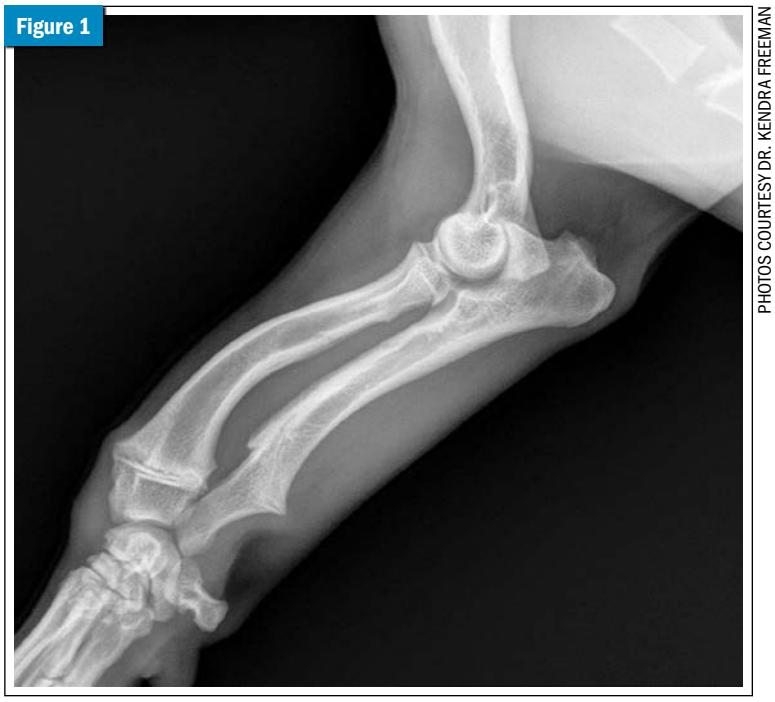
Grapiprant is an EP4 prostaglandin receptor antagonist that has been shown to improve symptoms of osteoarthritis and has a wide safety margin.[5] Once-daily administration may be easier for some pet owners; however, cost may be an issue for some.

- One of the most effective management tools, as well as the most challenging for most pet owners to implement, is weight management. We know dogs that are appropriately calorie-restricted and encouraged to maintain lean body mass, live longer and have a later onset of chronic diseases.[6]

Extra body weight puts additional stress on joints, limits mobility, and the adipose tissue itself is pro-inflammatory. Many clients overestimate their pet's activity and underestimate how many calories the pet is consuming. I find giving pet owners specific instructions about daily calorie intake and periodic check-ins makes weight loss more successful.

> "Carprofen is generally well tolerated, with minimal side effects noted after two months of administration. Carprofen has the advantage of the availability of generic forms making it reasonably affordable for pet owners."

Figure 1



PHOTOS COURTESY DR. KENDRA FREEMAN

Joint incongruity in the elbow of a young dog. Without surgical intervention, the patient is likely to develop osteoarthritis at a young age.

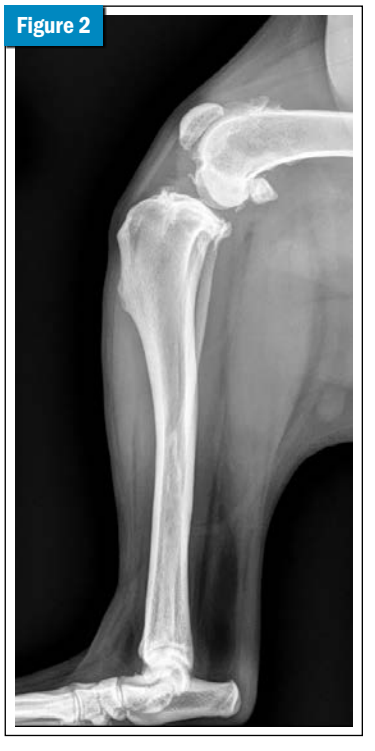
- For joint supplements, omega-3 fatty acids have shown the most consistent benefits in canine patients. Fish oil supplements with omega-3 fatty acids have been shown to decrease inflammation by decreasing arachidonic acid (AA), as well as improve mobility in canine patients.[7]

Literature supporting the effectiveness of glucosamine supplementation has been inconsistent. A study in the *Veterinary Journal* showed glucosamine and chondroitin supplements had a slower onset of benefit compared to carprofen, but were beneficial.[8]

A more recent study showed no benefit to glucosamine and chondroitin sulfate supplementation.[9] Clinically, I have seen the benefit of glucosamine and chondroitin sulfate supplementation. If a client is going to spend their financial resources on a glucosamine supplement, I encourage a veterinary-specific product that also contains chondroitin sulfate and eggshell membrane.[10]

Numerous additional modalities, including platelet-rich plasma, acupuncture, laser therapy, and physical therapy, can be used in conjunction with medications and supplements to manage osteoarthritis. Bedinvetmab targets nerve growth factor and is effective at improving symptoms of osteoarthritis, but it has no known anti-inflammatory effects.

Figure 2



Radiographic evidence of osteoarthritis present in a stifle with cranial cruciate ligament injury.

The core strategy for osteoarthritis management and treatment remains inflammation management—non–steroidal anti-inflammatory medications, omega-3 supplements, and weight reduction/management and correction of underlying disease processes. Additional therapies and activity modifications can be tailored for each patient, and

many of these patients can live comfortable and reasonably active lives. ●

Kendra Freeman DVM, MS, DACVS, is a graduate of Colorado State University and maintains dual certification with the American College of Veterinary Surgeons. Dr. Freeman is an associate surgeon in Albuquerque, N.M. Her case load consists of orthopedics, general soft tissue, and sports medicine cases with the occasional return to her roots in large animal lameness and surgery.

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"Stabilizing the affected stifles with a TPLO or surgical correction of the medial patella luxation can improve patient comfort and has the potential to limit or at least slow down the progression of OA in the future."

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Oncological diagnostics and screening tests: What's the evidence?

EVIDENCE-BASED MEDICINE

Erica Tramuta-Drobnis, VMD, MPH, CPH

If only we could detect cancer before it becomes clinical in all patients, wouldn't that be fabulous?

Let's use the example of a hemoabdomen in a large to giant breed dog that has collapsed and is pale and weak: a classic presentation for an emergency visit. The dog presents as tachycardic, with pale to muddy oral mucous membranes, poor pulses, and with or without an obvious fluid wave in the abdomen. Abdominocentesis finds frank blood, and a splenic mass is identified on point-of-care ultrasound (POCUS). Wouldn't it be fantastic if a simple blood test with excellent specificity and sensitivity could screen at-risk dogs for this condition as they age, before the acute bleed occurs? What about breeds at risk for lymphoma, mast cell tumors, and other commonly seen neoplasias? Can they be identified before the dog presents with grave clinical signs?

Possible diagnostics for cancer screening

New cancer screening methods have the potential to greatly benefit animals, improve the diagnostic capabilities of the humans who take care of them, as well as clinical outcomes. Emerging methods include:

1) *Liquid biopsies.* These are primarily blood or urine-based assays that identify cancer-related biomarkers or genetic alterations in an animal's blood. However, to date, these tests are not standardized and should be confirmed with tissue-based samples.[1–6] Further, these tests have variable sensitivity and specificity, making their validity and utility questionable at best, based on current evidence and available diagnostics.
2) *Molecular diagnostics.* Some examples are next-generation sequencing [NGS], a form of DNA/RNA sequencing that detects mutations or variations that suggest the presence of cancer.[6,7] (*e.g.* BRAF mutations found in urine samples of those with bladder tumors[8,9])
3) *Nematode Scent Detection Test (NSDT)* via Caenorhabditis elegans. Several pilot and early studies in humans and very early studies in animals suggest the chemotactic analysis of urine samples via this nematode can detect certain cancers based on olfactory detection of volatile organic compounds (VOCs) within the urine.[10–17] In people, research has evaluated prostate, mammary, and pancreatic cancers, among others.

Evaluations in dogs have suggested effectiveness in correctly identifying animals with mast cells, hemangiosarcoma, lymphoma, melanoma, and soft tissue sarcomas. However, the study design, inclusion/exclusion criteria, grade of evidence, and study publication location are of low grade and thus require further evaluation. This test may provide a cost-effective screening modality for those at risk of cancer in the future.

4) *Urine VOCs detection.* VOCs are being further researched for use via canine scent detection, gas chromatography, or other modalities not associated with a nematode.[18–20]
5) *Nu.Q Vet Cancer Test.* This in-house diagnostic test uses a blood sample. Early research suggests it can evaluate concentrations of canine plasma nucleosomes via antibodies specifically designed for nucleosomes. Initial research has shown evidence suggesting early diagnosis of lymphoma and hemangiosarcoma may be possible.

Current company research is evaluating other cancers, including mast cell tumors. Elevated cell death, which increases the presence of plasma nucleosomes, may indicate neoplasia, and a positive result indicates further testing is warranted.[21–23] The initial report's sensitivity rates suggested a sensitivity of 49.8 percent for cancer findings in all dogs and a specificity level of 97 percent. However, mast cell tumors, osteosarcomas, and soft tissue sarcomas were the least likely to be identified, but often of key concern.[24,25]

To date, additional supporting literature and research not affiliated with the founding company is warranted.[22,23] Studies in humans suggest that nucleosomes may be used in cancer identification; thus, it is reasonable to assume that this diagnostic may ultimately benefit animals.

Diagnostic aids to help in grading, staging, and therapeutic planning, once neoplasia has definitively been identified, include:

1) Advanced imaging, including those using AI-enhanced imaging (*e.g.* MRI, CT, and PET scans).[6,26,27]
2) Precision veterinary medicine techniques, including:[6,28,29]
   a. SearchLight DNA™. This is a tumor genetic diagnostic test that utilizes predictive biomarkers to aid in treatment and prognosis guidance. This diagnostic test evaluates for 120 genetic mutations within the animal's DNA and then recommends therapy based on the genetic findings.[6,30–32] The significance of all 120 mutations is still not fully understood. Independent research validating the utility of this test is still ongoing, and additional information is warranted.
   b. FidoCure® identifies numerous mutations within a tissue sample of a cancerous lesion. A veterinarian submits a cancerous tissue sample, and the company develops a DNA report personalized to that patient's tumor, identifying any key genetic mutations that may impact treatment modalities. Then they assist in prescribing or recommending oral therapies for at-home administration.[33–35] However, additional mutations may be identified in addition to known cancer mutations that can help guide evidence-based therapeutic practices. To date, no further information has been gleaned. Additional studies are warranted.
3) Personalized Prediction Profiles (PPP). This utilizes artificial intelligence modalities to enhance therapy (*e.g.* ImpriMed™, which was the first available option).[36–39] This, too, is a form of precision veterinary medicine, also known as "functional" precision medicine.[40] This program aims to enhance treatment protocols based on pre-established evidence-based practices using AI learning and methodologies. Additional high-quality independent research studies, with publications in highly reputable journals, are justified.

IMAGE GENERATED USING OPEN AI'S DALL-E

What's the evidence?

Can or should minimally invasive or noninvasive methods be routinely used to identify neoplasias in time to treat and even cure patients before they reach critical or terminal states? Novel diagnostics are becoming more visible in the veterinary field. However, is there sufficient evidence to support current or soon-to-be-released diagnostics and screening tests touted as lifesaving to employ them confidently in practice?

A commonly promoted concept in human medicine is "precision medicine," which uses lifestyle, environmental factors, and genetics to personalize care. The goal of many of the diagnostics being developed in veterinary medicine revolves around this concept. However, precision medicine focuses on the gene side while considering environmental and lifestyle factors.[41,42]

Currently, most uses of precision medicine in veterinary medicine are more targeted toward treatment as part of a multimodal approach.[40] Still, the use of genetics in early cancer diagnosis is promising, and research is ongoing in veterinary and human medicine. Additional work in this field is merited. In addition, research and refinements in techniques must continue in the currently available methods and programs to improve the sensitivity and specificity of various tests.

Knowledge gaps and uncertainty

Research in cats and other species is very limited. To fill the gaps, further research to evaluate non-invasive diagnostic means in other species is warranted. Studies in other species must be vigorous, generalizable, and well-designed.

Unfortunately, much of the current body of evidence (including that utilized in this article) that supports newer screening and diagnostic tools appears in journals with questionable publication practices. The fact the bulk of supporting evidence for these cancer screening tests appears in such predatory journals, in addition to small sample sizes, retrospective studies, a lack of comparable studies, and a lack of independent research, is a concern. Nevertheless, further research is justified to support or refute accuracy claims and to provide recommendations that can be adopted in practice.

Take-home points

Human studies and some early animal research suggest liquid biopsies (blood samples with genetic markers, biomarker evaluation, or related tests) could be utilized for early cancer detection, but only in combination with physical exams, routine diagnostics, and medical history and findings. Further research is paramount to ensure the sensitivity and specificity of these tests and to confirm that such tests do not simply create undue stress in pet-parents by screening for mutations and other parameters that are not understood and cannot be reliably interpreted and translated into clinical practice.

While some of the aforementioned screening and diagnostic/precision medicine modalities have variable degrees of evidence supporting use, if a clinician chooses to adopt these types of diagnostics, clients should be informed they are not the only means of diagnostics or treatment, and they are not necessarily reliable. If employed, these tests should be used as part of a multimodal toolset in diagnosing and treating cancer. Clinicians should be aware clients may start asking for these screening tests. They should be knowledgeable about their pros and cons before offering them, and consultation with outside experts (*e.g.* oncologists) may be advisable. ●

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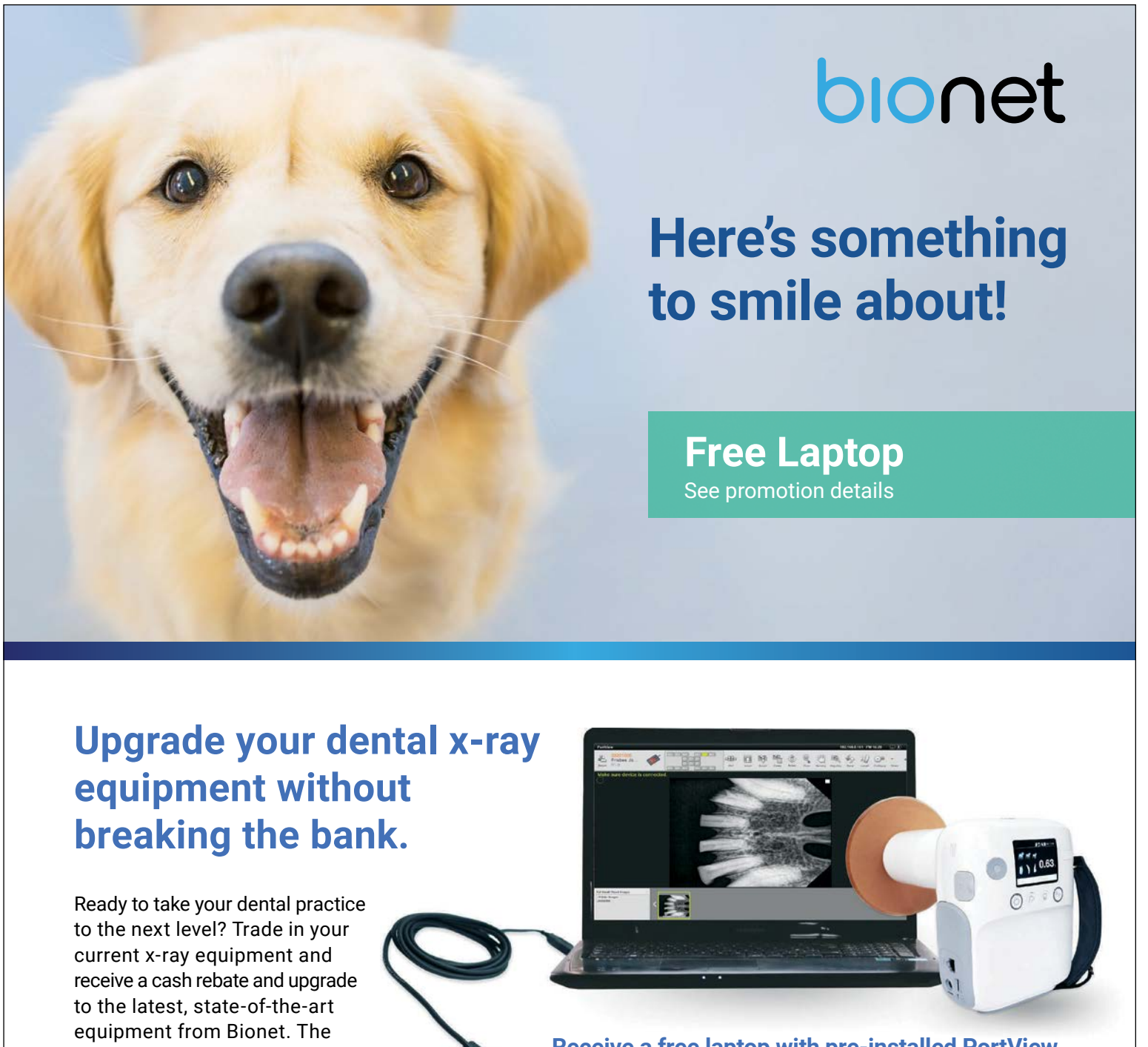
View references for this article online at veterinarypracticenews.com/cancer-diagnostics-evidence.

"Initial research has shown evidence suggesting early diagnosis of lymphoma and hemangiosarcoma may be possible. Current company research is evaluating other cancers, including mast cell tumors."



One Health, from Cover

Routine screening for infectious disease-causing pathogens is part of the veterinary day to day. Timely testing in dogs and cats for fecal parasites, heartworm (*Dirofilaria immitis*), along with canine exposure to tick-borne disease pathogens (*i.e. Borrelia burgdorferi, Anaplasma* and *Ehrlichia* spp.) is advised by multiple expert and evidence-based guidelines and groups.[1-4]

For veterinary teams, detection of fecal parasites or evidence of vector-borne disease (VBD) pathogen exposure is not always isolated to the clinical impact on an individual cat or dog. There may also be environmental, zoonotic, and public health concerns, and with these factors comes a strong need for clear client communication on risks.

Recent research has raised awareness on the potential emergence and range expansion of several parasite pathogens of profound One Health significance.[5-11] These studies and case reports have implications for pet owners, veterinary and human health professionals, and wildlife researchers.

Additionally, fecal surveillance and subsequent parasite detection, along with serologic screening for tick-borne disease, have potential antimicrobial use implications, warranting consideration of antimicrobial (anti-parasite and antibiotic) stewardship.

Routine wellness visits for dogs and cats, and veterinary observed increases in screening test positivity in pets,[1,7] are reflecting global rising temperatures, climate change, wildlife habitat shifts, and changes in the regional ranges, abundance, and emergence of VBD pathogens and fecal parasites. Results of routine diagnostic screening (fecal and blood sampling) have highlighted the role of veterinarians in One Health, and dogs and cats as sentinels for human infectious disease risk.

Let's look at two routine screening test clinical examples, Frankie (dog) and Reggie (cat):

Case 1: Frankie

Andrew presents for a wellness appointment with his dog, Frankie, a healthy Westie (female) that gets a lot of exercise, is eating a commercial diet well, and has a physical exam within normal limits. Frankie was dewormed as a puppy. As part of her wellness visit, blood is drawn and sent to a reference laboratory for VBD pathogen (heartworm, tick-borne disease) screening.

Frankie's findings (Seropositive for both *Borrelia burgdorferi* and *Anaplasma* spp.) prompt the veterinary team to discuss ticks. When asked, owner Andrew says he pulled a few off the dog (and himself) about a month ago and has been finding ticks in his yard (Calloway County, Mo.).

Tick-borne disease pathogens, such as *Anaplasma* spp. and *B. burgdorferi* (the agent of Lyme disease), have emerged in previously uncommon regions and remain a significant concern in endemic areas of the U.S. and Canada.[1,5] These changes, due to climate shifts impacting the range and abundance of tick vectors, have led to increases in disease risk for dogs and their two-legged companions, aka humans. One example of this is the distribution of *Ixodes scapularis* ticks, which vector both *Anaplasma* spp. and *B. burgdorferi*.

Today, *I. scapularis* distribution is markedly wider (plus further south and west) than in the recent past, and activity of this tick type (and others) is increasingly observed during winter months, such as January and February.[5]

For many veterinary clinics and pet owners, awareness of Lyme disease and its cause is typically high. However, in new regions, like the southern and west-central U.S., Lyme disease awareness, and the need for tick prevention, particularly during cooler seasons, may be low. It is well established that dogs serve as human disease risk sentinels for Lyme disease, as test seropositivity rises in a region, so too does human Lyme disease incidence.[6]

Veterinary teams may not be as familiar with *Anaplasma* spp., and a clinically observed increase in test positivity in canine patients may be cause for concern.[1,7] Like *B. burgdorferi* (Lyme), most dogs that test positive for *Anaplasma* spp. exposure do not show clinical signs. However, in humans, anaplasmosis has a much higher mortality as compared to Lyme disease and is much less likely to be diagnosed due to decreased awareness among human medical teams.[8]

For both of Frankie's test results, a conversation about tick risk, the need for prevention, and the importance of ongoing preventive care for both human and dog are indicated. An algorithm can be helpful as an aid to these conversations and clinical decision-making on Frankie's next steps.

Frankie's test results highlight One Health and a dog's role as a sentinel for human disease risk:

B. burgdorferi (Lyme) and *Anaplasma* spp. can cause illness in both dogs and humans and are transmitted by the same tick vector (*Ixodes* spp.). Frankie's veterinary screening has alerted Andrew to a shared risk in their environment, and steps can be taken to protect both.

By monitoring trends in canine exposure, veterinarians performing the advised screening[1-4] proactively identify care needs for the individual dog (*e.g.* additional testing to detect proteinuria, a CBC to look for changes, and emphasis on the need for parasite prevention products). This day-to-day preventive care enables dogs to serve as sentinels for their human caregivers' infectious disease risks, plus their families and broader community.

Case 2: Reggie

Lynn presents for a routine wellness visit with her adult cat, Reggie, an indoor/outdoor domestic shorthair (M/N) with no previous health concerns. He is eating a commercial diet, and his physical exam is unremarkable, aside from being overweight (body condition score 7/9).

Lynn says she knows Reggie hunts because he sometimes presents her with "gifts." He receives flea prevention on a seasonal basis and has not traveled outside of Boulder, Colo.

As part of Reggie's wellness visit, a fecal sample is sent to a reference laboratory for routine endoparasite screening.

Reggie's finding of a parasitic co-infection with *Toxacara cati*, and *Echinococcus multilocularis*, come as a surprise to his veterinary team. The clinic is promptly contacted by an internal medicine consultant to discuss his results, and advise on next steps for prompt treatment, re-testing, and advisement of outreach to their state public health veterinarian, along with recommendations that Lynn (and any in-contact family members) contact their human health care provider.[9,10]

Fecal parasites, like *T. cati*, and *E. multilocularis* are both zoonotic, and while veterinary teams are well-used to speaking about roundworm (*T. cati*) risk to pet-owners, awareness of the tiny tapeworm (*E. multilocularis*), and the concern surrounding infection and the potential outcome of alveolar echinococcosis for humans and dogs, is frequently low, particularly in emerging risk areas of the U.S. and Canada.[1,2,8-10]

Routine wellness visits and diagnostic screenings in pets highlight their role as sentinels for emerging infectious diseases—reflecting broader One Health concerns tied to climate change, shifting wildlife habitats, and the spread of vector-borne and fecal parasites.

Reggie's case also illustrates the unique role veterinary teams play through routine screening and testing to accurately and efficiently diagnose common fecal parasites, like roundworm (*T. cati*), in cats, along with detecting emerging parasites of One Health importance and potentially severe zoonotic risk, like *E. multilocularis*. In cats, especially those with outdoor access and hunting behaviour, co-infections with multiple parasites occur frequently and some parasites can only be diagnosed with PCR, such as *E. multilocularis*.[9-11] Reggie's veterinarian team was able to confidently diagnose his multi-parasite infection, target treatment for all parasites, apply actionable antimicrobial stewardship in his case management, identify significant zoonotic concerns, and provide risk counselling for all humans that may have been in contact with *E. multilocularis* immediately infective eggs, along with work with their relevant public health authority to alert to an emerging infectious disease concern.

Reggie's test result highlights the cat's role as a sentinel for human disease risk. In One Health, *E. multilocularis* can cause severe disease in both humans and dogs, and *T. cati* can cause illness in cats and is a well-established zoonotic concern.

Veterinarians performing advised fecal screenings proactively identify care needs for the individual cat (*e.g.*, emphasising the need for and compliance with parasite prevention products), and enable cats (and dogs) to serve as sentinels for their human caregivers' infectious disease risks—plus their families and broader community.

Practicing One Health

As veterinary professionals, we have long understood the power of the human-animal bond and

how dogs and cats truly are humans' best friends. These days, a One Health approach is essential in one's clinic, as infectious diseases that we commonly screen for may well impact our pet patients and beyond.

The changing global environment and advances in veterinary diagnostic capabilities have spotlighted disease risks that exist at the intersection of human and animal health, along with the environment (wildlife), in addition to having appropriate clinical antimicrobial use (stewardship) implications. It is frequently up to us to step forward and educate our pet owners, and in some cases, fellow human health care professionals, that due to climate change and other factors, such as travel and pet importation, past conditions surrounding infectious disease-causing pathogen risk may no longer be applicable.

Just as those of us in the U.S. and Canada must adapt to seasonal shifts and hotter temperatures, on a human level, we must adapt our clinical practice, grow our awareness, and place value on why we perform screening tests. We must also get comfortable communicating what our cat and dog sentinels are sharing with us to alert them to their own and their human caregivers' disease risks for the two- and four-legged. ●

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Brief Summary of full Prescribing Information.

ProHeart® 12 (moxidectin)

For Extended-Release Injectable Suspension for Dogs

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

INDICATIONS
ProHeart 12 is indicated for use in dogs 12 months of age and older for the prevention of heartworm disease caused by *Dirofilaria immitis* for 12 months.
ProHeart 12 is indicated for the treatment of existing larval and adult hookworm (*Ancylostoma caninum* and *Uncinaria stenocephala*) infections.

RISK MINIMIZATION ACTION PLAN
The ProHeart 12 and ProHeart 6 Risk Minimization Action Plan (RiskMAP) provides educational materials to the veterinarian, veterinary staff, and the dog owner explaining the risks and proper use of ProHeart 12 and ProHeart 6. ProHeart 12 and ProHeart 6 are the same formulation, but ProHeart 12 is three times the concentration of ProHeart 6. ProHeart 12 and ProHeart 6 are for use in dogs only and are available through a restricted distribution program to veterinarians that have completed the RiskMAP training and certification module.

The ProHeart 12 and ProHeart 6 web-based training and certification module is available at http://www.proheart12.com. This website has important information on the safe and effective use of ProHeart 12 and ProHeart 6 for veterinarians.

Only veterinarians and veterinary technicians/assistants that have completed the training and are certified can administer ProHeart 12 and ProHeart 6. Veterinarians are expected to report all adverse events that occur in animals or humans to the manufacturer. Important safety information is included below:

CONTRAINDICATIONS
ProHeart 12 is contraindicated in animals previously found to be hypersensitive to this drug or ProHeart 6.

HUMAN WARNINGS
Not for human use. Keep this and all drugs out of the reach of children.
If contact with your skin occurs, wash thoroughly with water. May be irritating to the eyes. If product accidentally gets into your eyes, flush eyes thoroughly with water. In case of accidental ingestion, or if skin or eye irritation occurs, contact a Poison Control Center or physician for treatment advice and show the package insert to the physician.

Take care to avoid accidental self-injection. In case of accidental self-injection, seek medical advice and show the package insert or the label to the physician. The Safety Data Sheet (SDS) contains more detailed occupational safety information.

WARNINGS
Anaphylactic and anaphylactoid reactions may occur in some dogs following administration of ProHeart 12 alone or with vaccines. In some cases, these reactions have resulted in death following administration of moxidectin microspheres (see **POST-APPROVAL EXPERIENCE**). Anaphylactic and anaphylactoid reactions should be treated immediately with the same measures used to treat hypersensitivity reactions to vaccines and other injectable products.

Always provide Client Information Sheet and review with owners before administering ProHeart 12. The owner should be advised to observe their dog for adverse drug events including those described on the sheet.

Do not administer ProHeart 12 to dogs who are sick, debilitated, underweight or who have a history of weight loss.

PRECAUTIONS
Prior to administration of ProHeart 12, the health of the patient should be assessed by a thorough medical history, physical examination and diagnostic testing as indicated (see **WARNINGS**).

Caution should be used when administering ProHeart 12 in dogs with pre-existing allergic disease, including food allergy, atopy, and flea allergy dermatitis. (see **WARNINGS**).

Caution should be used when administering ProHeart 12 concurrently with vaccinations. Adverse reactions, including anaphylaxis, have been reported following the concomitant use of moxidectin microspheres and vaccinations (see **WARNINGS** and **POST-APPROVAL EXPERIENCE**).

ProHeart 12 should not be used more frequently than every 12 months.

The effectiveness of ProHeart 12 has not been evaluated in dogs less than 12 months of age.

Prior to administration of ProHeart 12, dogs should be tested for existing heartworm infections. Infected dogs should be treated with an adulticide to remove adult heartworms. ProHeart 12 is not effective against adult *D. immitis*.

Caution should be used when administering ProHeart 12 to heartworm positive dogs (see **ADVERSE REACTIONS**).

ADVERSE REACTIONS
A well-controlled field study was conducted, including a total of 593 dogs (297 received two doses of ProHeart 12, 12 months apart and 296 received a monthly oral heartworm preventive as active control) ranging in age from 1 to 14 years. Over the 605-day study period, all observations of potential adverse reactions were recorded.

Table 2: Number of Dogs* with Adverse Reactions Reported During the ProHeart 12 Field Study

Adverse Reaction	ProHeart® 12 n=297 (%)	Active Control n=296 (%)
Vomiting	75 (25.3)	78 (26.4)
Lethargy	46 (15.5)	34 (11.5)
Diarrhea (with and without blood)	43 (14.5)	46 (15.5)
Anorexia	41 (13.8)	31 (10.5)
Seizures	10 (3.4)	7 (2.4)
Hepatopathy	8 (2.7)	3 (1.0)
Hypersalivation	7 (2.4)	3 (1.0)
Anaphylactoid/Hypersensitivity Reactions	6 (2.0)	4 (1.4)

*Some dogs may have experienced more than one adverse reaction or more than one occurrence of the same adverse reaction during the study.

Two ProHeart 12 (moxidectin) - treated dogs experienced anaphylactoid/hypersensitivity-related clinical signs within the first 24 hours following the initial treatment. Both dogs responded to symptomatic treatment. One dog experienced hives and facial swelling that resolved in 24 hours. The second dog experienced redness and swelling of the face and paws, followed by vomiting, polydipsia, and elevated heart rate and was treated symptomatically. Signs resolved within 4 days. One dog was pre-treated before the second injection of ProHeart 12, and neither dog had a reaction to the second dose 12 months later. One active control-treated dog experienced anaphylactoid/hypersensitivity-related clinical signs within the first 24 hours. The dog was withdrawn from the study prior to the second monthly dose.

Mild injection site reactions occurred in six ProHeart 12-treated dogs and were observed from one to seven days post dosing and included warmth, swelling and pruritus. One of these cases included mild pruritus at the injection site that resolved spontaneously within 24 hours of administration.

In a laboratory effectiveness study, dogs with 4- and 6-month-old heartworm infections administered moxidectin microspheres at a dose of 0.17 mg/kg experienced vomiting, lethargy and bloody diarrhea. These signs were more severe in the dogs with 4-month-old heartworm infections, including one dog that was recumbent and required supportive care, than in the dogs with older (6-month-old) infections.

Post-Approval Experience (2018): The following adverse events are based on post-approval adverse drug experience reporting for ProHeart 6. ProHeart 12 and ProHeart 6 are the same formulation, but ProHeart 12 is three times the concentration of ProHeart 6. Not all adverse reactions 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 are listed in decreasing order of frequency by body system.

Immune: anaphylaxis and/or anaphylactoid reactions, urticaria, head/facial edema, pruritus, pale mucous membranes, collapse, cardiovascular shock, erythema, immune-mediated hemolytic anemia, immune-mediated thrombocytopenia (signs reflected in other system categories could be related to allergic reactions, i.e. gastrointestinal, dermatologic, and hematologic)
Gastrointestinal: vomiting (with or without blood), diarrhea with or without blood, hypersalivation
General: depression, lethargy, anorexia, fever, weight loss, weakness
Dermatological: injection site pruritus/swelling, erythema multiforme
Neurological: seizures, ataxia, trembling, hind limb paresis
Hematological: leukocytosis, anemia, thrombocytopenia
Respiratory: dyspnea, tachypnea, coughing
Hepatic: elevated liver enzymes, hypoproteinemia, hyperbilirubinemia, hepatopathy
Urinary: elevated BUN, elevated creatinine, hematuria, polydipsia, polyuria
Cardiopulmonary signs such as coughing and dyspnea may occur in heartworm positive dogs.

In some cases, death has been reported as an outcome of the adverse events listed above.

Foreign market experience with ProHeart 12 includes similar voluntarily reported adverse events, including death, following administration of ProHeart 12.

For a copy of the Safety Data Sheet (SDS) or to report suspected adverse reactions, contact Zoetis at 1-888-963-8471. For additional information about adverse drug experience reporting for animal drugs, contact FDA at 1-888-FDA-VETS or www.fda.gov/reportanimalae.

INFORMATION FOR DOG OWNERS
Always provide Client Information Sheet and review with owners before administering ProHeart 12. Owners should be advised of the potential for adverse reactions, including anaphylaxis, and be informed of the clinical signs associated with drug toxicity (see **WARNINGS, ADVERSE REACTIONS** and **POST-APPROVAL EXPERIENCE** sections.)

Owners should be advised to contact their veterinarian immediately if signs of toxicity are observed. The vast majority of patients with drug related adverse reactions have recovered when the signs are recognized and veterinary care, if appropriate, is initiated.

STORAGE INFORMATION
Store the unconstituted product at or below 25°C (77°F). Do not expose to light for extended periods of time. After constitution, the product is stable for 8 weeks stored under refrigeration at 2° to 8°C (36° to 46°F).

HOW SUPPLIED
ProHeart 12 10 mL vial product is available in the following package sizes.

1-Pack	5-Pack	10-Pack
1 - 10% moxidectin sterile microspheres- 889 mg/vial 1 - Sterile vehicle - 8 mL/vial	5 - 10% moxidectin sterile microspheres- 889 mg/vial 5 - Sterile vehicle - 8 mL/vial	10 - 10% moxidectin sterile microspheres- 889 mg/vial 10 - Sterile vehicle - 8 mL/vial

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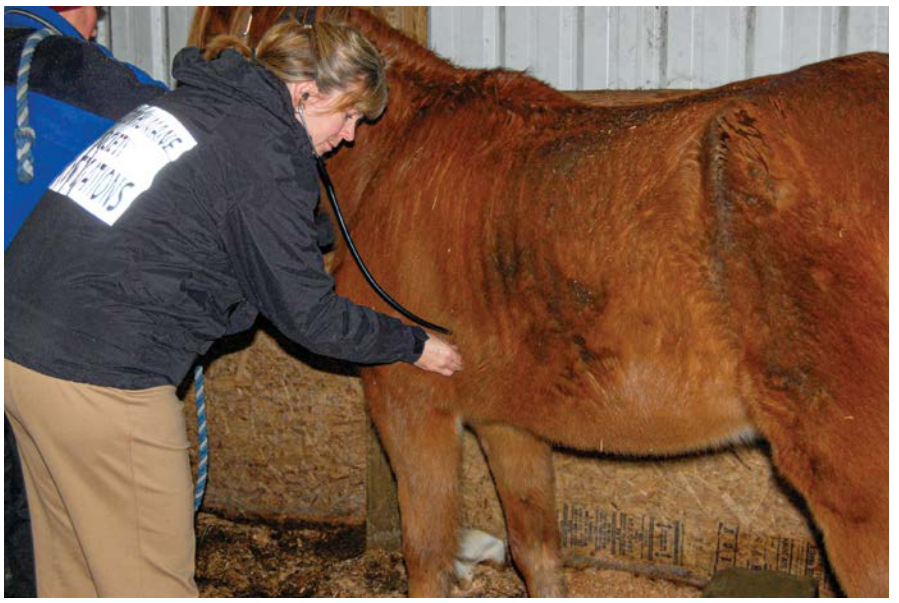
Animal cruelty, from Cover

"Ninety-nine percent of animal cruelty cases cannot be proven beyond a reasonable doubt without testimony from a veterinary professional."

–Jacob Kamins, senior assistant attorney general, animal cruelty resource prosecutor



When responding on scene, veterinarians are critical in identifying important evidence, consulting on humane transport methods, and triaging critically ill or injured animals.

Enforcement agencies rely on the veterinarian's examination findings to support their investigations.

PHOTOS COURTESY OREGON HUMANE SOCIETY

Clinic support staff and technicians can provide valuable assistance during forensic workups and should be trained on documentation and evidence collection procedures.

When an animal presents in your exam room in poor condition, consideration must be given to both the patient and the client, and neglect or abuse should be added to your rule-out list.

Introduction

Veterinarians are unequivocally at the heart of the response to animal cruelty. Jacob Kamins, a prosecutor for animal crimes in Oregon for the past 11 years, has prosecuted hundreds of animal cruelty cases. While his statement illustrates the essential nature of the veterinarian's role at trial, it only scratches the surface of the impact veterinarians can have on combating animal cruelty in their communities.

Veterinarians are uniquely positioned to be instrumental in both preventing and responding to animal cruelty.

From advocacy to your state representatives to performing forensic examinations to preventing neglect before it occurs, the vital role of veterinarians cannot be understated.

By explaining all the dimensions of veterinary involvement and how your existing training and skills serve you well at every turn, by the conclusion of this feature, you should feel emboldened to step into these heroic positions.

Prevention

By explicitly highlighting "prevention . . . of animal suffering,"[1] the *Veterinarian's Oath* effectively endorses the many steps the veterinary community can take to prevent animal cruelty.

As veterinarians, we have the best vantage point to identify issues with treating an animal at an early stage. This opens the door to intervention, education, and creative problem-solving in an effort to preserve the human-animal bond where appropriate. So much of our job is educating our clients about their pet's health and care needs. Unfortunately, all too often, we encounter prohibitive financial constraints to our clients, frustrating our efforts at education to help our patients.

To address this challenge—that can be the difference in preserving a bond and keeping people in the community out of the courtroom—client education should be paired with resources (such as local food banks, vaccine clinics, or low-cost spay/neuter events) or customized treatment plans that both address the welfare of the animal and the owner's capacity to provide care.

Working together with your client towards the best outcome for their animal by learning from each other directly translates to a reduced risk of animal crime in your community.

Private clinic response

While the majority of concerns for an animal's welfare can be resolved through education before they rise to the level of criminal intervention, you will encounter animals in your practice that you have a good faith belief are victims of cruelty. Your role as the veterinarian transitions from educating the client to educating enforcement entities that can investigate the situation further. Many resources are available to veterinarians and their staff about how to respond when confronted with suspected animal cruelty, including some that provide templates for a clinic policy on how to respond.[2]

Although you may not see patients that raise this concern regularly, you still employ the veterinary skills and training you apply to every other patient. The suspicion of animal maltreatment will often surface during the physical examination. Your findings during this exam and information provided by the owner might begin to raise red flags.

In addition to carefully recording physical exam findings in the medical record, veterinarians should do the following in cases of suspected cruelty: make notes about concerns that fall outside the general exam checklist (such as behavior, odor, matting); take photographs of any visible concerns such as lesions, bruising, or mats; perform full body radiographs if you suspect physical abuse; and note any additional information garnered by clinic staff or from the individuals who brought in the animal.

Rely on your veterinary training and trust your skills when the story of an injury or condition does not match what you are seeing on the animal. Although it may seem counterintuitive, individuals who mistreat animals do also bring them to the veterinarian for treatment; the reasons for this may vary but the occurrence of it does not.

Animal cruelty is a crime[3] and therefore can be investigated by local law enforcement agencies. When you report your concerns, be prepared to provide them with the owner's name, address, and contact information along with a description of your concerns. As a veterinarian who has witnessed the animal's condition firsthand, do not hesitate to emphasize your qualifications and experience when making the report. The enforcement agency may respond to your clinic immediately or may choose to follow up with the individuals later. Generally, you are not permitted to hold the animal without the owner's consent unless law enforcement intervenes to seize or impound the animal.

Assisting law enforcement

Just as law enforcement officers utilize the medical examiner in cases involving human death or a firearms expert at a scene in which guns were discharged in the commission of a crime, they rely on the forensic findings of veterinarians when investigating a report of animal cruelty.

Veterinarians can identify evidence that would otherwise be overlooked and pose informed questions. For this reason, veterinarians might be asked by a local law enforcement agency to review case materials—reports, records, photographs, and videos—and provide an expert opinion about the evidence. We may also be asked to assist with the execution of a search warrant or conduct a forensic examination on an animal connected to an ongoing investigation.

When assisting law enforcement, it is paramount to remember we are being asked to do so because of our requisite knowledge and skills needed to

evaluate and identify evidence of animal cruelty. Reviewing and assessing images and witness reports mean you are not examining the animal itself, and officers may have questions you are unable to answer. Do not hesitate to volunteer information about what is catching your attention in the materials you reviewed—behavioral red flags or injuries that do not match the story—this can expand the scope of an investigation by bringing additional details to light.

If you are asked to conduct an examination on an animal related to an investigation, communicate with the officer about any protocols you should be aware of and educate the officer about what your process will look like. Proceed with the examination as outlined earlier. Be meticulous in your documentation and use a scribe if it is helpful to ensure every detail is recorded. These notes will be used to generate the report you will present to the officer.

These same guidelines apply when a law enforcement agency needs your assistance in the execution of a search warrant. In this role, you are given the opportunity to take in more information about the circumstances where an animal is found and incorporate that information into your assessment and diagnosis. The lead agency should provide you with logistical details about what to expect and, again, there are numerous resources you can avail yourself of in advance to prepare.

Be confident about contributing ideas about safe animal handling and plans for triage of sick or injured animals.

Assisting a prosecutor

A veterinarian can play several roles in a cruelty case at a prosecutor's request. If you have conducted an exam on a victim or assisted with the execution of a search warrant in an animal cruelty case, then you will contribute your expertise to the prosecution as the primary veterinarian on the case, and you can give testimony about your firsthand observations.

With our expertise, we can be called as witness to give qualified opinion about the evidence presented in a case even without examining an animal or the scene directly. Sometimes, we can play both the role of a primary veterinarian and an expert witness in a case.

The prosecutor relies on the veterinarian to explain the evidence, so they know what criminal charges are applicable and how to question other witnesses on the stand. As a testifying witness in a criminal case, it is not your job to win the case, but to tell the truth and share your expertise with the judge or the jury. By putting a veterinarian on the witness stand, the prosecutor is giving a voice to the victim animal who is unable to testify to the injuries, illnesses, or conditions they experienced.

When participating as a partner to law enforcement, animal cruelty investigations are bolstered by your expertise at the crime scene, in the hospital setting, as well as in the courtroom.

Animal neglect often occurs due to a lack of resources and education. The veterinarian can help preserve the bond and circumvent a criminal investigation by offering education and resources for affordable care.

Animal shelter response

Shelter medicine is now a board-certified specialty in veterinary medicine. The veterinarians practicing in an animal shelter environment are likely to encounter animal cruelty cases or be called on to assist enforcement agencies with cases.

Whether taking in an animal surrendered from the public or helping with a large-scale seizure of animals, the foundational principles still apply—document your observations, photograph the animals and the environment when possible, plan to generate a report, and provide necessary medical care to the animal(s).

When an animal shelter plays the role of an evidence-holding facility for many victims seized during a criminal investigation, the enforcement agency relies on that entity to collect additional evidence and safeguard the animals in their care. The primary veterinarian needs to conduct examinations on the animals as soon as possible, and access to the animal population should be restricted from the public.

When law enforcement has the resource of an animal shelter with well-trained staff to assist with animal handling and evidence identification and collection, the response to animal cruelty concerns in that community is more efficient, comprehensive, and successful.

Legislation

Legislation is one of the most effective means of combating animal cruelty and can potentially protect the largest number of animals. Your veterinary degree and experience provide valuable insight for elected officials, lobbyists, and committee members when they are drafting or proposing new additions to your state or local laws and ordinances.

The laws protecting animals need to consider their physiology, care needs, and behavioral tendencies to be successfully applied in the field. Legislators rely on veterinary input, through task forces or testimony to legislative committees, to strengthen their statutes in this way.

Conclusion

In each instance, the veterinarian is an educator, just to different audiences. We already have the knowledge and experience in the subject matter; we are simply presenting it in varying ways depending on the audience, which can include our clients, our staff, a police officer, a prosecutor, another veterinarian, a legislator, or a jury.

This is not to say it is easy to play any of these roles or that our schedules lend themselves to yet another commitment, but remember the oath, remember why you became a veterinarian, and remember you are not alone in this fight against animal cruelty. ●

Working together in the field of shelter medicine and humane investigations, the creators of Victim to Verdict LLC combined their cross-disciplinary expertise and experience to create resources that provide education and support to anyone responding to animal cruelty concerns. The Victim to Verdict team includes Kris Otteman, DVM, ABVP Shelter Medicine, CAWA, national forensic veterinarian; Linda Fielder, CAWA, animal cruelty investigations and response expert; and Emily Lewis, Esq. MSEL, animal protection attorney. Their comprehensive textbook, titled Animal Cruelty Investigations: A Collaborative Approach from Victim to Verdict, *published in 2022, was followed with the launch of an engaging online training program through the Oregon State University. For more, visit www.V2V.com.*

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1. American Veterinary Medical Association (2024, Oct. 7). Veterinarian's Oath. https://www.avma.org/resources-tools/avma-policies/veterinarians-oath
2. The book, Animal Cruelty Investigations: A Collaborative Approach from Victim to Verdict provides a template for a clinic policy on response to animal cruelty and multiple customizable forms can be found on the Victim to Verdict website (www.victim2verdict.com). National organizations, such as the ASPCA and the International Veterinary Forensic Sciences Association, have forms and templates readily available.
3. Animal Legal Defense Fund (2024, Oct. 7). 2023 U.S. Animal Protection Laws Rankings: The Best and Worst States and Territories for Animal Protection Laws. https://aldf.org/project/us-state-rankings/

3 additional resources

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A New Way Forward in Canine Osteoarthritis: Targeting Pain and Inflammation at Its Source

By Bob Menardi, DVM, and Eric Schreiber

Cinder, a black labrador retriever, was always a fun-loving companion. Her pet parent, Terry, describes her as "my silly, happy, bouncy girl." A canine athlete, Cinder participated in agility events until the age of 5 when she started noticeably restricting her movements.

"Cinder is one of those dogs who doesn't have a sense of self-preservation, so we knew something was really wrong when she showed a reluctance to jump," Terry says. It wasn't long until Cinder was diagnosed with osteoarthritis (OA), one of the most common and debilitating conditions in veterinary practice today.[1]

Over the next year, Cinder received numerous canine OA treatments, including NSAIDs, hyaluronic acid (HA), and platelet-rich plasma (PRP) injections, but none of these made much of a difference and the OA was progressing. "You could see how unhappy she was. She had a downtrodden look to her," Terry recalls. "She didn't want to come out of a dark bedroom, not even to eat, and I thought we were getting closer to having tough conversations about what do next. Do we take the unthinkable step of having to euthanize her? It was something we couldn't even imagine ever having to do."

That's when her veterinarian handed Terry a flyer for Synovetin OA®, a treatment that changed everything for Cinder. In the first three days following treatment, she was walking again. Three to four weeks later, she was running around with the family's other labs and initiating play.

The turnaround for Cinder is typical of the difference Synovetin OA has made for thousands of dogs. It's completely different from other approaches to OA management that just treat symptoms. Instead, it's the only treatment specifically designed to target the underlying cause of the disease—inflammation—and the resulting pain and progression of OA.

A Disease of Inflammation

Cinder's story is not uncommon. In fact, roughly 25% of all adult dogs in the US suffer from arthritis joint pain, or about 1 in 4.[1] Veterinarians are all too familiar with the signs: stiffness, lameness, difficulty rising, reluctance to jump or play. OA remains one of the most common causes of chronic pain in dogs—and also one of the most frustrating, because traditional treatments are typically designed to just treat pain signals rather than the underlying cause.[2]

Historically, OA has been thought of as a "wear-and-tear" disease of older dogs involving the mechanical breakdown of the joint over time. But now researchers and experts have proven it to be a disease of relentless inflammation that is directly responsible for the pain and progression of joint degradation, one which can affect even otherwise healthy young dogs. In fact, one study showed that radiographic evidence of OA was highly prevalent in dogs less than 4 years old, 60% of which were clinically affected.[3]

Whether triggered by developmental joint disease (ie, elbow dysplasia), injury, or general cartilage degeneration, OA is driven by synovial inflammation (synovitis). This inflammation leads to significant pain and the production of pro-inflammatory mediators which break down cartilage, damage synovial tissue, and contribute to the sclerosis of subchondral bone.

If left unchecked, this process becomes a vicious cycle. The inflammatory environment worsens, leading to more pain, more tissue damage, and ultimately, joint failure. Cartilage thins. Osteophytes form. The joint capsule thickens. And all the while, the dog's pain and immobility increases. Without stopping the inflammation, we cannot truly control the pain and stop this vicious cycle. (Figure 1)

OA progression is driven by a vicious cycle of ongoing inflammation, pain, and cartilage destruction.

The Traditional Toolkit Has Its Limits

The traditional approach to canine OA has largely focused on treatments such as NSAIDs, joint supplements, stem cell, PRP, and anti-nerve growth factor (anti-NGF) injections. These modalities offer important benefits, but they aren't designed to treat the underlying cause of the disease. At best, they may buy time and potentially improve quality of life. At worst, they provide insufficient relief or carry risks that limit long-term use. Recent published data suggest the possibility that anti-NGF injections actually accelerate OA disease.[2,4]

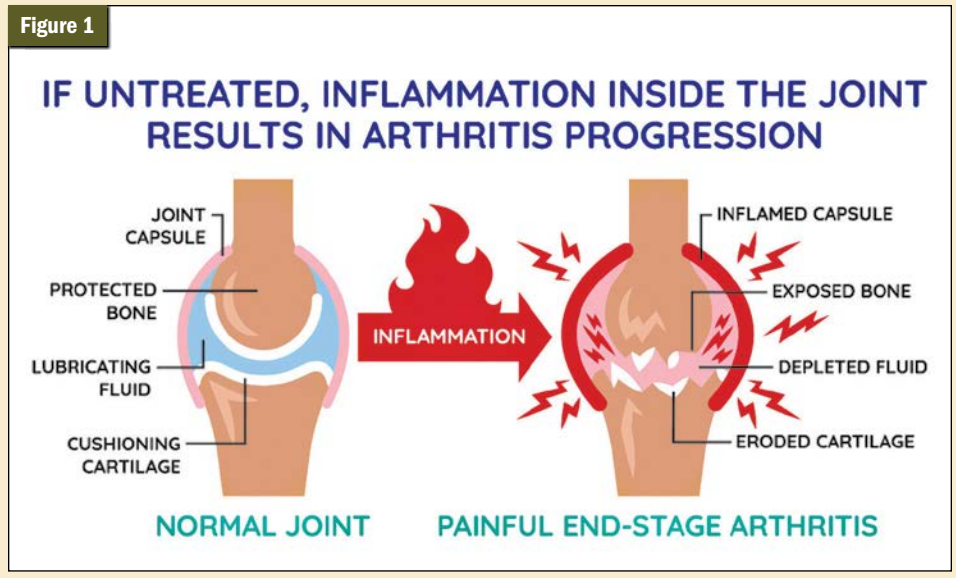
This raises a critical question: What if we could do more than manage symptoms? What if we could target the inflammation driving the disease?

A Different Approach

Synovetin OA, a colloid containing microparticles of the radioisotope tin-117m, is an intra-articular veterinary device now available at over 100 practices across the US. It represents a paradigm shift: from managing symptoms by masking pain to breaking the vicious cycle of inflammation and helping to reduce pain at the source, while also preserving the health of the joint.

Synovetin OA is injected directly into the affected joint. It is not a drug and is non-systemic. Once there, it delivers targeted radiotherapy to activated macrophages in the synovium and synovial fluid—the very cells that perpetuate inflammation in OA.

Figure 1



Following treatment, inflamed, painful synovial cells (synoviocytes) take up the microparticles. The emitted energy (from conversion electrons) eliminates these cells, restoring the synovium and providing immediate pain relief. Macrophages in the synovial fluid also engulf the tin microparticles and are subsequently eliminated. This ends the production of cartilage damaging cytokines, thus breaking the destructive cycle at its source.[5]

Tin-117m conversion electrons are low energy, with a short tissue penetration range which is ideal for treating synovitis while remaining completely safe to cartilage, bone, or other joint structures.[6]

This approach offers advantages to veterinarians and pet parents alike:[6-9]

- One simple, minimally-invasive outpatient treatment provides up to one full year of relief
- Targets the inflammation that causes pain and drives disease progression rather than just treating the symptoms
- Exceptionally safe with no systemic side effects for treated dogs
- No pet parent compliance issues that come with daily medications or monthly veterinary visits

Pain Relief Plus the Potential to Slow OA Progression

While long-term data in dogs is still emerging, preclinical studies in rodent models have shown evidence that tin-117m has the potential to slow disease progression, with substantial reductions in synovitis, cartilage erosion, and significant slowing of bony remodeling (as shown in osteophyte growth) observed. This raises the question: "Is Synovetin OA a disease-modifying osteoarthritis device?" It may be too early to tell, but these preliminary findings are promising—and exciting.[10,11]

New Hope for Dogs Suffering from OA and Pain

For veterinarians and pet parents like Terry, Synovetin OA offers new hope and an "inflammation-forward" approach. With this novel modality, we can treat OA not as a degenerative process, but as an inflammation-mediated cascade that can be interrupted at all stages of the disease. This could be especially beneficial in early OA where the targeted action provides the best opportunity to relieve pain and break the vicious cycle to potentially slow progression.[5-11]

In Cinder's case, this approach made all the difference. For the millions of dogs facing similar struggles, innovations like Synovetin OA may open the door to better outcomes for patients and their families, at all stages of the disease. "Cinder has now been treated three times with Synovetin OA, each time giving her more than one year of relief," says Terry. "I have a happy, healthy, active, and pain-free dog again." ●

Learn More

To find out how Synovetin OA can fit into your OA treatment strategy, visit Synovetin.com or contact Eric Schreiber, Chief Commercial Officer, at eschreiber@exubrion.com.

Important information about Synovetin OA.

Studied in canine elbows, Synovetin OA is given by authorized veterinarians. Temporary discomfort in treated joints may occur. Visit Synovetin.com.

References

View references for this article online at veterinarypracticenews.com/education-center-exubrion-therapeutics-canine-osteoarthritis.

This Education Center article was underwritten by Exubrion Therapeutics

In canine osteoarthritis...

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*As demonstrated in preclinical published studies of induced osteoarthritis in rodent models.

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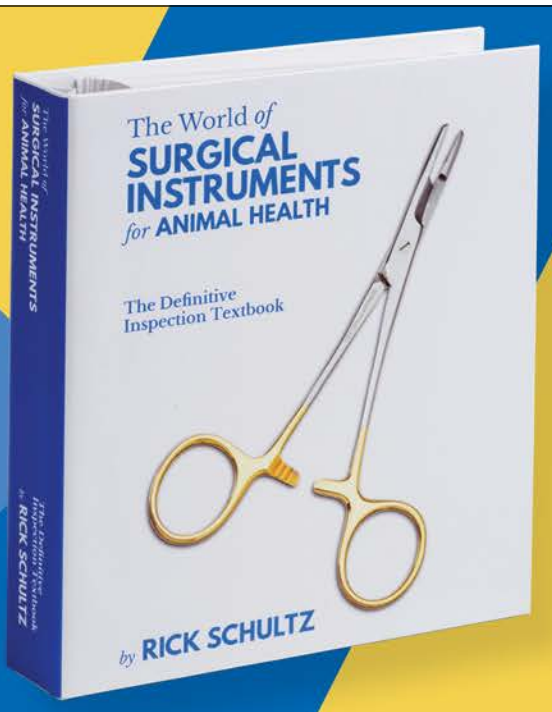

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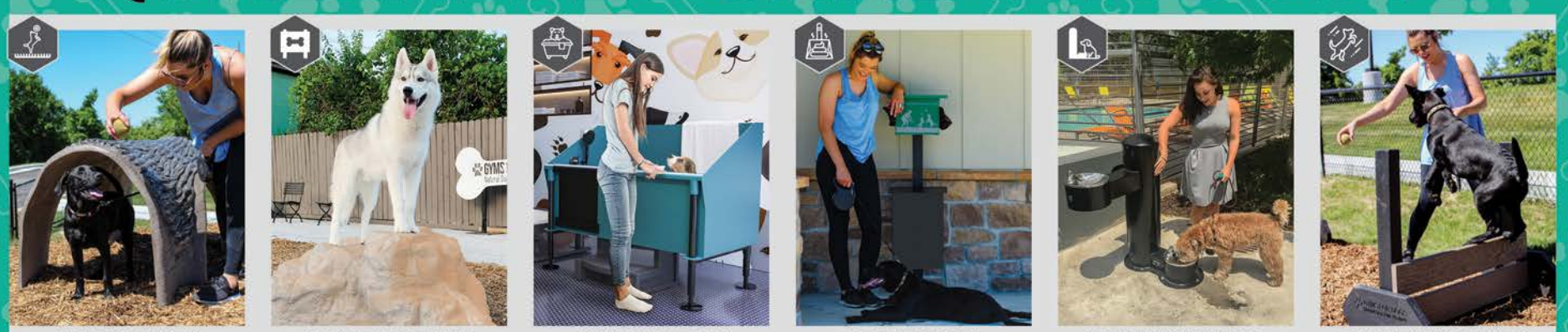

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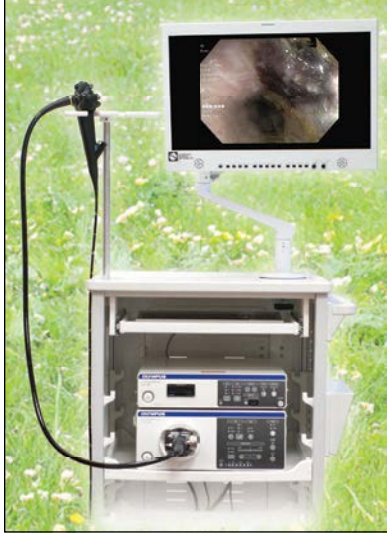

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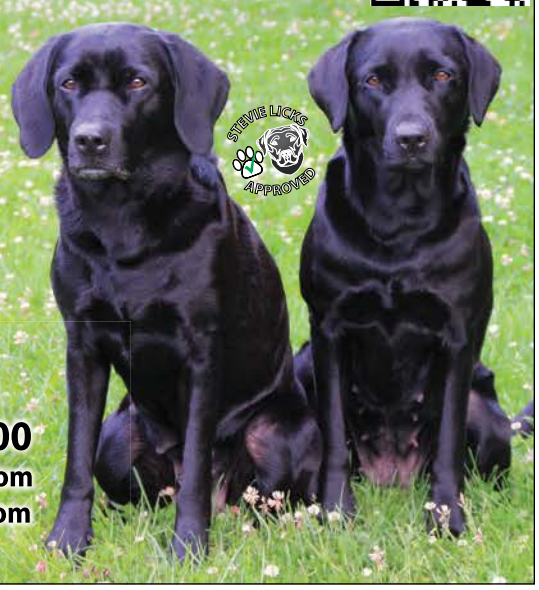

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5 emotional triggers in the vet workplace (and how to defuse them)

Patty Khuly, VMD, MBA

Last month, I wrote about spotting burnout in the workplace. This month, I will attempt to identify their wellspring so we will all stand a better chance of capping them before they overflow onto our workplaces, our careers, our families, and our physical and mental health. I will even offer a couple of suggestions that might help you handle them better in the future.

1) A lawsuit or complaint

To be clear: I have never been sued. I have, however, found myself hiring an attorney to defend my license after a client lodged a complaint. The client was mentally unwell, and the complaint was ultimately found baseless and frivolous. In fact, my supposed transgressions were not fully rooted in reality (this client was absolutely bonkers), but the anxiety it provoked was too real. In the end, I suffered an unnecessary degree of stress for almost a year as a result of a long-winded, rambling, hand-written complaint.

If you practice long enough, it will probably happen to you, too, but here's the truth: most of the time, you will prevail. If you are sure you did nothing wrong, your suffering is theoretically optional. Sure, you have to endure the pain of being hated by a client and the possible expense of a legal defense, but it is highly unlikely you will lose your license.

I'm not claiming you will not suffer, I'm just saying you shouldn't. My suggestions here are twofold:

- *Before receiving a complaint is the best time* to be sure you have ticked the box that lets you opt in to the "license defense" section on your PLIT insurance. (This ensures you have an attorney to represent you in front of your professional board.)
- Once you have been sued or received a complaint, it is the best time to seek extra help with your mental health. If you are anything like me, this is probably the time you will need it most.

2) Medical errors

Making an honest mistake while practicing medicine is bad enough. Making one that leads to the death or injury of a patient can be devastating. Nothing less than the future of your career is at stake when the almost inevitable happens to you … because you will make plenty of mistakes and you will lose patients. The chance that both events will coincide at some point in your career is pretty high. So, fasten your seatbelt.

The emotional toll of medical errors is uniformly high. As it probably should be. However, that does not mean you should quit practicing or stop performing procedures. (I have seen colleagues make both costly decisions.) Nor does it indicate your worthiness as a professional or as a person.

Mistakes are how we learn. As you well know, it is why they call it "practicing" medicine. Here are my suggestions:

- *Talk to your colleagues.* If you are comfortable, post about it on social media in a vet-only forum. Above all, do everything in your power to include as many veterinarians' opinions as possible. I promise they will free you of the notion you suck as a human and as a veterinarian. We have all done it (and probably will do it again).
- *Read* Complications, a great book by Dr. Atul Gawande. You will know why I recommended it after you read it. Or maybe the title says it all.

3) Comparing yourself

As I like to tell my son, "Comparison is the root of all evil." Once you start fixating on what other people have and compare those features and effects to those you do not possess but would like to, unhappiness almost invariably ensues. It does not matter whether we are talking about shiny objects, like boats, cars and homes; or less tangible things, like respect, power, and fame, comparisons can start to feel really ugly, even when these things include objects or characteristics you do not even want (but are sometimes told you should aspire to).

In veterinary medicine this happens most typically when comparing ourselves to friends, family, clients or acquaintances, who seem measurably less intelligent or hard-working and earn five times the income.

"It's just not right!" you exclaim. Most of the time, you would be correct in your assessment, but justified resentment only gets you so far. After all, it always feels worse to indulge the resentment than to have ignored the comparison altogether.

Here's how I handle it:

- *Identify the problem.* Admit that your current unhappiness toward a person or situation might be rooted in comparison. This here is half the battle. Handling it often comes readily thereafter.
- *Make a gratitude list.* Instead of assailing the character or the possessions "enjoyed" by the object of your comparison, list those things that mean something to you. This is a life hack that has never steered me wrong.

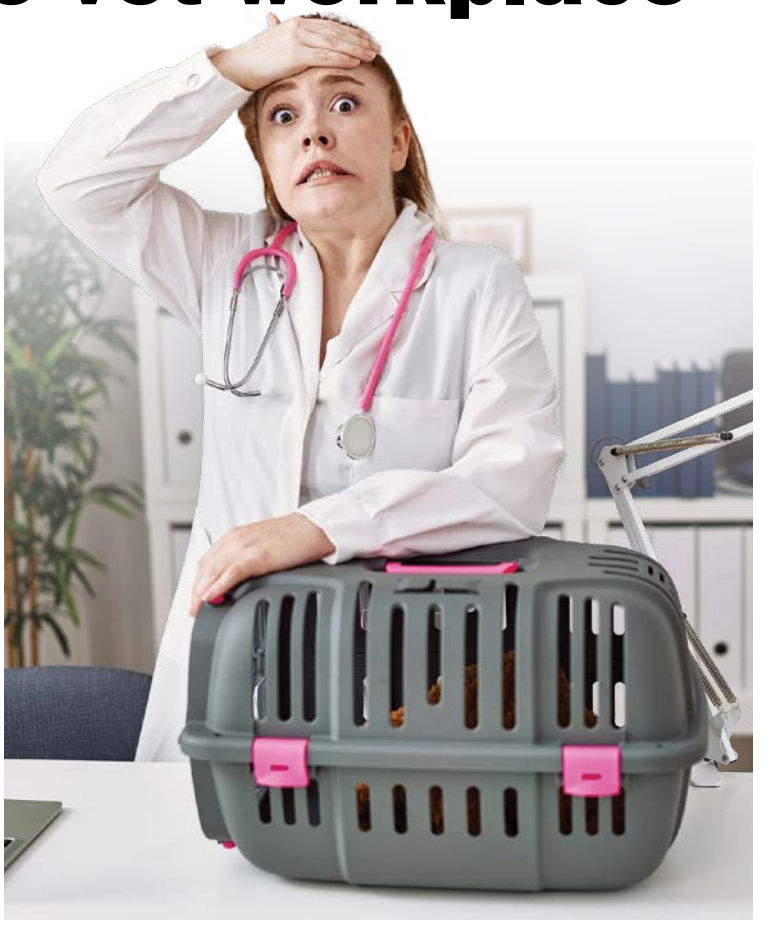
4) Personality clashes and office gossip

You cannot get along with everyone all the time. Since we work in close quarters with plenty of young and/or stressed-out individuals, drama has a way of stalking us in the workplace.

As I have gotten older, I have become more immune to office gossip (something to look forward to in middle age), but with respect to personality clashes … not so much. These will persist, and you will have to get better at dealing with them lest your work life devolve into a perpetual *s*—show.

To get past the pain of ill will, personality mismatches and other intra-office clashes likely to recur in close quarters, consider these options:

- *Don't feed the trolls.* Acknowledge that you would be happier and your work product would be better if you ignored the offensive behavior.
- *Pledge to be a better person (not the better person).* Do not continue to harp on personality flaws or misdeeds. Instead, try to identify your part in the personality clash or problem at hand. (What did you do wrong? How did you add fuel to the fire?)



After all, you can only fix one side of the equation. There is nothing you can do about someone else's behavior. Having addressed your side, it is up to them to clean up their side of the street. You will be surprised to see how quickly things can resolve thereafter.

5) Client complaints and negative online reviews

Nothing gut-punches like a client complaint … unless it is one that appears in a negative online review. Worse still? A credible, reasonable negative online review about a justified client complaint. Sure, crazy, negative online reviews about imagined transgressions will sometimes hurt the practice harder than the truth. However, for me, nothing hurts more than when news of our most egregious shortcomings is disseminated among the public at large.

The good thing about the latter kind of review is there is something you can do about it. Reasonable people will sometimes remove negative reviews when we respond with an honest apology and a promise to do better. That's the first thing I recommend everyone do. And, if possible, address it as a personal phone call or in-person conversation, not an online message.

But what's a veterinarian to do if the person is absolutely bat guano wackadoodle?

- *Try to reason with the human.* It is always worth a try. Pro-tip: Always appeal to their pet's best interest first.
- *Try to get the review removed.* This is becoming increasingly difficult, but again, it's always worth a try and becomes especially feasible when the review is threatening or names individuals.
- *Do not ignore the review altogether but never get into a back-and-forth on the subject.* Write something anodyne about your willingness to serve the patient and put a period on it. Then try to ignore the review forever and ever, amen.

All my solutions are easy to write and even tougher to implement. However, the hard truth is that we should try to have these roll off our backs as we go. Our only other option is to accumulate increasingly stressful workplace situations, and none of us wants that. This job would become untenable otherwise, and I'm not ready to give it up just yet. ●

Patty Khuly, VMD, MBA, runs a small animal practice in Miami, Fla., and is available at drpattykhuly.com. Columnists' opinions do not necessarily reflect those of Veterinary Practice News.

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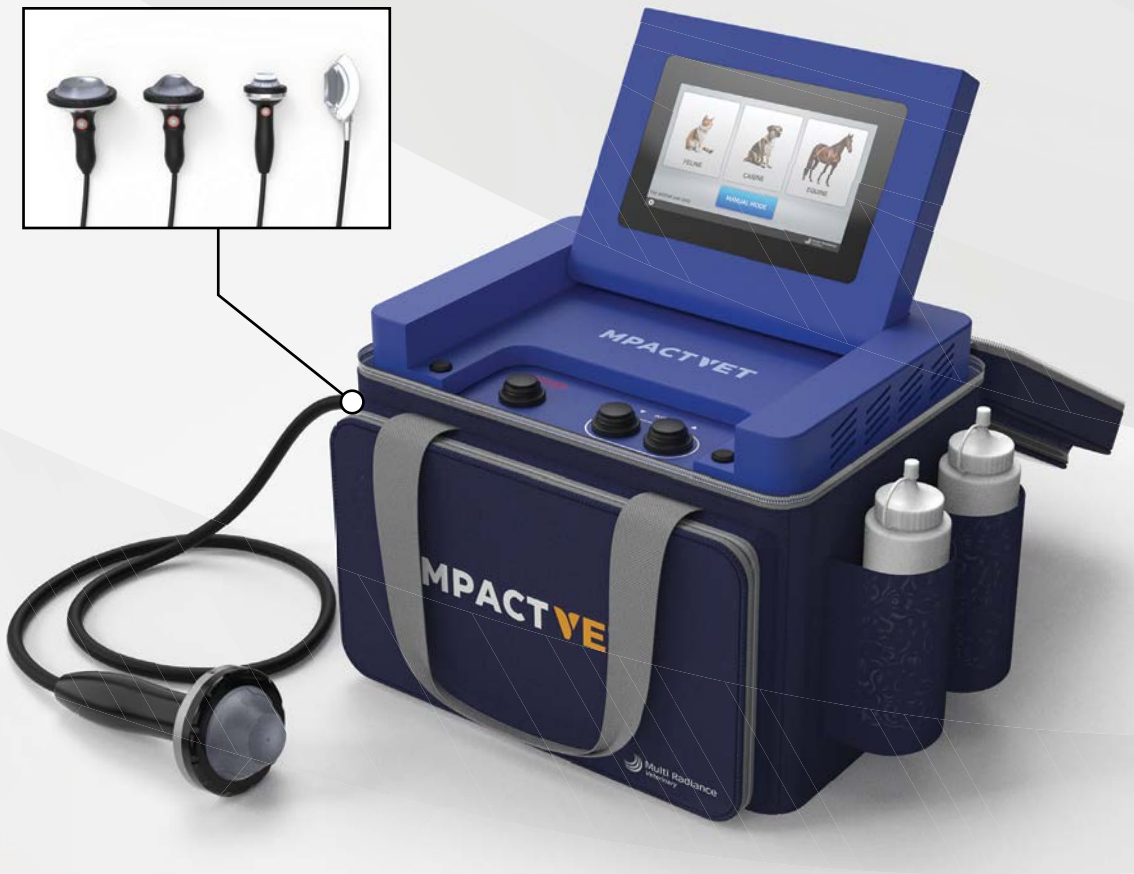

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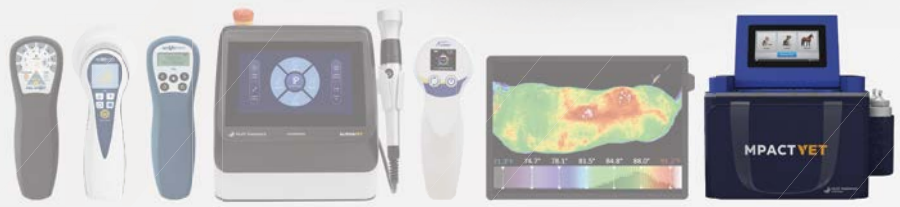

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