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Is it pain or dysphoria?

- Has breeding altered canine brain anatomy? p 6
- 6 steps to success in building a new hospital p 10
- The power of setting boundaries p 21
- Why you should celebrate a clean bill of health p 24
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A clean bill of health is a reason to celebrate

Is it pain or dysphoria? How to tell the difference and what to do about it

ProHeart for the win: Why injectables work for us
IMPORTANT SAFETY INFORMATION: METACAM (meloxicam oral suspension) and PREVICOX (firocoxib) are for use in dogs only. METACAM (meloxicam) Solution for Injection is approved for use in dogs or cats. Repeated use of meloxicam in cats has been associated with acute renal failure and death. Do not administer additional injectable or oral meloxicam to cats. As a class, cyclooxygenase inhibitory NSAIDs like METACAM and PREVICOX may be associated with gastrointestinal, kidney, or liver side effects. Dogs should be evaluated for pre-existing conditions and currently prescribed medications prior to treatment with METACAM or PREVICOX, then monitored regularly while on therapy. Concurrent use with another NSAID, corticosteroid, or nephrotoxic medication should be avoided or monitored closely.

For more information on products mentioned in this ad, please see full prescribing information.
In a controlled field study evaluating orthopedic postoperative pain and inflammation, 226 dogs were randomly administered PREVICOX or a control (sham-dosed-pilled) for the control of postoperative pain and inflammation associated with soft-tissue surgery. Surgery to repair a ruptured cruciate ligament included the following stabilization procedures: labeler suture and/or imbrication, titular head transposition, tibial plateau leveling ostectomy (TPLO), and/or the "over the top" technique. The study (n = 220 for effectiveness) demonstrated that PREVICOX-treated dogs had significantly lower need for rescue medication than the control (sham-dosed-pilled) in controlling postoperative pain and inflammation associated with soft-tissue surgery.

In a 20-week study in 8X dogs, 4X dogs were administered firocoxib at 50 mg/kg (ten times the recommended total daily dose) for 14 weeks. On average, the dogs in the 3X and 5X dose groups did not gain weight during the study period. One of these dogs had severe duodenal ulceration, with hepatic fatty change and associated vomiting, diarrhea, and hypoproteinemia. Histopathologic examination revealed minimal diffuse slight hepatic fatty change. At the indicated dose of 5 mg/kg, there were no treatment-related adverse events. Decreased appetite, vomiting, diarrhea, and anorexia were seen more often in dogs in the 5X dose group. One dog in the 3X dose group was diagnosed with juvenile polyarthritis of unknown etiology, exhibiting recurrent episodes of vomiting and diarrhea, lethargy, pain, anorexia, azotemia, and pruritus. Of the 108 control dogs, 13 (12%) were in the control group and 4 (4%) in the placebo group.

Among 249 dogs of various breeds, ranging in age from 11 months to 20 years, 226 dogs with a variety of painful conditions were randomly assigned to either the PREVICOX or the control (sham-dosed-pilled) group for the control of postoperative pain and inflammation associated with orthopedic surgery. Surgery to repair a ruptured cruciate ligament included the following stabilization procedures: labeler suture and/or imbrication, titular head transposition, tibial plateau leveling ostectomy (TPLO), and/or the "over the top" technique. The study (n = 220 for effectiveness) demonstrated that PREVICOX-treated dogs had significantly lower need for rescue medication than the control (sham-dosed-pilled) in controlling postoperative pain and inflammation associated with orthopedic surgery.

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Metacam®
(meloxicam oral suspension)
1.5 mg/mL (equivalent to 0.05 mg per drop) / 0.5 mg/mL (equivalent to 0.02 mg per drop)
Non-steroidal anti-inflammatory drug for oral use in dogs only

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

Description: Meloxicam is a non-steroidal anti-inflammatory drug (NSAID) of the oxicam class. Each milliliter of METACAM Oral Suspension contains meloxicam equivalent to 0.5 or 1.5 milligrams and sodium benzoate (1.5 milligrams) as a preservative. The chemical name for Meloxicam is 4-[(2-methyl-6-(2-thiophenyl)thiazol-2-yl)-2H-1,2-benzothiazine-3-carboxamide-1,1-dioxide.

Indications: METACAM Oral Suspension is indicated for the control of pain and inflammation associated with osteoarthritis in dogs.

Contraindications: Dogs with known hypersensitivity to meloxicam should not receive METACAM Oral Suspension. Do not use METACAM Oral Suspension in cats. Acute renal failure and death have been associated with the use of meloxicam in cats.

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. For oral use in dogs only.

MELOXICAM may be mixed with food and given with or without feed. When administering the drug with milk or dairy products, the milk should be withheld for 2 hours before and 2 hours after the administration of the drug, to allow the milk to go through the stomach and be eliminated before the drug reaches the small intestines. MELOXICAM may be mixed with food and given with or without feed. When administering the drug with milk or dairy products, the milk should be withheld for 2 hours before and 2 hours after the administration of the drug, to allow the milk to go through the stomach and be eliminated before the drug reaches the small intestines.

Contraindications: Dogs with known hypersensitivity to meloxicam should not receive METACAM Oral Suspension.

Precautions: The safe use of METACAM Oral Suspension in dogs younger than 6 months of age, dogs used for breeding, in pregnant or lactating bitches has not been evaluated. Meloxicam is not recommended for use in cats. Concurrent administration of potentially nephrotoxic drugs should be carefully monitored. Concurrent administration of potentially nephrotoxic drugs should be carefully monitored. Concurrent administration of potentially nephrotoxic drugs should be carefully monitored.

Adverse Reactions: Field safety was evaluated in 306 dogs. Based on the results of two studies, GI abnormalities (vomiting, soft stools, diarrhea, and inappetence) were the most common adverse reactions associated with the administration of meloxicam. The follow adverse events are based on post-adverse drug experience reporting. 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.

Gastrointestinal: vomiting, anorexia, diarrhea, melena, gastrointestinal ulceration
Urinary: azotemia, elevated creatinine, renal failure
Neurological/Behavioral: lethargy, depression
Hepatic: elevated liver enzymes
Dermatologic: pruritus

Death has been reported as an outcome of the adverse events listed above. Acute renal failure and death have been associated with the use of meloxicam in cats.

Information For Dog Owners: METACAM, like other drugs of its class, is not free from adverse reactions. Owners should be advised of the potential for adverse reactions and be informed of the clinical signs associated with drug intolerance. Adverse reactions may include vomiting, diarrhea, decreased appetite, dark or tarry stools, increased water consumption, increased urination, pale gums due to anemia, yellowing of gums, skin or white of the eye due to jaundice, lethargy, incoordination, seizure, or behavioral changes. Serious adverse reactions associated with this drug class can occur without warning and in rare situations result in death (see Adverse Reactions). Owners should be advised to discontinue the MEDICATION and seek veterinary advice if symptoms of intolerance are observed.

Effectiveness: The effectiveness of meloxicam was demonstrated in two field studies involving a total of 277 dogs representing various breeds, between six months and sixteen years of age, all diagnosed with osteoarthritis. Both studies were double-blind, placebo-controlled, and included a control group of dogs. The dogs received 0.2 mg/kg meloxicam once daily. All dogs were maintained on 0.1 mg/kg oral meloxicam from days 2 through 14 of both studies. Parameters evaluated by veterinarians included lameness, weight-bearing, pain on palpation, and overall improvement. Parameters assessed by owners included mobility, ability to rise, limping, and overall improvement. In the first field study (n=109), dogs showed significant improvement in lameness, weight-bearing, pain on palpation, and overall improvement. Variables assessed by owners included mobility, ability to rise, limping, and overall improvement.

In this field study, dogs showed clinical improvement with statistical significance after 14 days of meloxicam treatment for all variables.

Reference: 1. FIOL for NADA 141-219 Metacam (meloxicam) 5 mg/mL Solution for Injection.

Manufactured for: Boehringer Ingelheim Vetmedica, Inc. St. Joseph, MO 64505 U.S.A.

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Why they did it
Humans have been breeding dogs for thousands of years, but it wasn’t until recently that someone thought to ask if human preferences for certain canine traits have affected brain anatomy.

That someone is Erin Hecht, PhD, an assistant professor of neuroscience from Harvard University. She found inspiration as a graduate student at Emory University while watching a nature program about domestic dogs and selectively bred Russian foxes. In an interview with The Harvard Gazette, Dr. Hecht said she was surprised to learn that the scientists were only concerned with genetics and evolution—not neuroscience. “I thought, ‘How is this possible? No one’s thought about looking at their brains,’” she told the Gazette.

What they did
Eager to fill in the gap, Dr. Hecht reached out to Marc Kent, DVM, DACVIM, a professor of small animal neurology at the University of Georgia College of Veterinary Medicine, who gave her access to magnetic resonance imaging (MRI) scans from dozens of his canine patients.

“The first question we wanted to ask was, are the brains of different

Journal Scan:
The brains behind the breeds
A recent study suggests that selective breeding has significantly altered the anatomy of the canine brain.

By Sarah Mouton Dowdy
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breeds of dogs different?”, Dr. Hecht said in an interview with The Washington Post. And after analyzing the MRIs of 62 dogs representing 33 breeds, she and her colleagues found that their brains are indeed different, and that the differences aren’t randomly distributed and aren’t caused by variations in brain size, body size or skull shape.¹

What they found
The researchers discovered that neuroanatomic variation is focused in specific networks of the brain that significantly correlate with behavioral specializations like sight hunting, scent hunting, guarding and companionship. They also note that most of the variation was observed in the terminal branches of the phylogenetic tree, which indicates strong, recent selection in individual breeds. “Together,” the researchers conclude in the abstract, “these results establish that brain anatomy varies significantly in dogs, likely due to human-applied selection for behavior.”

Study limitations
In a Washington Post interview, Jeffrey Stevens, PhD, director of the University of Nebraska’s Canine Cognition and Human Interaction Lab, discussed some of the study’s limitations. For starters, he explained that not everyone is convinced of the usefulness of mapping behaviors to breeds because individuals within the same breed can vary a lot. Dr. Stevens also noted that the dogs weren’t performing breed-specific tasks at the time of their MRI scans, calling into question whether any big conclusions linking breed and behavior can be drawn.

Further potential limitations stem from the fact that all of the research participants were house pets, not working dogs that regularly put their breed-specific talents to serious use. This fact is important because, as Dr. Hecht explained to the Post, studies have shown that the brain changes as it learns a new language or motor skill. In other words, the brain anatomy of an old English sheepdog who spends its days herding sheep in the New Zealand countryside could look very different from that of an old English sheepdog who lives the life of a pampered Instagram darling in a Chicago apartment (lending further support to Dr. Stevens’ initial concern). With this in mind, Dr. Stevens suggested that a future focus on working dogs could reveal even stronger correlations.

Future research
Speaking of the future, Dr. Hecht, whose lab also studies brain evolution in humans, told The Harvard Gazette that further research on dog brains could provide insight into the brains of their masters—an idea that wasn’t taken very seriously by other scientists and funding agencies when Dr. Hecht first began her research back in 2012. Using border collies as an example (perhaps because she has two of her own), she explained that while they’re remarkable herders, they aren’t born knowing how to herd.

“Learning plays a crucial role, but there’s clearly something about herding that’s already in their brains when they are born,” she said. “It’s not innate behavior, it’s a predisposition to learn that behavior. That’s analogous to what goes on with humans with language. They don’t pop out of the womb being able to speak, but clearly all humans are predisposed in a very significant way to learn language. If we can figure out how evolution got those skills into dog brains, it might help us understand how humans evolved the skills that separate us from other animals.”

Dr. Hecht is now specifically studying working dogs—both champions and their less successful littermates—in an attempt to better understand how dog brain anatomy has been shaped by recent evolution. “We’re looking for animals raised in the same environment where, for whatever reason, one has excelled and one dropped out,” she told the Gazette. ●

REFERENCE

Sarah Mouton Dowdy, a former associate content specialist for dvm360.com, is a freelance writer and editor in Kansas City, Missouri.

For more results from recent veterinary research, visit dvm360.com and search “Journal Scan.”
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² Data on file at Boehringer Ingelheim.
³ Data on file at Boehringer Ingelheim.

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Six steps to success in building a new veterinary hospital

If you’ve got big dreams of building a practice of your own from the ground up, take it from the winner of the dvm360 Hospital Design Competition in the “less than 8,000 square feet” category: It can happen for you.

The Hospital Design Competition judges praised Tustin Legacy Animal Hospital in Tustin, California, for a nicely detailed interior, great finishes, and a solid, efficient plan.

Owners Drs. Celine Hayek and Kristin Negvesky noted that they had "complementary styles and ways of thinking about things," which combined to create a winning formula for this startup hospital.

1. Find a good realtor
Drs. Negvesky and Hayek first found a realtor to help them choose a site. Never having owned a business before, the two say they had a steep learning curve. Thankfully, their real estate agent "had a lot of experience with veterinary hospitals and was a huge help."

2. Find a good bank
Securing loans and handling financing proved challenging for these newbies, but they say Bank of America was a big help.

3. Design your dream
"Our main goal was to design a place that gave people a really good vibe when they walked in the door," says Dr. Negvesky. For them, "client service is No. 1, and we wanted our hospital to feel approachable, with a clean, fresh style."

The pair wanted an easy-flowing plan, with plenty of sunlight, where they were "able to see the back of the hospital from the front."

There was also one more must-have: "A chandelier, a big one!" says Dr. Negvesky. The doctors got their chandelier and the fresh, clean vibe they wanted throughout their 2,685-square-foot practice, which houses four exam rooms and separate dog and cat waiting areas.

4. Be prepared to make adjustments
The doctors did want two-door exam rooms, but they had to scrap that idea because it took too much space away from their tight floor plan.

Another strategic choice: To focus on practicing medicine, the pair decided not to offer boarding and grooming services as they had originally planned. "We had heard a lot of stories of things not going well for others, and it seems that a lot of negative reviews online stem from boarding and grooming, which should not be a reflection of your medicine," says Dr. Negvesky.

5. Hire a great interior designer
For help with getting the right vibe for the practice, Drs. Hayek and Negvesky hired an interior designer. They outlined the colors they wanted (blues and greens), the
the way.
off right and have adjusted course as needed along
because the two young practice owners started
surprised, though, when someone we didn’t know
with someone whose pet they knew. “We were super
toured the practice and got to know the owners.
would be serving. Food trucks, activities, raffles and
 doctors held a grand opening event to introduce
6. Get set to open (and repeat step 4)
the requirement of a chandelier in the reception area,
the reception area (complete with crystal chandelier), the employee
Tustin Legacy Animal Hospital has grown steadily
break room, the treatment area and a cat-only exam room.
style they were looking for (upscale yet inviting), and
the requirement of a chandelier in the reception area, and
the designer ran with it. 6. Get set to open (and repeat step 4) A week before the practice officially opened, the
doctors held a grand opening event to introduce themselves and get to know the community they
would be serving. Food trucks, activities, raffles and
hospital tours brought in about 100 people, who
toured the practice and got to know the owners. To help start off the first day of business in their
new space, they scheduled an 8:30 a.m. appointment
with someone whose pet they knew. “We were super
surprised, though, when someone we didn’t know
walked in at 8 a.m.,” says Dr. Negvesky.
Tustin Legacy Animal Hospital has grown steadily
since that first unexpected appointment, no doubt
because the two young practice owners started
off right and have adjusted course as needed along
the way. ●
Wrangling the topic of CBD with your veterinary clients

This is not the Wild West of CBD exploration anymore. Cannabis is becoming legalized for people, which means your veterinary clients are going to be asking about it more. Here’s what you need to know.

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

You’re up on the legality of using cannabidiol (CBD) and think you’re ready to take the plunge, but where should you start? Let’s start with what we know.

In the Wild West of hemp-derived CBD—prior to legalization on the federal level in late 2018—it wasn’t unusual for my clients to tell me they’d started their dog or cat on CBD. We always ask what botanicals or supplements clients are giving their pets, as many of these products have side effects that can be deadly either alone or when given in combination with other medications, so my practice was probably a bit more aware than many. Nevertheless, I was astounded at how many people used these types of products but wouldn’t bring it up unless asked.

My point is, if you don’t ask, you don’t know, and you could be exposing yourself to a legal concern should there be an interaction with a medication you dispense. Not sure about the supplement? Download the Memorial Sloan Kettering Cancer Center’s About Herbs app. It’s meant for humans, but it’s still a great source of information on actions, precautions, interactions and adverse events.

Luckily for us, CBD doesn’t seem to have any dangerous actions or interactions and, unlike many drugs, it seems to only push body systems toward normal. I say “seems” because, until recently, even doing research on CBD was illegal. In the future, as additional CBD trials are performed, more concrete evidence on adverse and therapeutic effects will be available. >>
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✓ Over 223 million doses of afoxolaner have been prescribed¹
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IMPORTANT SAFETY INFORMATION: NexGard® is for use in dogs only. The most frequently reported adverse reactions include vomiting, pruritus, lethargy, diarrhea and lack of appetite. The safe use of NexGard in pregnant, breeding, or lactating dogs has not been evaluated. Use with caution in dogs with a history of seizures or neurologic disorders. For more information, see the full prescribing information or visit www.NexGardClinic.com.

¹Data on file.
CAUTION: Federal (U.S.A) law restricts this drug to use by or on the order of a licensed veterinarian.

Description: NexGard® (afoxolaner) is available in four sizes of beef-flavored, soft chewables for oral administration to dogs and puppies according to their weight. Each chewable is formulated to provide a minimum afoxolaner dosage of 1.14 mg/lb (2.5 mg/kg). Afoxolaner has the chemical composition 1-Naphthalencarboxamide, 4-[[3-chloro-5-(1H-imidazol-1-yl)-phenyl]-4, 5-dihydro-5-[trifluoromethyl]-3-nitrosoyl]-N-(2-oxo-2, 3, 4, 5-tetrahydro-3-methinylaminomethyl)phenyl. Indications: NexGard kills adult fleas and is indicated for the treatment and prevention of flea infestations (Ctenocephalides felis), and the treatment and control of Black-legged tick (Ixodes scapularis), American Dog tick (Dermacentor variabilis), Lone Star tick, (Amblyomma americanum), and Brown dog tick (Rhipicephalus sanguineus) infestations in dogs and puppies 8 weeks of age and older, weighing 4 pounds of body weight or greater, for one month. NexGard is indicated for the prevention of Borrelia burgdorferi infections as a direct result of killing louse (scapularis) vector ticks. Dosage and Administration: NexGard is given orally once a month, at the minimum dosage of 1.14 mg/lb (2.5 mg/kg).

Dosing Schedule: | Body Weight | Afoxolaner Per Chewable (mg) | Chewables Administered |
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<tr>
<td>≤ 4.0 lbs</td>
<td>0.4</td>
<td>One</td>
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<td>4.1 to 9.9 lbs</td>
<td>0.8</td>
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<tr>
<td>10.0 to 29.9 lbs</td>
<td>1.6</td>
<td>One</td>
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<tr>
<td>30.0 to 60.0 lbs</td>
<td>2.5</td>
<td>One</td>
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<td>60.1 to 121.0 lbs</td>
<td>3.8</td>
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<tr>
<td>Over 121.0 lbs</td>
<td>Administer the appropriate combination of chewables</td>
<td></td>
</tr>
</tbody>
</table>

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

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

Tick Treatment and Control: Treatment with NexGard may begin at any time of the year (see Effectiveness). Contraindications: There are no known contraindications for the use of NexGard.

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

Precautions: Afoxolaner is a member of the isoxazoline class. This class has been associated with neurologic adverse reactions including tremors, ataxia, and seizures. Seizures have been reported in dogs receiving isoxazoline class drugs, even in dogs without a history of seizures. Use with caution in dogs with a history of seizures or neurologic disorders (see Adverse Reactions and Post-Approval Experience). The safe use of NexGard in breeding, pregnant or lactating dogs has not been evaluated.

Adverse Reactions: In a well-controlled US field study, which included a total of 333 households and 615 treated dogs (415 administered afoxolaner, 200 administered active control), no serious adverse reactions were observed with NexGard. Over the 90-day study period, all observations of potential adverse reactions were recorded. The most frequent reactions reported at an incidence of ≥ 1% within any of the three months of observations are presented in the following table. The most frequently reported adverse reaction was vomiting. The occurrence of vomiting was generally self-limiting and of short duration and tended to decrease with subsequent doses in both groups. Five treated dogs experienced anorexia during the study, and two of those dogs experienced anorexia with the first dose but not subsequent doses after the third dose of NexGard. The dog remained enrolled and completed the study. Another dog with a history of seizures had a seizure 19 days after the third dose of NexGard. The dog remained enrolled and completed the study. A third dog with a history of seizures received NexGard and experienced no seizures throughout the study.

Table 1: Dogs With Adverse Reactions.

<table>
<thead>
<tr>
<th>Treatment Group</th>
<th>Afoxolaner</th>
<th>Oral active control</th>
</tr>
</thead>
<tbody>
<tr>
<td>N (%) (n=205)</td>
<td>N (%) (n=200)</td>
<td></td>
</tr>
<tr>
<td>Vomiting (with and without blood)</td>
<td>37</td>
<td>25</td>
</tr>
<tr>
<td>Diarrhea (with and without blood)</td>
<td>13</td>
<td>7</td>
</tr>
<tr>
<td>Lethargy</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>Anorexia</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>

Post-Approval Experience (July 2018): These adverse events are based on post-approval adverse drug experience reporting. Not all adverse events are reported to FDA/CVM. It is not always possible to reliably estimate the adverse event frequency or establish a causal relationship to product exposure using these data. The following adverse events reported for dogs are listed in decreasing order of reporting frequency for NexGard: Vomiting, puritus, lethargy, diarrhea (with and without blood), anorexia, seizures, hyperactivity/ restlessness, panting, erythema, ataxia, dermatitis (including rash, papules), allergic reactions (including hives, swelling), and tremors.

Contact Information: For a copy of the Safety Data Sheet (SDS) or to report suspected adverse drug events, contact Merrel at 1-888-637-4251 or www.merjoe.com. For additional information about adverse drug experience reporting for animal drugs, contact FDA at 1-888-FDA-VETS or online at http://www.fda.gov/AnimalVeterinary/SafetyHealth.

Mode of Action: Afoxolaner is a member of the isoxazoline family, shown to bind to a binding site to inhibit insect and canine ligand-gated chloride channels, in particular those gated by the neurotransmitter gamma-amino-butyric acid (GABA), thereby blocking pre- and postsynaptic transfer of chloride ions across cell membranes. Prolonged afoxolaner-induced hyperpolarization results in uncontrolled activity of the central nervous system and death of insects and anacarines. The selective toxicity of afoxolaner between insects and canines and mammals may be inferred by the differential sensitivity of the insects and acarines’ GABA receptors versus mammalian GABA receptors.

Effectiveness: In a well-controlled laboratory study, NexGard began to kill fleas four hours after initial administration and demonstrated >98% effectiveness at eight hours. In a separate well-controlled laboratory study, NexGard demonstrated 100% effectiveness against adult fleas 24 hours post-infestation for 35 days, and was ≥93% effective at 12 hours post-infestation through Day 21, and on Day 35. On Day 28, NexGard was 81.1% effective 12 hours post-infestation. Dogs in the treated and control groups that were infested with fleas on Day 1 generated flea eggs at 12- and 24-hours post-treatment (0-11 eggs and 1-17 eggs in the NexGard treated dogs, and 4-80 eggs and 0-118 eggs in the control dogs, at 12- and 24-hours, respectively). At subsequent evaluations post-infestation, fleas from the treated group continued to be essentially unable to produce any eggs (0-1 eggs) while fleas from the control group continued to produce eggs (1-141 eggs). In a 90-day US field study conducted in households with existing flea infestations of varying severity, the effectiveness of NexGard against fleas on the Day 30, 60, 90 visits compared with baseline was 88.0%, 89.7%, and 99.9%, respectively.

Collectively, data from the three studies (two laboratory and one field) demonstrate that NexGard kills fleas effectively and prevents subsequent flea infestations after the start of treatment of existing flea infestations. In well-controlled laboratory studies, NexGard demonstrated >97% effectiveness against Dermacentor variabilis, >98% effectiveness against Ixodes scapularis, and >92% effectiveness against Rhipicephalus sanguineus, 48 hours post-infestation for 30 days. At 72 hours post-infestation, NexGard demonstrated >97% effectiveness against Amblyomma americanum for 30 days. In two separate, well-controlled laboratory studies, NexGard was effective at preventing Borrelia burgdorferi infections after dogs were infested with louse (scapularis) vector ticks 28 days post-treatment.

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

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

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

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

NADA 141-410, Approved by FDA Marketed: From Frontline Vet Labs™, a Division of Merial, Inc. Duluth, GA 30096-4640 USA

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What does CBD do?

Although there were not a lot of dogs involved, a double-blind, placebo-controlled study at Cornell on the effects of using ElleVet’s CBD oil on dogs with chronic osteoarthritis pain showed an improvement in pain scores. More studies are needed, but this one agrees with the observations of many of my clients who have used CBD products.

On the human side, the FDA approved the CBD product Epidiolex for the treatment of intractable epilepsy in children—so we know it helps with seizures, at least in humans. (Two synthetic THC–based medications have also been approved for use in people undergoing chemotherapy: dronabinol [Marinol] for appetite stimulation and nabilone [Cesamet] to treat nausea.)

Another potential use in animals (besides pain management) for which there’s only anecdotal evidence is for the relief of anxiety, including noise phobias.

How do you know which products are best?

Prior to December 2018, only a handful of animal CBD products were available. Now there are countless products, many of which are being recommended in human CBD dispensaries for animal use. To help make this easier to navigate, here are my rules for use:

- **No human products.** They may contain substances such as xylitol or other additives that are fine for people but not so much for dogs or cats.

- **Ask the manufacturer for an assay from an outside lab.** You want to make sure the stated strength on each batch is supported by a lab report.

- **Ask the manufacturer if they’ve had their product tested for pesticides and heavy metals.** Remember, it takes a lot of hemp to make a small amount of CBD, so these unwanted substances may be concentrated as well.

- **Ask the manufacturer if the product has more than one fraction of CBD or contains terpenes.** We still don’t know what makes hemp or CBD work, and it’s thought by some that products containing the different subtypes of CBD and terpenes may be more efficacious.

What about dosing and frequency?

There are legal implications if you indicate a CBD dose your clients should follow when they administer a product to their pet. This can be interpreted as you giving a drug, which can increase your liability should something go wrong. It’s best if you tell pet owners to follow the manufacturer’s directions. And, finally, it’s important to convey to your clients that at this point in time the number of studies supporting the use of CBD is scant, and we really don’t know what long-term benefits—or problems—might arise from its use. Your clients want what’s best for their pet’s condition, and maybe CBD is part of that solution. However, in these early days of legalization, make sure they’re aware of all the related cautions.

Dr. Petty owns Arbor Pointe Veterinary Hospital, Canton, Michigan.

REFERENCE

This dog (main image) shows classic signs of dysphoria following a surgical procedure: visible third eyelids, open mouth due to panting and the need for full body support by the technician. After treatment with butorphanol (inset), the eyes have rotated centrally, the third eyelids are no longer visible, and the dog can hold her head up.

Is it pain or dysphoria? How to tell the difference and what to do about it

Having a thorough understanding of analgesia, pain and dysphoria is necessary to provide appropriate management interventions that will help achieve a positive outcome for your veterinary patients.

By Heather Carter, BS, LVT, VTS (Anesthesia & Analgesia)
Managing pain during an anesthetic event is integral to veterinary patient care and recovery, and can be achieved via multiple modalities. Pure mu opioids, the foundation of pain management, induce a wide spectrum of positive and negative effects in animals. Aside from managing pain, positive effects of mu opioids include sedation and a sense of euphoria; negative effects can include nausea, vomiting/diarrhea and dysphoria. The adverse effects of mu opioids are dose dependent and can be limited with use of a multimodal approach.

When the anesthetist is faced with managing adverse effects of mu opioid administration, an understanding of the differences between analgesia, pain and dysphoria can guide the appropriate intervention and outcome.

**Analgesia, pain and dysphoria defined**

**Analgesia** is defined as the lack of a response to painful or noxious stimuli while in an awake state. The interruption of painful stimuli is integral to veterinary patient care, comfort and recovery.¹ One of the ways analgesia can be achieved is via administration of opioids and interruption of the pain pathway.

**Pain** is a noxious stimulus that potentiates a cascade of events. Untreated pain provokes myriad unwanted physiologic responses such as anorexia, self-trauma, central sensitization and maladaptive behaviors, all of which prolong recovery and add unnecessary stress.¹ Stress drives the sympathetic nervous system, which activates the flight or fight response.

Pain is unique to each patient and exists in different capacities, including chronic arthritic pain, neuropathic pain, acute pain and traumatic pain. Because further >>

---

**Figure 1. Dysphoria management**
complications can arise when more than one type of pain is present, the anesthetist must simultaneously plan for pain related to chronic problems and anticipate acute pain. For example, an older patient with arthritic hips that is going to be positioned for an abdominal exploratory requires hip support in addition to systemic analgesia.

Dysphoria, a feeling of discomfort or unease, often occurs with administration of pure mu opioids. Co-administration of anesthetics, underappreciated pain or underlying behavioral issues can factor into the development of dysphoria. Of note, administration of opioids in painful canine and feline patients is less likely to promote dysphoria, nausea and vomiting. Rapidly delivered intravenous opioids—even at clinically appropriate doses—may promote excitement, which is generally brief and typically resolves without intervention. By comparison, dysphoric patients are vocal, disruptive, and inconsolable. An inconsolable patient does not respond to interaction. The dysphoric patient may be bradycardic, disinterested in food or water, and the third eyelids may be visible. Dysphoria can also be accompanied by anxiety, distress, or agitation.

**Dysphoria Versus Pain: Key Points to Remember**
- Dysphoria and pain are different phenomena and necessitate different interventions.
- Inconsolable patients do not respond to interactions or manipulation of the affected area. These patients may present with visible third eyelids, minimal jaw tone and bradycardia.
- When uncertain about the appropriate treatment method, first rule out pain.
- Once dysphoria is remedied, these patients still require appropriate pain management.
- Most importantly, sedation is not the correct intervention for every painful or dysphoric patient.

**A systematic approach is recommended when determining whether pain or dysphoria is present. If the anesthetist is uncertain about which treatment is indicated, pain should be ruled out first.**

<table>
<thead>
<tr>
<th>Table 1. Dysphoria treatment</th>
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<tbody>
<tr>
<td><strong>DRUG</strong></td>
</tr>
<tr>
<td>Naloxone</td>
</tr>
<tr>
<td>Butorphanol</td>
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</table>

<table>
<thead>
<tr>
<th>Table 2. Sedatives/anxiolytics used in veterinary medicine</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>DRUG</strong></td>
</tr>
<tr>
<td>Dexmedetomidine</td>
</tr>
<tr>
<td>Acepromazine</td>
</tr>
<tr>
<td>Trazodone</td>
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</tbody>
</table>

*When using dexmedetomidine, thorough and consistent patient monitoring is vital. The profound cardiovascular effects of this medication may not be suitable for some patients.

<table>
<thead>
<tr>
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</tr>
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</tr>
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</table>

**Treatment**
A systematic approach is recommended when determining whether pain or dysphoria is present. If the anesthetist is uncertain about which treatment is indicated, pain should be ruled out first. A dysphoria management algorithm (Figure 1) provides treatment direction and options. Treating dysphoria can partially to completely antagonize the untoward effects of pure mu opioids (Table 1). High doses of naloxone will antagonize the central effects of opioid agonists that may cause the animal to experience acute pain and associated sympathetic stimulation with serious consequences that include tachycardia, hypertension.
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pulmonary edema and cardiac arrhythmias. It is best to administer naloxone to effect by careful titration, keeping in mind that multiple doses may be needed to maintain antagonistic effects due to its short duration of action.  

A common misconception about the painful or dysphoric patient is that the necessary intervention is a sedative or anxiolytic. Administering a sedative to a dysphoric patient does not resolve the dysphoria and potentially compounds existing problems (Fairfield, AF, personal communication, October 3, 2019). Similarly, painful patients will not be comfortable or euphoric after receiving a sedative. Table 2 details appropriate interventions after pain and/or dysphoria is treated or ruled out.

Complicating factors that may lead to difficult recoveries include older patient age and pre-existing anxiety. Interaction with and handling by the veterinary team, as well as the increased noise and lights inherent to a veterinary hospital setting, can also lead to rough recoveries. Interestingly, a having a full bladder can lead to a rough recovery as well.  

Ms. Carter is manager of operational excellence at Bush Veterinary Neurology Service in Frederick, MD.

REFERENCES

Diagnosis: Poor boundaries
Symptoms may include resentment, anger, frustration, burnout, exhaustion and sadness.

What are boundaries?
Boundaries are the lines you draw that help others know how you want to be treated. If you don’t have healthy boundaries, you might be passively relying on others to know how you want to be treated. While we would all love for people to consider others before themselves, that’s not reality.

Why are boundaries important?
Before I discovered my own boundaries, I was known as a “yes” woman in veterinary practice. Stay late to help with that blood transfusion? Yes! Need someone to help with that extra shift once a week until we find a replacement? I’ll do it!

I wanted opportunities to advance my career, and I thought I could handle anything. Until I couldn’t. I burnt myself out and ran from practice, trying to find a company that would treat me better. Finally, a good friend told me the truth: You can’t put everything and everyone before yourself and still be happy.

Anyone who’s flown has heard these words: “If the cabin should lose pressure, put your oxygen mask on first before assisting others.” The same goes for emotional health—you need to take care of yourself before helping others.

Treatment plan: Set a better perimeter
Feeling resentful, angry or burnt out may be signs that you’re ignoring your personal boundaries. When I always stayed late to help, I felt it was expected of me—that I had no choice. I felt angry, exhausted and resentful. Social psychologist Brené Brown advises keeping a resentment journal for a while to help track moments when you might need a boundary. Other helpful actions include:

Do a reality check. When staying late became my norm, I’d have thoughts like, “What would they...”
Do I care about this person’s opinion of me? Does it really exist? Consequences to the next shift. Boundaries need accountability. If you don’t uphold a boundary, does it really exist? Consequences don’t have to be all or nothing; for example, if I had to stay late one day, I wouldn’t quit on the spot. I would just make note of it and if it became a pattern or was regularly expected of me, I would have a conversation with my manager.

Define consequences. Boundaries need accountability. If you don’t uphold a boundary, does it really exist? Consequences don’t have to be all or nothing; for example, if I had to stay late one day, I wouldn’t quit on the spot. I would just make note of it and if it became a pattern or was regularly expected of me, I would have a conversation with my manager.

**Side effects: Roadblocks to watch for**

**Being uncomfortable saying “no” so often**

I was terrible at putting myself first, because I was afraid of what saying “no” would do. When I realized that no one was going to care about my wellbeing more than me, I had to choose what I needed over making sure that everyone else felt okay. When you start to create boundaries, you’ll need to get used to saying no. Making others uncomfortable is something we avoid like the plague, but it’s important that we learn to choose ourselves over discomfort.

**Holding onto guilt and fear**

Boundaries can be scary at first. Typically, we battle with the fear of what others will think about us or guilt that we’re letting people down. I predicted that my coworkers would think I was lazy, not a team player, and that I wouldn’t be offered other opportunities at work.

This is another good moment for a reality check. Letting go of fear doesn’t mean that you’ll never feel fear again—it means you choose to not let fear make the decision for you. If you believe your work is valuable, that you’re a hard worker and that you’ve earned opportunities, then use that evidence to challenge your fear when it sneaks into your thoughts.

**Being unprepared for pushback**

When I told my boss “no” for the first time, she was supportive. Over time, however, that boundary was pushed. When I got frustrated, I told myself the pushback was proof that my boss didn’t respect me. When I took some time to reality check my situation, I realized it had nothing to do with me: My boss was trying to manage a larger workplace problem, and my boundaries and needs just weren’t the first thing on her mind.

I realized that it isn’t always intentional when people push back or ignore boundaries. I also believed that I could still help solve the problem and maintain healthy boundaries. This led me to restate my boundaries with my boss and explain my goal: I wanted to help, and I wanted to be healthy. That conversation led to more collaboration, not a battle.

If you experience pushback when you set a boundary, do a reality check. Have an open conversation with the person. See how your shared goals align. If the person continues to treat you badly or is angry with you, ask yourself:

- Do I care about this person’s opinion of me?
- Is this relationship healthy for me?
- How can I maintain my boundaries while still working with this person?

**Prognosis: Good**

Signs of better boundaries over time can include more self-awareness, improved relationships, less stress, improved communication skills, increased understanding of others, and increased happiness. Until I discovered the power of boundaries, I was afraid of them. I assumed that the more I pleased others, the more successful I would be. Now I see this is counterintuitive: I can only expect others to respect me as much as I respect myself.

Boundaries are hard in the beginning. They take practice and self-reflection to be successful. The stakes can be high, because the people we need to build the most boundaries with are often the ones we care about the most.

With healthier boundaries, I see less conflict in my relationships and my communication skills have improved. In addition, I take on less guilt, which helps me move past emotional thoughts more quickly. They can do the same for you.

Kristina Guldbrand worked as a certified veterinary technician for 12 years before becoming an account manager for Veterinary System Services in the Denver, Colorado, area. She has received training through the International Coaching Federation and provides workshops, leadership and wellbeing coaching as well as teambuilding for practices.
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WARNINGS: Use ZYCORTAL Suspension with caution in dogs with congestive heart disease, edema, severe renal disease or primary hepatic failure. Desoxycorticosterone pivalate may cause polyuria, polydipsia, increased blood volume, edema and cardiac enlargement. Excessive weight gain may indicate fluid retention secondary to sodium retention.

HUMAN WARNINGS: Not for human use. Keep this and all drugs out of the reach of children. Consult a physician in case of accidental human exposure.

PRECAUTIONS: Any dog presenting with severe hypovolemia, dehydration, pre-renal azotemia and inadequate tissue perfusion (“Addisonian crisis”) must be rehydrated with intravenous fluid (sodium) therapy before starting treatment with ZYCORTAL Suspension. The effectiveness of ZYCORTAL Suspension may be reduced if potassium-sparing diuretics, such as spironolactone, are administered concurrently.

ADVERSE REACTIONS: The field safety analysis included evaluation of 1,52 dogs. The most common adverse reactions reported are polyuria, polydipsia, depression/tetany, inappropriate urination, alopecia, decreased appetite/anorexia, panting, vomiting, diarrhea, shaking/trembling, polyphagia, urinary tract infection, urinary tract incontinence and restlessness. Reports of anaphylaxis and anemia have been associated with a different desoxycorticosterone pivalate injectable suspension product.

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A clean bill of health is a reason to celebrate

I advocate for more early-detection diagnostics because they make sense for pet health, client peace of mind and the practice’s bottom line.

By Nancy Drumm

Adding more and better preventive care protocols in your veterinary practice can seem daunting: What exactly counts as preventive care? How do you price the services? Will clients accept it? Don’t worry—I know from experience that implementing preventive care protocols can work well for your patients, your clients and your practice.

The first step in this journey is reminding yourself that veterinary medicine is about providing our clients’ four-legged family members with the best quality and longevity of life possible. In other words, it covers much of the work you already do: annual or twice-yearly physical exams, early-detection diagnostics and vaccines, as well as prevention of disease from fleas, ticks and heartworms. Every veterinary team, yours included, already has a written or unwritten standard of care that applies to how you treat pets for their annual healthy pet exam, regardless of whether your practice calls it a wellness exam, preventive care visit or some other name. The point is that all practices are already in some way heading down the preventive care path, and the protocols outlined here can help your practice make further progress in a way that’s right for your team.

Recommend diagnostics consistently

I argue that the standard of care for a practice must ensure that you aren’t missing early signs of disease that should be monitored or treated. To do that, a preventive care appointment that includes early-detection diagnostics provides the best value for clients and the highest probability of catching potential concerns as early as possible.

Research from the American Animal Hospital Association (AAHA) clearly supports the importance for otherwise “healthy pets” of conducting internal parasite exams, vector-borne disease testing, a
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complete blood count (CBC) and a serum chemistry profile. One in four adult and senior dogs that present for a healthy pet exam will have diagnostic markers that require follow-up, making it critical that we recommend these diagnostics consistently.

**Price preventive services strategically**

How can a typical practice price preventive care services to maximize value for clients? In our practices, we’ve seen success with charging less for preventive care appointments than for sick patient appointments. We know that preventive care appointments are price-shopped, and being competitive in pricing for these exams while still remaining profitable can bring new clients in the door.

After all, no practice—no matter how good it is—can wow a client who doesn’t come in. A preventive care appointment is an opportunity to create lasting bonds, so a pet owner returns when the dog eats a tennis ball or the cat’s chronic kidney disease needs management. We need to respect the lifetime value that a satisfied and bonded client brings to the practice directly as well as through word-of-mouth referrals to our practice for family and friends.

Here’s a successful case study example: Our practices established a baseline protocol for early detection that made sense in our region. And we priced it aggressively to gain compliance and increase revenue per patient visit. Our practices are in tick country, and we see many tickborne diseases that we need to test for annually. As a result, our early-detection diagnostic panel includes an internal parasite test (comprehensive fecal analysis), testing for tickborne disease and heartworm disease, a CBC, a serum chemistry profile and an SDMA (symmetric dimethylarginine) test.

We price our early-detection diagnostic panel (including CBC, serum chemistry profile and SDMA test) about 30% higher than the comprehensive fecal analysis and SNAP 4Dx Plus Test (Idexx) combination, which generates additional revenue per preventive care visit. Clients find it affordable, and we’re able to incorporate diagnostics into more preventive care visits. Some clients may say, “Not at this time,” but they’ll never say yes unless we ask them.

**Communicate effectively**

Most of the time, early-detection diagnostic results will be within normal limits, so veterinarians and team members need to celebrate this good news with clients. Teams can help clients understand that these tests matter in helping their pets live the best life they can. All too often in veterinary medicine, we become excited about the unusual and are biased about the “normal.” We sometimes forget that for our clients, the news that their pet is healthy and doing well can be exciting.

When your team members see the value being placed on “normal,” they’re more likely to feel confident in recommending early-detection diagnostics as well. We need to emphasize the value of preventive care for our patients and clients and to our teams within the practice.

Another crucial moment with early-detection diagnostics is when we find problems in otherwise healthy-appearing pets and find opportunities to intervene earlier. When we see markers that concern us, we can talk to clients about the appropriate strategy right away, whether it’s treatment or monitoring. Clients appreciate the value of detecting potential disease early, and we’re ultimately hoping for better outcomes if we catch something before the pet becomes ill.

**Appreciate the work of preventive care**

Practice managers and owners would all prefer to generate more income during a 20-minute visit, because all of our fixed costs are the same whether we earn $75 or $250. Additional diagnostics is a way practices can earn more revenue during a patient visit.

Research indicates that we’re likely to find problems when we actually look for them. That’s why early intervention not only helps the patient, but also provides additional revenue for the practice through the diagnostics as well as additional follow-up activity. Our practices have seen an increase in dentistry and minor surgeries, such as lump removals, because a more comprehensive panel can be used for most of our preanesthetic protocols.

Ultimately, practice managers and owners need to design the standard of care and protocols for what makes sense for that practice and that location. Educate clients on the benefits of early detection, and make sure that it’s part of your preventive care process. Develop an early-detection diagnostic panel that meets your needs and workflow, and price it aggressively to provide value to all of the stakeholders in your practice.

**REFERENCE**


Nancy Drumm is general manager of four AAHA-accredited hospitals in the Capital District of New York and blogs on one of IDEXX’s veterinary-facing websites at practicelife.com.
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There's still time to register for Fetch Baltimore (April 2-5)!
Visit fetchdvm360.com for information and to register for this fun and educational event.
When we decided to start promoting ProHeart 12 (Zoetis), we were uncertain how successful it would be for our practice. But a light bulb went off for us as we thought more and more about it. If we could get more patients on these injectables, we’d get 100% compliance with heartworm preventive (as opposed to trusting clients to remember every dose at home) and keep sales in the clinic and out of online pharmacies. The best part is, we priced the injectable to be competitive. Here’s how we did it—and you can try it too.

**Set the price**
Price ProHeart less than a popular online pharmacy’s price for a 12-month supply of a popular oral preventive. Explain that to clients.
Create a price sheet by weight for pricing purposes on treatment plans.

**Get buy-in**
Make ProHeart as important as a rabies vaccine when educating clients and team members.
Make sure all the hospital’s doctors feel good about recommending the injectable.
Encourage team members to put their own dogs on ProHeart. (Sales reps may be able to provide product for the team.) Nothing is more comforting for recommending products and services to a client than a team member saying, “My dog is on it, and I love it!”

**Set goals**
Partner with your reps to set goals with enticing rewards. I suggest a three-month goal, so educating clients becomes a habit.
Update team members on the compliance numbers regularly.

**Educate clients**
Remind clients that ProHeart is convenient, requiring only one injection a year.
Explain that they no longer have to remember to dose every month or shove a pill down their dog’s throat.
Make sure clients realize that your pricing is competitive with that of noninjectable heartworm preventives and that they may even benefit from manufacturer rebates.

**Manage the skeptics**
Concerned that a once-a-year preventive will cut down on client visits? When I look at numbers, single-dose purchasers are less than 30% compliant. With that compliance rate (you can check your own), I’d argue clients aren’t visiting the practice more often.

**Ready, Set, Go!**
Moving to injectables like ProHeart 12 with long durations also allows you to cut back on other drugs (like parasite preventives) taking up inventory space and eating up staff time.
ProHeart 12 was a hit for our veterinary hospital—200 injectables in the first six weeks—and the math that makes it work for us and our clients might work for your practice too. It’s worth a try!

Emily Shiver, CVPM, is practice manager at Cleveland Heights Animal Hospital in Lakeland, Florida.
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