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Trends magazine

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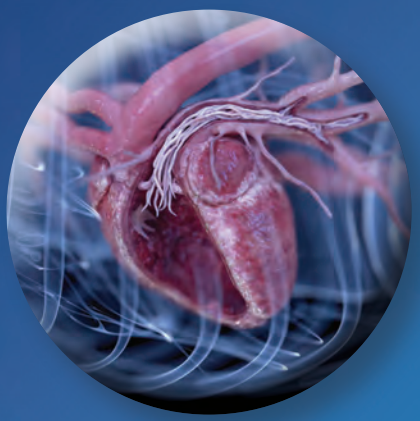
FIGHTING THE SPREAD of Canine Heartworm Disease

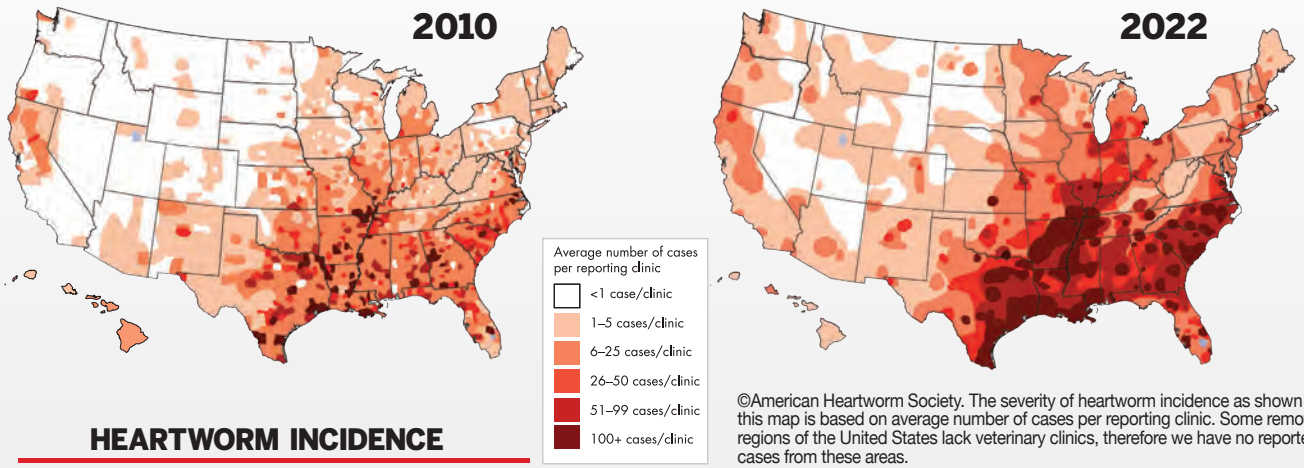


NexGard® PLUS
(afoxolaner, moxidectin, and pyrantel chewable tablets)

This delicious, easy-to-give chew can help you protect more of your patients against heartworm disease.

HEARTWORM DISEASE IS ON THE RISE

The latest incidence map from the American Heartworm Society (AHS) shows an upward trend in the overall heartworm infection rates in the US.[1] When you look more closely, you see the rates are trending upward in traditional hot spot areas, but more alarmingly, the rates are also rising in geographic locations with historically low heartworm rates.



HEARTWORM INCIDENCE

©American Heartworm Society. The severity of heartworm incidence as shown in this map is based on average number of cases per reporting clinic. Some remote regions of the United States lack veterinary clinics, therefore we have no reported cases from these areas.

IT ALL STARTS WITH YOUR RECOMMENDATION

When it comes to slowing this increase in heartworm disease, it all starts with recommending year-round heartworm disease prevention for all your canine patients.

Recent assessments show that approximately

68%

of dogs seen by veterinarians in the US receive no heartworm disease prevention from that veterinary practice each year.[2,3]

Sponsored by Boehringer Ingelheim

This delicious, beef-flavored soft chew makes compliance easy

DESIGNED WITH COMPLIANCE IN MIND

When developing *NexGard*® PLUS (afoxolaner, moxidectin, and pyrantel chewable tablets), the Boehringer Ingelheim team worked to create a delicious, beef-flavored chew with a soft texture that is designed to be easy-to-give and provide an ideal experience for both your patients and their owners.

IN A LABORATORY STUDY,

DOGS PREFERRED*[4]

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

OVER

***Simparica* TRIO®**
(sarolaner, moxidectin, and pyrantel chewable tablets)

THE ONE YOU WANT FOR ONE-AND-DONE MONTHLY PROTECTION

FLEAS + TICKS + HEARTWORM DISEASE + ROUNDWORMS + HOOKWORMS

- Delicious, beef-flavored soft chew makes compliance easy and enjoyable
- The same proven dose of afoxolaner prescribed to millions of dogs[5]
- Delivers an optimized dose of moxidectin that is safe and effective
- Safe for use in puppies as young as 8 weeks, weighing 4 pounds or more
- Backed by the exceptional **SATISFACTION GUARANTEE** from *NexGard*® Brand Products to give you peace of mind

*For dogs demonstrating a preference, they preferred *NexGard* PLUS chews over SIMPARICA TRIO.

IMPORTANT SAFETY INFORMATION: *NexGard*® PLUS (afoxolaner, moxidectin, and pyrantel chewable tablets) is 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.

References: 1. New American Heartworm Society Heartworm Incidence Map Reveals Upward Trend in Heartworm Cases. American Heartworm Society. Published April 11, 2023. Accessed September 15, 2023. https://www.heartwormsociety.org/in-the-news/825-new-american-heartworm-society-heartworm-incidence-map-reveals-upward-trend-in-heartworm-cases. **2.** Drake J, Wiseman S. Increasing incidence of *Dirofilaria immitis* in dogs in USA with focus on the southeast region 2013-2016. *Parasit Vectors*. 2018 Jan 17;11(1):39. **3.** Data on file at IDEXX Laboratories, Inc. Westbrook, Maine USA. **4.** Data on file at Boehringer Ingelheim. **5.** Data on file at Boehringer Ingelheim.

Boehringer Ingelheim

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*. NexGard® PLUS is indicated 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), and *Amblyomma americanum* (lone star tick) infestations for one month in dogs and puppies eight weeks of age and older, weighing four pounds of body weight or greater.

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 to 8 lbs.	9.375	45	18.75	One
8.1 to 17 lbs.	18.75	90	37.5	One
17.1 to 33 lbs.	37.5	180	75	One
33.1 to 66 lbs.	75	360	150	One
66.1 to 132 lbs.	150	720	300	One
Over 132 lbs.	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.

Collectively, the data from the four studies (three laboratory and one 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, afoxolaner alone demonstrated >97% effectiveness against *Dermacentor variabilis*, >94% effectiveness against *Ixodes scapularis*, and >93% effectiveness against *Rhipicephalus sanguineus*, 48 hours post-infestation, for one month. At 72 hours post-infestation, NexGard® PLUS demonstrated ≥97% effectiveness against *Amblyomma americanum* for one month.

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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from the editor's desk

HELLO READERS! I almost called this issue the Inventory Issue, but I didn't want to scare anyone away. Inventory might not be the most exciting topic you have ever thought of, but don't tell that to Nicole Clausen, CSSGB, CCFP. The self-proclaimed inventory nerd has five great tips for you to get your inventory management under control for the new year.

Speaking of inventory, we also have an article from Lowell Ackerman, DVM, DACVD (Emeritus), MBA, MPA, CVA, MRCVS, on what you should stock in your pharmacy for 2024. Ackerman acknowledges that most practitioners are not super excited about thinking about inventory—but it is important for keeping track of profitability, and we all like profits!

Almost as titillating as inventory is practice finance—but once again, it comes down to the question of "are you making money?" Karen E. Felsted, CPA, MS, DVM, CVPM, CVA, makes it easy to perform a profit checkup with her expert advice.

Of course, you don't want to miss reading the executive summary of AAHA's latest guidelines, the *2023 AAHA Management of Allergic Skin Diseases in Dogs and Cats Guidelines*. This is one of our most anticipated guidelines, and for good reason. An amazing task force has brought together the best brains in the business when it comes to itchy pets. Of course, you can read and download the entire guidelines from either jaaha.org or aaha.org/allergic-diseases.

Our podcast article this month is a conversation with Kathleen Cooney, DVM, CHPV, DACAW resident, founder of the Companion Animal Euthanasia Training Academy (CAETA). Cooney tries to answer the question: can euthanasia be a beautiful thing? It is not always, but it definitely can be.

THE *TRENDS* EMPLOYEE OF THE MONTH CONTEST—EVERYBODY WINS

Do me a favor. Right now, go to aaha.org/EOTM and nominate one of your coworkers for the employee of the month contest. Then, have them nominate you! When you enter our monthly drawing, the winner will win a $400 gift card, and the person who nominated them will receive a $100 gift card from Amazon! This is your chance to shine the spotlight on one of your best employees, and win some loot for doing so. If you don't win, don't worry, you can enter again the next month! Enter today at aaha.org/EOTM.

COMING NEXT MONTH

We have a great surprise for you in January. I won't give it away, but it is something that has not been done in more than 10 years here at *Trends*. Can you guess? You won't be disappointed! As for the article topics, we are going to get into tech utilization, telehealth, and staff retention and also take a dive into the wild world of artificial intelligence.

As always, let me know what you think at trends@aaha.org.

—Ben Williams, Editor

View from the Board

Numbers Don't Lie

I can't speak for everyone, but I can say that when I entered veterinary school, I did not do so with the intention of hoping to someday worry about inventory management and watching key performance indicators (KPIs). I entered veterinary medicine because it was exciting, and I loved the challenge of helping those who cannot speak for themselves. I loved the problem-solving component mixed with science. At no point did I fantasize about watching KPIs, much less worrying about how those KPIs would affect my staff, myself, and occasionally my patients and clients. Even when I became a partner in a practice, I didn't fully understand the importance of watching them. It wasn't until I became a sole owner that I realized just how important KPIs are to the health of my practice. Fast forward to now, and I am watching my KPIs regularly. I am making strategic practice decisions based on trends in my KPIs and have a much healthier practice because of it.

I learned pretty quickly in practice that while going with a gut feeling is important, it is not a good bellwether from which to make decisions. Generally, numbers don't lie. They can be skewed, even ignored, but they don't lie. When I started watching KPIs such as payroll, cost of goods/inventory, taxes, electricity/water, and so on, it became apparent that when costs of things increased, that directly affected profitability and my ability to reinvest in the practice. I found that the easiest way for me to manage that was by watching my inventory and cost of goods like a hawk. Holding myself accountable to a budget set based on my KPIs had the most direct effect on my ability to pay my staff. When the hospital is more profitable, there is more money as a percentage of gross for payroll. This makes for happier staff, and I can feel better knowing that I am supporting them at a higher level financially than I was able to previously.

The things I found that helped control my inventory are not new ideas. Practice consultants have been talking about them for years. I did not create these ideas, I just started listening to them and implemented the ones that seemed to make the most sense. The biggest help was not carrying multiple versions of items that did the same thing. This includes things like heartworm prevention. In my area this is easily the largest percentage of inventory, and limiting the options that I carry in house did a great job of helping the bottom line. The same goes for ear medication and anti-inflammatories. Yes, we have an online store for the one-offs, but that is still pretty minimal. With in-house pharmacies shrinking due to online options, it is important to not have a lot of money sitting on the shelf collecting dust when it can be put to use in other ways, such as updated equipment, new areas of revenue, or staff payroll.

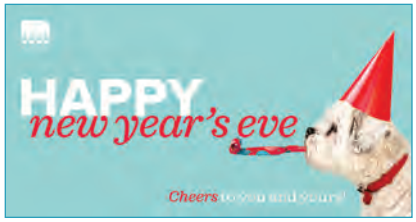
My recommendation is to not rely on any gut feeling. Every hospital should have someone who geeks out on the numbers to help guide the ship and make strategic decisions that are in the best interest of the business. Numbers don't lie, but they also don't tell you anything if you don't look at them.

Scott Driever, DVM, is president-elect of the AAHA board. Driever is a Houston native who received his DVM degree from Texas A&M University in 2000. Upon graduation, he moved back to Houston and began his veterinary career at Animal Hospital Highway 6 in Sugar Land, Texas, where he became a partner in 2005. In 2015, he purchased the rest of the practice and became the sole owner. His wife, Susan, is the office manager at the practice.

This month in AAHA's Publicity Toolbox . . .

Here are the downloadable social media images available for AAHA-accredited members at **aaha.org/publicity** this month:

If you're cold, they're cold.
Season's Greetings
National Cat Lovers Month
Happy New Year's Eve
December 31



What Does Your Fire Evacuation Plan Look Like?

We have been revamping our Safety and Health SOP, and evacuation plans are top of mind. We have a fire evacuation plan and a group meeting place; however, we would love to hear from others when it comes to their protocol. Thanks in advance!

A: AVMA also has a Safety Standards regarding a written disaster and emergency management plan. Check them out here: avma.org/resources-tools/animal-health-and-welfare/disaster-preparedness.

A: Call your local fire department and ask them to help set up a plan. They were great!

AAHA | Community

Help a peer by adding your thoughts to the conversation at community.aaha.org. Questions about your membership? Email community@aaha.org.

New Device Gives Voice to Animals' Pain

by Emily Singler, VMD

How often do you find yourself trying to convince a client that their pet is in pain, even though they aren't crying? How about those times when you are wondering if your patient's behavioral changes may be pain-related? The practice of veterinary medicine is undoubtedly more challenging because our patients cannot verbalize what they are feeling.

We are, of course, experts at reading animal body language and gleaning as much information as we can from it. But there are still times when it is hard to know how much pain our patients are experiencing. A new device called PainTrace is changing all that by "giving a voice to pain."

To learn more, I caught up virtually with three representatives of BioTraceIT, the manufacturer of PainTrace. Deb Dullen, president and CEO; Ralph Harvey, DVM, MS, DACVAA, chair of the veterinary advisory board; and Katie Hickey, global clinical program director, joined me on a call from the National Institutes of Health (NIH) Pain in Animals Workshop in Bethesda, Maryland, to share more.

What Is PainTrace?

As Harvey, a veterinary anesthesiologist, eloquently described it, "the language of pain is electrical activity." PainTrace is a small device about the size of a deck of cards that is attached by a cable to two small metal sensors created to measure skin-based electrical activity that is indicative of pain within the body.

This noninvasive device boasts the ability to measure both acute and chronic pain, to document trends in pain levels over time, and to help localize pain in the body.

"It takes on the individualized experience of pain," Dullen said, which includes not only the physical sensation but also the psychological and social aspects of pain.

How Does It Work?

PainTrace is designed to be used in the veterinary clinic during a physical examination, while the patient is moving, during a surgical or dental procedure, or during recovery from a procedure. The sensors are placed and acquire a systemic signal comprising the whole body, regardless of the suspected pain localization.

Once the sensors are applied to the skin with an adhesive, the device communicates wirelessly with an iPad equipped with PainTrace software, allowing for real-time electrical readings that determine a patient's "pain score," which is a cumulative measurement of pain throughout the patient's body.

On the iPad, users will see a graph with a line tracing of the pain score of the patient and how it changes (if applicable) as the patient moves or when certain parts of the body are touched or manipulated. This helps veterinary professionals to localize the pain and determine its severity.

Esin Deniz/iStock via Getty Images Plus

According to Harvey, PainTrace can detect pain that was otherwise not detectable on physical examination, even by experienced practitioners. Pet owners can also witness the results in real time and have a more tangible indicator of their pet's pain.

How Have the Results Been Validated?

Much of the initial research and development was conducted in humans, who thankfully can verbalize their pain to corroborate the electrical readings. In patients, functional magnetic resonance imaging has been used to measure changes in the brain that are known to be consistent with pain responses. These findings were correlated with pain score readings from PainTrace.

Harvey and Hickey performed a live demonstration for me on the call. Harvey, who has been diagnosed with arthritis in one of his wrists, applied the sensors to his skin. Hickey showed me the pain score tracing on an iPad while she flexed one of Harvey's wrists and then the other. There was a clear spike in the pain score reading when Harvey's painful wrist was flexed, but no spike when his other wrist was flexed.

Case Summary: A Paralyzed Dog Gets a Second Chance

Harvey also shared a case summary to illustrate the value of PainTrace. A dog with a spinal injury had become paralyzed. The dog was treated with physical therapy for weeks and did not appear to be improving. The dog owners were strongly considering euthanasia because of poor quality of life.

The treating veterinarian had a PainTrace device and decided to use it to look for any evidence of spinal cord activity. With the device connected, the veterinarian performed a toe pinch and plantar pinch and measured an electrical response. This was enough to convince the owners to hold off on euthanasia and wait a little longer. The dog is now walking, albeit not perfectly.

Future Impacts on Patient Care

Dullen suggests that the implications of more widespread use of PainTrace are significant. "Veterinarians report that when pet owners see pain live, they are more motivated to make a decision with the vet to treat their pet's pain," she said, meaning more animals will get the relief they need.

This technology also presents a new diagnostic option for animals who cannot safely be handled without chemical restraint, since PainTrace can still obtain accurate readings in sedated or anesthetized patients.

Future Impacts on Team Wellbeing

The device may also make a positive impact on the mental wellbeing of veterinary personnel. Dullen said that based on published research, one of the biggest contributors to veterinary staff wellbeing is client satisfaction at the time of the visit. When pet owners partner with their veterinary team to provide the care that their pet needs, veterinary personnel can experience greater job satisfaction and improved wellbeing.

Clinical Trials Are Ongoing

The BioTraceIT team has big plans for PainTrace. Clinical trials are ongoing to gain FDA approval for human clinical use. The team also envisions a future where the device is already on hand in pet owners' homes, for use with both humans and animals. In this scenario, the veterinary team could instruct the pet owner to obtain their pet's pain score at home to either triage or monitor their pet's condition.

PainTrace was created to "speak for animals who have no voice," Harvey said. Hopefully, this technology can also help strengthen our bonds with our patients and our clients. ※

Further reading

Observational Study Monitoring Pain in 25 Dogs
paintrace.com/wp-content/uploads/2021/02/Observational-Study-Monitoring-Pain-in-25-Dogs.pdf

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PainTrace Resources
paintrace.com/resources

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New Study Explores Vaccine Hesitancy in Dog Owners

by Emily Singler, VMD

Many of us have had experiences with pet owners who refuse vaccines for their pets. These owners will offer a variety of reasons for their resistance, or sometimes no reason at all. Up until now, we have only had anecdotal evidence of this trend. Now, for the first time, researchers have started to quantify vaccine hesitancy in dog owners.

Matt Motta, PhD, assistant professor of health law, policy, and management at Boston University School of Public Health; Gabriella Motta, VMD, associate veterinarian at Glenolden Animal Hospital; and Dominik Stecula, PhD, assistant professor of political science at Colorado State University, recently conducted a study on canine vaccine hesitancy (CVH) and some of its causes and effects.

The Mottas, brother and sister, spoke with me and shared their motivation for conducting this research. They report that all three coauthors have been "aware for years" that some dog owners don't want to vaccinate their dogs.

From a Campfire to Cross-Disciplinary Research

Matt Motta, a researcher who has studied vaccine hesitancy in humans, and Gabriella Motta, a small animal veterinarian working in the trenches, recall sitting around a family campfire, trading "horror" stories from work. The subject of vaccine hesitancy came up.

Seeing that there were a lot of anecdotal similarities between their experiences with humans and animals, they kept talking about it. They continued that conversation "for a while," Matt Motta said, comparing human vaccine hesitancy, particularly to the COVID-19 vaccine, to pet owners who refused to vaccinate their dogs.

But unlike in human medicine, the authors noted that no one had made an effort to quantify vaccine hesitancy in animal owners or determine the effects of this behavior on public health and health policy. So, they set out to do just that.

Factors of Vaccine Hesitancy

According to Matt Motta, their findings suggest that the same factors (political party, level of education, promotion of vaccine misinformation, and others) that make people less likely to have a positive opinion of vaccines for themselves negatively affect their opinions on vaccines for their dogs.

This has been termed the "vaccine spillover effect," whereby views toward one vaccine affect views toward other unrelated vaccines. Matt Motta wrote in another article that negative attitudes toward the COVID-19 vaccine may be spilling over into attitudes toward mandatory vaccination of children for other diseases, for example.

The Rabies Example

The researchers documented that, among the dog owners surveyed, 37% found canine vaccines to be unsafe; 22% found them to be ineffective; and 30% found them to be unnecessary. Fifty-three percent of dog owners agreed with at least one of these positions.

In terms of the canine rabies vaccine specifically, 84% of dog-owning respondents indicated that they were sure that their dog was up to date with their rabies vaccine. Forty-eight percent of respondents opposed mandatory rabies vaccination for pets, believing that the decision to vaccinate should be left to the pet owner.

The sequelae of vaccine hesitancy in pet owners can be detrimental to both human and animal health, particularly in the case of rabies vaccination. Whereas transmission of rabies from dogs to humans can be largely prevented by vaccinating at least 70% of dogs in high-risk areas, the study authors report, areas where this 70% canine vaccination threshold is not met typically can see thousands of human deaths from rabies each year.

Opposition to rabies vaccine laws may contribute to relaxation and/or eradication of such laws in some municipalities, increasing the public health risk in those areas.

Vaccine Hesitancy and Veterinary Wellbeing

CVH also likely negatively affects the mental wellbeing, stress, and burnout levels of veterinary professionals, the researchers add. When pet owners disregard our expert advice to vaccinate their pets, the veterinary professional–client relationship can be damaged.

Conflict can also arise when unvaccinated animals are denied services such as boarding, surgeries, or nail trims to protect other animals, especially when veterinary staff and owners don't understand or agree with the decision. Veterinary professionals who do handle unvaccinated animals can experience increased stress as they worry about exposure to themselves, their coworkers, and their other patients.

The Mottas agree that their study is just the beginning. Future work will measure feline vaccine hesitancy, collect more qualitative information about why pet owners are hesitant to vaccinate their pets, and try to document correlations between infectious disease trends and vaccine hesitancy in pet owners.

They also plan to study any proposed changes to rabies vaccine laws in the past 40 years to determine how often changes have been made, why the changes were proposed, and what the effects of those changes have been.

Is Vaccine Hesitancy a Messaging Problem?

When asked if vaccine hesitancy in pet owners shows a messaging problem in veterinary clinical practice, the Mottas each relayed their own experiences. Matt Motta responded that, in his research with human vaccine hesitancy, "one of the best predictors of how people feel about medicine is how people feel about science and experts." These feelings can be affected by a number of factors, including political party affiliation and religion.

Gabriella Motta added that it is important at the clinical level to try to understand why any individual client might not want to vaccinate. While this won't always be the case, there may be some opportunities to refute any misinformation and help increase client trust so that they reconsider vaccination.

She also points out the importance of discussing vaccines and preventive care with clients who only tend to seek veterinary care when their pets are sick. These clients may not always be aware of what their pets are missing from vaccinations, and they may not understand the value of preventive care in their pets' lives.

As these studies continue, the Mottas hope that others will join them in looking for solutions to protect animal and human health, while fostering trust between pet owners and their veterinary teams. ※

Further reading

Sick as a Dog? The Prevalence, Politicization, and Health Policy Consequences of Canine Vaccine Hesitancy (CVH)
osf.io/preprints/socarxiv/qmbkv

Is partisan conflict over COVID-19 vaccination eroding support for childhood vaccine mandates?
nature.com/articles/s41541-023-00611-3

Emily Singler, VMD, is a 2001 graduate of Penn State University and a 2005 graduate of University of Pennsylvania School of Veterinary Medicine. Her career in veterinary medicine has included experience in shelter medicine, in private practice, and as a relief veterinarian. She currently works as a veterinary writer, consultant, and mentor and enjoys writing for both pet owners and veterinary professionals. Her writing interests include public health, preventive medicine, the human-animal bond, and life as a working mom. She is the author of *Pregnancy and Postpartum Considerations for the Veterinary Team*, which was published by CRC Press in November 2023 and is available to order now at www.emilysinglervmd.com.

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Claro® is indicated for the treatment of otitis externa in dogs associated with susceptible strains of yeast *(Malassezia pachydermatis)* and bacteria *(Staphylococcus pseudintermedius)*.

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[1]Angus JC. Otic cytology in health and disease. VCSA. 2004;34:411-24.
[2]Elanco Animal Health. Sales data on file.

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Awareness. Detection. Diagnosis.

November is Pet Diabetes Month.

Educating pet owners about the symptoms, treatment, and management of pet diabetes, so they can seek appropriate treatment for their dog or cat, is the goal of Pet Diabetes Month.

Early detection of pet diabetes is critical to proper management, and actively promoting diabetes awareness shows leadership from your clinic.

It is estimated that 1 in 300 adult dogs and 1 in 230 cats in the U.S. have diabetes.[1,2]

Use your social media channels, such as your clinic's Facebook page, to create interest in your program and spread awareness with **#PetDiabetesMonth**!

Learn more at **usa.petdiabetesmonth.com.**

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References: 1. Canine diabetes mellitus; can old dogs teach us new tricks? Catchpole B, Ristic JM, Fleeman LM, Davison LJ. *Diabetologia* 48:1948-1956, 2005. **2.** Feline diabetes mellitus in the UK: The prevalence within an insured cat population and a questionnaire-based putative risk factor analysis. McCann TM, Simpson KE, Shaw DJ, et al. *J Feline Med Surg* 9:289-299, 2007.

MERCK Animal Health

notebook

Giles was trapped in a sofa bed in a New York City apartment

Nationwide's 15th Annual Hambone Award Winner

Giles, a New York City cat who was inadvertently smooshed under a sofa bed, has captured the 15th annual Hambone Award for the most unusual pet insurance claim of the year. Nationwide presents the award to bring awareness to the unique and surprising things that can happen to pets—and how pet insurance plays a role in helping them.

Giles, adopted from a cat rescue, lives happily in a New York City apartment with owners Reid and Kaitlyn, who reported he has a newfound aversion to hinged objects.

The runners-up were Jax, a pug from Las Vegas who got heat stroke while cozied up in a comforter following surgery, and Sunny, a determined Labrador retriever from Anaheim who shimmied his crate five feet across the room to ingest three phone charger cords. The families of Jax and Sunny each receive a gift card and the opportunity for a charity donation to be made in each pet's honor.

All nominated pets have recovered and received reimbursements for eligible veterinary expenses from Nationwide pet insurance.

Hemodialysis Helps Dog Defy Odds of 10% Survival Rate After Antifreeze Poisoning

The UC Davis School of Veterinary Medicine News recently reported the successful treatment of a dog who had consumed antifreeze. In the fall of 2022, Mija, a rescued two-year-old Australian cattle dog mix, explored the garage of Ana Alexander, her rescuer, and chewed into a bottle of antifreeze. Alexander rushed the vomiting Mija to a local veterinary emergency room, where the prognosis was bleak—Mija had only about a 10% chance of survival. Her kidneys were failing due to antifreeze (ethylene glycol) poisoning.

When Mija arrived at the UC Davis veterinary hospital, the only facility in Northern California able to treat her extensive organ injuries, doctors concluded that Mija needed hemodialysis. But even with many rounds of dialysis, the chances of Mija's recovery were low.

Alexander agreed to dialysis. She learned how to tube feed Mija and to provide extensive home care. Over the next four weeks, Mija received eight dialysis treatments. She progressed to eating on her own and to weekly and then monthly appointments.

A year later, Mija's condition is no longer life-threatening. Alexander reports she is full of energy and is doing exceptionally well.

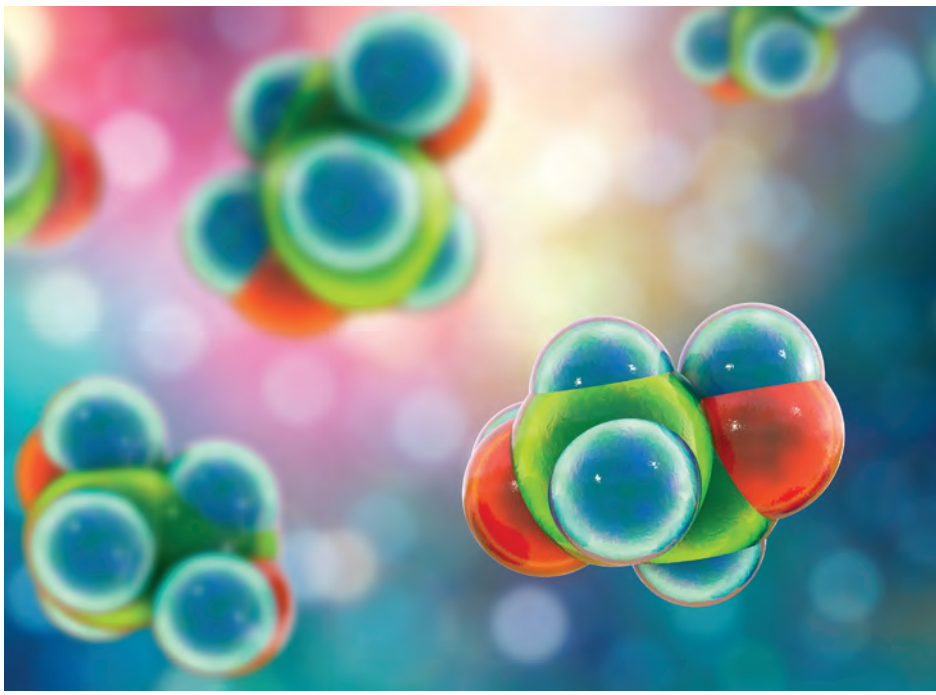
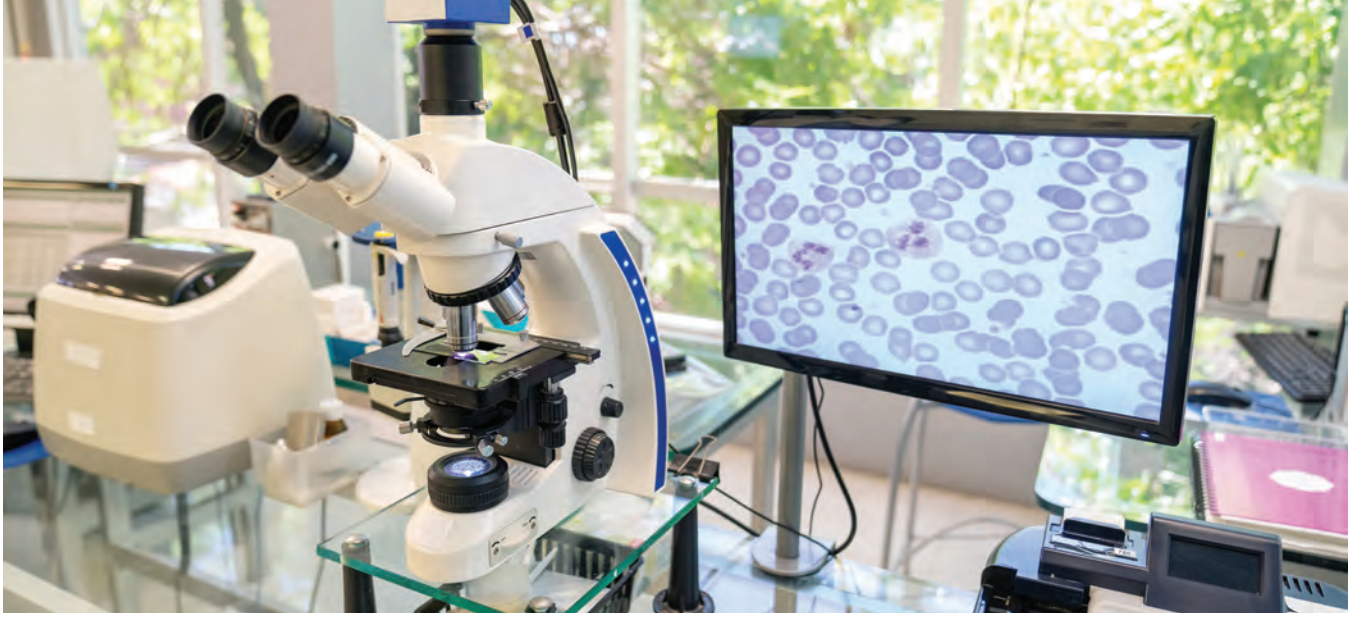


Photo courtesy of Nationwide, Dr_Microbe/iStock via Getty Images Plus



Researchers Exploring Data and AI Tools for Animal Health Diagnosis and Treatment

Stefan Keller, DVM, PhD, DECVP, an assistant professor and pathologist in the School of Veterinary Medicine at UC Davis, is exploring ways to use AI in three projects with colleagues from the university's Artificial Intelligence in Veterinary Medicine Interest Group. The projects are:

1. **Identifying Patterns with AI Tools**
   Keller and team are developing a machine learning algorithm (called a "classifier") that uses historical patient data to reduce errors in the interpretation of blood tests and to avoid inaccurate diagnoses. The project is funded by the UC Davis Venture Catalyst Science Translation and Innovative Research (STAIRTM) grant program.

   "We have thousands of . . . blood test data from over the past decades; if we take all that and run it through our algorithm, we can predict what disease the pets might have and what the prognosis might be," Keller said. While the initial application is for dogs, the team sees an opportunity to adapt the tool for cats and horses.

2. **Standardizing the Assessment of Inflammation**
   In Keller's second project, the team is investigating the assessment of inflammation in inflammatory bowel disease in aged cats. Keller sees an opportunity to standardize the assessment of inflammation and share it with clinicians by digitizing the data and running AI algorithms on it.

3. **Automating Patient Diagnosis in Real Time**
   Currently, scientists manually pull the data from a patient database onto a computer, run the classifier on that data locally, and then provide the information back to the clinician. Keller's team is working on shortening the process by hosting the classifiers on a shared platform and feeding the patient data directly into it so the patterns can be detected in real time.

FDA Conditionally Approves Canine Seizure Medication Fidoquel-CA1

The US Food and Drug Administration has granted Genus Lifesciences Inc. conditional approval of Fidoquel-CA1 (phenobarbital tablets) for the control of seizures associated with idiopathic epilepsy in dogs. Idiopathic epilepsy is a type of seizure disorder without a known cause and is a serious or life-threatening condition that affects approximately 5% of dogs.

Unapproved phenobarbital tablets from the human drug marketplace have historically been used in veterinary medicine to help control seizures in dogs. Fidoquel-CA1 are the only phenobarbital tablets that have received the agency's conditional approval for safety, quality manufacturing, and reasonable expectation of effectiveness.

Initial conditional approval is valid for one year with the potential for four annual renewals. During this time, the animal drug sponsor must demonstrate that it is actively working toward collecting the remaining effectiveness data needed to achieve full approval.

alvarez/E+ via Getty Images

CareVet, Blendvet, and Hill's Launch DEIB Initiative

CareVet, a leading network of veterinary hospitals, has announced a strategic partnership with Blendvet and Hill's Pet Nutrition to integrate diversity, equity, inclusion, and belonging (DEIB) content into its companywide CareVet Learning Institute. Hill's Pet Nutrition sponsored this integration as part of its ongoing commitment to creating a significant and lasting impact on the veterinary medical community.

The partnership fosters inclusivity and belonging in workplace environments for veterinary teams, clientele, and the community. On-demand modules developed by Blendvet and hosted on CareVet Learning Institute are available to veterinary professionals within CareVet's network.

The modules introduce veterinary professionals to critical DEIB issues prevalent in the industry; promote creative thinking; and ignite positive change within the workplace. The Blendvet modules, the nation's first and only veterinary-curated DEIB training curriculum, empower veterinary hospitals to cultivate a more inclusive workplace by offering both individual certification and hospital certification.

QUOTE OF THE MONTH

"I am driven by two main philosophies: Know more today about the world than I knew yesterday. And lessen the suffering of others. You'd be surprised how far that gets you."

—Neil deGrasse Tyson

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Immunotherapy Drugs Bring Years of Life to Dog

The life expectancy of most dogs who develop metastatic osteosarcoma is only 8 to 10 weeks. Jelly Bean, a Labrador retriever mix, has survived for nearly three years thanks to a clinical trial at Tufts University's Cummings School of Veterinary Medicine. Her progress may hold clues for treating osteosarcoma in dogs and, one day, people.

"The ability of the novel oral immunotherapy combination to induce a complete remission of Jelly Bean's cancer laid the groundwork for a prospective study of this therapy in dogs with osteosarcoma, given prior to the development of resistance," said Cheryl London, DVM, PhD, DACVIM, associate dean of research and graduate education and director of the Clinical Research Shared Resource. "We found that the immunotherapy regimen was equivalent to standard chemotherapy. Ultimately, our goal is to combine the immunotherapy regimen with chemotherapy to further improve outcomes in both dogs and people."

AVMA Champions Efforts to Address Rural Veterinary Shortages

The Rural Veterinary Workforce Act, formerly known as the Veterinary Medicine Loan Repayment Program (VMLRP) Enhancement Act, has been reintroduced in both the House and Senate after months of collaborative work by the American Veterinary Medical Association (AVMA), other stakeholder organizations, and congressional offices.

Championed by the AVMA, the bipartisan legislation would expand the reach of the VMLRP—a program that helps increase access to food animal veterinary services in rural areas by assisting with the significant obstacle of educational debt. The Rural Veterinary Workforce Act would end the federal taxation on VMLRP awards, which would enable more veterinarians to participate in a program that offers up to $75,000 over three years for student loan repayment in exchange for service in U.S. Department of Agriculture (USDA)–designated shortage areas. This would make the tax treatment of the awards the same as for the analogous program for physicians.

In 2023, the USDA declared 237 rural veterinary shortage areas in 47 states, which is more than any year to date. Since 2010, USDA awarded 795 VMLRP awards to veterinarians; meanwhile, 2,061 applications have been received to participate in the program since its inception.

“Increasing veterinary services in high-priority rural areas through the Rural Veterinary Workforce Act would help keep the nation’s livestock healthy and our food supply safe and secure, and protect public health,” said Rena Carlson, DVM, AVMA president.

Destination Pet Removes Noncompete Clauses in Employment Contracts for Veterinary Professionals

Destination Pet LLC, a premier provider of veterinary care and pet services, has eliminated the noncompete clause from employment contracts for veterinarians. All currently employed Destination Pet veterinarians have been released from any noncompetition agreements they had with Destination Pet or its subsidiaries.

Destination Pet belongs to a growing number of employers who have chosen to eliminate noncompete clauses in their employment agreements with veterinary professionals.

While Destination Pet is waiving the enforcement of noncompetition provisions, nonsolicitation provisions will remain in effect. Noncompete provisions will still apply as part of the sale of a business for prior practice owners.

Texas A&M Veterinarians Developing Frailty Instrument to Improve Canine Geriatric Care

Measuring frailty is a vital aspect of human geriatric care. Frailty considers physical, mental, and emotional changes associated with aging and is a better indicator of the body's condition and overall health than age. Now, the Dog Aging Project, a collaborative program led by the Texas A&M School of Veterinary Medicine & Biomedical Sciences (VMBS) and the University of Washington School of Medicine, is creating a frailty instrument that can be used to make health decisions and personalize geriatric veterinary care for dogs.

The plan for developing this instrument, using a variety of simple tests and questionnaires that can be performed by dog owners and veterinarians, was recently published in *Frontiers in Veterinary Science*.

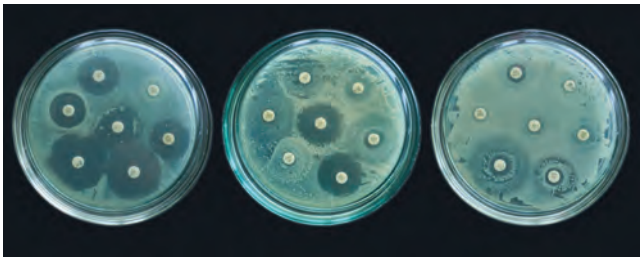
Once the Project team members have narrowed down the questions that most effectively determine a dog's frailty, they will develop a numerical frailty scale that general veterinary practitioners can use. After that, they plan to expand the scale into a full Frailty Instrument for Dogs to increase its usefulness in real-life situations.

Especially in an emergency room setting, knowing a dog's frailty score will help manage owner expectations and ensure that the medical decisions being made accurately consider the dog's prognosis and quality of life.

FDA Releases Plan for Supporting Antimicrobial Stewardship

Antimicrobials are crucial for treating infections, but nonjudicious use of these therapeutics can lead to the evolution of resistant bacteria. The FDA's Center for Veterinary Medicine (CVM) has long been committed to antimicrobial stewardship in animals to help preserve the effectiveness of antimicrobial drugs and slow the development of antimicrobial resistance.

The CVM recently released "Supporting Antimicrobial Stewardship in Veterinary Settings, Goals for Fiscal Years 2024–2028," a five-year plan building on the plan for FY 2019–2023.



The five-year plans are intended to provide stakeholders with a transparent roadmap of the actions that correspond to FDA's three main veterinary stewardship goals:

1. Align antimicrobial drug product use with the principles of antimicrobial stewardship.
2. Foster stewardship of antimicrobials in veterinary settings.
3. Enhance monitoring of antimicrobial resistance and antimicrobial drug use in animals.

For continuity, the new five-year plan begins in Phase 3 and is organized under the same overarching goals and objectives.

Stakeholders and the public can see what FDA has accomplished thus far and follow progress on the FDA website.

Read the *2022 AAFP/AAHA Antimicrobial Stewardship Guidelines*, available at aaha.org/antimicrobials

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DROP EVERYTHING

SGLT2-inhibitor velagliflozin simplifies treating feline diabetes

Sponsored by Boehringer Ingelheim

Diabetes mellitus (DM) is one of the most common endocrinopathies in cats. While many cats experience good quality of life with dietary management and twice-daily insulin therapy, many owners may struggle with schedule disruption, needle phobia, and worry over potential hypoglycemia. **The unfortunate result is euthanasia for up to 30% of feline diabetics at or within 1 year of diagnosis.**[1,2]

In the last year, the FDA approved 2 oral sodium-glucose cotransporter-2 (SGLT2) inhibitors for use in newly diagnosed diabetic cats. BEXACAT™ (bexagliflozin tablets), which comes in oral tablet form, and SENVELGO® (velagliflozin oral solution), a liquid oral solution that's administered directly in the cat's mouth or on a small amount of wet food. For owners, a needle-free, once-daily treatment option could greatly simplify managing the disease.

SGLT2 inhibitors such as empagliflozin and dapagliflozin have treated type 2 diabetes mellitus (T2DM) in humans for over 10 years. They work by decreasing renal reabsorption of glucose, resulting in glucose loss through the urine and subsequent decreased blood glucose concentration (BG). SGLT2 inhibitors also have cardio- and renoprotective effects in people.

For felines, velagliflozin demonstrated its clinical efficacy in a pivotal field trial.[3] Two hundred fifty-two diabetic cats were enrolled—214 were newly diagnosed (ND), and 38 were previously treated with insulin (IT). One hundred fifty-eight cats (70%) completed the extended use period of the study; 26 cats were removed for reasons unrelated to velagliflozin treatment, and 68 cats were removed for poor clinical response (16 cats) or adverse events (52 cats). **By day 180, 81% of the remaining cats had BG or fructosamine concentration within reference range; 89% and 88% had improvement of polyuria and polydipsia, respectively. No cats developed clinical hypoglycemia.**

The most common side effect in the trial was diarrhea, which occurred in 50% of the cats. In most cases, diarrhea was mild and self-limiting. Only 2 cats were removed from the study because of diarrhea.

The most severe side effect was diabetic ketoacidosis (DKA), which occurred in 18 cats. During the first 2 weeks of treatment, 14/18 cats developed DKA, suggesting the need for close monitoring during this period. A significantly higher percentage of IT cats (7/38—18%) developed DKA than ND cats (11/214—5%). This compares favorably to a study in which 6% of diabetic cats treated with insulin presented with DKA.[4] Although IT cats were included in the velagliflozin study, SENVELGO oral solution is only approved by the FDA for use in ND cats.

The ideal velagliflozin patient is an otherwise healthy, uncomplicated diabetic cat that is eating and drinking, hydrated, and has no evidence of decreased appetite, vomiting, or diarrhea. Prior to treatment with velagliflozin, a minimum data base including complete blood count, serum biochemistry, tT4, urinalysis, fructosamine, and assessment of ketones is indicated for baseline evaluation and to rule out concurrent disease and ketosis.

Monitoring the success of velagliflozin treatment focuses on assessing physical exam (PE) and clinical signs, and evaluating parameters associated with glucose control and DKA. It's also crucial for owners to look for indicators of ketosis and DKA—decreased appetite, lethargy, and vomiting. While the trial reported no clinical hypoglycemia, you should monitor cats for signs of hypoglycemia, including lethargy and neurologic signs.

When beginning velagliflozin therapy, perform rechecks at days 2-3, 7, and 14 to proactively identify DKA. PE parameters suggestive of developing DKA include dehydration and weight loss. Although many cats lose weight within the first 2-3 days of therapy without developing DKA, significant weight loss (>8%) suggests the need for closer monitoring over the next few days. Using a handheld ketone meter that measures beta hydroxybutyrate (BHB) is ideal, but urine dipsticks are also effective.

Most cats will improve clinical signs, glucose, and fructosamine within 30 days. If no improvement is seen at 30 days or ketosis occurs at any time (positive urine dipstick or >2.4 mmol/L on a handheld meter), discontinue velagliflozin and start the cat on insulin therapy.

In summary, velagliflozin is a promising once-daily liquid oral solution for treating feline DM. Most cats experience improvement of clinical signs and glycemic parameters within 30 days. Diarrhea is common, but usually mild and self-limiting. Euglycemic diabetic ketoacidosis (eDKA) is the most severe side effect; although uncommon (5% of ND), proactive monitoring by the owner and veterinary team is crucial for prevention and early detection.

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1. Diabetes in Cats: Quantitative market research study. Proprietary presentation, July 19, 2021. Kynetec; St. Louis, MO, on behalf of Boehringer Ingelheim.
2. Niessen SJM, Hazuchova K, Powney SL, et al. The big pet diabetes survey: perceived frequency and triggers for euthanasia. *Vet Sci.* 2017;4(2):27.
3. Data on file at Boehringer Ingelheim.
4. Cooper RL, Drobatz KJ, Lennon EM, Hess RS. (2015). Retrospective evaluation of risk factors and outcome predictors in cats with diabetic ketoacidosis (1997-2007): 93 cases. *J Vet Emerg Crit Care.* 25(2), 263–272. https://doi.org/10.1111/vec.12298

Senvelgo®
(velagliflozin
oral solution)

NEW!

JUST WHAT CATS ORDERED

A convenient, once-daily liquid oral solution for feline diabetes

Simplify feline diabetes treatment for cats and their owners with the liberating convenience of a once-daily liquid oral solution.

- Delivers sustained glycemic control starting as soon as 1 week for most cats[1,2]
- Precise dosing tailored to the cat's weight
- Minimal risk of clinical hypoglycemic events[1-3]
- Well accepted by most cats[1]

Scan for more details!

*3 Months' Supply**

*Based on average cat weight of 11 lbs

1. Data on file at Boehringer Ingelheim.
2. SENVELGO® (velagliflozin oral solution) [Freedom of Information Summary; NADA 141-568]. St. Joseph, MO: Boehringer Ingelheim Vetmedica, Inc.; 2023.
3. SENVELGO® (velagliflozin oral solution) prescribing information.

IMPORTANT SAFETY INFORMATION: SENVELGO® (velagliflozin oral solution) is indicated to improve glycemic control in otherwise healthy cats with diabetes mellitus not previously treated with insulin. **Before using this product, it is important to read the entire product insert, including the boxed warning.**

Cats treated with SENVELGO may be at an increased risk of diabetic ketoacidosis or euglycemic diabetic ketoacidosis, both of which may result in death. Development of these conditions should be treated promptly, including insulin administration and discontinuation of SENVELGO.

Do not use SENVELGO in cats with diabetes mellitus who have previously been treated with insulin, who are receiving insulin, or in cats with insulin-dependent diabetes mellitus. The use of SENVELGO in cats with insulin-dependent diabetes mellitus, or the withdrawal of insulin and initiation of SENVELGO, is associated with an increased risk of diabetic ketoacidosis or euglycemic diabetic ketoacidosis and death.

Sudden onset of hyporexia/anorexia, lethargy, dehydration, or weight loss in cats receiving SENVELGO should prompt immediate discontinuation of SENVELGO and assessment for diabetic ketoacidosis, regardless of blood glucose level. SENVELGO should not be initiated in cats with ketonuria, ketonemia, pancreatitis, anorexia, dehydration, or lethargy at the time of diagnosis of diabetes mellitus, as it may indicate the presence of other concurrent disease and increase the risk of diabetic ketoacidosis.

Keep SENVELGO in a secure location out of reach of **children**, dogs, cats, and other animals to avoid accidental ingestion or overdose. **For more information, please refer to the enclosed package insert or visit SENVELGOClinic.com.**

Boehringer Ingelheim

L6528
Package Insert

Senvelgo
(velagliflozin oral solution)

15mg/ mL

For oral use in cats only

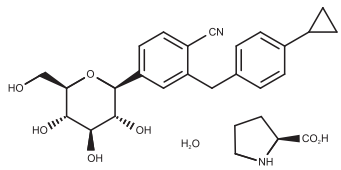
Sodium-glucose cotransporter 2 (SGLT2) inhibitor

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

WARNING: DIABETIC KETOACIDOSIS/EUGLYCEMIC DIABETIC KETOACIDOSIS
- **Cats treated with SENVELGO may be at an increased risk of diabetic ketoacidosis or euglycemic ketoacidosis (see Adverse Reactions). As diabetic ketoacidosis and euglycemic ketoacidosis in cats treated with SENVELGO may result in death, development of these conditions should be treated promptly, including insulin administration and discontinuation of SENVELGO (see Monitoring).**
- **Due to the risk of developing diabetic ketoacidosis or euglycemic ketoacidosis, do not use SENVELGO in cats with diabetes mellitus who have previously been treated with insulin, who are receiving insulin, or in cats with insulin-dependent diabetes mellitus (see Contraindications).**
- **SENVELGO should not be initiated in cats with anorexia, dehydration, or lethargy at the time of diagnosis of diabetes mellitus or without appropriate screening tests (see Animal Safety Warnings).**

Description: SENVELGO® (velagliflozin oral solution) equal to velagliflozin L-proline H_2O 20.051 mg/mL, is a clear, colorless to slightly yellow, to slightly brown, liquid multi-dose preparation consisting of 1.5% w/v velagliflozin in an aqueous mixture of propylene glycol and ethanol intended for oral use in cats. SENVELGO is an orally active, sodium-glucose cotransporter 2 (SGLT2) inhibitor.

The chemical name of velagliflozin is 2-(4-cyclopropyl-benzyl)-4-((2S,3R,4R,5S,6R)- 3,4,5-trihydroxy-6-hydroxymethyltetrahydropyran-2-yl)-benzonitrile. It forms a co-crystal with L-proline ((S)-pyrrolidine-2-carboxylic acid) as a monohydrate and velagliflozin, L-proline and H2O are in 1:1:1 ratios. Its empirical formula is $C_{23}H_{25}NO_5$ x $C_5H_9NO_2$ x H_2O, its molecular formula is $C_{28}H_{36}N_2O_8$, and its structural formula is:



Indication: SENVELGO is indicated to improve glycemic control in otherwise healthy cats with diabetes mellitus not previously treated with insulin.

Dosage and Administration: Always provide the Client Information Sheet with each prescription.

Dosing instructions:
The SENVELGO dose is 0.45 mg/lb of body weight (1 mg/kg), once daily regardless of blood glucose level. The dose may be administered directly into the mouth or with a small amount of wet food. Do not mix into food. The solution should be given at approximately the same time every day. If a dose is missed, it should be given as soon as possible on the same day. If the cat vomits within 30 minutes of dosing, the dose can be repeated.

SENVELGO should be administered using the dosing syringe provided in the package. The dosing syringe fits onto the bottle and has a body weight scale with increments per pound of body weight. The dose should be rounded down to the nearest pound. After administration, close the bottle tightly with the cap. If needed, the syringe can be cleaned with a clean, dry cloth.

Prior to initiation of treatment:
Prior to initiation of SENVELGO, the veterinarian should ensure the cat is alert, active, eating, and drinking. The veterinarian should conduct a physical examination, obtain a medical history, CBC, serum chemistry, serum fructosamine, and urinalysis including evaluation for ketonuria (see **Animal Safety Warnings**).

If there is a delay of more than a week between diagnosis of diabetes mellitus and initiation of SENVELGO, the veterinarian should re-evaluate the cat with a full physical examination and updated history to ensure the cat still meets the criteria described above. A delay of more than a week between diagnosis and starting SENVELGO may increase the risk of developing diabetic ketoacidosis.

Monitoring of cats receiving SENVELGO:
- Sudden onset of hyporexia/anorexia, lethargy, dehydration, or weight loss in cats receiving SENVELGO should prompt immediate discontinuation of SENVELGO and assessment of diabetic ketoacidosis, regardless of blood glucose level.
- **Evaluate for ketonuria 2 to 3 days after initiation of treatment and approximately 7 days after initiation of treatment and anytime the cat shows signs of illness.** If ketonuria is present, discontinue SENVELGO and promptly treat with insulin, even if blood glucose is normal.
- During the first 4 weeks after initiation of SENVELGO, glycemic control and clinical improvement should be evaluated.
  - A physical examination, blood glucose curve, serum fructosamine, and body weight should be assessed at 1 and 4 weeks after initiating SENVELGO.
  - SENVELGO should be discontinued, and initiation of insulin considered, in cats demonstrating poor glycemic control (weight loss, average blood glucose from a glucose curve > 300 mg/dL or fructosamine values suggesting poor control (> 450 µmol/L) after 4 weeks of treatment.
- During ongoing treatment with SENVELGO, blood glucose, fructosamine, urinary ketones, serum chemistry, body weight, hydration status, and clinical signs of diabetes mellitus should be routinely monitored.
  - Presence of ketonuria should prompt discontinuation of SENVELGO and transition to insulin.
  - Cats with increasing or persistently elevated triglyceride or cholesterol levels may have declining glycemic control or pancreatitis, and may be at risk of developing diabetic ketoacidosis or euglycemic diabetic ketoacidosis (diabetic ketoacidosis with normal blood glucose levels). Consider further evaluation and discontinuation of SENVELGO in these cats.
  - Increasing or persistently elevated feline pancreas-specific lipase (fPL) should prompt further evaluation for pancreatitis and consideration of discontinuation of SENVELGO.
  - Initial mild weight loss may be seen with SENVELGO associated with its mode of action (glucosuria and caloric wasting). Unintentional weight loss which doesn't improve or stabilize within 7 days may indicate the need to evaluate for concurrent disease and consideration of discontinuation of SENVELGO (see **Adverse Reactions**).
  - If clinical signs of illness occur, evaluate the cat as soon as possible to ensure it is not at risk for diabetic ketoacidosis or euglycemic diabetic ketoacidosis (see **Animal Safety Warnings**).
  - SENVELGO should be discontinued if the cat's clinical condition declines and/or glycemic control worsens after initial improvement.
- Cats may present with diabetic ketoacidosis and a normal blood glucose concentration (euglycemic diabetic ketoacidosis). Delay in recognition and treatment of diabetic ketoacidosis and euglycemic diabetic ketoacidosis may result in increased morbidity and mortality.
- Development of diabetic ketoacidosis or euglycemic ketoacidosis requires the following actions:
  - Discontinuation of SENVELGO
  - Prompt initiation of insulin therapy
  - Administration of dextrose or other carbohydrate source, regardless of blood glucose concentration
  - Appropriate nutritional support should be promptly initiated to prevent or treat hepatic lipidosis.

Contraindications: Do not use SENVELGO in cats with diabetes mellitus who have previously been treated with insulin, who are receiving insulin, or in cats with insulin-dependent diabetes mellitus. The use of SENVELGO in cats with insulin-dependent diabetes mellitus, or the withdrawal of insulin and initiation of SENVELGO, is associated with an increased risk of diabetic ketoacidosis or euglycemic diabetic ketoacidosis and death.

Warnings:
User Safety Warnings: Not for use in humans. Keep out of reach of children.

Wash hands after use. This product may cause mild eye irritation. Avoid contact with eyes. If the product accidentally gets into the eyes, rinse eyes immediately with plenty of water; if wearing contact lenses, rinse the eyes first then remove contact lens(es) and continue to rinse for 5-10 minutes. If eye irritation continues or accidental ingestion occurs, seek medical advice and provide this product information to the physician. Exposure to product may induce local or systemic allergic reaction in sensitized individuals. Oral exposure to velagliflozin may cause transient effects such as increased renal glucose excretion, increased urine volume, and hypoglycemia.

Animal Safety Warnings:
- SENVELGO should not be initiated in cats with:
  - Anorexia, dehydration, or lethargy at the time of diagnosis of diabetes mellitus as it may indicate the presence of other concurrent disease and increase the risk of diabetic ketoacidosis.
  - Ketonuria, ketonemia, or suspected diabetic ketoacidosis or a history of the same
  - Clinical suspicion of pancreatitis within the last month based on clinical signs, serum fPL > 12 mcg/L, and/or diagnostic imaging consistent with pancreatitis.
  - Chronic or unresponsive diarrhea
  - Cachexia
  - Bilirubin > 0.5 mg/dL
  - Creatinine > 2 mg/dL
- SENVELGO may cause a mild increase in serum creatinine, blood urea nitrogen (BUN), phosphorus, and sodium in cats with or without chronic kidney disease within weeks of starting therapy, followed by a stabilization of values.
- Cats with baseline creatinine between 1.6 and 2 mg/dL when SENVELGO treatment is started should be closely monitored for signs of volume depletion/dehydration and body weight loss. Renal function should be monitored within the first week of treatment initiation and then according to standard chronic kidney disease guidelines. SENVELGO has not been evaluated in cats with baseline creatinine > 2 mg/dL.
- Cats should be screened for urinary tract infections and treated, if indicated, when initiating SENVELGO. Cats treated with SENVELGO should be monitored for urinary tract infections and treated promptly.
- Cats should be evaluated for concurrent disease including pancreatitis, infectious disease, urinary tract infection, neoplasia, and hypersomatotropism (acromegaly) before initiating and while receiving SENVELGO as these conditions may increase the risk of developing diabetic ketoacidosis.
- Persistently low or worsening serum chloride values compared to the pre-treatment value may indicate the development of diabetic ketoacidosis or euglycemic diabetic ketoacidosis.
- SENVELGO may cause increased serum calcium and persistent elevations may require additional diagnostics. Persistent elevated calcium has been associated with increased risk of calcium-containing urolith formation in other SGLT2 inhibitors.
- Cats should be closely monitored for development of diabetic ketoacidosis or euglycemic diabetic ketoacidosis (for example, ketonuria or anorexia) after stopping SENVELGO. Euglycemia may persist for 2 to 3 days after stopping SENVELGO.
- Keep SENVELGO in a secure location out of reach of dogs, cats, and other animals to avoid accidental ingestion or overdose.

Precautions:
- Consider temporarily discontinuing SENVELGO during times of decreased caloric intake, such as surgery or decreased appetite, as continued administration of SENVLEGO may increase the risk of diabetic ketoacidosis.
- SENVELGO contains propylene glycol. When cats are administered SENVELGO at the 1 mg/kg/day dose, cats receive 40 mg/kg/day of propylene glycol. Exceeding 80 mg/kg/day of propylene glycol may result in excess hepatic glycogen stores. Use caution when administering SENVELGO to cats receiving other products that contain propylene glycol.
- Glucosuria may persist for 2-3 days after stopping SENVELGO. In cats receiving SENVELGO, glucosuria is not a reliable indicator for monitoring glycemic control.
- The safety and effectiveness of SENVELGO has not been evaluated in cats with chronic kidney disease (IRIS (International Renal Interest Society) Stages 3 and 4).
- The concurrent use of volume depleting drugs in cats treated with SENVELGO has not been evaluated.
- SENVELGO has not been evaluated with concurrent use of insulin or other blood glucose lowering treatments.
- The safety and effectiveness of SENVELGO in breeding, pregnant, and lactating cats has not been evaluated.

Adverse Reactions:
Two hundred fifty-two (252) cats with diabetes mellitus were enrolled in a 180-day multicenter field study. Safety data were evaluated in 252 cats treated with at least one dose of SENVELGO. Regardless of blood glucose level, cats received SENVELGO at a dose of 0.45 mg/lb once daily. The most common adverse reactions were diarrhea or loose stool, weight loss, vomiting, polyuria, polydipsia, and elevated blood urea nitrogen (BUN). The table below summarizes the adverse reactions reported in the study.

Adverse Reactions	Frequency (N=252) Number (%)
Diarrhea (including loose stool)	132 (52.3%)
Weight loss*	111 (44%)
Vomiting	92 (36.5%)
Polyuria	46 (18.3%)
Polydipsia	42 (16.7%)
BUN†	39 (15.5%)
Anorexia or hyporexia	34 (13.5%)
Hypersalivation and/or gagging	33 (13.1%)
Urine specific gravity > 1.060	29 (11.5%)
Dehydration	28 (11.1%)
Lethargy	20 (7.9%)
Polyphagia	19 (7.5%)
Urinary tract infections/cystitis	18 (7.1%)
Diabetic ketoacidosis or euglycemic diabetic ketoacidosis‡	18 (7.1%)
Hypercalcemia	16 (6.3%)
Ketonuria§	14 (5.6%)
Inappropriate urination	14 (5.6%)
Death or euthanasia	13 (5.2%)
Elevated AST and/or ALT**	12 (4.8%)
Hypertriglyceridemia††	12 (4.8%)
Hyperphosphatemia	12 (4.8%)
Elevated fPL	11 (4.4%)
Pancreatitis	10 (4.0%)
Elevated creatinine	9 (3.6%)
Hepatic lipidosis	6 (2.4%)
Urinary incontinence	3 (1.2%)

* Approximately 80 cats had weight loss during the first week of treatment, likely due to dehydration and/or caloric wasting from glucosuria.

† Most cats had elevations ≤ 1.5X upper limit of normal (ULN).

‡ All but 5 cases occurred within 2 weeks of starting SENVELGO. Twelve of these cats had euglycemic diabetic ketoacidosis.

§ These cats did not progress to diabetic ketoacidosis and all but one developed ketonuria within a week of starting SENVELGO. The cats discontinued SENVELGO and transitioned to insulin.

** Four of these cats had AST (aspartate aminotransferase) and/or ALT (alanine aminotransferase) > 2X ULN.

†† These cats sometimes also had elevated cholesterol.

The following adverse reactions were seen in the study with < 1% frequency: elevated creatine kinase (> 3X ULN), hypoglycemia without clinical signs (glucose ≤ 50 mg/dL), anemia, abnormal behavior, bradycardia, and dermatitis.

Ketonuria and diabetic ketoacidosis: Thirty-two (32) cats developed ketonuria, diabetic ketoacidosis or euglycemic diabetic ketoacidosis and were removed from the study. Twenty-six (26) of these cats developed ketonuria, diabetic ketoacidosis, or euglycemic diabetic ketoacidosis within the first 7 days of treatment with SENVELGO. Thirteen (13) of these cats developed ketonuria without further progression to diabetic ketoacidosis or euglycemic ketoacidosis and were transitioned to insulin. An additional thirteen (13) cats developed diabetic ketoacidosis or euglycemic ketoacidosis. Nine cats recovered after hospitalization and intensive treatment. Three of the 9 cats had concurrent conditions: hepatopathy (1), hepatic lipidosis (1), and pancreatitis and hepatic lipidosis (1). Four of the 13 cats were euthanized; three because the owners declined treatment and one cat was euthanized after not responding to hospitalization and intensive treatment.

Six cats developed ketonuria, diabetic ketoacidosis or euglycemic diabetic ketoacidosis after the first 7 days of treatment. One cat developed ketonuria without progression to diabetic ketoacidosis or euglycemic ketoacidosis after more than 4 months on SENVELGO. Five cats developed diabetic ketoacidosis or euglycemic ketoacidosis. Two cats (one with concurrent pancreatitis and hepatic lipidosis) were treated and recovered. One with concurrent pancreatitis was treated and recovered but died several days later. Two of the five cats were euthanized; one cat was euthanized after poor response to hospitalization and intensive therapy; and one was euthanized due to declining condition unrelated to diabetic ketoacidosis.

Thirty-eight enrolled cats had been previously treated with insulin. Of those 38 cats, 12 (32%) developed ketonuria, diabetic ketoacidosis, or euglycemic diabetic ketoacidosis during the first week and were removed from the study. These 12 cats are included in the 26 cases reported above and represent 46% of the cases removed in the first week of treatment due to ketonuria or ketoacidosis.

Death and euthanasia: Nineteen cats died (3) or were euthanized (16) during the study, or shortly following removal from the study, with thirteen possibly related to SENVELGO use or declining glycemic control. In addition to 6 of the cases associated with diabetic ketoacidosis described above, euthanasia was associated with the following conditions (number of cats): acute renal failure within a week of starting SENVELGO (1), worsening or emergent urinary incontinence associated with poor glycemic control (2), worsening polyuria/polydipsia and inappropriate urination (1), progressive signs of diabetes mellitus (1), declining condition and suspected pancreatitis (1), azotemia and lack of effect within a week of starting SENVELGO and possible concurrent hypersomatotropism (1).

Contact Information: To report suspected adverse drug events, for technical assistance, or to obtain a copy of the Safety Data Sheet (SDS), contact Boehringer Ingelheim Animal Health at 1-888-637-4251. 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.

Information for Cat Owners: Please provide and review the Client Information Sheet with cat owners to ensure they understand the entire contents before SENVELGO is administered. The Client Information Sheet contains important information regarding the use of SENVELGO. Owners should be advised to discontinue SENVELGO and contact a veterinarian immediately if their cat develops anorexia, lethargy, vomiting, diarrhea, or weakness.

Clinical Pharmacology:
Mechanism of Action:
Velagliflozin is an inhibitor of sodium-glucose cotransporter 2 (SGLT2), the renal transporter responsible for reabsorption of glucose from the glomerular filtrate back into the circulation. By inhibiting SGLT2, velagliflozin reduces the reabsorption of filtered glucose and lowers the renal threshold for glucose, thereby increasing urinary glucose excretion.

Pharmacokinetics: In a laboratory study conducted to determine the prandial state of maximum exposure, systemic exposure for velagliflozin was greater in the fasted state than in the fed state by 170% for the mean maximum observed plasma concentration (C_{max}), and by 45% for the mean area under the plasma concentration versus time curve (AUC) from dosing (time 0) to the last quantifiable concentration ($AUC_{0\text{-last}}$), respectively.

In a well-controlled, laboratory margin of safety study in healthy, adult cats (see **Target Animal Safety**), after repeat daily oral dosing for six months, a slight to moderate increase in exposure to velagliflozin was observed. In addition, a tendency for a less than dose proportional increase of maximum plasma concentration (C_{max}) and exposure (AUC) over the tested dose range was noted.

Following oral administration of SENVELGO in cats at 1 mg/kg, velagliflozin was rapidly absorbed with a median time to maximum concentration of 0.25 hours. The velagliflozin mean (± standard deviation) C_{max} was 1030 (± 361) ng/mL and the mean $AUC_{0\text{-last}}$ to the last quantifiable plasma concentration was 3295 (± 1098) day*ng/mL. The elimination half-life of velagliflozin was 3.68 (± 0.34) hours.

Effectiveness: Two hundred and fifty-two (252) cats diagnosed with diabetes mellitus were enrolled in a 180-day multicenter field study. The cats included various purebred and mixed breed cats ranging in age from 4 to 18 years and in weight from 5.7 to 26.5 lbs (2.6 to 12 kg). Cats were administered SENVELGO at a dose of 0.45 mg/lb (1 mg/kg) orally, once daily, regardless of blood glucose level, beginning on Day 0. Cats were evaluated at Days 2 or 3, and Days 7 and 30 and then monthly.

Treatment success was evaluated on Day 30 and was defined as improvement in at least one clinical sign of diabetes mellitus (polyuria, polydipsia, unintended weight loss, polyphagia, or diabetic neuropathy) and improvement in at least one blood glucose variable (blood glucose curve mean or serum fructosamine).

Of 198 cats included in the effectiveness-evaluable population:

- 175 cats (88.4%) were considered a treatment success on Day 30 (lower bound of the two-sided 90% confidence interval was 84%).
- Mean blood glucose decreased from 446.4 mg/dL (single fasted sample) prior to Day 0 to 169.8 mg/dL (blood glucose curve mean) on Day 30
- Mean fructosamine levels decreased from 551.4 µmol/L prior to Day 0 to 332.0 µmol/L on Day 30.
- Improvements in the clinical signs of polyuria, polydipsia, body weight, polyphagia, and diabetic neuropathy on Day 30 were observed in 125/177 (71%), 128/176 (73%), 133/167 (80%), 33/80 (41%), and 7/30 cats (23%), respectively.
- 157 cats completed the 180-day study

Target Animal Safety: In a well-controlled laboratory margin of safety study, SENVELGO was administered orally to fasted, healthy, 8 to 9 month old cats at 0, 1, 3, or 5 mg/kg body weight (corresponding to 1X, 3X or 5X the intended labeled point dose of 1 mg/kg) once daily for 26 weeks (6 months). Control cats (0 mg/kg) received saline at a volume equal to the 5 mg/kg dose. There were eight cats per group (4 females, 4 males). All cats survived the study and there were no SENVELGO-related effects on ophthalmic examinations, indirect systolic blood pressure measurements, and blood coagulation parameters. Hypersalivation and vomiting after dose administration occurred infrequently and was only observed in the groups that received SENVELGO.

During physical examinations on Days 14 and 28, there was a drug-related decrease in heart rate (< 140 bpm) in the cats that received SENVELGO compared to the control cats. There were no other drug-related effects on physical examinations.

Polydipsia, glucosuria, decreased urine creatinine, and diarrhea were reported more frequently in cats that received SENVELGO than in control cats.

Reddish, mucoid feces were observed in three instances in the 1X group cats. One cat in the 5X group had decreased activity, vomiting, and reduced feed consumption for one day, and reddened rectal mucous membranes were observed over the next 5 days. Two cats (3X and 5X groups) were each observed to have a reddened prepuce with white-yellow discharge twice during the study that was not associated with abnormal urinalyses.

Food consumption was higher in the cats that received SENVELGO compared to the control cats. The rate of body weight gain was lower in the 5X group cats compared to cats in the control, 1X and 3X groups.

There were drug-related increases in reticulocyte count, mean corpuscular hemoglobin, mean corpuscular volume, and Heinz body percentage, and a decrease in mean corpuscular hemoglobin concentration in the cats that received SENVELGO compared to control cats. None of the cats showed any clinical signs of anemia and the number of erythrocytes, hemoglobin, and hematocrit values were normal. There was no effect of SENVELGO on white blood cells and platelets.

There were drug-related increases in serum magnesium, albumin, cholesterol, and triglycerides in the cats that received SENVELGO, with some magnesium, serum albumin and triglyceride values above the reference range. There was a drug-related decrease in mean BUN in the cats that received SENVELGO. There were no other treatment-related changes in serum chemistry parameters, including serum glucose and symmetric dimethylarginine (SDMA).

A reticular pattern was observed on the surface of the liver of one control, three 1X, four 3X, and three 5X group cats.

How Supplied: SENVELGO (velagliflozin oral solution) 15 mg/mL, 30 mL nominal fill volume is supplied in a 45 mL plastic bottle with dosing syringe.

NDC 0010-4614-01

Storage Information: SENVELGO can be stored at or below 77°F (25°C) with excursions permitted up to 104°F (40°C). Once the bottle is opened, use the contents within six months.

Approved by FDA under NADA # 141-568

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

Revised 06/2023

Boehringer Ingelheim

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Organize Inventory with Ease

5 Pro Tips for Making Managing Inventory Easier

by Nicole Clausen, CSSGB, CCFP

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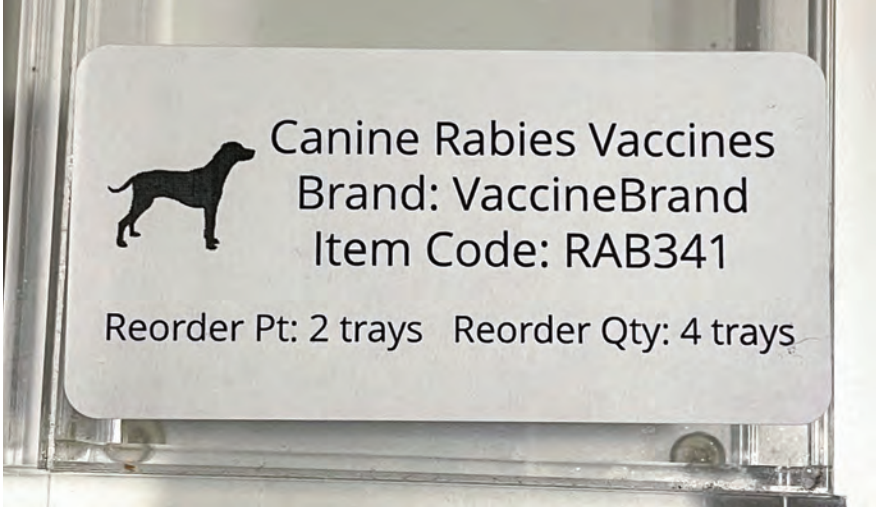
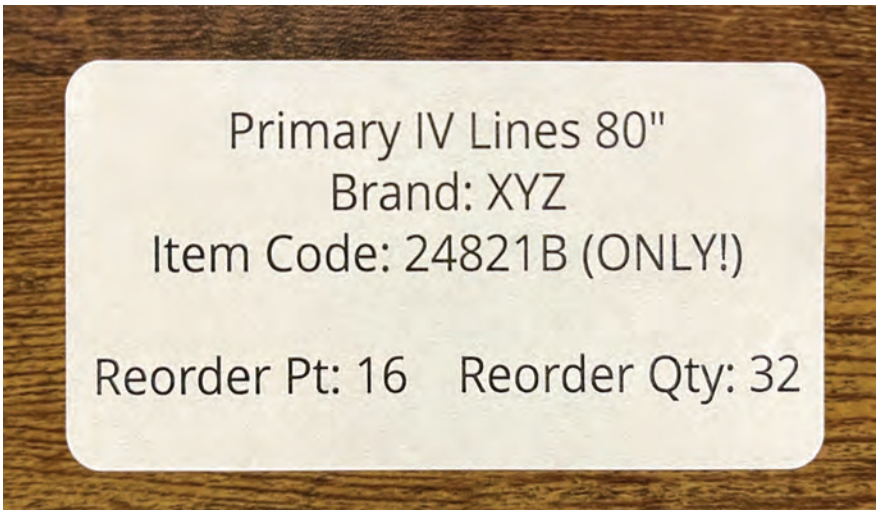




WHEN I FIRST STARTED MANAGING INVENTORY, my only training was, "When you shake a bottle and it feels low, order it." I remember standing in the pharmacy thinking, "But wait, what does that actually mean?" In the beginning, I would walk around the pharmacy shaking bottles, digging through drawers, trying to remember all the products and supplies the practice kept in stock. Sometimes, I would forget to order something; other times, I wouldn't order nearly enough; and other times, I would order way too much.

As I created systems as an inventory manager and eventually became an inventory consultant and educator for veterinary professionals, I've learned some tried-and-true methods and strategies that you can implement in your practice to make managing inventory much easier. What I've experienced over the years is that inventory management doesn't have to be complicated and doesn't need to take up a ton of time.

Reorder points are a flag to know when an item is running low; it's the "point" or low level where an item should be ordered.

When we are managing inventory, we want to navigate the balance between two main goals. We want to have what we need in stock for our patients, all while keeping the financial performance of our practice in mind. Whether you are a beginner or a seasoned pro at managing inventory, here are five of my favorite strategies to make inventory easier and help you get back to your patients faster.

#1: Know What Items to Order and When to Order Them

In my experience, I've found that many practices keep track of what to order by using the "want book." When something is running low, a team member will write it down in the book or on a whiteboard. Then, whenever it's time to order, they'll use what's written down and walk around trying to identify any other low items. That's the method I used when I first became an inventory manager.

As a beginner, I ran out of a few essential items because no one told me we were low and I had forgotten to check them. After that experience, I thought there had to be a better way, and I was on a mission to find it. That's when I learned about reorder points and creating reorder flags that didn't rely on the "want book."

Reorder points are a flag to know when an item is running low; it's the "point" or low level where an item should be ordered. It's "low" quantified. The corresponding reorder quantity is how much to order once that particular item is low. Reorder points changed the game for how I managed inventory!

Reorder points are a great way to forecast your demand. It's a way of using the data of what you've used or sold over a particular period to predict what you'll use in the future. As an example, let's say that for the last two

Photos courtesy of Nicole Clausen

months, you've sold 4,000 capsules of gabapentin 100 mg. Knowing that information, you can predict that you'll likely sell another 4,000 capsules in the next two months. Taking that information one step further, you can think about being "low" as having a two-week supply on the shelf, a commonly used reorder point. Rather than just shaking a bottle and guessing when it's low, you'll know precisely what "low" is.

A great way to get started with reorder points is with reorder tags. A reorder tag is a physical flag that's attached to your reorder point. Then, when that reorder point is reached, a team member will take off the tag and stick it in a bin, and you know it's time to order it. These physical tags work great for hospital supplies, consumables, bandaging supplies, janitorial supplies, and more. They are very versatile!

Let's explore an example. You've determined that when you get down to three boxes of 1cc syringes, you want to order six additional boxes. You would rubber band (or tape) the reorder tag to the third to last box. When someone opens that box, they remove the tag and put it in the "to be ordered" bin. Then, when it's order day, you grab all the tags from the bin, and you know what to order.

The downside of using tags, though, is that your team might not put them in the bin. They might get put in the trash, on the shelf beside them, or ignored. That's why I like to put bins throughout the practice, ensure the team knows exactly what to do with them, and develop fun ways to help your team get into the habit.

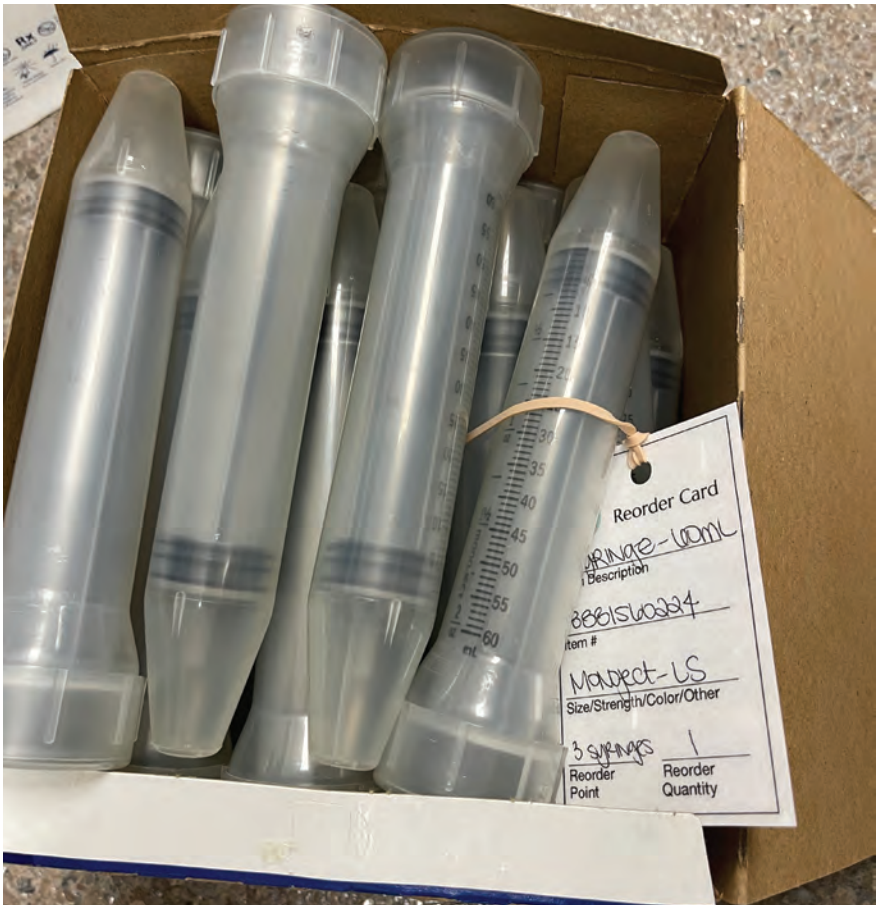
There are a few different ways of calculating reorder points and various types of reorder flags that you can use in your practice to help know when something is low without the "want book."

If you're already using reorder points in your practice, here are some considerations:

1. When was the last time you calculated your order points? Have you had any changes in your practice that might impact what you're selling?
2. Are the order points you're using now working for you? Are there any other types of flags you'd like to explore?
3. Are there any products in particular that you've run out of or would like to review the reorder points for?

Attach colorful reorder tags to inventory items and include details on when to reorder and how much to reorder.

Photos courtesy of Nicole Clausen



Reorder tags are a great way to remind staff to reorder products when they get below a certain threshold.

#2: Invite Your Team to Get Involved

Inventory is a team sport! Although there might just be one or a few people ultimately responsible for inventory, the whole team can and should be involved. At the very least, everyone in the practice should recognize its importance to your patients and practice. Remember, having inventory in stock and accessible means we can care for our patients! Depending on your practice, this could look like:

- Someone who loves craft projects might enjoy creating and maintaining reorder tags.
- Someone who loves organizing and watches *The Home Edit* on their day off might enjoy keeping the pharmacy, storage, and retail areas organized and tidy.
- A lead dental or surgery technician might be in charge of keeping the surgery suite or dental cart adequately stocked.
- Someone who loves spreadsheets, number crunching, and solving puzzles (with a dash of Type A personality) might enjoy being the inventory lead.

The benefit of cultivating a team culture that prioritizes inventory is that the patients win, whether the inventory team is responsible for it or the responsibility is shared throughout the practice. Also, having a team approach to inventory can bring added benefits. Different team members bring various skills and differing perspectives, there is shared accountability, and having a team approach can help catch errors more quickly and effectively.

#3: Leverage Your Practice Management System

Your practice management system or other inventory software can be an invaluable tool for your inventory. Depending on your software system, it can be a treasure trove of information and tools to make managing inventory easier. There are four main categories that I've found to be helpful:

Reporting

Depending on your practice management system, you can use different inventory reports to view sales reports and other financial information. For example, you can use sales reports to evaluate product markups and overall profit margins. You can also use reports to view the value of your inventory on hand to see if you're overstocked, have excessive amounts of stock, or use them for accounting and tax purposes.

Sales Information

Even if you are not currently using the inventory module in your practice management system, you will likely still have sales information because of how practices invoice out clients. Using sales information can be helpful to see what products are selling, what your top items are, or what items might be on the shelf collecting dust. Using this information can help you make data-informed decisions for your inventory.

Photos courtesy of Nicole Clausen

Inventory Tracking
When you use your practice management system to track your inventory, you'll quickly see what you have on hand and what you are running low on. You can even use the difference between what's on the shelf and what's in the software to help catch missed charges, excessive waste, or theft. Remember our order points from tip #1? You can enter your reorder points into your software, and your software can flag when you are running low. Reorder points in your software and using reorder tags can be a winning combination to make managing inventory much easier!

Receiving
With many practice management software systems, you can receive or enter inventory after it's been ordered and arrives in your practice. Using this function can help to easily update how much you've ordered (increasing your current quantity on hand) and update your prices as your costs increase. This workflow can help automate price increases so they don't get missed and keep your inventory more accurate in your software.

Depending on your practice management system, it might have tools and functions to help manage inventory.

#4: Organize Your Inventory

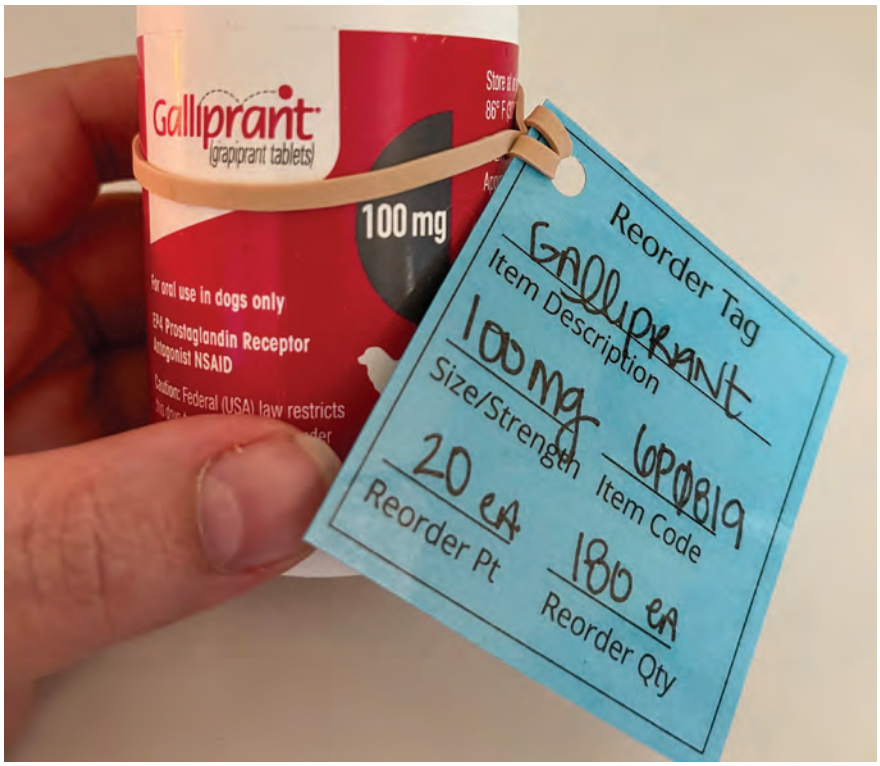
Keeping your inventory organized can help you and your team find what they need, when they need it. Nothing is worse than having a critical case, digging through cabinets or drawers, and not finding what you need. Not only that, but creating a system for structure and organization in your pharmacy and practice can help reduce expired products, overordering, and products getting lost.

When organizing your inventory, I recommend that each item have a primary location (ideally with a label) and a defined secondary backstock or overstock location. This way, everyone on your team knows exactly where an item is located and can cut down on the mental labor of trying to remember where things are all the time.

When organizing your inventory, I recommend that each item have a primary location (ideally with a label) and a defined secondary backstock or overstock location.

You can also combine your shelf labels and reorder points to easily see your reorder points (and if something is running low). For example, you could have a shelf label for primary IV lines. The label could list the item name, code (for purchasing), the reorder point, and the reorder quantity. Then, as you're looking through the pharmacy or central storage areas, you'll be able to quickly identify where an item should be and whether it's running low.

Organizing your inventory can be a great way to ensure everything can be found with ease and to know what you have on the shelf.



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Cycle counting—counting small amounts of inventory frequently throughout the year—can make managing inventory much easier.

#5: Count Your Inventory

Cycle counting—counting small amounts of inventory frequently throughout the year—can make managing inventory much easier. You might be thinking, there is no way that I have enough time throughout the week to count inventory (and I don't want to do this either!). I completely understand, but maybe I can help change your mind. Cycle counting is where you count small amounts of stock frequently, often weekly, throughout the year. With this process, typically, you count your high-value/often-sold items more regularly (like heartworm prevention or vaccines) than low-value/infrequently used items (like cotton balls or tongue depressors).

Cycle counting is helpful for several reasons. First and foremost, it helps you to keep your inventory in your practice management system accurate throughout the year. This means that your reorder points will flag at the appropriate time, and you can catch missed charges, theft, or other problems with your inventory. Additionally, because you kept your inventory accurate throughout the year, you don't have to do a massive end-of-year count that takes days!

For example, it's much easier to find out why you're missing 187 cephalexin capsules in one month than waiting until the end of the year when you realize you are missing 9,247!

Although cycle counts might not be the most fun task, they are very beneficial and help make managing inventory easier for you and your team.

Managing inventory doesn't have to be a lonely and frustrating job. I know it can feel that way sometimes, but your role is valuable and vital to your practice. Whether you enjoy inventory or you'd rather be doing anything else, there are ways you can make managing inventory easier in your practice. I invite you to be curious about what might work for you, how you can implement these strategies, and how you can make a difference in your inventory. I'm cheering you on every step of the way! ※

Nicole Clausen, CSSGB, CCFP, is the founder of Veterinary Care Logistics, a consulting and education firm specializing in inventory management for veterinary professionals. She is also the founder of the Veterinary Inventory Strategy Network, the host of the *Inventory Nation Podcast*, the creator of the Certified Veterinary Inventory Professional program (the first-ever certification for inventory managers), and the cofounder of Inventory Ally and is a regular speaker on inventory management.

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[1] Frantz NZ et al. Novel food with mixed soluble fiber promotes quicker resolution of acute diarrhoea in shelter kittens. *J Anim Physiol Anim Nutr.* 2020; 104:406. [2] Frantz NZ et al. Novel food with mixed soluble fiber promotes stool improvements and resolution of acute diarrhoea in shelter puppies. *J Anim Physiol Anim Nutr.* 2020; 104:406. [3] Frantz NZ et al. Novel food with mixed soluble fiber promotes improved stool scores in cats with chronic diarrhea. *J Anim Physiol Anim Nutr.* 2020; 104:406.

2023 AAHA Management of Allergic Skin Diseases in Dogs and Cats Guidelines

Executive Summary

by Constance Hardesty

These guidelines were prepared by a task force of experts convened by the American Animal Hospital Association. This document is intended as a guideline only, not an AAHA standard of care. These guidelines and recommendations should not be construed as dictating an exclusive protocol, course of treatment, or procedure. Variations in practice may be warranted based on the needs of the individual patient, resources, and limitations unique to each individual practice setting. Evidence-guided support for specific recommendations has been cited whenever possible and appropriate. Other recommendations are based on practical clinical experience and a consensus of expert opinion. Further research is needed to document some of these recommendations. Drug approvals and labeling are current at the time of writing but may change over time. Because each case is different, veterinarians must base their decisions on the best available scientific evidence in conjunction with their own knowledge and experience.

The 2023 AAHA Management of Allergic Skin Diseases in Dogs and Cats Guidelines *are generously supported by Hill's Pet Nutrition, Merck Animal Health, and Zoetis.*

This executive summary is not a replacement for reading the guidelines in their entirety. The full guidelines are published in the Nov/Dec 2023 issue of the Journal of the American Animal Hospital Association *(jaaha.org) and available online at aaha.org/allergic-diseases.*

Overview

THESE GUIDELINES PRESENT A SYSTEMATIC APPROACH to diagnosis, treatment, and management of allergic skin diseases in dogs and cats. The guidelines describe detailed diagnosis and treatment plans for flea allergy, food allergy, and atopy in dogs and for flea allergy, food allergy, and feline atopic skin syndrome in cats.

Management of the allergic patient entails a multimodal approach with frequent and ongoing communication with the client. Obtaining a comprehensive history is crucial for diagnosis and treatment of allergic skin diseases, and the guidelines describe key questions to ask when presented with allergic canine and feline patients. Once a detailed history is obtained, a physical examination should be performed, a minimum dermatologic database collected, and treatment for secondary infection, ectoparasites, and pruritus (where indicated) initiated.

The veterinary technician is an invaluable asset in dermatologic appointments. From taking comprehensive clinical histories to educating clients, technicians serve a vital role in the workup and successful management of pruritic patients.

The process of diagnosing and managing allergic skin disease can be prolonged and frustrating for clients. The guidelines offer recommendations and tips for client communication and when referral to a dermatologist should be considered to improve client satisfaction and optimize patient outcomes.

Introduction

An itchy pet is one of the most common reasons a client seeks veterinary care. Allergic skin diseases can cause discomfort and distress to the animal and stress to the pet's family members.

Identifying the cause(s) of an allergic condition can be a long, often frustrating process for both clients and veterinary staff. Multiple follow-up visits may be required before a final diagnosis is achieved. With most of these patients, this is the start of a long journey, and clients should be informed that there are likely no quick fixes or cures, only lifetime management strategies. Patients with allergic skin disease often require lifelong management to optimize their quality of life.

To manage client expectations, prepare a realistic diagnosis and treatment plan that incorporates individual factors, including financial considerations.

These guidelines offer a step-by-step approach to diagnose and manage flea allergy, food allergy, and atopy in the dog and cat.

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Prepare clients for long-term commitment and for the fact that occasional flares can occur in even the most well-managed patients.

Photographs, tables, algorithms, and flowcharts play a central, essential role in supporting the guidelines. These include photographs of pruritic patients and cytology to aid diagnosis, tables of recommended treatment options, decision trees, and a flowchart that illustrates the important contributions of technicians every step of the way.

Section-by-Section Summary

The guidelines are designed to simplify the path to diagnosis and management of canine and feline allergic skin diseases, while emphasizing a multimodal approach for the patient and effective client communication to ensure the best possible outcome. To that end, the guidelines are organized in eight sections, as summarized in the following. Each of the eight sections begins with three key takeaways. Because of space constraints, the key takeaways are not transcribed here. This is just one example of the guidelines' usefulness and why it is necessary to read them in their entirety.

Clients should be informed that there are likely no quick fixes or cures, only lifetime management strategies.

Section 1 describes the steps in diagnosing the canine patient with allergic skin disease. Each step in the process is discussed in some detail.

Step 1 is taking the clinical history and conducting the dermatologic physical examination. The guidelines offer a list of key questions to ask when taking the history and several photos of pruritic canine patients as a reference to aid in the physical examination (Figure 1). Step 2 is collecting the minimum dermatologic database; the minimum database is described.

Step 3 involves treating pruritus and step 4 is treatment for secondary infections and ectoparasites. The latter is supported by several images of the cytology of secondary bacterial and yeast infections (Figure 2). Step 5 is to recheck, verify medication, and assess response to treatment, with discussion of treatment options depending on the dog's response to initial treatment. Step 6 is the diet trial, which is important to making a diagnosis because no historical or physical examination findings can differentiate atopy from food allergy. Figure 3 is a decision tree for assessing diet trial results.

Step 7 addresses seasonal atopy or nonseasonal atopy with seasonal fluctuation.

Section 2 addresses treating the allergic canine patient, with subsections devoted to flea allergy, food allergy, and atopy. The discussion of atopy addresses initial management as well as long-term management and acute flares.

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Atopic patients need lifelong medical care requiring routine veterinary visits and an active working relationship with the client.

This stage can be frustrating as there is no one-size-fits-all treatment. Besides the need to manage secondary infections, inflammatory flares, and individual patient responses, veterinary teams must consider client compliance and finances.

Atopic patients need lifelong medical care requiring routine veterinary visits and an active working relationship with the client.

If adequate control of clinical signs cannot be achieved by the third veterinary visit, referral to a veterinary dermatologist should be presented as an option to provide more effective treatment and less cost in the long run.

Section 3 shifts focus to the feline patient, focusing on diagnosis. This section discusses clinical presentations of allergic dermatitis in cats and key differences between cats and dogs. Compared with dogs, the pathogenesis of allergic skin diseases in cats is not as well understood.

Feline atopic syndrome has been proposed as the umbrella nomenclature describing allergic dermatitis involving environmental allergens, food allergy (gastrointestinal manifestation), and allergic asthmas (respiratory disease) often associated with immunoglobulin E antibodies.

Feline atopic skin syndrome (FASS) refers to the entity associated with inflammatory and pruritic allergic skin disease from environmental allergens. The guidelines note that FASS can only be diagnosed based on compatible history and clinical signs and by ruling out all other similar-looking diseases.

At a Glance

Visual aids provide essential support for diagnosis, treatment, and management of the allergic pet and a guide to the varied contributions of technicians to effective, efficient care.

Table 1: Antipruritic and anti-inflammatory medications for dogs

Table 2: Acute flare and long-term management therapies in dogs

Table 3: Oral antihistamine doses for dogs

Table 4: Antimicrobials for skin infections in dogs (organized by appropriate use and with reference to the *2022 AAFP/AAHA Antimicrobial Stewardship Guidelines*)

Table 5: Oral antifungal medication doses for dogs

Table 6: Antipruritic and anti-inflammatory medications for cats

Table 7: Acute flare and long-term management therapies in cats

Table 8: Oral antihistamine doses for cats

Table 9: Oral antifungal medication doses for cats

Figure 1: Clinical presentation of the pruritic canine patient

Figure 2: Cytology of secondary bacterial and yeast infections

Figure 3: Assessing diet trial results

Figure 4: Diagnosing allergic skin disease in the canine patient

Figure 5: Clinical presentation of the pruritic feline patient

Figure 6: Diagnosing allergic skin disease in the feline patient

Figure 7: Flowchart of technician utilization for allergic skin diseases: One veterinarian and two technicians

Figure 8: Client communication flow chart for treatment plans

Follow the Icon!

Throughout the guidelines you will find icons that highlight tips related to spectrum of care (see Section 6), technician utilization (Section 7), and referrals:

Use of over-the-counter (OTC) diets should not be recommended when conducting a diet trial. Ingredients not declared on the label have been detected in OTC diets, possibly negating the results of the trial. However, the guidelines task force agrees that an OTC novel protein diet can be used if financial constraints make other diets impossible. The client should be warned that an OTC diet may not provide optimal results and should be considered a diet change, not a true diet trial.

Having technicians take the history is an excellent way for them to build client trust and relationships that can carry through treatment follow-ups, client education, and ongoing control measures.

A diagnosis of feline atopic skin syndrome is an excellent juncture in treatment to consider referral to a veterinary dermatologist if this has not occurred already.

None of the feline cutaneous reaction patterns are pathognomonic for any particular pruritic disease, emphasizing the need to perform a thorough diagnostic workup, including an accurate clinical history and dermatologic physical examination (step 1) and a minimum dermatologic database (step 2). The minimum dermatologic database should be collected based on reaction patterns (Figure 6).

Figure 5 presents photographs of the four distinct clinical patterns of feline allergic dermatitis: miliary dermatitis, head and neck pruritus, self-induced alopecia, and eosinophilic granuloma complex (including eosinophilic plaques, granulomas, and indolent ulcers).

Step 3 is to treat pruritus during the diagnostic period, and step 4 is to treat ectoparasites and secondary infections (a photograph shows superficial skin infection due to *Staphylococcus* spp.). Although topical antimicrobial therapies are ideal to reduce the overall exposure to systemic antibiotics, the grooming behavior of cats and their decreased tolerance for topical applications often limits their use.

Step 5 involves rechecking and assessing the cat's response to antiparasitic/antipruritic therapies. Step 6 is the diet trial, referencing the algorithm in Figure 3 for assessing the trial.

Section 4 describes managing feline chronic allergic conditions, including initial and long-term management of feline allergic skin diseases and acute flares. This section addresses flea allergy, food allergy, and FASS.

Before launching into a discussion of treatment and management options, pause for a moment to congratulate the client for seeing the diagnosis process through. Doing so speaks volumes about a practice's compassion and desire to cultivate long-lasting relationships.

The guidelines stress that ectoparasites and infections need to be ruled in or out before treating allergic skin disease. They also point out that FASS has different management considerations compared with canine atopic dermatitis; partnership with a veterinary dermatologist can be beneficial.

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Being aware of state regulations is the responsibility of the credentialed technician and the management team, and all actions taken must fall within the scope of their license. The entire veterinary team should become familiar with the scope of practice for credentialed technicians in their state.

Section 5 provides an overview of diagnosis and treatment of allergic otitis externa (AOE) in dogs and cats, including clinical presentation, diagnosis, treatment, and short-term and long-term management. The guidelines note that AOE is an inflammatory condition and should not be confused with infection, though infection often occurs secondary to AOE.

Section 6 presents spectrum of care (SOC) considerations for allergic pets. Spectrum of care means providing a continuum of acceptable care that considers evidence-based medicine while remaining responsive to client expectations and financial limitations.

This section discusses SOC considerations relevant to the clinical history, physical examination, treatment, referral, and telehealth.

Section 7 discusses the vital role of veterinary technicians and how to optimize their involvement, as illustrated in Figure 7. A veterinarian working with two technicians can see two appointments in the time it would otherwise take to see one.

The only limiting factors are state regulations and a veterinarian's willingness to train technicians to take over specific duties within defined parameters.

Many technicians want more responsibility commensurate with their training and allowing them to assume additional job duties is a wise investment of time for veterinarians.

Section 8 addresses client communication, with special emphasis on preparing clients for the long road ahead. This includes openly discussing factors like work schedules, household environment, and financial concerns that may affect patient care plans. It is especially important to manage client expectations, including that diagnosing and finding the right combination of treatments may take some time, that managing allergies is a lifelong commitment, and that flares occur even in well-managed cases. Ten key messaging points are offered.

The *2023 AAHA Management of Allergic Skin Diseases in Dogs and Cats Guidelines* are a rich resource of information, tips, and recommendations written by a task force of experts. Owing to space considerations, this executive summary can provide only a high-level overview of the guidelines' content. As mentioned previously, there is no substitute for reading the guidelines in their entirety. Access the full guidelines and additional resources at aaha.org/allergic-diseases. ※

The *2023 AAHA Management of Allergic Skin Diseases Guidelines are generously supported by Hill's Pet Nutrition Inc., Merck, and Zoetis.*

Constance Hardesty is a freelance writer living in Colorado. She is former editor-in-chief of AAHA.

Profit Checkup: What Are You Missing?

There are many data points that could be reviewed to actually assess the financial health of your practice, but the most important starting point is the practice's operating profit margin.

Check in with Your Finances in Advance of the New Year

by Karen E. Felsted, CPA, MS, DVM, CVPM, CVA

As we move toward the end of the year, it's a good time to start thinking about the financial health of your practice and what changes you want to make for 2024.

Clean Up Your Numbers

Veterinary teams take great pains to make sure the results they get from diagnostic testing are accurate; if they aren't, then any subsequent decisions made about the pet's care won't be right either. The concept is the same with management analysis. The result of any kind of analysis, including the profit calculation that follows, is only going to be as good as the quality of the data that went into it: garbage in = garbage out. If you're not sure you have good quality input, here are some of the things to look for.

Check up with your accountant or a veterinary financial advisor to make sure you are recording transactions properly. One of the most common errors in practice financial statements is how payroll is recorded. Payroll is often incorrectly recorded on a "net" basis rather than a "gross" basis, and this will totally distort any analysis you try to do regarding compensation and benefits. Gross payroll is the full amount an employee earns; for example, 80 hours X $20/hour = $1,600.

Net payroll is the bottom-line amount actually paid the employee on their check after taxes, benefits, and other deductions are made. The

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> Check up with your accountant or a veterinary financial advisor to make sure you are recording transactions properly.

employee with a gross payroll of $1,600 may only receive $1,032 after taxes and their share of benefits are deducted. Obviously, if you look at total net payroll as a percentage of gross revenue, it may look like your practice has significantly less payroll expense than other practices, when in fact your payroll expense may be similar to or much higher than other practices if you had only been looking at the right numbers!

Other common mistakes seen in a practice profit and loss statement include treating loan principle payments or shareholder dividends as an expense and not consistently using the same categories for the same kinds of expenses. This consistency is important; for example, if a practice started out by recording the purchase of pet food in the "Drugs and Medical Supplies" expense account and then later switched it to the "Dietary Product" expense account, then these numbers will not be comparable before and after the change and the trends analysis and related conclusions may be inaccurate.

In order to achieve this comparability, it is important to carefully set up the accounting system and define calculations precisely. Sometimes it will be necessary for a change to be made in order to improve the accounting system. This is acceptable; just remember that in the month of the change, some comparability will be lost. This comparability will be regained as time goes on and more data is added.

Make Your P&L Easy to Read and Easy to Use

The profit and loss (P&L) statement is meant to be a summary document. It should give you a high-level overview of how well the practice is doing from a revenue and expense perspective. It is *not* meant to include every possible piece of information ever needed for the analysis of the practice.

In order to compare the practice with outside benchmarking studies and to get the most meaningful analysis internally, the accounts used in the P&L should be those generally used by the veterinary profession. An excellent source is the American Animal Hospital Association/Veterinary Study Group's Chart of Accounts designed specifically for veterinary practices. This publication includes descriptions of the specific accounts and the types of transactions that should be recorded in each.

Very few practices will need every account included in this list; however, this Chart of Accounts is an excellent starting point. Ask yourself if particular info really has to be broken out in detail on the P&L before including it. For example, is it essential to have all 40 of the revenue categories on your P&L? No! A revenue by category report is readily available in every practice management information system when needed, so just use three to four revenue categories on the P&L. (Remember: it's meant to be a summary!)

The same concept applies to expenses. Travel expense is a very small expense in almost every practice. It makes much more sense to have just one account (travel and lodging expense) for the expenditures rather than breaking them out into air fare, lodging, parking, transportation, tolls, and so on. If you ever need that level of detail, it is readily accessible from your accounting software.

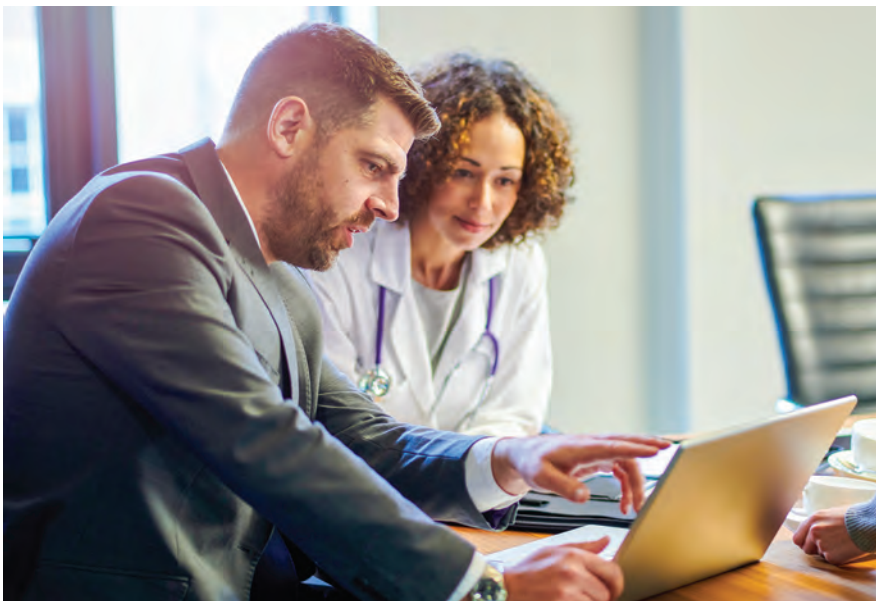
The profit and loss statement shouldn't be more than one or one-and-a-half pages long and should show expenses grouped into sections by type. Common sections include cost of goods sold/cost of professional services, compensation and benefits, revenue collection costs, facility and equipment expense, administrative expense, and other income/expense.

Anything longer or more complex than what is described here will make it impossible to get a good quality, high-level understanding of how the practice is doing. The point of the P&L will be lost.

Profit Calculation

There are many data points that could be reviewed to actually assess the financial health of your practice, but the most important starting point is the practice's operating profit margin. This figure represents the gold standard measure of a practice's financial success, and profits are a significant driver of cash flow and practice value. Unfortunately, most practices don't really know how profitable they are. The only bottom-line number they look at is their net income, and this is *not* the same; in fact, net income can be very different from true operating profit and lead the management team down the wrong road.

The operating profit is the difference between the operating revenues and expenses of a practice. Operating revenue and expenses include only items normally and necessarily seen in the day-to-day operations of the practice such as fees for professional services and drugs and medical supplies expense. These items should be stated at fair market value rates. For ease of comparison with other practices, the profit margin is generally stated as a percentage—this is calculated as practice profits divided by gross revenue. Some of the items that must be calculated differently to determine operating profit versus taxable income or net income include practice owner payments, facility and equipment rent (if these items are owned by the practice owner and leased to the practice), services provided by family members to the practice, and personal expenses paid by the practice. Additionally, items such as depreciation, amortization, interest expense, and interest income are removed entirely from the calculation of profit, although they would appropriately be included in a net income or taxable income calculation.



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Note, the term "EBITDA" or "adjusted EBITDA" is also used regularly and represents a very similar concept. EBITDA is an accounting term that stands for "earnings before interest, taxes, depreciation, and amortization." The same adjustments that are made to calculate profitability must be made to determine a meaningful EBITDA number. An EBITDA calculation made without adjustments is pointless. The one difference often seen between an adjusted EBITDA number and an operating profit figure is related to equipment purchase. An operating profit calculation generally includes a deduction for average annual equipment purchase, whereas an EBITDA calculation does not.

Calculating the true operating profits of a practice is not a simple task, but an excellent resource to get you started is a booklet titled "The No-Lo Practice: Avoiding a Practice Worth Less," available from vetpartners.org /practice-valuation-resources. VetPartners is a professional association of various kinds of business consultants and advisors who regularly work with veterinary practices. A veterinary financial consultant can also help you calculate this figure or refine your initial calculation.

Using the Data

If the practice's profits aren't at the desired level, what can be done about it? A lack of profitability comes from revenues that are too low, expenses that are too high, or a combination of the two. Understanding not only the profitability of the practice but the kinds of factors that lead to this state is critical. Until the practice has an idea of the root causes of the problem, it is difficult to determine what the correct solution is.

> A lack of profitability comes from revenues that are too low, expenses that are too high, or a combination of the two.

Just looking at one data point, such as total revenue for a particular year, is usually not very helpful. The following types of data comparisons are most commonly seen and offer greater insights, including comparisons between practices or from one period to the next:

- Trends analysis within a particular practice (for example, a particular month is compared to the prior month or the same month in the previous year)
- Comparison of the practice's metrics to published studies of these metrics within the veterinary industry
- Ratio analysis (for example, an expense is calculated as a percentage of total gross revenue)
- Analysis on a full-time-equivalent doctor or nondoctor staff basis
- Comparison of budgeted numbers with actual results

No comparisons are perfect; for example, activity in the practice may be cyclical and comparison of one period with another may show changes related to normal cyclicality rather than any improvements the practice has put in place. Different numbers of workdays in one period versus another can also impact the comparison. Regardless, internal trending is very helpful in understanding how well the practice is doing.

Key factors to consider when performing comparisons to published data include:

- How old is the data?
- Is the data meant to represent an average practice or "best practices"?
- Is the data reliable?
- Are the figures in the study calculated in the same fashion as in the practice?

No study will be perfectly comparable to all practices, but it is still possible to get valuable information to help operate the business more effectively. It simply means these comparisons must be used with caution and as one tool in running the business, not as the final word about how well a practice is doing.

Once the causes of a problem have been determined, specific action must be decided upon to correct a trend or improve operations. Finally, a practice should perform follow-up analysis to ensure the action decided upon is actually occurring and having the desired effect.

There are many outstanding management resources available to practitioners from organizations such as AAHA (aaha.org), VetPartners (vetpartners.org), the AVMA (avma.org), and the American Association of Feline Practitioners (AAFP) (catvets.com). Working with a financial advisor or practice consultant may help in not only gaining a greater understanding of the issues impacting profitability but in identifying and implementing solutions. VetPartners can help in locating an appropriate individual. Many continuing education events and veterinary publications also cover management topics that are useful in improving profitability. ※

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Taking Stock

What You Should Be Stocking in Your Pharmacy

by Lowell Ackerman, DVM, DACVD (Emeritus), MBA, MPA, CVA, MRCVS

If veterinary businesses don't need to provide clients with endless selection, and if they don't need to stock every product that teams might ever need or want, then what is the purpose of retail inventory?

As the end of the year approaches, it's time to do more than just count tablets, reconcile your count with your computer records, and pledge to track things better next year. Now is the time to rethink what you have on your hospital shelves, and whether that is consistent with your strategies for hospital success and customer service. You may be surprised to learn that you and your clients might be better served by considering other options.

Dispensing (including prescription medications, nonprescription over-the-counter products, and therapeutic diets) has long been a solid revenue generator for veterinary practices, typically accounting for 25–30% of income in primary-care hospitals. This makes dispensing the largest revenue source in most veterinary practices, but sadly, not necessarily the most profitable. If the veterinary pharmacy allows practices to deliver the level of care to which they aspire, clients benefit from the customized advice and instructions from the veterinary team. And if dispensing revenue can contribute to hospital profitability, then it makes sense to consider all your options.

The Purpose of Retail Inventory

In a bygone era (not that long ago, really), veterinary teams stocked the shelves with products that were

> It's easy to misclassify products as being profitable if one only looks at revenue generation, but this is deceptive.

required to meet medical needs and also products that they thought clients would want to buy, and that individual team members wanted to dispense. At a time when the profession had a relative monopoly on healthcare products sold for pets, this might have even made sense. However, times have changed.

Retail human pharmacies maintain a large inventory because they need to be responsive to physicians who could potentially write prescriptions for a variety of products and have them filled at the pharmacy of the patient's choice. Big box retailers maintain a large inventory because they need to be responsive to the fact that customers appreciate variety in the products they select. This really isn't true for veterinary practices, however. Clients rarely have the opportunity to browse for products in veterinary clinics, and there is no need to be a repository for every pharmaceutical that a veterinarian may ever choose to prescribe, so there is an opportunity for veterinary practices to be very selective as to what they choose to stock.

Of course, there is a difference between products that need to be stocked for internal use or to be dispensed and those products that might be prescribed or recommended, but may actually be provided more efficiently by others (e.g., partner pharmacies). Inventory occupies expensive real estate within a veterinary clinic, so it pays to be selective; there should be a compelling reason for each product to take up space on the shelf.

If veterinary businesses don't need to provide clients with endless selection, and if they don't need to stock every product that teams might ever need or want, then what is the purpose of retail inventory? Pharmacy items that become part of retail inventory need to serve a purpose, and that has both medical and business implications. Products stocked need to be medically relevant, and they need to be profitable for the hospital while still being competitively priced for the consumer. How does your inventory measure up?

It's easy to misclassify products as being profitable if one only looks at revenue generation, but this is deceptive. Profit is what is left over after *all* the costs of inventory have been considered, including the direct cost of acquisition; indirect costs associated with ordering, receiving, and "carrying" products; the money tied up in inventory that could have been used for other purposes (opportunity cost); any commission (production) paid; and the wasteful cost of "shrinkage," in which product was purchased and no longer available for sale, but for which no revenue was generated (e.g., theft, didn't appear on invoice, and so on).

Even though veterinary clinics have a relatively small retail footprint, in most cases they are still carrying many more products than make sense from a business standpoint. In fact, most hospitals could cut in half the number of products they are carrying, and it would streamline their operation and potentially be more, not less, profitable.

As we approach year-end, look at your inventory critically, and decide whether each item you intend to restock in the new year meets the following criteria for inclusion:

- Products dispensed should reflect a hospital's standard of care, and should be labeled for use in the species being treated.
- Products should promote client success at home, as convenience and compliance are important factors. Medications that don't get administered as intended don't benefit anyone.
- Products that have a unique competitive advantage for veterinary hospitals and that cannot be duplicated by other retailers (e.g., injectables) should be prioritized if medically prudent to do so.

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Even though veterinary clinics have a relatively small retail footprint, in most cases they are still carrying many more products than make sense from a business standpoint.

- Products needing to be on hand for immediate medical use, even if not routinely used (e.g., emergency drugs), need to be managed and priced by different criteria than other inventory items. They warrant premium classification.
- Products should have predictable shelf-time between purchase and sale, so ordering and holding (carrying) costs can be effectively analyzed and managed.
- Preferred products should be profitable to dispense even when competitively priced for clients.
- Products stocked should promote healthy long-term vendor relationships, so inventory can be managed cost-effectively, while encouraging vendors to remain committed to your practice success and prioritize your business when the need arises (e.g., product shortages, stockouts, and so on).

Standards of Care

Standards of care can refer to many different things in clinical practice, but for the purposes of inventory selection and management, consider these standards to be consensus strategies as to the preferred way a given practice will approach common situations. Most standards of care are derived from guidelines that are produced by professional organizations, and AAHA has many such guidelines available for veterinary practices (aaha.org/guidelines).

The purpose of guidelines is not to create a cookie-cutter approach to medicine, but rather to provide an evidence-based roadmap around which team consensus can be built. From an inventory perspective, standards of care are important because there is often needless duplication of product categories within veterinary practices, and this affects the ability to provide products cost-effectively and profitably to clients. While every veterinary professional is bound to have their favorites in each category, choosing consensus products as first-choice options allows the hospital to secure the best purchase terms while reducing similar inventory items. It also lessens medical errors because hospital teams need to be familiar with fewer products.

This also allows practices to purchase larger volumes of prioritized products (rather than splitting the purchase across multiple products providing similar benefits), which often allows better pricing to the client. After all, is there really a need to keep six different parasite-control products on the shelf? Does it make sense to have three different benzoyl peroxide shampoos in stock? You might decide that the go-to nonsteroidal anti-inflammatory drug for your canine pain management standard is Product X, and that is the predominant such product on the shelf, but that still wouldn't stop you from dispensing Product Y from your partner pharmacy if you thought it was more appropriate for a given patient.

Standards of care are not meant to stifle innovation or personalized medicine (pet-specific care). They are just a recognition of what the practice hopes to accomplish in the routine management of common clinical situations. Building consensus of entire hospital teams around standards also allows the practice to consider which products that are medically acceptable also make sense to stock from a business perspective. Even if it is a very good product, if it doesn't meet the criteria established in the last section, it probably hasn't earned a place on your product shelves. That doesn't mean it can't be dispensed from your

partner pharmacy, only that it doesn't make financial sense to stock it in your in-house pharmacy.

Product, Price, and Profitability

When it comes to product selection, it is important to keep in mind that one of the features of a suitable product to be stocked in a veterinary hospital is that it needs to be sold at a price that is at least comparable with other retail channels available to them, while still being profitable for the hospital to maintain in inventory and sell. This can be challenging and must be evaluated for each individual potential product meeting the hospital's standard of care.

When it comes to products for which veterinarians have a competitive advantage (e.g., injectables) it is much easier to prioritize them within standards of care, and there is more leeway in pricing that can be acceptable to both veterinary practices and consumers. In fact, if injectables are appropriate therapies in some situations, there are distinct advantages for the profession, because they are not going to be available through most other retail outlets that don't have veterinary professionals or paraprofessionals able to administer them.

For many other dispensed items, the veterinary team may need to decide whether it makes sense to stock certain items in the hospital pharmacy or dispense them through a partner pharmacy. In a very simplistic sense, it may at first seem like it is worth stocking more products simply because they generate revenue, but unless costs can be effectively managed, such items can detract from practice profitability. Revenue is *not* the same as profit. Revenue numbers can be misleading because they don't consider the indirect costs associated with inventory, which can be substantial. Certain items may be more profitable for the hospital if a commission can be generated from a partner pharmacy without the need to incur inventory costs.

There are also many products that just don't make sense to stock in an in-house pharmacy because they can't be sold at a price point that is competitive with other channels. For example, human generic medications may be cheaper than similar veterinary-labeled medications, but it is typically not possible to sell them to clients at a comparable price to that of a human pharmacy. If certain veterinarians truly believe that extra-label drug use meets their standard of care, then clients would be better served getting a prescription and buying those heavily discounted items elsewhere. If our commitment is to delivering client value, we can often better serve pet owners' needs with products licensed for use in the species being treated.

'Tis the time of year when thoughts often turn, begrudgingly, to inventory. This year, perhaps there is an opportunity to do more than just product counts. It's worth considering what you would like your inventory to be able to do for you in the year ahead—and work toward that New Year's resolution now. ※

Note: Some of this material has been abstracted from Five-Minute Veterinary Practice Management Consult, 3rd Edition, *and from* Pet-Specific Care for the Veterinary Team.

Recommended Reading

Ackerman, L. "Pharmacy Management as a Profit Center" in *Blackwell's Five-Minute Veterinary Practice Management Consult, 3rd Edition*. Edited by Ackerman, L. Ames, (New Jersey: Wiley-Blackwell, 2020), 622–23.

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In My Experience

The main disadvantage of propofol is a big one. It must be injected into a vein.

Is Propofol During Euthanasia Doing More Harm Than Good?

by Kathleen Cooney, DVM, CHPV, DACAW resident

As good as propofol has been as a pre-euthanasia anesthetic, times are changing. It's possible that holding on to propofol's use is slowing progress toward more modern euthanasia protocols, especially in hospitals trying to elevate patient care. Patients benefit when everything is done to keep the procedure free of pain and anxiety, and today, this is best facilitated by giving sedatives and anesthetics before intravenous (IV) catheter placement is attempted. Clients want their pet sleeping and pain-free in their final moments.[1] They also want the chance to remain with their pet during the entirety of the appointment. In a time when exceeding client expectations is the norm, perhaps a pre-euthanasia propofol fade-out is worth exploring.

Why Do We Use Propofol Before Euthanasia?

The search for the perfect smooth euthanasia procedure has been in the making for a long time. Many have sought to find the perfect euthanasia solution and/or something useful before the procedure to soften the effects of the drugs we use.[2, 3] Pentobarbital, the most common euthanasia solution here in the United States, is reliable by itself when properly dosed and is leveraged for a variety of species.[4] It remains the gold standard for companion animals, and while good at achieving death, can generate active signs of death

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(e.g., agonal breaths, vocalization, muscle tremors) that are unpleasant for clients and veterinary personnel to see.[5, 6, 7, 8] The ideal scenario is a patient that succumbs quickly to the euthanasia solution, as if to welcome a permanent deep sleep with no evidence of knowing it's even happening.

Propofol became available to veterinary medicine in the early 1990s and is a staple drug these days. We rely on it for smooth anesthetic induction for both short and long procedures. It is reliable and very recognizable. You see a syringe of white solution and know what it's for. For decades now, veterinarians and technicians have used propofol as part of a two-step euthanasia process: administer propofol IV, then administer pentobarbital. Because propofol must be given into the vein, the animal patient is traditionally brought to the treatment area where the staff will place an indwelling IV catheter, then be returned to its owner for the procedure.

I was unable to track down exactly how propofol gained such popularity as a pre-euthanasia agent. I'm sure the quick anesthesia effects and desire by practitioners to reduce active signs of death during euthanasia made it attractive. In 2019, however, a study revealed that propofol before pentobarbital has minimal benefits in this regard. Its use does appear to reduce some perimortem muscle activity and patient vocalization during euthanasia, although it does not have much effect on agonal breathing.[9, 10] Agonal breathing is a normal reflexive response during death and is difficult for both clients and staff to see when they aren't prepared for it. The rate of pentobarbital administration may have something to do with that[11] but was not included in the study.

> Since the goal is to reduce fear, anxiety, and stress (FAS) during euthanasia, it makes sense to provide an anesthetic well before any technical aspects of euthanasia begin.

The main perks, then, are that propofol renders a patient unconscious before pentobarbital is given. This unconsciousness removes the need for any further restraint, lessens the risk of dysphoria from pentobarbital, and reduces at least some active signs of death.[12] Propofol also removes the starkness of death. I've heard many pet owners mention how difficult it was to see the "light" leave their awake pet's eyes during euthanasia. Using propofol to induce that ultra-deep sleep is like a rehearsal for the death itself. Clients see their pet peaceful and pain-free in their final moments, no longer moving or responding to sounds. As we will see, other anesthetics do all this, too, and with no need for venous access.

The Opportunity for Something Better

The main disadvantage of propofol is a big one. It must be injected into a vein. Propofol is ineffective when given intramuscularly and will create significant tissue damage.[13] Venous access in awake patients means restraint, and this usually means the patient will be separated from its owners for the trip back to the treatment area for IV catheter placement. Can we keep the benefits that propofol has and remove this disadvantage?

The AVMA noted in their euthanasia guidelines that presedation or anesthesia should be provided for patients whenever practicable.[14] I'm

on board with this 100%. What they didn't exactly specify is when to give it. Since the goal is to reduce fear, anxiety, and stress (FAS) during euthanasia, it makes sense to provide an anesthetic well before any technical aspects of euthanasia begin, and by this, I mean restraint for IV access, clipping fur, and the euthanasia solution injection itself. We have other anesthetics like ketamine, tiletamine, and alfaxalone ready for intramuscular injection that require minimal restraint in canine and feline patients. Euthanasia techniques have also evolved in recent years so that venous access isn't even necessary. Pentobarbital can be given in other areas of high perfusion in the body, allowing staff to avoid veins altogether which is advantageous when blood pressures are poor or veins hard to find.[15]

Animal Hospice & Palliative Care Certificate Program

The Animal Hospice & Palliative Care Certificate Program is an online continuing education course covering topics in animal hospice, palliative care, and the euthanasia experience. The program is presented by Kathleen Cooney, DVM, CHPV, DACAW resident. Learn more at: aaha.org/education/online-training/animal-hospice--palliative-care-certificate-program.

Read an interview with Kathleen Cooney, DVM, CHPV, DACAW resident, in this issue, on page 56.

> If you think of it with the idea that the patient enters the comfort room alive, and will only leave it deceased, you are on the right track.

Avoiding the Treatment Area

The treatment area can be a scary place with all its sights, smells, and sounds. Non-propofol anesthetics like ketamine, tiletamine, or alfaxalone may be given to the patient in the examination/comfort room. The patient may be offered treats and other distractions while the drug combinations are given. Veterinary support staff can work together with the client in the room to safely give the anesthetics with the least amount of pain or anxiety to the patient. After the injection is complete, the patient spends time with the client, being supported and loved. Once they are sleeping, then the IV catheter is placed with the patient unaware. The goal is for them to succumb to sleep with minimal restraint and discomfort, in line with modern euthanasia practices.

If you think of it with the idea that the patient enters the comfort room alive, and will only leave it deceased, you are on the right track. All equipment one needs for euthanasia will be brought into the room, including cordless clippers, med supplies including all drugs, and memorialization items that can be made and sent home with the client. Euthanasia patients are already compromised (physically

and/or emotionally), so keeping them out of the treatment area is beneficial. Reducing stress includes keeping them in safe and familiar surroundings (one room, not two), and with fewer people.[16, 17]

What makes propofol worth avoiding is the tendency or potential to default to the old way of doing things. Old way: Separate patient to treatment area, restrain, place IV catheter, return to client after stressful event. New way: Keep patient in the examination/comfort room, give intramuscular (or subcutaneous or oral) anesthetic drug combination, allow patient to fall asleep with owner, place IV catheter (or use the intraorgan method), and administer euthanasia.

The veterinary team will need to agree that reducing FAS during euthanasia is important and impart protocol upgrades accordingly. I have seen many hospitals improve morale and team wellbeing by making this simple switch. Propofol will still have its usefulness for short procedures and surgical induction, and if an IV catheter is already placed following hospitalization, by all means, use it before euthanasia.

Closing Thoughts

Euthanasia has evolved to be more than the act of giving pentobarbital. The patient's wellbeing is related to the time leading up to death as much as the moment of death itself. When considering companion animal euthanasia, clients want and expect more for their pets. Propofol as a pre-euthanasia anesthetic after IV catheter placement was once the gold standard, but the new gold standard says the patient should be sedated or anesthetized beforehand and to keep the patient with the client for the duration. With new nonvenous techniques gaining traction too, requiring the propofol protocol like the old days may do more harm than good for patients, clients, and veterinary teams. ※

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Are You a Resilient Leader?

Resilience Is the New Leadership Competency

by M. Carolyn Miller

If the "great resignation" taught us anything, it's that people are tired. And the storms won't abate, given rising costs and a looming recession. The antidote, leadership gurus say, is a new leadership competency, resilience or "Type R," as authors Ama Marston and Stephanie Marston dubbed it in their book, *Type R: Transformative Resilience for Thriving in a Turbulent World*.

So, as a practice owner or manager, how do you build personal resilience and show your team how to do the same? Simultaneously, how do you create, or continue to build, a practice where staff want to come to work regardless of the darkening skies?

It begins by understanding what *resilience* is. The old definition of resilience was about grit and determination, clinical psychologist Steven Stein told the Society of Human Resources Management (SHRM) in "Why Resilient Executives are Better Leaders." Not anymore. Now, it involves self-awareness and responsiveness to those around you.

> "The old definition of resilience was about grit and determination. [Today,] it involves self-awareness and responsiveness to those around you."
>
> —STEVEN STEIN, CLINICAL PSYCHOLOGIST

Resilience has three levels of competence, each linked to the other, noted Deloitte Consulting, LLC, a global financial consulting firm, in "Turning Resilience into a Core Competency." The first level is personal; that is, observing and commandeering your own thoughts.

The second level concerns your ability to connect and empathize with

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others. Has a staff member suddenly taken on additional caregiving responsibilities? Ask how you or the practice can support them. Did your partner recently have a health crisis? Express your concern.

The third level is about how you respond to outside forces. This can be the competition that has moved in down the street and demands an innovative response. It can also be your response to a virus that is spreading across the globe and demands new practice operational procedures.

Personal Resilience

Personal resilience is an inside job. It involves your ability to be aware of your thoughts, emotions, and reaction patterns and have agency over them, noted Deloitte. For instance, does a new practice challenge immediately cause you to feel victimized? And are you aware enough to see that and then redirect your thoughts more positively?

Another skill of personal resilience is your ability to be realistically optimistic. In other words, do you believe wholeheartedly that you can overcome whatever is ahead? And can you see the challenge, and your response to it, as your values in action? For instance, during the pandemic, did your practice rally to the challenge and come up with innovative ways to serve your clients and their pets because that is part of your mission?

Interpersonal Resilience

Connection and empathy matter in the workplace, noted Deloitte. And they are built via a "collection of moments" that can make or break communication. One of the biggest relationship builders is how you respond to an employee's good news. If you applaud the person and even help them relive the experience by asking details, you build trust and empathy at a deep level.

Even "negative" interactions, such as how to address a staff member's behavior, can build communication. It's all a matter of attitude, noted Deloitte, moving from one of "reprimand" to one of "curiosity." Listen rather than speak.

Begin by affirming your mutual goal. For instance, "Can we agree that the goal is for you and Sallie to be able to work together amicably?" Then, test your assumptions by asking questions. (And take responsibility for any way you or practice systems may have contributed to the issue.) Finally, conclude the conversation by agreeing on a next step.

Environmental Resilience

Outside forces can be market-driven, such as rising supplier prices. They can also be larger social issues that prompt you to take a stand. And while you can't control these forces, you can control how you respond to them and the meaning you attach to them. In other words, can you turn the obstacle into an opportunity for your practice, and its staff, to grow?

Environmental resilience also involves your impact and service to others. For those in the veterinary field, this is often second nature. And the pandemic revealed the level of dedication practices had toward serving their clients and patients in overcoming that particular environmental challenge.

These three layers are intricately woven together. And it is your ability to learn and model these competencies that will dictate your ability to thrive regardless of what's ahead. In doing so, you will teach by example how your team can do the same. ※

M. Carolyn Miller, MA, has taught, written, and designed training programs in leadership for 30 years. Find out more at cultureshape.com.

Can Euthanasia Be Beautiful?

A Conversation with Kathleen Cooney, DVM, CHPV, DACAW resident

Interview by Katie Berlin, DVM

Have you ever known veterinary team members who seem to seek out euthanasia appointments? Maybe they even seem happier afterward? In general practice, end-of-life care can feel like a big downer, although it's part of almost every day. But according to Kathleen Cooney, DVM, CHPV, DACAW resident, euthanasia can be the most beautiful part of the day for the veterinary team, and for some team members, seeing more end-of-life appointments is actually self-care.

In her second appearance on *Central Line: The AAHA Podcast*, Cooney explains that a large part of delivering that beautiful euthanasia experience is self-regulation on the part of the veterinary team, which also helps keep compassion fatigue at bay.

Kathy Cooney: There's always an opportunity to make euthanasia beautiful, especially for our patient, because there may sometimes be emotional turmoil between the veterinary team and the client, but who's ultimately at the end of that needle is our patient, and we have to do right by them. The animals pick up on the negative energy in the room, so I always call upon the veterinary team to relax themselves and self-regulate, to carry through with a technically sound, strong euthanasia appointment, even though they may be upset about things. It can still be done.

Whether it's a veterinarian or a technician performing the procedure, once they've made the decision to move forward, they need to practice with principle-based medicine, not outcome-based medicine, meaning they are focused in on what they can control—and that is their principles, their values, and their virtues. Their kindness, their patience, their tolerance, their loving nature.

Now, that said, it's important for veterinary teams to have euthanasia manuals, standard operating procedures, that the team agrees to. How do you define "convenience euthanasia" and what situations for euthanasia will we actually feel comfortable proceeding with? Get everybody on the same page, because there are few things more stressful to a team than when one veterinarian or technician will euthanize a patient because they think it's right and another team member thinks it's wrong.

Katie Berlin: It's an important distinction—that we are not saying, "We will say yes or no to every convenience euthanasia, so we don't have to argue." We are saying, "This is how we handle it. These are the questions that we ask. This is how we speak to each other and the client."

> "What I find is probably the hardest thing is when the client feels that it's the right time for euthanasia, but the veterinarian is unsure."
>
> —KATHLEEN COONEY, DVM, CHPV, DACAW RESIDENT

Once judgment enters the conversation, it's so hard to get it out of the room. In my experience, once we start to question and everybody's talking, even when they're not involved in the case, that's when it feels like a crossroads; and as a team, it's a time to come together.

Advocating for the Patient

KC: What I find is probably the hardest thing is when the client feels that it's the right time for euthanasia, but the veterinarian is unsure. We really want to try this pain medication or change the diet, do something. And the fact that the client ultimately is the one who makes those decisions puts the veterinarian in a challenging spot, so it's a matter of following what you think is best ethically and making sure, again, that we're paying attention to the patient in front of us, because we can get so wrapped up in what's going on with the client that we fail a bit to advocate what's best for our patient.

So it is about being bold enough to go there and say, "If there was care available to improve quality of life and extend things for a period of time, how would you feel about that?" But knowing that when you open up the floor like that and all the client gives you is a negative, then more than likely they're not going to be able to go down that path. And

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then the veterinarian has to decide if euthanasia is going to be the best course of action. Because we know that suffering is coming. It may not be there to the extent where euthanasia is warranted today, but it is coming. So is it worthwhile to make that decision sooner rather than later?

It is always a leap of faith. We just don't know truly how much more time this animal would have with or without palliative care sometimes, so it's about making a leap of faith in the patient's best interest, knowing that oftentimes it's going to be in the client's best interest as well.

KB: I saw a post once way back when, where I think somebody was struggling with this question, and one of the veterinarians who responded said something like, "There are many worse things for a pet than a good death." I think about that a lot. In many cases, it's not the best thing for the pet to go home with an owner who is determined that that pet be euthanized today and gets talked out of it. If they take the pet home, those are a lot of complicated emotions to send a person home with, and then here's this animal that depends on them completely, and they have to rethink all of the feelings that they just came into the vet clinic with, and I just think that's got to be really hard.

If I've made the decision to take my pet in for euthanasia, I've decided. It's taken a lot of soul searching to get there and I'm not in a great position to rethink that.

KC: When a client's made up their mind that they want euthanasia, for a veterinarian to change direction in that moment is asking a lot. It's extremely challenging. And that's where I often just need to focus in on my patient there and say, "Yep, I know everything that the client's saying. I know that they had a goodbye farewell party last night. They've been posting pictures all over social media. Today is the day." However, you might have a patient in front of you that says, "But what if I don't want today to be the last day?"

I don't know many things that are more challenging than that situation. So that's where I at least like to open up the floor to give the family time to unload for five to ten minutes and tell me everything that I really need to hear to make sure that moving forward with euthanasia makes sense.

Whenever I start an appointment, I establish rapport with my clients for a good 5 to 15 minutes, so I can get more back story, because a lot of these clients I've never met before. This is the first time that I'm meeting their pet, and I need to know more of that back story besides what they just told me on the phone or my intake form.

Like so many others out there, I have dedicated my entire career to end-of-life and euthanasia in particular, and [once I] helped 10 pets in one day; I can get up the next day and be able to do it again because every single appointment I approached in the right manner.

KB: For somebody who really is doing the work for themselves and letting principles guide them, it seems like that could be a very, very satisfying day.

Self-Care, Self-Aware

KC: One of my favorite tips is for hospitals to place an image of the human-animal bond outside of the euthanasia room, whether it's a traditional exam room or a euthanasia comfort room. The purpose of it is to take pause, to stop and look at it, and then just take a deep breath

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> "I think a really smart move is for management to ask personnel their feelings about euthanasia when they first hire on, about the volume of euthanasia they think that they can handle, because some are already self-aware enough to know that one euthanasia a day is about all that they can manage."
>
> —KATHLEEN COONEY, DVM, CHPV, DACAW RESIDENT

and relax your body before you walk into that room. It gets you in the right headspace to be fully present.

It's actually a self-regulation exercise, which will calm you so that you have a better barrier against secondary traumatic stress and therefore against compassion fatigue. Compassion fatigue really is two things: burnout and secondary traumatic stress, also known as vicarious traumatization. It's really hard to manage burnout; let's face it, we've got a zillion things going on, and I think many of us would be burned out just with family life, independent of vet med.

But the secondary traumatic stress part, that is something we can be in control of—to relax our bodies so if we are witnessing the primary traumatic stress of the client or our patient, whatever trauma we're witnessing, we are calm physically.

KB: At the hospitals where I've worked, there's always been a technician or two who have prided themselves on being the one who's tough. If somebody else is having a bad day, they're going to go in and take care of the euthanasia, or they're going to go in and take care of the sobbing client with the walk-in emergency, or nothing can ever really get to them. And I did worry a little bit sometimes that they would go in and it would feel callous to the client, because they were so adamant that nothing could reach them that they didn't allow themselves to feel with the client and to put themselves in the client's shoes and treat the client with the delicacy that most of us need in those situations.

But I also worry about them. I worry that they actually had a lot of feelings that were not getting acknowledged. How do you take care of team members who don't seem to need to be taken care of?

KC: I think a really smart move is for management to ask personnel their feelings about euthanasia when they first hire on, about the volume of euthanasia they think that they can handle, because some are already self-aware enough to know that one euthanasia a day is about all that they can manage. Somebody might say, "I can handle as much euthanasia as you want to come my way," and that's then somebody that you need to track regularly because more likely they are taking on those euthanasia appointments.

In fact, part of what brought me into end-of-life as my career choice was the private practice that I was working at in Michigan right after graduation. I found that they were aligning me with

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a lot of the euthanasia appointments throughout the day, so I was actually performing more euthanasia than some of my colleagues. And I said, "What's this all about?" And they said, "Well, you seem to do pretty well when you come out of those appointments. You seem balanced, like you're better than when you went into the appointment."

With regard to the techs and the veterinarians, if they want to go into those rooms because they want to have the story time and they want to see the connection, I think it's important to let them do that, but [also] make sure that they've got the right skills in place to protect them from either primary or secondary traumatic stress. And if they're the type of person that will feed on that bond and the beauty of euthanasia the right way, that may sustain them in vet med. So I never want anybody to gravitate away from it or to [say], "You can only do one or two euthanasias a day," because it really might be their soulful work.

That said, if there is somebody who's saying, "Yes, I want to take all the euthanasias to protect everybody else," I think it's a matter of really looking at that person and making sure that they're not already exhibiting signs of compassion fatigue. Are they sarcastic? Are they snarky? Are they talking about escape fantasies? They shouldn't be the ones who are going in there because it could actually make them worse. So anybody who's got the skills in place emotionally, physically to be present for euthanasia, I am all for it, but it's up to management.

KB: I definitely remember situations where we've said, "No, you've already had three today, like somebody else should take this one," and we thought we were being protective, but it's possible that that person really loved those appointments and didn't really know how to say so, because in some places it's not seen as something that you should want to do.

KC: Exactly.

The Spectrum of Feelings

KB: How, as a team, can you help each other deal with those feelings that linger after the appointment's over?

KC: I'll first say that it's normal to feel a variety of emotions, and sometimes it's conflict, sometimes it's regret—it's all over the board. What my approach has been is to leverage emotional intelligence in general. Knowing what your triggers and motivations are, why you feel the way you feel, even simple self-awareness: "What am I feeling right now?" Acknowledging what that emotion is and giving yourself a chance to unpack it and decide, "Do I want to feel this way? How do I want to feel and how do I get there?"

But part of the exercise of standing in front of that picture outside of the euthanasia room is to reflect on what's on the other side of that door. Who am I bringing into that space and who am I interacting with? Is this a dog that looks just like a dog that I lost two months ago, or is it a little girl that looks just like my daughter? Recognize what those triggers are to get yourself in the right headspace before you go in, and also during. And one of my tips is always to take a lot of sighs and deep breaths during euthanasia, to continue to relax yourself during that interaction, so that when you walk out you are

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"Compassion fatigue really is two things: burnout and secondary traumatic stress, also known as vicarious traumatization."

—KATHLEEN COONEY, DVM, CHPV, DACAW RESIDENT

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in theory more balanced and in a better headspace than you would have been had you not gone through those exercises.

But at the end of the day, we still have those appointments that stick with us a little more, so ask yourself, "Do I need to keep thinking about this? What is the goal of putting this energy into it?" And if it was because it was mildly traumatic, if it was mildly stressful, "How am I going to go into the next euthanasia and be more in control so that I can be, again, more resilient in this work?"

I like to listen to comedy radio. I love music. I love being able to compartmentalize to the best of my ability so that I can walk into the room with my euthanasia hat and my doctor hat on, and then I can take that off and be kind of my normal Kathy self. When I ride along with veterinary students from Colorado State University, they say, "Dr. Cooney, you are two different people. You got your game face on when you were in there with the family and you are calm and you are compassionate. You are so fully there in the moment." And as soon as that client departs and I've got my patient who's now deceased respectfully contained, ready for aftercare or whatever that it is, I am a completely different person. My voice changes, my attitude changes, and I'm my jovial self. So that is a very active approach, to just say, "I'm not going to let this sit with me all day," and feel good about that helper's high in the work that I just did.

KB: That is the first time I've ever heard anybody talk about that. The time when you come out of the euthanasia room and everybody expects you to be really serious and sad, and it almost seems like if you're not feeling it really hard for a while afterward, then you are being callous or you didn't care. But if you're actually processing the feelings in that moment and, like you said, doing the work to make sure you're in the right place when you go into that room and being present for every moment that you're in that room, then you don't necessarily have all of that weight when you come out. And like you said, you have a helper's high. I just did my job really well.

KC: Yeah, I just did awesome work. ※

Also see a related article by Kathleen Cooney, DVM, CHPV, DACAW resident, in this issue on page 50.

Kathleen Cooney, DVM, CHPV, DACAW resident, is founder of the Companion Animal Euthanasia Training Academy (CAETA), which provides training in companion animal euthanasia for veterinarians, technicians, and everyone wanting to learn best practices.

Katie Berlin, DVM, is the host of *Central Line: The AAHA Podcast.*

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Sadie McDonald, CVT

Veterinary Technician

Hawthorne Animal Hospital

Glen Carbon, Illinois

Year started in vet medicine: **2013**

Years with practice: **6**

Nominated by: **Kelsie Reider**

AAHA MEMBER

Employee of the Month

Why Is Sadie So Awesome?

Sadie is an excellent employee who gives 110% every shift. She is dependable and smart, has amazing tech skills, knows every aspect of the hospital, is responsible and reliable, puts her patient care first, and is able to think outside of the box. Sadie is an open door to talk to about all of the different responsibilities she has at Hawthorne.

How Does She Go Above and Beyond?

Sadie is always going the extra mile when taking care of the patients in the front and back of the hospital. She is always willing to step in and help when doctors need help. She is wonderful at communicating complicated diagnoses to clients in ways that help them better understand. She is always willing to stand up for coworkers when necessary. She knows all aspects of the hospital, which allows her to understand and empathize with coworkers in all departments.

In Their Own Words

Why do you love your job: I love that when I go home at the end of the day, I always feel like I made a difference. I also love that every day is different, and you never know what you are going to see or do when you come in to your shift.

Pets at home: I have a six-year-old mixed-breed dog named Tipsy.

What brought you to the profession: I started working as an animal care attendant when I was 19 and started to shadow surgeries over time. I fell in love with veterinary medicine after that.

Hobbies outside of work: I have a three-year-old and a one-year-old, with another on the way, so most of my time is spent running them around! I also enjoy reading and listening to true crime podcasts.

Favorite book/TV show: My favorite book is *The Woman in the Window* by A. J. Finn. My favorite show is *You*, and my favorite actor is Steve Howey.

Each month Trends spotlights an AAHA member, with generous support from CareCredit.* If you want to nominate someone, visit aaha.org/EOTM and enter them for a chance to win an Amazon gift card for you and your nominee!

*The Employee of the Month contest is administered by AAHA.

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