Find it all here.
dvm360™

Maine brings its fight against opioid abuse to veterinarians

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The path to a better death

Over and over again, we veterinarians hear it from our clients: Our pets die better than we do. In many cases, they're right. Here's why a One Health approach is needed for pain and death. **page 18**

dvm360 leadership CHALLENGE
Pet Pain and Death

Plus

CVC unconventional

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[2] Freedom of Information: NADA140-971 (January 15, 1993).

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Volume 48, Issue 8

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Pain and death—and love

This Leadership Challenge highlights the poignant end of a pet's life.

No one thinks about the end when they get a new pet. Whether it's a puppy or kitten, adult dog or cat, guinea pig or cockatiel, few people caught up in the flush of new love think to themselves, "This is not going to end well. At some point this animal is going to die, perhaps with me as witness, and I will be heartbroken."

And if they're not dwelling on that, they're certainly not imagining the weeks and months leading up to the end—the pet's loss of mobility, its weakness and pain, the devastating diagnosis that ushers in the final chapter without warning.

Fortunately for these pet owners, there are veterinarians and team members who think of little else. Their mission is to understand veterinary pain and suffering—and, in accordance, the euthanasia process—so thoroughly that when a pet reaches the end of its life, they are able to ease its passage with the absolute minimum of pain and suffering (and support the owners in their grief as well).

We feature some of these hospice and euthanasia-focused veterinarians in this issue of *dvm360*, as well as in *Vetted* and *Firstline* and on dvm360.com, presenting their philosophies and best practices to their colleagues in the profession. Veterinarians are no strangers to euthanasia as the final service offered a pet and client, but this focus on hospice and palliative care, as well as providing a "good death" for pets, seems to be gathering force, and we thought it was worthy of attention in a dvm360 Leadership Challenge.

So what exactly is a Leadership Challenge, you may be asking? It's an editorial series examining all aspects of an emerging topic in veterinary medicine—an invitation to veterinarians and team members to meet challenges and opportunities facing the profession in new ways.

While you might not agree with all the views presented here, we hope you'll still engage with the ideas in ways that help you with your next end-of-life patient—or maybe even help you create a new niche in your veterinary practice or embark on a whole new career. However you are affected, I firmly believe that your patients facing death (along with their heartbroken owners, who didn't see this coming at the beginning of the journey) will be better off as a result. **dvm360**

Maine brings its fight against opioid abuse to veterinarians

Clinicians must check a state database for pet owner drug abuse before prescribing opioids or benzodiazepines. *By Rachael Zimlich*

Veterinarians in Maine are being tasked with policing pet owners for opioid abuse, requiring them to review the prescription record of individuals picking up controlled substances for pets and alerting the state when there's cause for suspicion. That's where the requirement stops, though, as the new law won't prevent veterinarians from prescribing opioids or benzodiazepines, even when abuse is suspected.

Veterinary leaders like Katherine Soverel, executive director of the Maine Veterinary Medical Association (MVMA), says that while the opioid crisis is a public health threat that will take a slew of providers to fight, she doesn't think it's a fight for veterinarians.

"The MVMA believes that veterinarians can be part of the solution. However, as the law currently stands veterinarians are not able to be effective. Veterinarians do not have the human medical exposure, background or professional liability coverage for reviewing and interpreting human medical records as the law currently requires," Soverel says. "The current law is written with human health providers in mind. This makes sense given that human prescribers and dispensers are the source of the vast majority of drug diversion and abuse. Veterinarians were thrown into the current law without much consideration for the many differences in how veterinary medicine is practiced versus human medicine."

MVMA would support checking prescription records of animal patients rather than pet owners, she says.

The new law went into effect in March 2017 and expands Maine's Prescription Drug Monitoring Program (PDMP) to include veterinarians. The new law has two requirements—that veterinarians check the state's PDMP when prescribing opioids or benzodiazepines, and that veterinarians earn three hours of continuing education on prescribing practices for opiates every two years beginning in December 2017.

In order to check the PDMP, veterinarians first have to register with the state. From there, they will be required to check the records of anyone seeking an opioid or benzodiazepine for an animal. This will require a birthdate, full name and often a valid photo identification for the pet owner. Prior to issuing a prescription, the veterinarian will have to review three things—the aggregate morphine milligram equivalent prescribed or written for the pet owner, how many prescriptions that individual currently has for controlled substances and how many pharmacies are filling controlled substances for that person.

When a prescription is given, veterinarians must include a Drug Enforcement Agency (DEA) number on the prescription, and no more than seven days' worth of medication can be prescribed for acute pain. In cases of chronic pain management, prescriptions may be written only for 30 days at a time and veterinarians will have to recheck the PDMP every 90 days. The requirements for checking the PDMP do not apply when the opioid or benzodiazepine is administered in the clinical setting.

In cases where a pet owner or requester of a pet medication is found to have a questionable record of prescriptions in the PDMP, veterinarians have to notify PDMP administrators but are not required to confront pet owners, according to MVMA.

Veterinarians who don't follow the new requirement will be subject to a $250 fine for each occurrence, capped at $5,000 per year, according to the law. The state will begin levying fines this coming October.

The law will also end up costing veterinarians in other ways because of a July 1 requirement that opiate and benzodiazepine prescriptions be sent to pharmacies electronically.

"At this time there are also no e-prescribing software options available to veterinarians that are financially feasible," Soverel says. "The state has made a waiver available to prescribers that do not have the capability to prescribe electronically, but many members have contacted the MVMA concerned about how they will meet the electronic prescribing requirement."

The costs, she says, will be passed on to pet owners in many cases.

Amanda Bisol, DVM, legislative chair for the MVMA, says the association opposed the inclusion of veterinarians in the bill.

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Please see Brief Summary on page 06.

"The initial proposed legislation did not include veterinarians, but the head of the Department of Health and Human Services (DHHS) in Maine recommended adding us, which we did not know was planned until the public hearing on the bill," Dr. Bisol says. "We were not as prepared as we could have been, as we thought they would follow the lead of other states in excluding veterinarians."

Dr. Bisol says the MVMA encouraged veterinarians to contact their legislators about the bill—to no avail.

Connecticut, Maine, New Hampshire, New York, California and Minnesota are among the states that have similar laws, Dr. Bisol says.

Although she was opposed to the bill, Dr. Bisol was involved in a stakeholder group that helped state leaders form the rules of the law and create a module that walks veterinarians through the new rules and the process of checking the PDMP.

Still, she wonders about the point of veterinarian involvement given the fact that animal prescriptions will not be included in the database.

"I think any abuse by clients in the veterinary realm is a small issue and so to include veterinarians and make an already confusing database worse is ineffective. We are not mandated to report in Maine, which means any prescriptions veterinarians dispense directly are not in the database," Dr. Bisol says. "There is also no set way for pharmacists to add animal scripts and so it is impossible to accurately search a pet at this time."

Additionally, while the new law doesn't place restrictions on how veterinarians prescribe these medications as a rule, veterinarians are making changes in practice.

"The law does not limit what a veterinarian can do in terms of prescribing, aside from length of time and how often refills can be made. It only requires us to check and report suspicious activity to DHHS," Dr. Bisol says.

But the new rule is having unintended consequences that may have a negative effect on pets.

"From instances I have heard, veterinarians are misinterpreting the rules and choosing not to use the medication," Dr. Bisol says. "The only time a veterinarian would not be allowed to prescribe would be if the owner refused to give their birthdate to the veterinarian so they could check the database. In this case it would be illegal to prescribe as we have to check the database."

While Dr. Bisol says pet owners have generally been supportive of veterinarians joining the fight against opioid abuse, Soverel says she has heard another side—that some pet owners are uncomfortable with their veterinarian having access to their personal medical information.

"At the MVMA we would very much like to run a survey to better understand how the public feels about this," Soverel says. "It is those individuals who are uncomfortable who would be less likely to speak up about their concerns, so I think it's hard to say how pet owners feel without a formal survey that ensures anonymity."

Though it's been difficult to find out exactly what pet owners think about the new law, Dr. Bisol says veterinarians have been clear about their displeasure with the bill for a variety of reasons.

"It's a huge ethical issue that should not be overlooked for a nonhuman medical professional to be reading this database on [human] patients," Dr. Bisol says, adding she has concerns over the number of people who have access to the PDMP and being able to view her DEA number in the system. "There is absolutely no need for a veterinarian to be a part of policing human doctors and pharmacists for their prescriptions to their patients. … We are not allowed to treat humans and therefore should not have anything to do with their medical information." **dvm360**

AirHeart Pet Hospital soars into John F. Kennedy Airport

The airport's animal terminal expands to provide primary and urgent veterinary services to both travelers and locals.

Compassion-First Pet Hospitals recently opened AirHeart Pet Hospital (a nod to famous aviator Amelia Earhart) inside The ARK, a 24-hour animal terminal and quarantine center at John F. Kennedy Airport, according to a company release.

Staffed with five veterinarians, 13 licensed veterinary technicians and 13 veterinary assistants, the new hospital provides primary and urgent care to the pets of both travelers and locals, including JFK airport employees.

"With more than 2 million pets and other live animals being transported annually in the United States, veterinary medical care is critically needed," says Lauren Jordon, DVM, of AirHeart Pet Hospital, in the release. "Because of our location, we will face some of the most interesting medical challenges, so we have ensured our state-of-the-art facility and the professional staff are fully equipped to meet any issue that comes our way."

In addition to six exam rooms, two isolation wards and three patient wards, the full-service hospital includes suites for radiology and dental procedures, two surgery rooms, prep areas for instruments and surgery, a treatment room, and lab and pharmacy areas. Services range from new puppy and kitten exams to geriatric medicine and end-of-life care.

AirHeart Pet Hospital is located at 78A North Boundary Road, Jamaica, New York. Its hours of operation are from 8 a.m. to midnight Monday through Saturday and from 8 a.m. to 6 p.m. on Sundays. The hospital plans to eventually add 24-hour emergency services as well. **dvm360**

IMAGE COURTESY OF AIRHEART PET HOSPITAL

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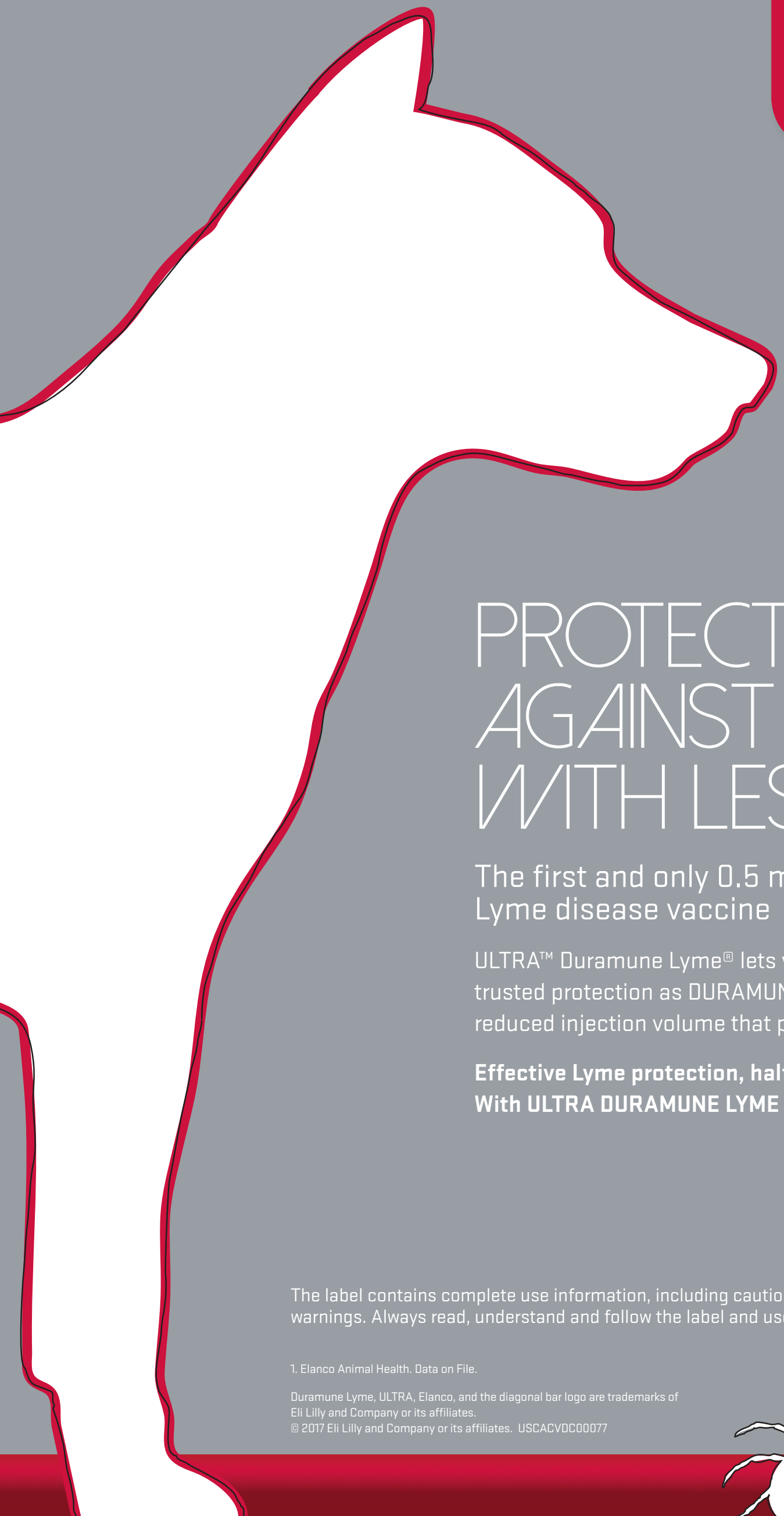

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Whisker fatigue: Did pet bowl companies invent a feline malady?

The New York Times says whisker fatigue is plaguing cats. The solution? Why, just a $40 feeding dish.

By Katie James, Associate Content Specialist

Has the term "whisker fatigue" sprung up in your client conversations lately? Or perhaps you've seen headlines in mainstream media referencing the term? It may be because of a June 5 *New York Times* article titled "Feline Food Issues? 'Whisker Fatigue' May Be to Blame."

The article defines whisker fatigue as "a fairly new diagnosis, one that many (but not all) veterinarians take seriously. When cats have to stick their faces into deep bowls and their whiskers rub up against the sides, the experience can be stressful, prompting them to paw the food onto the floor, fight with other cats or grow apprehensive at mealtimes."

It goes on to report a pet owner's account of solving troubling feeding issues (due to whisker fatigue, of course) after much internet research and self-diagnosis. Three pet bowl manufacturers (Hepper, Pet Fusion and Dr. Catsby)—surprise, surprise—sell just the bowl to solve the stress and discomfort caused by whisker fatigue. What the article doesn't include is input from any of the many veterinarians who purport to take this new condition seriously.

The bowls featured in the article are made of stainless steel (which is better than plastic for preventing feline chin acne, a common dermatologic condition affecting cats, the *Times* notes) and are wider and shallower than a traditional dish or bowl.

So yes, while steel is better than plastic, and an individual cat may prefer to eat out of a larger bowl, is there any credibility to the *Times* article? The only sources interviewed have a vested interest in selling their products. As one representative assured the *Times* reporter, "Whisker fatigue is a real thing."

The article's thin sourcing led *Boston Magazine* reporter Chris Sweeney to call out the *Times* in his piece "Did the *New York Times* Publish Fake News About Cats?" and do a little digging of his own. Sweeney reached out to the Cummings School of Veterinary Medicine at Tufts University as well as the American Veterinary Medical Association (AVMA).

A Tufts spokesperson told Sweeney that several members of the faculty were not familiar with whisker fatigue as a diagnosis, but the experts at the school's clinical nutrition service said that "there are many medical reasons for a cat's appetite to change, and it's important to investigate and address concerns with a veterinarian."

AVMA president Thomas Meyer, DVM, MS, echoed the sentiment that changes in eating behavior are a matter of concern and should be addressed with a veterinarian, but he added, "While a cat's whiskers are very sensitive, there is currently no evidence showing that whiskers rubbing against food bowls causes cats stress or discomfort."

Sweeney also searched the *Journal of the American Veterinary Medical Association*, the *American Journal of Veterinary Research* and the *International Journal of Feline Medicine and Surgery* for the term. Each search turned up zero results.

We at *dvm360* were also on the skeptical side, so we reached out to Elizabeth Colleran, DVM, MS, DABVP (feline), American Association of Feline Practitioners board member and feline-only practice owner, to see if she, a bona fide cat expert, had ever heard of the condition. Colleran said the *Times* article had made the rounds among feline practitioners and she agreed with the Tufts nutritionists: "A change in appetite is a serious symptom and should be fully and carefully investigated."

That said, whiskers serve many functions for cats, Colleran continued. "As sense organs with a high degree of specialized nerve endings that are quite sensitive, one could make the case for overstimulation of whiskers causing some unpleasantness. But, there is absolutely no data to support it as 'a thing,'" she told us.

So while cat owners mean well and most want the best for their pets, gentle education and a full examination is likely the best course of action if they call your clinic seeking advice about "whisker fatigue." **dvm360**

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Exclusive report: New study reveals insights into pet owners' purchasing decisions

Pet Owner Paths research pinpoints differences in how younger pet owners choose pet care. *By Kristi Reimer Fender, Editor*

A new study of pet owner behavior has found important differences in the ways millennial pet owners make decisions about their pets' care compared with older pet owners—and how and when both groups decide to involve a veterinarian.

The Pet Owner Paths research, sponsored by Merck, Unfenced (an animal health creative agency) and Kynetec (a market research firm), looks at the specific steps pet owners take when making decisions about their pets' health. The research was released exclusively to dvm360.

In addition to looking at younger versus older pet owners, researchers examined decision making by product category (including dental, dermatology and pain), differences between dog and cat owners, differences when a pet is sick versus when it's healthy, and more.

Here are some key topline findings from the research.

Millennials are the future—and the future is now

According to the American Pet Products Association, millennials are now the largest segment of pet owners. They are conscientious and poised to be excellent veterinary clients, a report on the research states. Specifically, according to the report, millennials are:

> Investing more time in their pets, evaluating their needs more thoroughly and spending more money.

> More likely to use veterinary products preventively rather than just as a treatment.

> More likely to use products continuously versus intermittently.

> More likely to get dental cleanings and use dental rinses.

> More likely to see veterinarians as integral to their journey as pet owners.

Millennials are invested in the 'learning journey'

For younger pet owners, decision making is "a long, complex and often iterative journey," the Pet Owner Paths report states. This journey takes them substantially longer than it does older pet owners, and it does not always end with a purchase. "Even after researching and evaluating options, millennials are less likely to purchase a product and stop the process; they often want to keep looking," the report says. Millennials tend to cast a wide net when they're looking for information to support a decision—they "actively gather, curate and assess information from many, many sources."

Veterinarians are integral to the millennial's journey

According to the Pet Owner Paths research, millennials are more likely to involve their veterinarian in their journey than older pet owners (57 percent versus 42 percent). They're also more likely to report that they ultimately follow the veterinarian's recommendations (50 percent versus 31 percent).

On the other hand, millennials are more likely to get their information from multiple sources in the veterinary clinic (veterinarians, technicians and front office employees); traditional pet owners rely almost entirely on the veterinarian.

Millennials demand instant access and communication

When millennials were asked what they most valued as a veterinary service offering, they chose 24/7 chat or texting availability as one of their top options—it was No. 1 for dog owners and No. 2 for cat owners. These pet owners are also more likely than older clients to reach out to the veterinarian using alternative methods (social media, email), and they are also heavy users of on-demand information sources.

Cat owners are not small dog owners

The Pet Owner Paths researchers discovered that cat owners as a whole spend more time on the decision-making journey than dog owners, regardless of generation. They're more likely to use online sources to gather information, jumping on the web immediately to find answers to their questions. Cat owners are also more inclined to read product packaging than dog owners, and more millennial cat owners than millennial dog owners recall receiving a specific recommendation from their veterinarian. Millennial cat owners are the most likely of any segment to use alternative communication methods (email, social media posts) to reach out to their veterinarian.

Veterinarians and pet owners see the world differently

The research also highlighted important differences between how veterinarians and pet owners view various aspects of pet care:

> Preventive health. Veterinarians see preventive care as spaying and neutering, providing vaccines and establishing a parasite control program. They believe they are responsible for defining preventive care appropriately and providing it for the pet. Pet owners on the other hand believe preventive care involves emotional well-being, exercise, nutrition, play and veterinary care. They think they are the ones responsible for providing these things.

> The veterinarian-client-patient relationship (VCPR). In the veterinarian's mind, the doctor assumes responsibility for making medical judgments regarding patient health and the client agrees to follow those instructions. For the pet owner, the VCPR is a trusting bond with a significant care provider who knows and cares about the pet and participates with the pet owner to provide the best care.

> The purpose of a veterinary visit. For veterinarians, it's to evaluate and determine the best course of action. For the pet owner, it's to get expert advice to include in the decision-making process.

> Dr. Google. For veterinarians, the web is a "dangerous, misinformed competitor to the veterinarian's authority and client relationships," according to the report. For pet owners, it's an on-demand source of copious information that they can curate to be more informed as they make decisions.

Additional insights

Here are some other interesting trends identified in the research:

> Millennial dog owners are moving away from small dog ownership and toward medium-sized dogs (in one segment of the study, 50 percent of millennials owned a medium-sized dog compared with 34 percent of older owners of dogs).

> Pet ownership is becoming more balanced between men and women. More millennial dog owners are male (39 percent) compared with older dog owners (29 percent), and more millennial cat owners are male (46 percent) compared with older cat owners (31 percent).

Implications

While the Pet Owner Paths study contains much more information (look for further coverage in *dvm360* magazine, *Vetted* and *Firstline* as well as on dvm360.com), veterinarians can take immediate action by engaging with millennials differently, researchers report: They can embrace alternative methods of communication, stop trying to compete with Dr. Google and instead embrace it, and have patience with the long and involved decision-making journey millennials need to travel for their pets' health. **dvm360**

Fear Free initiative sees enrollment of more than 14,000 in first year

Around 5,500 veterinary professionals and other animal care workers are already certified, according to the organization.

Enrollment of veterinary professionals and other animal care workers for Fear Free training and certification has surpassed 14,000 in its first year with around 5,500 having already achieved certification, according to a release from the initiative. Initial estimates put first-year enrollment at 1,000.

The initiative, designed to "take the 'pet' out of 'petrified,'" aims to reduce fear, anxiety and stress in pets receiving veterinary care. It was founded by Marty Becker, DVM, and developed by a 160-member advisory panel composed of veterinary behaviorists, veterinary technician behavior specialists, veterinary anesthetists, practice management experts, boarded practitioners experienced in Fear Free methods, hospital and animal shelter designers, medical icons and other experts, the release states.

Dr. Becker states in the release that the program's success is owed to three main factors. "First," he says, "Fear Free is the right thing to do; nobody gets involved with veterinary medicine to make life worse for animals. Second, Fear Free allows veterinary professionals to practice a higher quality of medicine while elevating care for their patients. Finally, pet owners are actively searching for individuals with certification to take care of their pets, so practitioners are flocking to certification because of market demand."

In addition to the core certification program, Fear Free also offers level two training and specialty continuing education courses such as the Foundation for Kittens and Puppies, the release states.

Enrollees represent more than 1,500 practices in 21 countries. Current projections show that 25,000 to 30,000 professionals will be enrolled in the eight-module program by the end of 2017, the release states.

"Fear Free has added an amazing fresh perspective in our professional interactions with our patients and clients," says Thomas F. Meyer, DVM, president of the AVMA, in the release. "Our entire veterinary team has bonded to make sure each pets visit is a positive and enjoyable experience. Our clients see how we embrace the human-animal bond by our commitment to a Fear Free visit. This is a game changer and a must for every pet." dvm360

Fear Free: An urgent obligation (and unprecedented opportunity)

You've probably heard of Dr. Marty Becker. And if you've heard of Dr. Marty Becker, chances are you've heard of his dream of transforming every veterinary practice into a Fear Free practice.

"I realized I always had the pet's physical well-being in mind, as almost all veterinarians do," Marty Becker, DVM, says. But what about emotional well-being? In fact, patients' fear may remain unrecognized or tolerated until it becomes a problem for the veterinary staff.

Are you open to testing strategies that could reduce pets' fear or anxiety during visits to your hospital?

97 percent of the dvm360 Fear Free survery respondents say yes!

A big part of the Fear Free movement is veterinarians and team members helping clients come to a better understanding of fear in pets—and its implications over a lifetime. If you're just starting to dip your toe in the water, or if you're the only one in the practice who is really fired up—and you're not the boss—know that Fear Free strategies are practically free and shouldn't take much time to implement. Between 40 percent and 70 percent of respondents to our Fear Free study are using these strategies regularly now. If you're in that group, one key step is to make sure you're telling clients you're taking these great steps to make their pets' visits go more smoothly.

So if you think treating a pet for medical conditions while overlooking signs of fear and anxiety is counter-intuitive, you're not alone. Check out dvm360.com/FFsave10 to learn more (including how to save 10% on the Fear Free Certification Program). dvm360

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1 The same active ingredients for heartworm protection and internal parasite control as the leading competitor, but at a lower price.
2 Please refer to Tri-Heart® Plus Prescribing Information for more detail.
3 Average discounted price of Tri-Heart® Plus compared to Heartgard® Plus. December 2016, 57-69 US Flea and Heartworm Markets, Brakke Consulting and Average price of Tri-Heart® Plus compared to Heartgard® Plus as per Price List, Merial® Brand Pet Products Effective February 1st, 2017.

All dogs should be tested for heartworm infection before starting a preventive program. In a small percentage of ivermectin/pyrantel treated dogs, digestive and neurological side effects may occur. Tri-Heart and Tri-Heart Plus logos are registered trademarks of Merck Animal Health. Heartgard is a registered trademark of Merial, Inc.

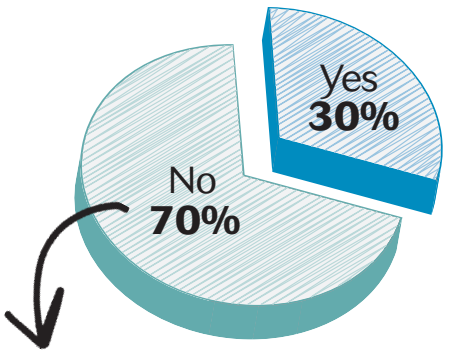
Please see brief summary on page 22

Doing DR the dental way

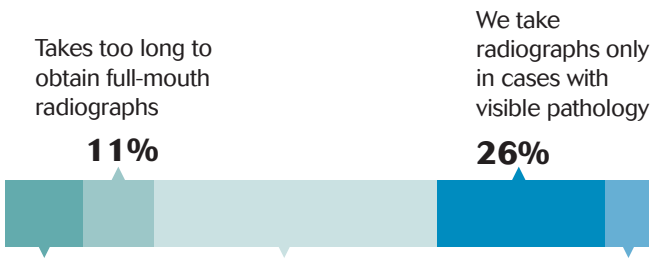
dvm360 survey delves into veterinarians' habits and opinions on full-mouth radiographs and more.

Most veterinary dentists insist that full-mouth radiographs are necessary in every dental workup. But so far most veterinarians aren't buying it—or their clients aren't, as the case may be. Review the results of our exclusive survey, then check out the tips from Barden Greenfield, DVM, DAVDC, on making the most of your dental radiography equipment.

Do you obtain full-mouth radiographs on all your dental procedures?

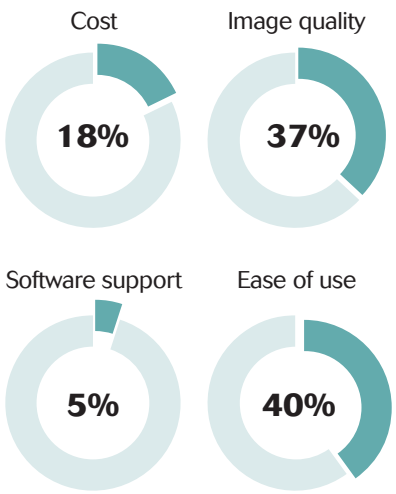


If no, why not?

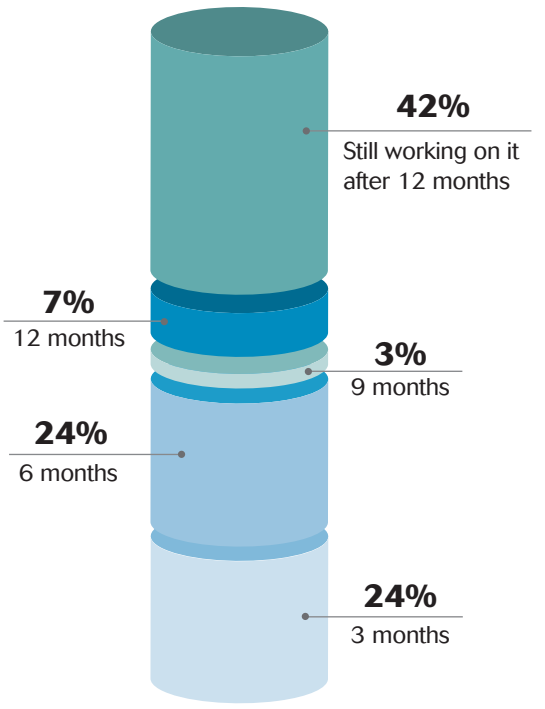


Data source
The dvm360 Clinical Updates survey on digital radiography was sent in April 2017 to subscribers of *dvm360*, *Vetted* and *Firstline* and garnered 213 responses, with a 6 percent margin of error.

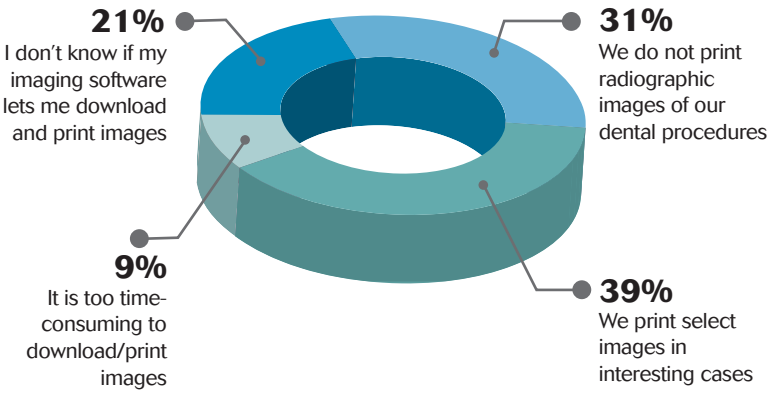
When evaluating a dental radiographic system, which is most important in your selection?



How long did it take you and your team to be proficient in obtaining high-quality full-mouth radiographs in your patients?



Dental imaging systems let veterinarians showcase procedures and inform clients of pathology. Which statement best reflects your practice at this time?



3 tips to make dental DR work for you

If you have digital dental radiography, you should be performing dental radiographs on every case, insists Barden Greenfield, DVM, DAVDC, of Your Pet Dentist in Memphis and a recent CVC speaker. Why? A UC Davis study from 1998 found that three out of 10 dogs and four out of 10 cats had disease that can only be diagnosed with dental radiography. The upshot? If you've got it, use it. Here are some tips from Dr. Greenfield.

1. **Know your breed differences.** A few examples: Portuguese water dogs may have delayed tooth eruption, boxers have a high incidence of embedded maxillary or mandibular first premolars, and bulldogs and boxers have a wide mandibular symphysis. Historically, the smaller the breed, the higher the potential for more problems like tooth crowding, rotation and embedded teeth.

2. **View radiographs the way the mouth is oriented.** If you have all your radiographs assembled in a way that mimics the natural way the teeth fall in the mouth, it helps you localize problems.

3. **Watch your contrast.** Dr. Greenfield warns that while increased contrast can seem more appealing to the eyes, it comes at a cost. Marginal bone (the bone level just below the gum line) may not be visualized with high contrast, so lower contrast, which may be a bit less clear, is preferred in many instances.

Find these tips helpful? There are lots more at **dvm360.com/dentalDR**.

Are your financials AAHA-compliant?

Now you can check with the AAHA/VMG Standardized Chart of Accounts, recently made available to the veterinary profession as a free resource.

By Brendan Howard, Business Channel Director

Sure, there are bigger things to dream about than a standardized chart of accounts. But if one existed, different practices could compare revenue and expenses—apples to apples—and learn from their differences without having to figure out the weird way Doctor A categorizes diagnostics and Doctor B likes to count wellness exams on his balance sheet.

Well, that time has come. Once restricted to AAHA members, the AAHA/VMG Standardized Chart of Accounts is now free to everyone, courtesy of AAHA and the study group organization Veterinary Management Groups (VMG).

Veterinary Economics Editorial Advisory Board member Gary Glassman, CPA, helped develop an earlier version of the chart of accounts, and he says the list includes more detailed categories for income and expenses that give practice owners more information about their business.

"[The chart of accounts] has become somewhat of a standard for those who look to do more with their accounting and don't just rely on their accountant without specific veterinary knowledge," Glassman says.

The availability of the free tool is a first success for the AVMA's Economic Advisory Research Council, which is tasked with "organizing and efficiently using the veterinary profession's scarce resources." And you can't really know your resources if you don't know what they're called, right?

The AAHA/VMG Standardized Chart of Accounts has been endorsed as the industry standard by the AVMA, VetPartners and the Veterinary Hospital Managers Association, as well as AAHA and VMG.

"[This] will allow practitioners to better organize their practice's finances in line with generally accepted accounting principles," reads a release from organizers. "Additionally, AAHA recommends all accounting firms working with veterinary practices adopt the standardized codes." **dvm360**

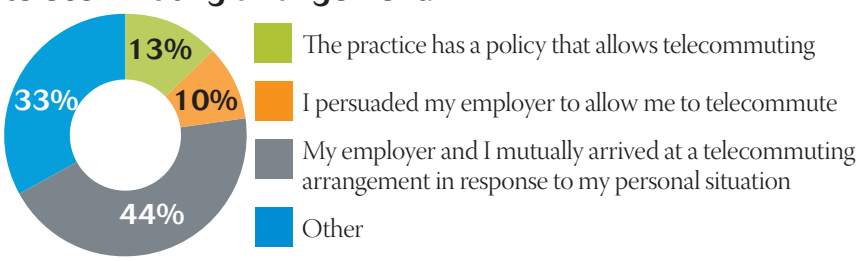
The AAHA/VMG Standardized Chart of Accounts has been endorsed as the industry standard by the AVMA, VetPartners and the Veterinary Hospital Managers Association, as well as AAHA and VMG.

Telecommuting trends for practice managers

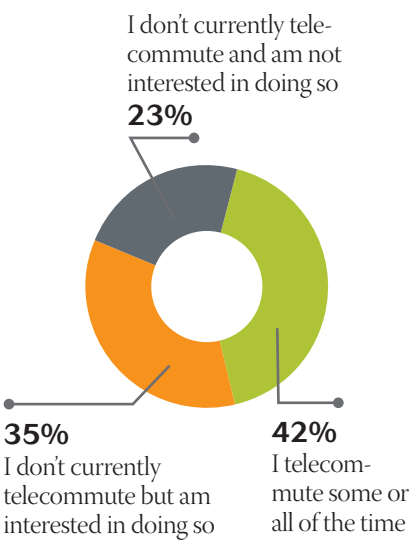
This VHMA survey indicates how many managers work from home ... and how it's working.

Telecommuting is fairly common outside of veterinary medicine but can be more difficult in businesses such as veterinary practices that are regularly open to clients. However, the results from a survey by the Veterinary Hospital Managers Association (VHMA) suggest that telecommuting in one form or another is a viable option for practice managers. Close to half the respondents (42 percent) report that they spend either some or all of their time working remotely. An additional 33 percent expressed interest in telecommuting, although they do not currently do so. **dvm360**

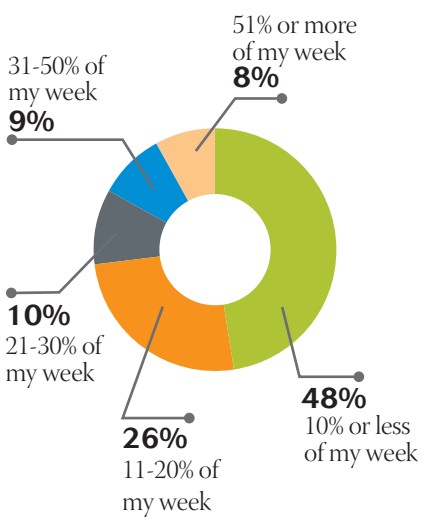
Please select the response that best characterizes your telecommuting arrangement.



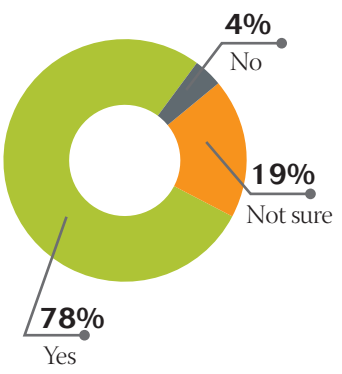
Do you telecommute?



If you do telecommute, approximately what percentage of your regular workweek is spent off premises?



Would you recommend telecommuting as an option for practice managers?



Which of the following tasks have you performed effectively while working remotely?

One Health and the path to a better death

Over and over again, we veterinarians hear it from our clients: Our pets die better than we do. In many cases, they're right. *By Jessica Vogelsang, DVM*

dvm360 leadership CHALLENGE
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[1] Data on file.

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PRECAUTIONS: As a class, NSAIDs may be associated with gastrointestinal, renal and hepatic toxicity. Effects may result from decreased prostaglandin production and inhibition of the enzyme cyclooxygenase which is responsible for the formation of prostaglandins from arachindonic acid. When NSAIDs inhibit prostaglandins that cause inflammation they may also inhibit those prostaglandins which maintain normal homeostatic function. These antiprostaglandin effects may result in clinically significant disease in patients with underlying or pre-existing disease more often than in healthy patients. Carprofen is an NSAID, and as with others in that class, adverse reactions may occur with its use. The most frequently reported effects have been gastrointestinal signs. Events involving suspected renal, hematologic, and neurologic, dermatologic, and hepatic effects have also been reported. Concomitant use of carprofen with other anti-inflammatory drugs, such as other NSAIDs or corticosteroids, should be avoided because of the potential increase of adverse reactions, including gastrointestinal ulcerations and/or perforations. Carprofen is not recommended for use in dogs with bleeding disorders, as safety has not been established in dogs with these disorders. The safe use of carprofen in animals less than 6 weeks of age, pregnant dogs, dogs used for breeding purposes, or in lactating bitches has not been established.

ADVERSE REACTIONS:
During investigational studies for the caplet formulation with twice-daily administration of 1 mg/lb., no clinically significant adverse reactions were reported. Some clinical signs were observed during field studies which were similar for carprofen caplet and placebo treated dogs. Incidences were observed in both groups: vomiting (4%), diarrhea (4%), changes in appetite (3%), lethargy (1.4%), behavioral changes (1%), and constipation (0.3%).

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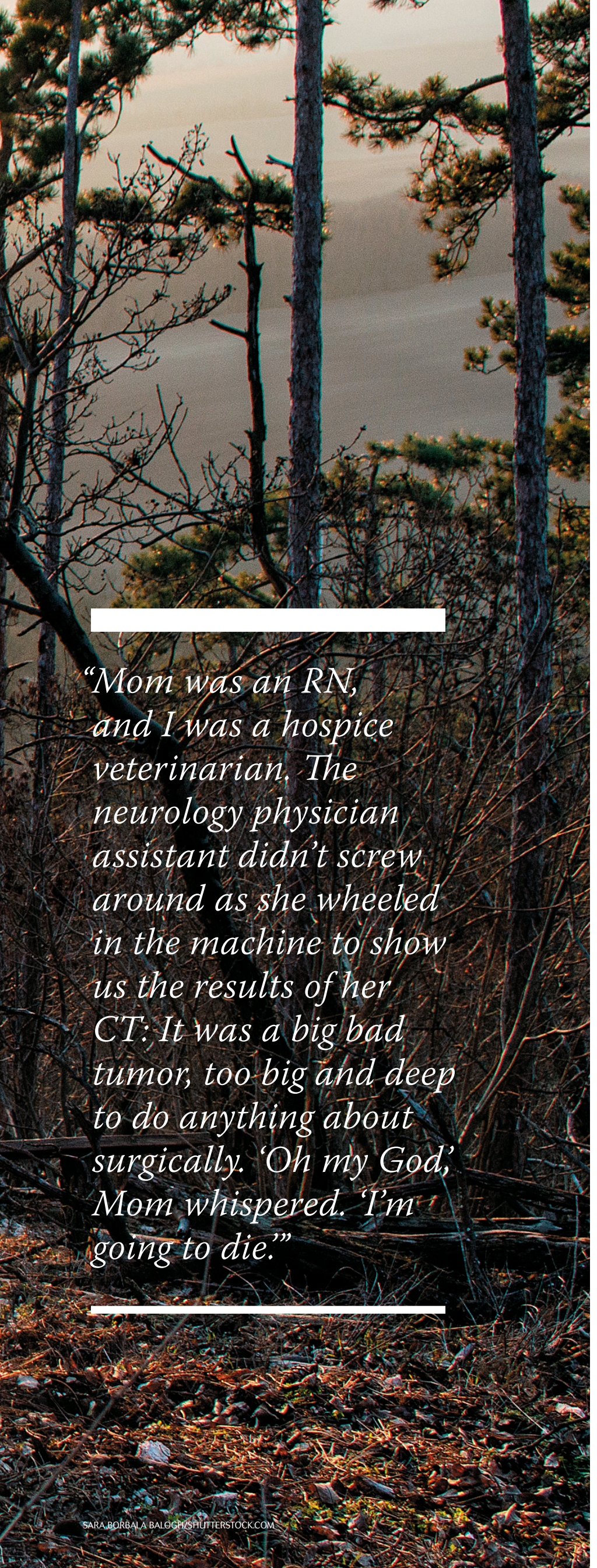

SARA BORBALA BALOGH/SHUTTERSTOCK.COM

I think we forget as a veterinary profession that we're unicorns when it comes to being comfortable with death. We're stuck in a corner with the coroners as we make the morbid jokes and view death with an ease the rest of Western society lacks. Even MDs don't get it—in their world, euthanasia is a grave sin, not a moral obligation, even when one is suffering a terminal illness.

Like many aspiring veterinarians, I thought euthanasia would be the hardest part of my job. It wasn't—not by a long shot. I hated surgery, I was ambivalent about endocrinology, but I really excelled at death. Not in the sense that it hastened a pet's demise, but that when it was time, I could help pet owners manage the complicated emotional landscape that accompanies the decision to euthanize. Veterinary hospice and home euthanasia barely existed when I graduated, but over the years they developed into an area of interest and specialization. And I was all on board.

My time in the field has taught me that our ingrained fear of death can be overcome, that comfort with the transition can be taught, and that experience and steady support can make all the difference during a time of grief. Why then, I reasoned, don't we give ourselves credit for our role in helping people prepare for other deaths in their lives? If more people were actively involved in end-of-life decision making for their pets, perhaps they would be more inclined to talk about death and dying with their human family members when the time came.

Our pets die better than we do

"Futile care"—that scene in the ICU where physicians crack the chest of a 90-year-old in multi-organ failure who just arrested—plays out every day across the United States. The older you get, the more likely you are to die in a hospital. According to the Centers for Disease Control and Prevention, 73 percent of people over the age of 65 die as inpatients.

I took to heart Ken Murray's seminal 2011 essay "How Doctors Die," which describes physicians who get bad prognoses and never set foot in a hospital again, instead maximizing their time out in the world with loved ones.

I didn't want to be one of the 73 percent. It sounded like a horrible way to go. Over and over again, we hear it from our clients: Our pets die better than we do. In many cases, they're right.

I decided I wanted to share this message. Such was my fervor that I started speaking publicly about the lessons we can take from our

pets' deaths, presenting to other veterinarians as well as the general public. I was on fire! I was the Death Fairy, come to teach children that death is something we face, not something we stuff into an ICU and hide behind a hospital room curtain. I was lit from within by a persistent certainty in my bones that I would affect someone out there who desperately needed to hear those words.

As is so often the case in life, I was right in all the wrong ways.

'I don't want to go back to the hospital ever again'

My mother, who dutifully attended all my talks and clapped the loudest at all of them, had been experiencing what we laughed off as "senior moments" for several months. Two months into my Death Fairy World Tour, she was diagnosed with a grade IV glioblastoma—it was the same kind of tumor that had taken the life of Brittany Maynard—a woman diagnosed with terminal brain cancer who made news several years ago for her fight to end her life on her terms—the year before.

Mom was an RN, and I was a hospice veterinarian. The neurology physician assistant didn't screw around as she wheeled in the machine to show us the results of her CT: It was a big bad tumor, too big and deep to do anything about surgically.

"Oh my God," Mom whispered. "I'm going to die."

As everyone around her held her and told her it was going to be OK, I stood silent—because she was right, of course. I sat in the room while the radiation oncologist told her about the six-week protocol for radiation, and as the other oncologist laid out the chemotherapy protocol. She was so stressed at the idea that she had a five-minute seizure in the car on the way home from the hospital. When I called the doctor from the side of the freeway to ask if we should come back to the hospital, she said, "Why would you? That's just the way it's going to be from now on."

So we sat in a parking lot as she thrashed and I fumed.

Every time we went back to the hospital for follow-ups, she receded into herself a little more. It took several days before it occurred to anyone—in this case, my sister—to ask my mother what she wanted out of all of this.

"I don't want to go back to the hospi-

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tal ever again," she said. So we didn't.

I fielded calls from the doctors to explain why we were withdrawing from their care, receiving reactions that ranged from incredulous to understanding. I needed permission from her neurosurgeon to get a hospice consultation.

We stood on that muddy, pothole-filled road of a cancer diagnosis with a big beautiful gate off to the side that no one thought to point out to us until we asked, and then there it was. So we left the road.

The truth is, you need to fight like hell to get off the merry-go-round of aggressive care, and I completely understand why so few people do. It's unrealistic expectations on the part of patients, their families and the doctors; it's our culture; it's the need to win; it's the fact that many people don't even know that getting off is an option until it's too late. When we're overwhelmed with life-or-death diagnoses, we go along with whoever's in charge because it's the path of least resistance. We forget that we're the ones in charge.

When I told the oncology resident we didn't want to do chemo, he was angry.

"You could double her lifespan!" he said.

"From what to what?" I asked. "Be honest with me."

His eyes flicked over to Mom and then back to me. He didn't want to say it out loud.

"With treatment, six to eight months," he conceded. "What is it you do again?"

"I'm a hospice veterinarian," I replied.

"Oh," he said.

That was the last thing he said to me. When we left the hospital that day, we never went back, and my mother never had another seizure.

When people said, 'I wish we could do this' for people,' tears would well in my eyes

While my mother was in hospice, I continued to see hospice and euthanasia appointments for work. When people said, "I wish we could do this for people," tears would well in my eyes. I was petrified of what might happen to my mother in the end stages of her cancer, and I wondered what I would do if she felt her medications weren't managing her symptoms. To my relief, she was very well-managed. I understand this is not the case for all cancer patients. I still wish that, had she needed it, the choice to end things sooner would have been available. Even though we didn't need it, the fear of helplessness is a terrible feeling.

"The truth is, you need to fight like hell to get off the merry-go-round of aggressive care, and I completely understand why so few people do."

Several months after Mom's death, California joined Colorado, Oregon, Vermont and Washington in enacting a Death With Dignity Act. I attended a local meeting of Compassion & Choices, an advocacy group for patients wanting choice in end-of-life care. I was surrounded by doctors who were seen as rebels and traitors to the profession for thinking it was ethical to allow terminally ill patients to hasten their own deaths. Euthanasia is a dirty word furtively whispered, hence the verbiage "death with dignity" versus "assisted suicide."

The doctors were fascinated by my job and by the idea that veterinarians on the whole consider the relief of suffering a moral obligation, that euthanasia is the norm and not the exception. In veterinary medicine, "natural death" is the dirty word furtively whispered, and clients who wish for it often report feeling pressured into choosing euthanasia before they feel ready.

With MDs and DVMs at such polar opposite ends of the spectrum in terms of how we view both death and the doctor's role in it, is it any wonder that patients struggle so hard with these decisions? If physicians tell families they're equipped to manage a dying patient's symptoms adequately—if that's the human standard of care—then we have to be understanding when those people come to us requesting the same for their pets. As we finally open conversations and bridge the gap, doctors are warming to the idea of death with dignity just as veterinarians are starting to aggressively manage terminal patients with palliative care. We're both walking toward the middle while realizing that every death is different. Truly, it's One Health at its finest.

In my mother's case, she lived two months past her diagnosis. A far cry short of the six to eight she might have had otherwise, but I would choose the short and pleasant walk over the long and painful one any day.

She had two beautiful, quiet, loving months, with my children on her bed every day and the *Harry Potter* films on replay in the background. With milkshakes instead of hospital pudding and a golden retriever to sleep on her feet.

I never would have been able to fight for what she wanted had I not been doing this very same thing already for dogs and cats. So, yes, when I say our work makes a difference, I mean it. Because I lived it.

I mourn the loss of my mother every day, but I've never once regretted the way she died: on her own terms, surrounded by family. How many people get to say that?

Not enough.

We veterinarians still have work to do. **dvm360**

Jessica Vogelsang, DVM, is a certified veterinary journalist, a regular contributor to a number of publications, author of All Dogs Go to Kevin*, and creator of the popular blog Pawcurious.*

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Talking to kids about euthanasia

Hospice veterinarian Dr. Jessica Vogelsang became acutely aware of her communication shortcomings when she had to explain euthanasia to her own children—an experience that completely transformed how she now counsels parents in the same situation. *By Sarah Mouton Dowdy, Associate Content Specialist*

As a hospice veterinarian at Paws into Grace in San Diego, California, Jessica Vogelsang, DVM, is an expert when it comes to end-of-life veterinary care. But until somewhat recently, she wasn't so skilled at having euthanasia conversations with kids.

"My shortcomings were revealed when I had to explain euthanasia to my own upset and confused kids," says Dr. Vogelsang. "I had no idea what I was doing. Pulling from my Catholic school background, I tried to explain the concept of heaven, to which my son responded, 'Who's Kevin, and why does he have our dog?'" (Dr. Vogelsang later drew on that experience when she published her first book, *All Dogs Go to Kevin*).

It became painfully clear to Dr. Vogelsang that she wasn't doing clients any favors by giving them her default how-to-tell-the-kids advice: "Tell them whatever feels right." Her clients didn't know what was right. They didn't know where to start or what was appropriate. They needed more concrete guidance.

Dr. Vogelsang's first piece of advice is to start early. "As soon as you know a pet has a terminal illness, start talking about the end-of-life process," she says. "Plant the seed by saying, 'I know you have kids. Have you thought about how you want to handle telling them?' Most people wait until the day of the euthanasia to talk to their children, which is a difficult time to start laying the groundwork."

The next step is to provide tools, like a handout on general communication tips, age-specific advice and ideas for celebrating and memorializing pets (see page 26). Help parents

ART_PHOTO/SHUTTERSTOCK.COM

see they have an opportunity to teach and model appropriate grieving to their children, who may be encountering bereavement for the first time.

"My favorite situations are when you have kids who've been prepared early on and who want to go through some sort of ceremony beforehand—maybe they'll write a letter or light some candles—and you'll just see them really involved in the process. It's beautiful for them, and it's absolutely astonishing to watch the calming effect it has on the parents," says Dr. Vogelsang.

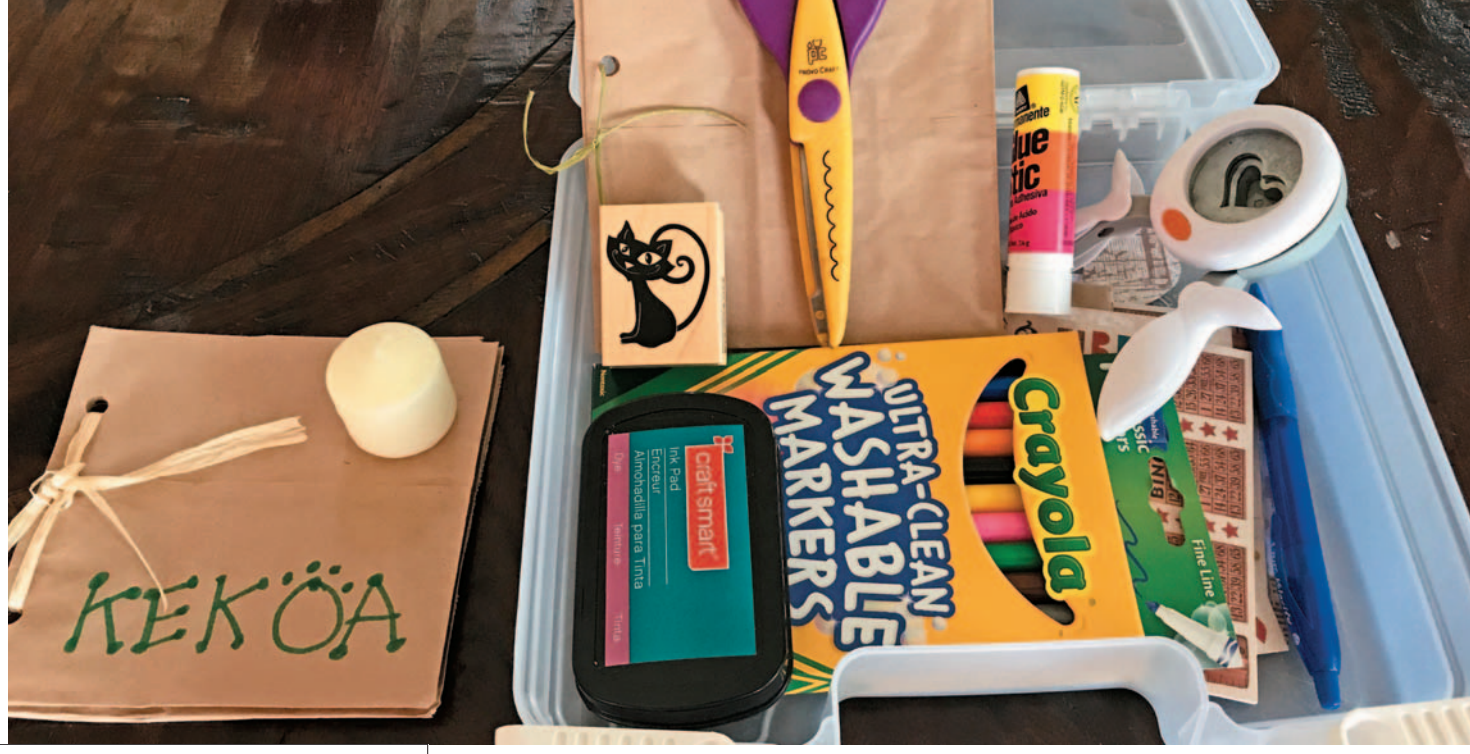
You don't always have the luxury of planting a seed early on, but you can still be ready to provide advice and support on the day of the euthanasia. If you end up being the one to break the news to a child, the same general communication tips from this handout apply. Don't sugarcoat what's happening with vague expressions like, "Spot is going to sleep for a long time." Say, "I've done everything I can do, but Spot won't get better. I will give him a shot that stops his heart from beating. He won't feel any pain."

Explain to parents that up until almost age 5, kids are typically more in tune with their parents' emotions than their own, says Dani McVety, DVM, owner of Lap of Love Veterinary Hospice and In-Home Euthanasia in Lutz, Florida. They may not want their child present during the euthanasia so they can experience their emotions in full without worrying about their child's interpretation.

Ways clients can celebrate a pet's life as a family before the euthanasia

> Hire a photographer or videographer to record happy moments.
> Create a bucket list of things to do before the pet passes.
> Create a scrapbook of the pet's life.
> Write down favorite memories and share them with each other
> Young children can draw pictures or make a collage.
> Plant a tree or bush in the pet's favorite spot.

Source: Jessica Vogelsang, DVM; kidshealth.org; and aplb.org



Dr. Vogelsang keeps a craft box with her to use when children are present at a euthanasia appointment.

Dr. Vogelsang has a box of crafts on hand for every euthanasia appointment where children are present. It's full of things children can do to express themselves and stay occupied, like collage, drawing and letter-writing materials and bubbles. "I let them pick what feels most comforting," she says.

According to Dr. McVety, "Teenagers can be one of the most difficult age ranges to talk to because they have an altruistic view of society and want to fight through what's happening. I try to talk to the teenager directly because you can see parents get very defensive—particularly when they're already grieving."

Dr. McVety tries to meet teenagers where they are by saying something like, "I understand you feel like we're giving up. But let's talk about what we can't do and what we can do. We can't keep coming back to the emergency room. We can't risk a potentially difficult passing. We can provide the most peaceful euthanasia, and that's why I'm here."

Helping parents and children in this way may seem difficult to juggle in addition to your other tasks, but Dr. Vogelsang sees it as a veterinarian's duty: "If we are asking people to take on the responsibility of making this decision for their pets, we owe it to them to provide tools to manage the emotions involved." (We also owe it to clients to help them know when it's time. Visit **dvm360.com/toosoon** for a client-facing video that can help owners navigate this difficult decision). dvm360

Client handout: Help kids say goodbye to their pets

Use this handout for age-appropriate ways of talking about veterinary euthanasia and honoring the life of a dear departing pet.

Euthanasia offers a unique opportunity to help kids understand and process death—perhaps for the first time. And while it's true that parents are the ultimate experts on their kids, if they approach you for advice on what to tell their kids, telling clients to say "whatever feels right" misses the boat. If these clients knew what was "right," they wouldn't be asking you!

Give clients something more concrete (or in this case, paper). The handout at right offers age-appropriate advice to guide parents through the euthanasia discussion with their kids. (Heads up: The handout encourages parents to reach out to their veterinarian if they are unable to have the discussion on their own, so be ready to provide support.)

Visit **dvm360.com/kids anddeath** to download the handout or scan the code.


FROM YOUR VETERINARIAN

dvm360

Saying goodbye to your pet:

Help your child understand and grieve

Euthanasia offers a unique opportunity to help your child understand and process death in a healthy way. How you talk to your child will depend on three things: the closeness of the child-pet bond, your child's age and your child's maturity level. Here are some ideas for helping kids (and yourself) through the grieving process. (Keep in mind that these are just guidelines; you're the expert when it comes to your own child.)

General communication tips

> Avoid glossing over the event and be as clear as possible. Instead of saying, "Spot's just going to sleep for a long time," say, "The veterinarian has done everything she can do, but Spot won't get better. Spot will get a shot that stops his heart from beating. He won't feel any pain."

> If the thought of breaking the news to your child is too overwhelming, you can ask your veterinarian or a close family friend to help.

> Let your child know it's OK to feel sad, lonely, frustrated or angry about losing a pet. Encourage open discussion, and don't feel like you have to hide your feelings. Modeling healthy grief helps children learn how to cope and lets them know they aren't alone in their sadness.

> It's common for kids to ask about what happens to pets after they die, so be prepared to answer—even if it's a truthful admission that you don't know.

> Let other caregivers in your child's life, like teachers, know about what your family is going through.

Age-specific advice

Every child is different, but here are some general guidelines about what kids can understand by age:

Up until around 5 years old, children are more in tune with your emotions than their own. You may not want to have your young child present during the euthanasia so you can experience your emotions in full without worrying about your child's interpretation. Though it's unlikely your child will understand, tell him or her that the pet will die and won't be coming home. Reassure your child that he or she did nothing to cause your pet's death.

Children between **5 and 6 years old** may have a general understanding of death, though they may not be able to grasp its permanence. At this age, grieving children may exhibit habit changes (less appetite, difficulty sleeping) and should be given opportunities to share their emotions. Reassure your child that your pet's death is not his or her fault. Starting at this age, most children are able to decide if they want to be present for the euthanasia.

Children between **7 and 9 years old** are able to understand that death is permanent and may start to worry about losing other loved ones. Their grief may cause problems at school and behavior changes, so your child may become more aggressive or clingy toward you. As with other ages, reassure your child that he or she did nothing to cause the pet's death.

Children between **10 to 11 years old** can typically understand that death is natural and inevitable. They often use their parents as a model for how to respond.

Adolescents are at a stage when they want to be treated like adults one day and be comforted like children the next, so responses to pet loss can vary a lot. They may become frustrated and try to fight what's happening because they feel like everyone is giving up. You can reach out to your veterinarian for support in explaining that you've done all you can.

Ways to celebrate your pet's life as a family before the euthanasia

> Hire a photographer or videographer to record happy moments of your family playing with your pet.

> Create a bucket list of things you want to do with your pet before he or she passes.

Ways to memorialize your pet as a family

> Create a scrapbook of your pet's life.

> Write down some of your favorite memories and share them with each other. If your kids are too young to write, have them draw pictures or make a collage.

> Plant a tree or bush in your pet's favorite spot.

LILIANA VENDRASCO/SHUTTERSTOCK.COM

Sources: Jessica Vogelsang, DVM; Dani McVety, DVM; kidshealth.org; aplb.org

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1. Kirkby Shaw, K., Rausch-Derra, L., and Rhodes, L. 2016. "Grapiprant: an EP4 prostaglandin receptor antagonist and novel therapy for pain and inflammation." Vet. Med. Sci. 2: 3-9.
2. Rausch-Derra, L., Huebner, M., and Rhodes, L. 2015. "Evaluation of the safety of long-term, daily oral administration of grapiprant, a novel drug for treatment of osteoarthritis pain and inflammation, in healthy dogs." Am. J. Vet. Res. 76.10: 853-859.

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‘I am an angel of death’

I wear that title as a badge of honor. My value as a veterinarian lies in the art and skill of providing a peaceful death—I at the heart of my mobile hospice practice. *By Melanie Santspree, DVM*

It’s more than just euthanasia, and it’s not just putting a pet to sleep. It’s more than a 15-minute slot in the middle of an overbooked day. It’s more than another sympathy card hastily signed because 20 other medical records demand attention. It’s more than a sad “That’s too bad,” and a brief hug with a “Hope the rest of your day is better.” It’s more than the end of the life of a biological organism.

It’s death. And it’s what I do as a veterinarian.

My tuition-free degree in death

The loss of my grandmother, grandfather, uncle, mother, three jobs, one dog, two cats, two rabbits and two personal relationships within a four-year period by the age of 30 gave me a tuition-free degree in death, grief, depression and loss. I can’t recall how I survived weaving through these things amid back-to-back appointments at a veterinary hospital.

But I do have a recollection—many, actually—of stepping into the bathroom for a moment to wipe away tears. I can remember gripping the sink in the exam room, breathing deeply after the little boy asked me where his best friend went and why I took him. I can also remember leaning over the toilet, sick with bile boiling inside me, because I had to work the day after my mother died as I’d used my three bereavement days watching her die and was denied more.

I had to get it together. I had to walk into another room and smile. When I think of the enormity of what anything dying means, the inherent respect demanded from this process arises as a familiar lump in my throat.

Simplistically stated, dealing with death is hard. But you know what’s always harder? Inducing the death. People don’t know how we do it so often, because we don’t know how we do it so often—at least I didn’t. I did not process death respectfully. I did not exemplify my best all the time. I did not heal emotionally and mentally. Our veterinary peers, and often our superiors, say we’re weak when we need some time to process our emotions after a humane euthanasia. I thought I was weak too.

The art of death

It’s different for me now that I’m a veterinarian dedicated to hospice and end-of-

ILLUSTRATIONS BY ADRIENNE WAGNER

life care. I've practiced and trained and worked to improve my bedside manner. Today, from the moment I receive notification of a euthanasia appointment and start to think about the family and pet ... to the moment I decide on the best cocktail of drugs ... to the moment I prepare myself, my appearance, my car and my emotional state ... to the moment I pull into the driveway ... to the moment I begin my purposeful walk toward a grief-stricken human being, bypassing their outstretched hand and providing the strong embrace they really need ... it all culminates in this: I am here, I see you, I see your pain.

Clients know that no one and nothing holds more importance than they do, than their sick pet does, right in that moment. I don't need to have been there for the past 10 years of that pet's life. I am here now.

On pages 30 and 31 I've shared a list of ways I pay attention to every small detail in my home visits.

In an ideal world, we'll all have time and space for the right euthanasia

I hope for a day when general practitioners have the time, space and support to provide pet-owning families with an exceptionally humane euthanasia experience and with the time and space to grieve right in the veterinary hospital. But until then, I am here, ready and willing to be the rainbow bridge between veterinarian and client.

I am determined to preserve memories with a nontraumatic passing. I am determined to support all the homeless pets out there by supporting the proper death of those already in a home, because the better I do my job, the easier it will be for a person to go out there and save another life.

It is a trite simplification to say I am good at death. But I am. And I'm so glad I've chosen to place my value as a veterinarian in the art, skill and compassion of death as part of the field of hospice and palliative veterinary care. dvm360

Melanie Santspree, DVM, practices in Albany, New York, with Lap of Love mobile euthanasia and hospice service.

When Dr. Santspree sees the pet at a euthanasia appointment, she makes a point to always say out loud how beautiful the cat or dog is.

the in-home euthanasia experience

By Melanie Santspree, DVM

As I enter a home, I notice whether the pet owner has shoes on (if not, mine come off too).

When I see the pet, I always say out loud how beautiful the cat or dog is—and I honestly see that beauty.

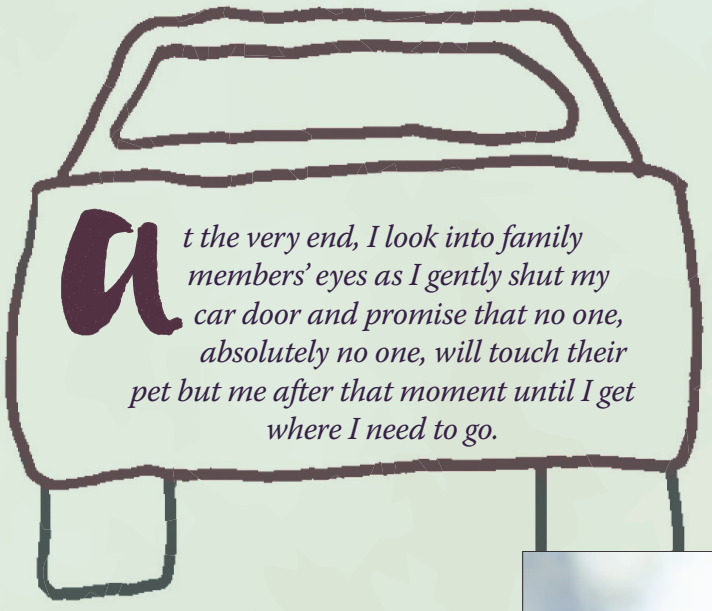
In facing the pet for my visit, I put down my bag, get down on my knees and look into the animal's eyes.

When it's time to speak and explain, I talk through the procedure and the pet's condition, and I validate the family members' feelings. I want to reaffirm their decision and tell them what I can and will do for them in our time together.

When it's time to start, often the reclusive, dying dog or the painful and rigid cat will rise and come to me. I feel sometimes, when they do this, that pets are silently conveying their readiness to move on.

As I speak, I am constantly sensitive to those around me. I listen patiently. I ask questions to learn what I need to help write a memorial. I never ask for a check at the wrong moment. I judge whether the family needs a joke or a prayer at any given moment.

ILLUSTRATIONS BY ADRIENNE WAGNER



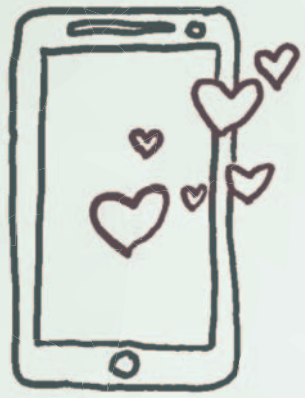
At the very end, I look into family members' eyes as I gently shut my car door and promise that no one, absolutely no one, will touch their pet but me after that moment until I get where I need to go.

When it's time, I bundle the pet in a blanket, carry it carefully out with me, place it gently beside me in the front seat and buckle it in. I know that pet's body matters. I show that to clients in the careful way I handle

it. That's not always easy, depending on the pet. I lift weights and take boxing classes, because I'll be damned if I'm going to ask the man choking back tears to help me carry his dead dog to my car when he can barely rise from his knees.

When I'm finished and the pet has moved on, I know I'm not done. I don't leave until the family is ready. I know sometimes, when I gently hold an old woman's hand, that she has lost the most important thing in the world to her, and when I walk out the door, she'll feel alone.

After the visit, I'm still doing my job when I write the card, craft the right words for the memorial or customize the personal email. I clip the fur in every color from the pet's coat. I carefully take the paw print in plaster. I call to check in with the pet owner the next day. I call to let the family's veterinarian know how everything went. dvm360



dvm360 leadership CHALLENGE
Pet Pain and Death

Death and other client kindnesses

Pet owners need hospice and euthanasia help in your patients' rough moments. Brush up on your client communication and manage these exam room and home encounters right. *By Jessica Vogelsang, DVM*

"Never turn down the leftover bowls and medications."

This advice, passed down by sage colleagues with years of experience in end-of-life care for pets, has served me well over the years. After a euthanasia, heartbroken owners who don't want the reminders of a life now passed offer half-empty dog food bags, careworn beds and near-full bottles of medication in the hope that someone might be able to use them. Even though I can't do anything with most of the items, I always take them, if for no other reason than to spare the owner having to deal with the items themselves.

It's the medications that strike me the most: how many of them are barely touched, how little time has passed between the time of the prescription and the time of euthanasia, and how few of them are the currently recommended palliative drugs. Many are drugs intended to cure, intended for aggressive treatment, and the fact that they sit unused in my medication graveyard is the true indicator of how much good they're doing.

When a patient receives a life-limiting diagnosis, we jump right to the treatment plan—

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it's what we're trained to do, whether we're a veterinarian or an MD. Gold treatment, silver treatment, bronze treatment. We ask a few questions to help us get to the point: What can you afford, and how aggressive do you want to be? But this line of questioning makes a big assumption—that everyone views "gold treatment" the same way.

You can't define a best plan without knowing the desired outcome, and talking to a patient's family about goals is the key element. I learned this the hard way. When my mother was diagnosed with grade IV glioblastoma, the process went like this: The neurosurgeon told us the diagnosis. The radiation oncologist laid out the course of daily radiation. The medical oncologist told us what chemotherapy she would be having. My mother knew what she wanted from the moment she heard the diagnosis: hospice care. The only problem was, no one asked her opinion until after they set her down a course she didn't want. Extricating her from unwanted interventions took a Herculean effort that should have been unnecessary.

When we're overwhelmed, it takes a great deal of effort to get off the track we're set on by our doctors, so most of the time, we don't. I will never forget the oncologist rolling his eyes at me when I told him my mother was declining treatment. He spoke to us as if we were daft, unaware that both of us were medical professionals. He couldn't understand why my mother was turning down the opportunity to live an extra three months. He assumed that is what anyone would want, but she was more than willing to trade that time to be free of daily hospital visits and chemotherapy, and enjoy a quiet spring at home watching *Harry Potter* movies on repeat. Her gold standard was very different from his, and once given the microphone, she expressed it with clear-eyed certainty. I learned a lot from that experience.

Ask, 'What's best for the pet and the family?'

Medicine has been evolving from a paternal to a patient-centered model of decision making for several decades, but clearly it's still a work in progress. As we develop better communication strategies for families navigating end-of-life decisions for pets, we must make discussion of client goals an essential part of the consultation. Fortunately for us, hospice veterinarians like Shea Cox, DVM, of Bridge Veterinary Services are leading the charge. (Full disclosure: I work with Paws into Grace doing this same kind of work.)

Dr. Shea Cox

Dr. Cox is an expert when it comes to end-of-life care. She's a certified hospice and palliative care veterinarian, certified veterinary pain practitioner, certified pet loss professional and the president-elect of the International Association of Animal Hospice and Palliative Care (IAAHPC). Before entering the veterinary field, she was a registered nurse in human hospice and home health care. And for Dr. Cox, excellent end-of-life care all comes down to time.

"My 'aha' moment … happened in my 10th year working as an emergency veterinarian," Dr. Cox says. At the time she often received patients in the ER that were declining from complications of their primary disease process. Even though they'd just been seen by a veterinarian or veterinary specialist, their owners often felt lost or overwhelmed with regards to the pet's diagnosis and care, Dr. Cox says.

Take a patient that's just seen a vet-

Euthanasia: Too soon? Not soon enough?

To watch a video with more advice from CVC educator Mary Gardner, DVM, on helping clients through the process, visit **dvm360.com/righttime.**

dvm360 leadership CHALLENGE
Pet Pain and Death

Check it out: Here's what *dvm360*'s sister publications are up to:

Vetted™

As progressive veterinary care allows pets to live longer lives, the need to keep them comfortable in their later years and cross over the final threshold with ease and grace becomes ever more paramount. Vetted's coverage includes guidance on rescue drug protocols to use when clients aren't quite ready to euthanize, tips to help notify clients and team members that a euthanasia is happening in the clinic and four products to help senior pets in pain have more mobility.

firstline®

End-of-life care is a delicate topic for pet owners. Firstline's coverage will include expert insights on how to do hospice the right way, including leveraging the team and technology to maximize patient comfort and client care. We'll also bust common hospice myths and offer tips and tools to communicate more effectively about hospice and euthanasia.

To find all of this coverage, plus online-exclusive content, head over to **dvm360.com/petpainanddeath.**

erinary oncologist, for example. The oncologist "has one hour to discuss diagnosis, prognosis, treatment options and costs of care," Dr. Cox says. "Because of the vast amount of information that needs to be shared in a short time, conversations are often one-sided until the last few minutes, when the doctor asks, 'Do you have any questions?'"

Yes, the oncologist can deliver all of that in a compassionate way, Dr. Cox says, but clients still struggle in the moment to process all those details at the same time as their emotions are hijacking their brains. The result is they go home with very little understanding of what just took place.

In her hospice practice, Dr. Cox sets the stage for better client understanding by leading a guided discussion with families during their initial consultation. In addition to information about disease and treatment, she covers such issues as:

- family goals
- relationships and beliefs
- challenges in the delivery of care
- past experiences with care
- quality of life for the family as well as the pet
- preparation for death and the euthanasia process.

Adapting intake forms from human hospice, Dr. Cox has created a four-page checklist to remind her to touch on all the necessary topics. She schedules three-hour new-client appointments at the pet owner's home, with both a veterinarian and a veterinary technician, and she's learned (surprisingly) that the medicine is the easiest part of the discussion.

"About 20 percent of the conversation centers around a client's understanding of the medicine," she says, "while I spend 80 percent getting an understanding of the pet owners' needs and goals and helping them determine the 'lines in the sand' to know when the time is right for euthanasia."

Dealing with the "when is it time?" question is one of the most essential parts of Dr. Cox's hospice work. She says many clients express angst when their veterinarian tells them they'll "know when he's ready" and to come back for euthanasia "when it's time."

Dr. Cox says this places a heavy burden on families when, more often than not, they have no idea when their pet is at the right point for euthanasia. "When they don't know but feel that they should know, they become burdened with feelings of guilt and that they're not doing right by their pets," she says.

So Dr. Cox has adopted an alternative expression: "I say, 'When you begin to feel that your pet is not experiencing joy or quality of life, let's talk more about what that may mean to both of you.'" The emphasis is on noticing changes, not making a final determination on the spot.

Too much to talk about, too little time = Do you need help?

Dr. Cox recently worked with four practices to interview 100 clients about their pets' end-of-life experiences. The two biggest themes? Not enough time to discuss end-of-life issues with the veterinarian during a normal appointment, and not enough "easy access" to the veterinarian when it was time to review quality of life or possible euthanasia. That's regrettable but understandable, Dr. Cox says.

"Current practice business models only allow for 15- to 30-minute appointments at best," she says. "This just isn't enough time to provide the level of care needed, especially when one considers the emotional complexities involved with end-of-life communication and the many needs of a geriatric pet with multiple comorbidities. It all comes back to time."

One way to get past this hurdle is a multidisciplinary team that includes a doctor and technician dedicated to the lengthy at-home visits that can be time-consuming, emotional and complicated.

Is an outside hospice veterinarian the answer? Dr. Cox's business model is built on "yes," and she emphasizes that while it can be hard for general practitioners to include another veterinarian in a cherished client's care, it can result in better outcomes. This model is also consistent with human medicine, where multidisciplinary care is increasingly being embraced by hospitals and patients alike.

In fact, Dr. Cox finds that the referring veterinarians often benefit from the referral almost as much as the families.

"A hospice-medicine relationship does not replace the relationship the family has with their lifelong veterinarian," Dr. Cox says. "It's a collaborative relationship. We're not just there for the pet and client but the veterinarian as well. Part of our role is to lighten the load of care by being an additional layer of support in a veterinarian's busy day."

End-of-life clients often require more frequent, in-depth conversations than other clients, and a hospice veterinarian is well equipped to offer that emotional support and presence. If a hospice veterinarian isn't available in a particular area, or if a general practice wants to make end-of-life care more of an emphasis, a doctor-and-technician team can take the lead on developing this service for its clients (see "4 steps to improve your end-of-life care for families" on this page).

Whether you're focused on improving your own patient care and client communication about end-of-life issues or seeking out third-party help to support your hospice care, the adage that "you don't know what you don't know" has never been more relevant. When clients are given clear choices and options with end-of-life care, they often make choices we never would have anticipated. But if we don't let them know what's possible, they'll never get there. Rather than treating death as an afterthought or an unfortunate consequence of treatment failure, it's time we do better by our clients and empower them to implement a plan that offers comfort, peace and reassurance. **dvm360**

4 steps to improve your end-of-life care for families

1. Use your technicians. Invest in training a licensed veterinary technician who has a strong interest in end-of-life care and who can work closely with a veterinarian in creating end-of-life care plans.

2. Review the End of Life Guidelines from AAHA and the International Association for Animal Hospice and Palliative Care (IAAHPC).

3. Grab the latest textbooks. Two hospice-specific textbooks were released recently by Wiley: *Hospice and Palliative Care for Companion Animals: Principles and Practice and Treatment and Care of the Geriatric Veterinary Patient* (Dr. Cox is a contributing author).

4. Get certified. For a truly in-depth experience, enroll in the IAAHPC's Animal Hospice and Palliative Care Certification Program. This brand-new, 100-hour, RACE-approved program is available to veterinarians and licensed veterinary technicians for certification in hospice and palliative care.

The right building for renovation: NorthStar VETS' satellite clinic building was originally a mattress store, so it had minimal interior architecture. "As the building became available, we knew it had the right structure and square footage needed to be rebuilt into a veterinary hospital," says owner Dr. Daniel Stobie. Strategically placed window decals tie in with the hospital's brand. They also ensure the privacy of everyone inside.

A new NorthStar for clients

The sky's the limit for NorthStar VETS. Discover how they packed their new satellite veterinary clinic location into a space one-fifth the size of their main facility. *By Ashley Griffin*

Well, they did it again.

The NorthStar VETS team opened another hospital, despite owner Daniel Stobie, DVM, MS, DACVS, saying back in 2012 that there wouldn't be enough hair left on his head for another project. This time they built a Veterinary Emergency Trauma and Specialty Center satellite clinic in Maple Shade, New Jersey, about 30 miles from their main location in Robbinsville, New Jersey.

"It's kind of like childbirth in that you forget how painful it is once it's done," Dr. Stobie says. "But when you're holding your baby, you want to do it again."

Dr. Stobie said it was a little easier this time around, because he knew what to expect. And he credits his hard-working team for the successful completion of the new clinic. As before, their efforts didn't go unnoticed by our judges—NorthStar VETS was named a 2017 *Veterinary Economics* Hospital Design Competition Merit Award winner (an award they also earned in the 2012 competition).

Thinking about building a satellite clinic of your own? Here are three tips to consider from NorthStar VETS.

1. Build for convenience

Building the 24/7 satellite clinic in Maple Shade was all about convenience for veterinary clients, Dr. Stobie says. The new 4,746-square-foot location is near a centrally located intersection that connects to the main highways in the state.

"We knew that many of our clients came from that area for appointments, rechecks and ongoing care with certain specialists," Dr. Stobie says. "And because our specialists rotate through the satellite location, clients could still see the doctor who performed their pet's surgery or who was treating their pet's diabetes, for example."

One big takeaway? When you choose an additional location, make sure it's easy to access in an emergency and convenient for anyone

A familiar reception: "We made sure that anyone walking through the front door of any of our locations knew they were entering NorthStar VETS and could expect the best care," Dr. Stobie says. "It was important to me for the satellite clinic to feel familiar to the staff as well." He says that the blues, earth tones and long horizontal lines all work together to put pet parents at ease and to signal continuity from location to location for veterinary team members.

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Exam rooms for everyone: NorthStar VETS' satellite clinic features five exam rooms—one for oncology, one for triage and three for emergency doctors and specialists. The rooms are bright and clean and continue the distinct NorthStar VETS look from the lobby, including the Hampton blonde porcelain tile. On the walls is vinyl wainscot, a wood chair rail and one painted accent wall. The cabinets from Midmark have a warm honey maple finish and the countertops are stain-resistant, durable Silestone. "Each exam room is outfitted differently, depending on who uses it," Dr. Stobie says. "So the exam room for surgeons has knee models and relevant posters, and the ophthalmology room can become dark for eye exams."

The heart of the hospital: The general treatment area has ample space and is the heart of the hospital. With multiple tables, a variety of patients can be treated and undergo procedures depending on their needs. The floor-to-ceiling windows of the original building were walled over, leaving just the clerestory windows for natural light. Stonhard poured epoxy floors to complete the clean and comfortable treatment area.

travelling from the satellite location to the main hospital.

2. Continue the look

From building materials to furniture, equipment and color schemes, Dr. Stobie was looked to mirror the VETS brand he'd established in the main hospital.

3. Plan on surprises

So what is this two-time Merit Award winner's advice for tackling a veterinary hospital design project? Choose your architect and builder wisely.

"When the builder and architect have worked together on projects before, it's even better because it reduces conflict when issues come up," Dr. Stobie says.

He says there are always going to be issues you can't anticipate. Even after they opened the doors at the new satellite clinic, they were still changing things in order to maximize the available space, which is one-fifth the size of the main location.

Advice from a winner

"Attend the Veterinary Economics Hospital Design Conference to find out all of the aspects of building a hospital, from site selection and permitting to final construction," Dr. Stobie recommends. "Also, do a thorough demographic study to be sure the area can support your project." **dvm360**

Ashley Griffin is a freelance writer based in Kansas City and a former content specialist for dvm360.

NorthStar VETS by the numbers

Owners: Dr. Daniel Stobie
Number of doctors: 39 full-time, 5 part-time
Exam rooms: 5
Total cost: $2,125,505
Building cost: $1,348,781 (building only; excludes land purchase, landscaping, parking lot, etc.)
Cost per square foot: $293
Square footage: 4,746
Structure type: Leasehold renovation
Architect: Jeffrey L. Grogan, Jeffrey L. Grogan Architects
Photographer: Hugh Loomis, Hugh Loomis Photography

Collaboration station: The main hallway separating the lobby from general treatment is an important space that lets team members make notes on patient progress as well as contact clients and referring veterinarians by phone. "The close proximity also allows doctors and technicians to collaborate better on cases and work as a cohesive team," Dr. Stobie says.

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[1]Data on file at Merial.

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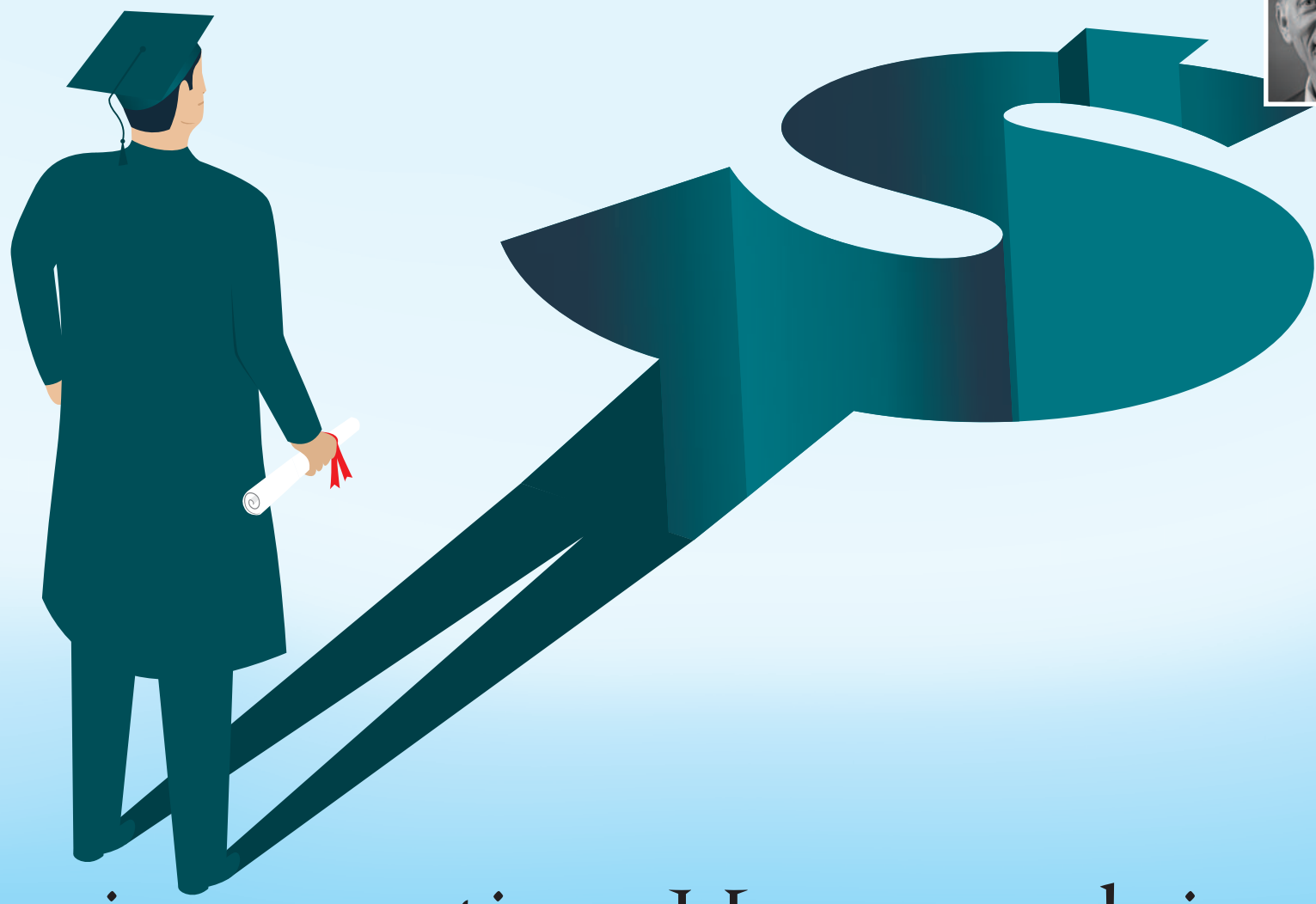


Burning question: How much is my veterinary degree worth?

To answer this, let's look at investment costs, lifetime earnings and intangible benefits.

By Michael Dicks, PhD, and Bridgette Bain, PhD

Applicants to veterinary school make a conscious decision to invest time and effort to obtain a doctorate of veterinary medicine. Economists consider this kind of decision an attempt to maximize "utility," or well-being, which includes both measurable and nonmeasurable benefits. Measurable benefits are monetary rewards; nonmeasurable benefits are those that provide happiness not related to money.

In a market economy, the simplest way to compare the measurable benefits of various investment options is to look at what provides the greatest return for each dollar invested. The difference between the investment chosen and the next best opportunity provides an estimate of unmeasurable benefits.

The DVM degree investment

So, the amount of money you as a veterinarian spend to obtain your DVM is an investment. And the investment to become a veterinarian actually contains three parts:

- The total cost of obtaining a veterinary education (tuition and fees, books, supplies, equipment and anything else needed to obtain the degree, including the interest accrued on a loan while in school)
- The foregone income you could have obtained with a bachelor's degree, which you skipped while attending veterinary school
- The lifelong earnings you gave up from nonveterinary career paths in order to earn money as a veterinarian (opportunity cost)

Table 1 shows how these investments play out over the career of an average veterinarian today.

Veterinarian lifelong earnings profile

The measurable return on investment in a veterinary education is the total lifelong earnings that can be obtained with a veterinary degree minus all of these costs. This "earnings profile"—the amount of income obtained over a lifetime—is different for men and women, as well as those with a bachelor's degree and those with a DVM (see Table 2). Note that the gap between the earnings profile for a female veterinarian and a female bachelor's degree holder is considerably larger than the same gap for men. This difference means that the opportunity cost of becoming a veterinarian is much higher for men than for women, as men give up a much higher bachelor's degree salary.

Net present value

The difference between the DVM earnings profile and the total investment over the lifetime of a veterinarian's career is the net value of the DVM degree. The final step in determining the value (in today's dollars) of a veterinary medical degree is to determine the present value of all future earnings minus all the investment costs (direct education expenses, foregone income and opportunity cost)—in other words, the net present value (NPV).

To adjust from the net value to the NPV, we must "discount" or translate future revenues and costs to today's values. Discounting reflects one's time preference of money. That is, how much would I have to offer to pay you a year from now to justify withholding $100 from you today? If you said $110, then you've indicated that next year's dollar has to be discounted by 10 percent to be equal to the value of your dollar today. A more reasonable discount rate is 4 percent: I would need to pay you $104 dollars a year from now to give you the same utility as $100 today.

When both returns and investment are properly adjusted to reflect today's values, the net value of the DVM degree becomes the NPV of the DVM degree. The average NPV

GETTY IMAGES

TABLE 1

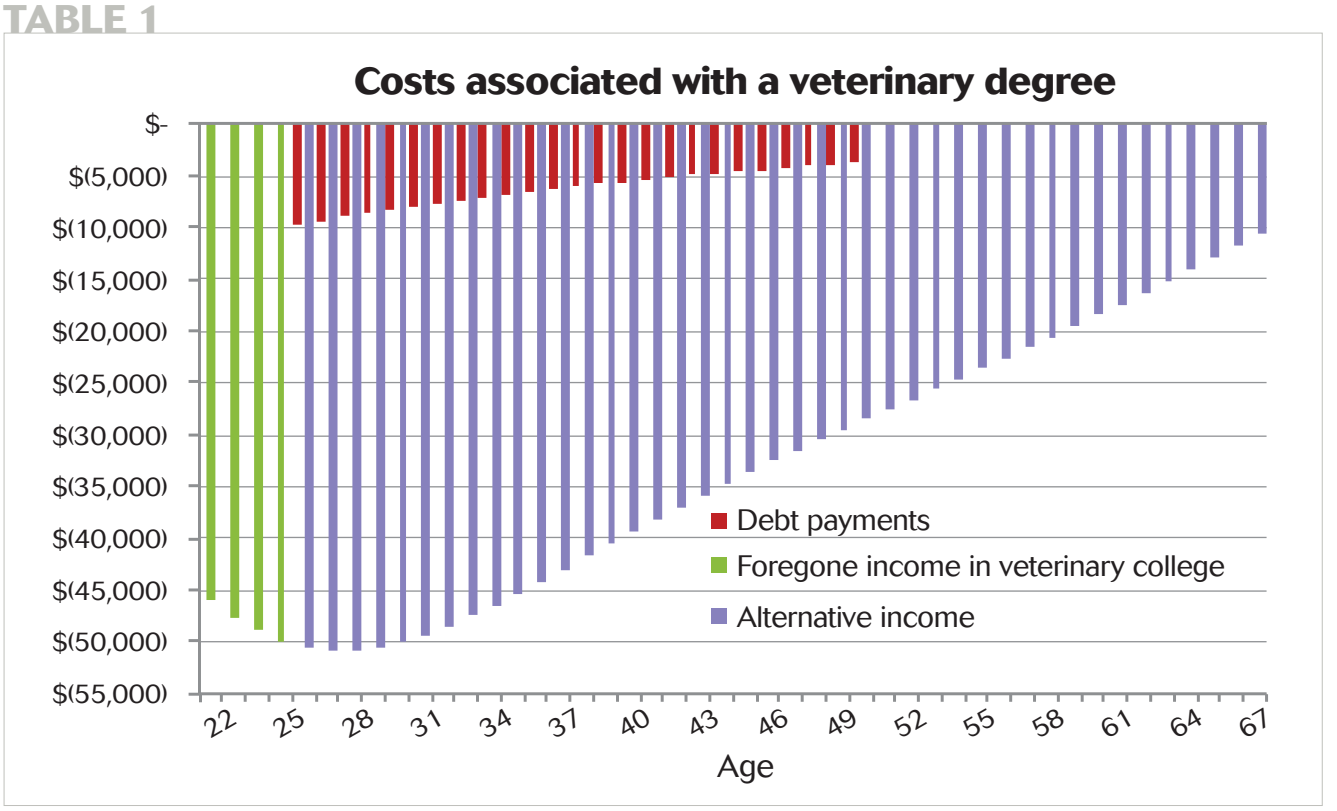


TABLE 2

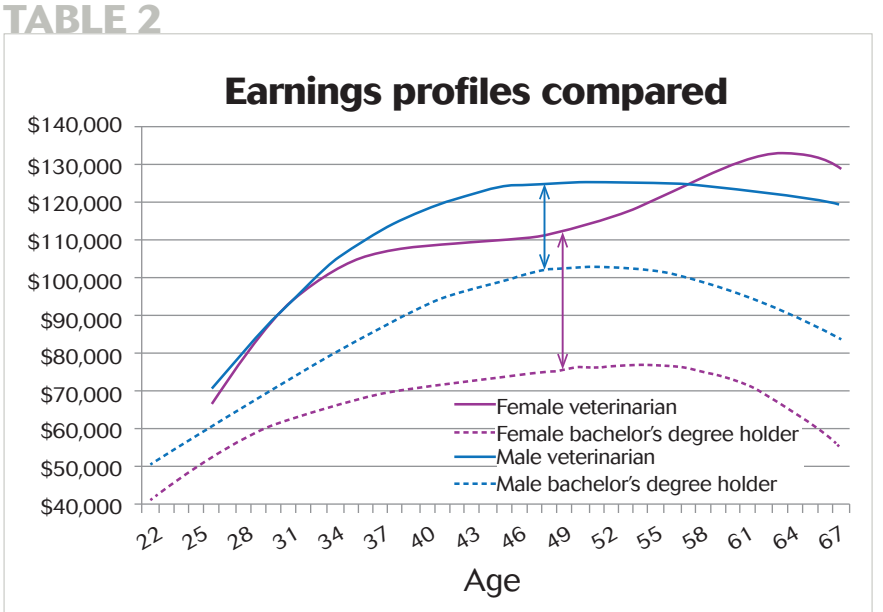
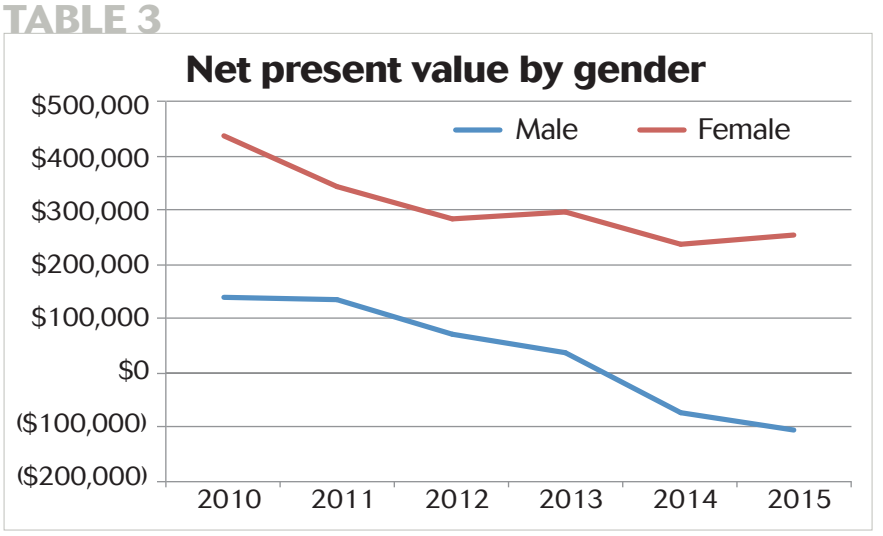


TABLE 3



of the DVM degree for 2016 graduates was roughly $250,000 (Table 3 shows the difference for women and men), but this varies greatly by location, practice type, hours worked, specialization and other factors.

Since men's opportunity cost is larger than women's while their veterinarian earnings profiles are not that different, the NPV of the DVM degree for women is higher than for men. And women break even on their investment (benefits exceed costs) at around age 42, whereas even after age 75, the average male veterinarian still does not break even on his investment.

This means that the average male veterinarian over his lifetime, or at least up to age 75, never earns enough income to offset his initial investment plus income he forewent while in veterinary college.

Of course, there are also nonmeasurable benefits and costs associated with the DVM degree that aren't included in net present value. These include the gratification of daily interaction with animals, the satisfaction of helping animals and animal owners, and the harm to one's health resulting from client conflicts.

But knowing the NPV of the DVM degree enables prospective and current veterinarians to compare alternative careers and career paths just as one compares alternative investment opportunities. This measure can be used, along with nonmeasurable benefits and costs, to help veterinarians make more informed career choices and track the economic performance of the profession over time. **dvm360**

AVMA | Veterinary Economics

Dr. Michael Dicks is director of the AVMA's Veterinary Economics Division. Dr. Bridgette Bain is an analyst with the Veterinary Economics Division.

Party foul:

When loose lips sink careers

When an employee has too much to drink, is an apology enough to rectify the situation?

Tass Animal Hospital was a progressive 21st-century veterinary clinic. Over the past 22 years Dr. Jim Tass had built his one-doctor clinic into a five-doctor veterinary center. His secrets to success were satisfying a skilled staff, providing excellent customer service and not having partners. He lived and died by his decisions and his alone.

Dr. Tass fervently believed that a happy staff was a productive staff. He enabled flexible work schedules, offered excellent benefits and kept his door open. In return he expected dedicated medical professionals with integrity and compassion.

The annual July Fourth picnic was both a staff get-together as well as the boss's reward for a job well done. There was swimming, barbecue and beer and of course much wearing of the red, white and blue.

It was a warm day and Jill Simpson, a veteran technician, definitely enjoyed her beer. She was chatting with her coworkers late in the day while eating hot dogs and drinking yet another beer when she let it slip to some of the other technicians that she thought Dr. Tass threw a great party but wasn't a very good veterinarian. She also said she had to correct a lot of his mistakes. Jill added that of course he was the boss and fixing mistakes was her job.

It didn't take long for Dr. Tass to become aware of his technician's comments, and he was upset when he learned that one of his senior technicians didn't respect his veterinary competency. He prided himself in being a capable, hardworking clinician. So he arranged a meeting with technician Simpson to discuss her comments.

The meeting was awkward but also revealing. Dr. Tass asked if what he had been told was accurate, and if so why she hadn't come to him with her concerns. Her response was surprising. She admitted to having too many beers, which loosened her tongue and impaired her judgment. When she was somewhat inebriated she started posturing and bragging to impress her coworkers. She said that this often occurred when she'd had a bit too much to drink.

Technician Simpson assured Dr. Tass that she actually had total confidence in his veterinary skills. And as long as they were both being honest, she continued, she thought an office function with free-flowing alcohol maybe wasn't a great idea since it created an opportunity for staff to use poor judgment—just as she had. She said this with all due respect, because technically this party was an extension of the workplace.

Dr. Tass thought Simpson was painting herself as a victim in this situation. He did take their conversation as an apology, but in the end he had to decide if he could still trust his once-valued technician to be honest with him, his clients and his staff. He decided that he could not. He discharged his "at-will" employee, thanking her for the time she had spent at the clinic.

Do you think Dr. Tass made the right decision? Did he contribute to the incident as his technician claimed?

Rosenberg's response

There's always a risk when you mix business with pleasure. The veterinary workplace can be stressful and recreational working rewards are often a welcome relief. All of this notwithstanding, we are all ultimately responsible for what we say and do. It must be noted that all work-related functions—from parties to conventions to break room moments—mandate workplace behavioral standards.

Dr. Tass provided alcohol to adult staff members as part of a celebration. Technician Simpson used poor judgment, drank too much and said things she regretted. Whether she should have been fired is up for debate. She can't blame her boss for providing temptation, she can't disavow her self-inflicted bad behavior and, as she found out, she can't apologize and make the whole thing disappear. Unfortunately this was a tough lesson for technician Simpson to learn. **dvm360**

Dr. Marc Rosenberg is director of the Voorhees Veterinary Center in Voorhees, New Jersey. Although many of his scenarios in "The Dilemma" are based on real-life events, the veterinary practices, doctors and employees described are fictional. Send questions or comments to dvmnews@ubm.com.

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[1]Data on file

Hello. Is it courtesy you're looking for?

If you want to boost the lifespans of the people around you (like family, friends, clients, coworkers and even strangers), both scientific and observational research suggest you should up your friendliness factor.

I woke up to a broken water pump this morning. As luck would have it, our backup pump decided to go on walkabout as well.

Living in Anguilla, a 35-square-mile island in the Eastern Caribbean, isn't easy. Our home is next to the ocean, and maintenance is a never-ending struggle against the sea, salt and sun. No matter how hard I try, they're eventually victorious. And without a Home Depot or Menard's, simple repairs can consume my day (and my patience).

Swearing and spitting, I headed to the supermarket. As I walked away from my car with gritted teeth, I passed a man coming out of the building.

"Mornin'! You OK?" he asked.

"Could be better!" I said.

"Could always be worse," he replied.

After 16 years of living here, I have begun to notice certain characteristics among the locals.

For starters, the number of people who reach a ripe old age is remarkable. Hardly a week goes by that a local isn't recognized for celebrating a 95th, 98th or even 100th birthday. How can this be so common in a place that has suffered years of poverty and hunger because of an unjust relationship with other islands—a place where conveniences are hard to come by, services are unpredictable and dubious politics are a national pastime? And yet, similarly surprising, the people of Anguilla are incredibly friendly and welcoming.

Two unspoken expectations foster daily engagement between people on the island. First, if it is before noon and you walk into a store or an office or even pass someone on the road, you'd better say, "Good morning!" loud enough for everyone to hear. And if it is after noon, "Good day!" is in order. Second, if "Hellos" are exchanged, followed by an "All right?" you better respond with something like, "So far. You OK?" The man who greeted me outside the supermarket had followed the local customs beautifully.

I've come to see that these greetings aren't just courtesies; they're expressions of concern. And I've wondered if this concern somehow plays a role in longevity here. Does reaching out to people minimize loneliness and isolation? When we say, "Howdy!" does it make a difference to the people around us? Research suggests that it may.

A 2012 study from the *Archives of Internal Medicine* found that loneliness was associated with an increased risk of death. Another study from the same year in the *Journal of Neurology, Neurosurgery and Psychiatry* saw a link between loneliness and dementia in older people (which is somewhat worrisome to me since I'm approaching this stage of life with alarming speed). And according to a 2003 study published in *Science,* being excluded (which can lead to feeling lonely) triggered activity in the same areas of the brain that register pain.

A 2010 study from *PLoS ONE* found that people who have strong ties to family, friends or coworkers are 50 percent more likely to outlive those with fewer social connections. But despite these findings, with computers and smartphones increasingly replacing face-to-face interactions, society seems to be growing more detached.

The good news? Making a difference takes minimal effort. A 2011 study published in *Psychological Science* reported a link between eye contact and feelings of inclusion—even eye contact with strangers.

To continue the story above, the man's response made me pause in my ruminations of rage. Indeed, things could be worse. I thought about how blue the sky was and the ocean's warm waters. I considered the delightful fact that I didn't have to punch a clock. And you know what? I felt better.

Maybe you can reach out and make someone feel better too. You might just increase their lifespan. **dvm360**

Dr. Mike Paul is the fomer executive director of the Companion Animal Parasite Council and a former president of AAHA. He is the current principal of MAGPIE Veterinary Consulting and lives in Anguilla, British West Indies.

Disclaimer: The editors at dvm360 are not responsible for the number of days, weeks or months Lionel Richie's iconic '80s tune stays lodged in your head after reading this.

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Beach island or treatment area island?

For young associate Dr. Greenskin, the biggest choice of her life (whether she should buy the practice from old Dr. Codger) feels like a question of time: Time for family and personal life … or time traded for money and career fulfillment. Which will she choose?

Perhaps it's the sunny weather, thinks young associate Dr. Greenskin. Or maybe it's the semblance of a social life since she slashed her on-call and weekend work (see "On call and ticked off" at dvm360.com/campfield). Not only did Dr. Greenskin get to visit some out-of-town buddies last week, but she also plowed through her backlog of must-reads from *dvm360*.

Whatever the causes, Dr. Greenskin has been feeling absolutely energized about her life and career. Doing her best to put aside any guilty feelings for not living and breathing veterinary medicine every moment of every day, the maturing young DVM has found herself doing a better job with more energy while at work.

The biggest decision of her life (at least so far)

Herein lies her conundrum: With the looming pressure of a possible deal to buy into the gruff old boss man's hospital, thoughts of increased responsibility are proving to be a real buzzkill for her recent lifestyle improvements. She is at a crossroads, and the decision is boiling down to one question: Practice ownership—or not? The two roads

couldn't appear any more different.

Dr. Greenskin knows this is the most permanent decision she's ever faced. Leading up to veterinary school, she had plans A, B and C all lined up in case she got the dreaded "thin letter" from the schools she'd applied to. Once admitted, of course, she knew it was a commitment, but four years was a pretty short horizon at that stage in her life. Now her gut is telling her that she must be fully devoted to her decision for at least the next six to eight years if she wants a practice purchase to be worth the effort and risk.

While Dr. Greenskin is stewing, practice owner Dr. Codger is spending his day off doing some landscaping in front of the clinic. And wouldn't you know it? Greenskin's next appointment is Dr. Codger's high school classmate's former neighbor's ex-girlfriend. Codger can't resist the temptation to catch up with a member of his close-knit community. Before Greenskin can utter a word, Codger's fertilizer-soiled glove yanks the manila patient file out of the rack. He rushes into the exam room with a smile, ready for some good old storytellin' and vettin'.

This leaves Dr. Greenskin with nothing to do for the next 20 minutes. There's no in-your-face client or crazy-cat-induced adrenaline rush, which leaves her with an overwhelming sense of calm—a feeling that usually makes Dr. Greenskin uncomfortable. If her heart rate isn't at 80 percent of maximum, she feels like she isn't earning her keep.

This afternoon, though, she's a bit more pensive than usual. She rocks back and forth in the creaky faux-leather office chair with the stuffing poking through the seams. The dancing, tutu-wearing calendar kittens stare delightedly back at her, almost hypnotizing her into a trance.

Dream No. 1: High-flying, late-night-practicing veterinary owner

Dr. Greenskin walks through a fog and emerges into the front lobby of … Greenskin Animal Hospital! Everything is sparkling and new. Everywhere she looks, she sees her own personal touches—from the artwork on the walls to the otoscope heads that stay in place, with the little magnifying glasses still in them and uncracked. Things just seem taken care of.

Then the action starts: receptionists, technicians and clients with questions or demands meet her at every turn. She blasts through appointments and surgeries. One second she's on the phone and signing paychecks, the next she's elbow-deep in a hemoabdomen. She's even finding time to coach her own young associate through her first big case.

It's nonstop and Dr. Greenskin is handling it like a boss. Everyone respects her and shows it. Who's afraid of student loans? Not her. Cash flow is there, and she's pumping it back into the practice like there's no tomorrow, slowly building her dream hospital.

But there are some strains that linger in the back of her mind, like not spending as much time with the people who matter the most to her and not being as available for her family when they need her because she's up late again for a sick pet emergency.

Dream No. 2: Free-time-loving veterinary associate

A tornado-like rush swoops Dr. Greenskin high up through the clouds. She spins dizzyingly higher and higher until a violent downdraft pushes her back to the ground. When the wind and fog dissipate, she looks around. Back at Ole Doc Codger's place. The mismatched linoleum tiles and train-station-style seats bolted to the ground in the reception area are cozily familiar. She goes through the routine of another appointment, grabs her paycheck envelope and waves goodbye at Dr. Codger as she heads out the door at 4 p.m.

She's meeting her family at 5 p.m. at a local diner. There's enough left over after the student loan payment and living expenses to treat the family to dinner once every couple of months, and she looks forward to the get-together every time. She basks in the warmth of being close to the ones she loves and not being worried about her phone ringing at all hours. She knows that the path ahead is not one of financial richness, but the fulfillment of a wonderful quality of life is more than making up for it.

The lights shine brighter and brighter, so blinding she has to close her eyes.

All goes dark.

Will it all work out?

As Dr. Greenskin slowly opens her eyes, those adorable kitten ballerinas are still in full dance, wide-eyed as if waiting for their favorite veterinarian to emerge from her daydream.

Dr. Codger is out of the exam room like a flash. He picks up his trowel and drops the file in Dr. Greenskin's lap.

"It sure was great getting to catch up with an old friend!" Dr. Codger says. "Oh my, the stories!"

He grabs Dr. Greenskin's shoulder with a comforting, fatherly squeeze.

"I offered to talk to them about Fatkitty's diabetes care, but you know what, Doc? They saw you last time, and they want to see you again."

Dr. Codger smiles at seeing Dr. Greenskin's puzzled expression.

"They love you," he says. "You're going to do great things here."

With a wink, Dr. Codger heads back out to tend to the sago palms. dvm360

Dr. Jeremy Campfield works in emergency and critical care private practice in Southern California. He is also an avid kiteboarder.

Say hello to separation agreements

Let's get to know what these documents are, how they can help and why they might benefit your veterinary practice (and your wallet).

There's a new legal issue poking its head out from the woodchuck hole of veterinary associate contract law, and you'll want to guide your career horse around it carefully so you (and your bank account) don't come up lame.

With increasing frequency, correlating strongly with the rise of corporate veterinary medicine, associates departing from veterinary clinic employment are being asked, encouraged and perhaps even required to read and sign a "separation agreement." This is a document that basically memorializes the terms and mutual understandings of the veterinary hospital and one of its veterinarians when one or both parties decide it's time for the doctor to move on.

Why should I sign a separation agreement?

Most associate veterinarians assume that when they decide to leave a practice, they'll simply collect their belongings, hug their favorite coworkers and head out the door. They certainly don't think leaving a veterinary clinic will be like retiring from the CIA with its debriefings, confidentiality agreements and whatnot. And while this is mostly true, a separation agreement does come into play when circumstances have somehow changed between the associate's hire date and his or her departure date. Such a change may make a separation agreement desirable for both the clinic owner and the departing doc.

Changed circumstances? What do you mean?

Changed circumstances can occur either by happenstance or by intention.

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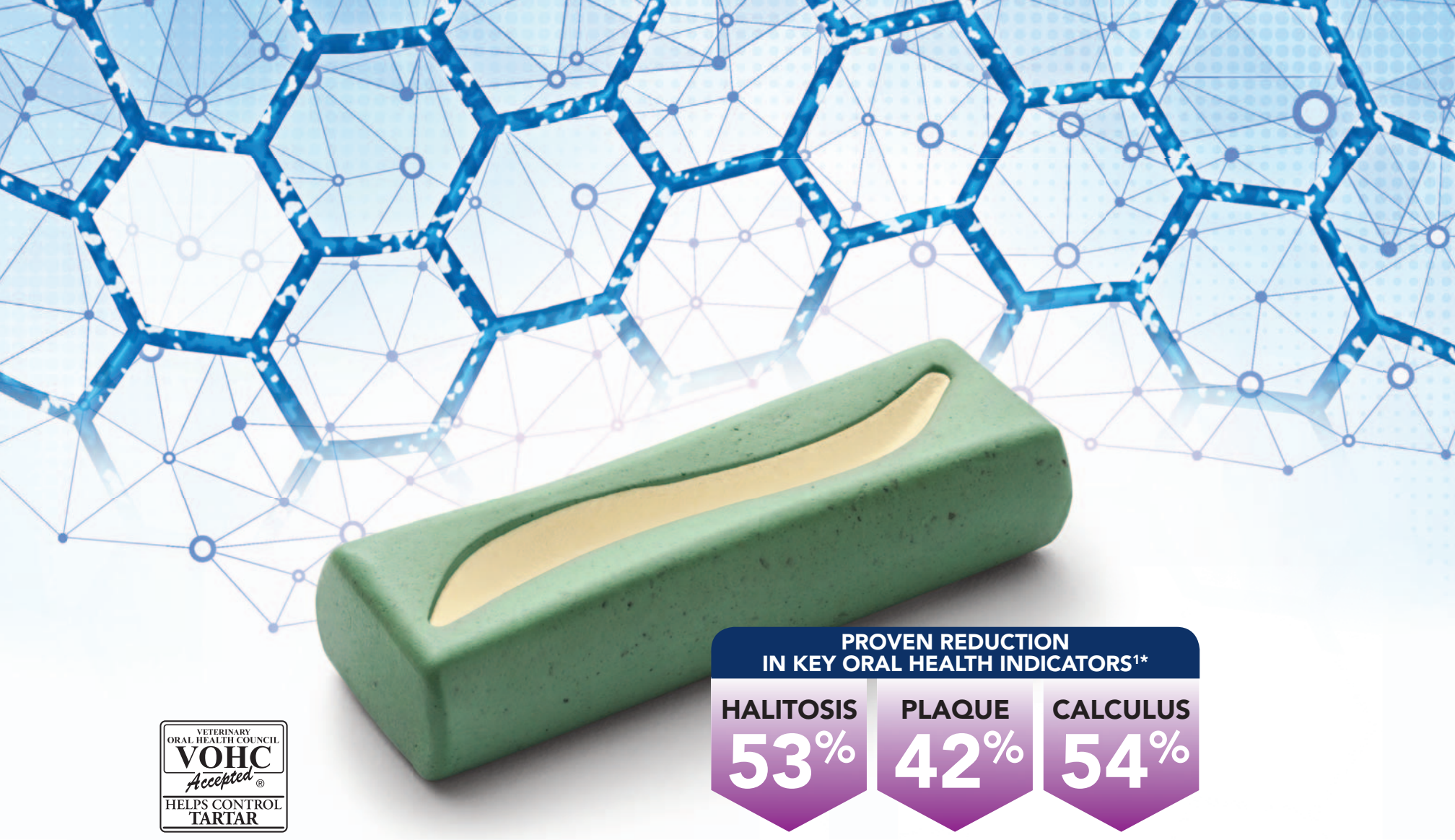

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Here are several common examples where altered elements of the employment relationship may lead to the need or desire for a document "outlining the terms" under which a veterinarian would exit his or her employment.

Compensation dispute. A separation agreement could be used to set out the terms under which an employed doctor has agreed to waive her legal rights with respect to past compensation improprieties in exchange for a lump-sum payment or continued phantom employment.

For example, let's assume Doctor A has worked for Venus Candy Co. through one of its recently acquired animal hospitals. The practice owner who sold his clinic to Venus owed a month's vacation to Doctor A at the time of closing. Doctor A continues to work at the hospital for three months and neither the old owner nor Venus will compensate her for the vacation due her under her old contract. Doctor A agrees to leave the practice but Venus requires her to sign a separation agreement relinquishing all legal rights against Venus, its predecessor owner and any other potential defendants with respect to the unpaid vacation time—in exchange for a lump-sum pre-tax payment of $7,000. (Or possibly for several weeks of regular salary payments without the requirement of actual attendance at work.)

Poorly drafted employment agreements. Sometimes a separation agreement will be utilized in order to introduce a term that was inadvertently left out of an employed veterinarian's original hiring document (engagement letter or employment contract). Consider this situation:

Doctor B loves working at Happy Paws Clinic—he gets along with the owner well and his co-workers are terrific. But after he's worked there for 10 years, the clinic owner marries a high-maintenance guy she met in a local casino. Suddenly the practice is "all about the money" and the new hubby takes over the books to make sure every possible dollar is logged. The work environment becomes terrible and Doctor B now wants out.

The practice owner sees the writing on the wall and fully expects Doctor B to be on Facebook and every other social media site telling the clients of Happy Paws exactly why he left. Since this type of bad press could hurt the business, the owner offers Doctor B a deal:

"Doctor B, we know you aren't happy here but we have a business to protect. Your employment has a noncompete, which you acknowledge applies to you, but it has no disparagement clause preventing you from slandering us on the web. I'm offering you a $5,000 lump-sum 'severance' check in exchange for your agreeing to sign a separation agreement including a blanket nondisparagement clause."

Other elements. Here are a few other examples of instances when a separation agreement might come into play:

> An employed doctor might waive any legal rights for back production pay in the event that her compensation wasn't calculated correctly based on her contract. Her boss might know his bookkeeping has been messy and haphazard over the years and doesn't want to worry about a post-employment lawsuit. In exchange, he might offer to reduce the length of the noncompete from two years to one.

> A clinic owner is close to retirement and one of his long-time associates is leaving. It's all on good terms, but the owner hopes to sell the practice to a corporation and cruise into retirement. Unfortunately, he suspects that his accountant may have made errors in funding the departing associate's 401(k) plan. A separation agreement might be called for to release the clinic owner from any liability for negligent management of the retirement program, possibly in exchange for a one-time bonus that the associate could put into a contributory IRA.

> An associate is discharged from a practice because, though the owner had no religious biases whatsoever, the clinic staff was rude and spoke inappropriately to the associate because of his faith, resulting in a toxic work environment. Practice management offers a separation agreement to the departing doctor, prohibiting him from filing a complaint with the Equal Employment Opportunity Commission (EEOC) in exchange for $50,000. (Think this is outrageous? Read on.)

To sum it up, the separation agreement has its place in certain circumstances when a veterinarian leaves his or her employer. These agreements can provide protection and a certain degree of security, comfort or compensation to one or both parties. These agreements should be negotiated in good faith and in compliance with all applicable laws.

And, yes, you guessed right in my final example above. A promise not to file a claim with the EEOC for inappropriate discharge is not an appropriate term for inclusion in a separation agreement. Federal law controls the right to file an employment discrimination claim. As such, that right cannot be contractually circumvented or waived. **dvm360**

Christopher J. Allen, DVM, JD, is president of the Associates in Veterinary Law P.C., which provides legal and consulting services exclusively to veterinarians. He can be reached via email at info@veterinarylaw.com. Dr. Allen serves on dvm360 magazine's Editorial Advisory Board.

TRESADERM (thiabendazole-dexamethasone-neomycin sulfate solution) Dermatologic Solution CAUTION: Federal (U.S.A.) law restricts this drug to use by or on the order of a licensed veterinarian. DESCRIPTION: Dermatologic Solution TRESADERM® (thiabendazole-dexamethasone-neomycin sulfate solution) contains the following active ingredients per ml: 40 mg thiabendazole, 1 mg dexamethasone, 3.2 mg neomycin (from neomycin sulfate). Inactive ingredients: glycerin, propylene glycol, purified water, hypophosphorous acid, calcium hypophosphite; about 8.5% ethyl alcohol and about 0.5% benzyl alcohol. INDICATIONS:Dermatologic solution TRESADERM is indicated as an aid in the treatment of certain bacterial, mycotic, and inflammatory dermatoses and otitis externa in dogs and cats. Both acute and chronic forms of these skin disorders respond to treatment with TRESADERM. Many forms of dermatosis are caused by bacteria (chiefly *Staphylococcus aureus*, *Proteus vulgaris* and *Pseudomonas aeruginosa*). Moreover, these organisms often act as opportunistic or concurrent pathogens that may complicate already established mycotic skin disorders, or otoacariasis caused by *Otodectes cynotis*. The principal etiologic agents of dermatomycoses in dogs and cats are species of the genera *Microsporum* and *Trichophyton*. The efficacy of neomycin as an antibacterial agent, with activity against both gram-negative and gram-positive pathogens, is well documented. Detailed studies in various laboratories have verified the significant activity thiabendazole displays against the important dermatophytes. Dexamethasone, a synthetic adrenocorticoid steroid, inhibits the reaction of connective tissue to injury and suppresses the classic inflammatory manifestations of skin disease. The formulation for TRESADERM combines these several activities in a complementary form for control of the discomfort and direct treatment of dermatitis and otitis externa produced by the above-mentioned infectious agents. DOSAGE AND ADMINISTRATION: Prior to the administration of Dermatologic Solution TRESADERM, remove the ceruminous, purulent or foreign materials from the ear canal, as well as the crust which may be associated with dermatoses affecting other parts of the body. The design of the container nozzle safely allows partial insertion into the ear canal for ease of administration. The amount to apply and the frequency of treatment are dependent upon the severity and extent of the lesions. Five to 15 drops should be instilled in the ear twice daily. In treating dermatoses affecting other than the ear the surface of the lesions should be well moistened (2 to 4 drops per square inch) with Dermatologic Solution TRESADERM twice daily. The volume required will be dependent upon the size of the lesion. Application of TRESADERM should be limited to a period of not longer than one week. PRECAUTIONS: On rare occasions dogs may be sensitive to neomycin. In these animals, application of the drug will result in erythema of the treated area, which may last for 24 to 48 hours. Also, evidence of transient discomfort has been noted in some dogs when the drug was applied to fissured or denuded areas. The expression of pain may last 2 to 5 minutes. Application of Dermatologic Solution TRESADERM should be limited to periods not longer than one week. While systemic side effects are not likely with topically applied corticosteroids, such a possibility should be considered if use of the solution is extensive and prolonged. If signs of salt and water retention or potassium excretion are noticed (increased thirst, weakness, lethargy, oliguria, gastrointestinal disturbances or tachycardia), treatment should be discontinued and appropriate measures taken to correct the electrolyte and fluid imbalance. Store in a refrigerator 36°-46°F (2°-8°C). WARNING: For topical use in dogs and cats. Avoid contact with eyes. Keep this and all drugs out of the reach of children. The Material Safety Data Sheet (MSDS) contains more detailed occupational safety information. To report adverse effects in users, to obtain an MSDS, or for assistance call 1-888-637-4251. HOW SUPPLIED: Product 55871-Dermatologic Solution TRESADERM Veterinary is supplied in 7.5-ml and 15-ml dropper bottles, each in 12-bottle boxes.

Tresaderm®

thiabendazole-dexamethasone-neomycin sulfate

CLEARS UP ALMOST ANYTHING

Trust TRESADERM® Dermatologic Solution as your solution to aid in the treatment of:

- ✓ Otitis Externa
- ✓ Hot Spots
- ✓ Focal Pyoderma
- ✓ Flea Allergy Dermatitis
- ✓ Mycotic Dermatosis
- ✓ Ringworm

Approved for use on dogs and cats

IMPORTANT SAFETY INFORMATION: TRESADERM is for topical use only in dogs and cats. On rare occasions, application of the product may result in erythema or discomfort in the treated area. Discomfort in the treated area can last from 24 hours to 48 hours.

Boehringer Ingelheim

Merial is now part of Boehringer Ingelheim.

Tick-borne Powassan virus on the rise in people

Powassan may not affect pets, but the rest of us need to remain vigilant about ticks for our own sake.

By Richard Gerhold, DVM, MS, PhD

Powassan virus is a disease transmitted by two *Ixodes* species—the black legged tick and another species that we see mainly on wild mammals like raccoons, woodchucks, skunks and possums. The virus is usually transmitted between spring and late fall (though it can sometimes occur during the winter). That's the season when these ticks are out and about. It's been around for a while, but we have seen an increased number of cases in people. It causes encephalitis, so infected people can experience headaches, altered consciousness or flu-like symptoms. It's important for people who are experiencing these symptoms to seek medical help.


Dr. Richard Gerhold

There is no evidence of Powassan virus causing disease in pets. However, there are a lot of tick-borne diseases that we do see in pets—whether it be Lyme disease, anaplasmosis or *Ehrlichia*—that are significant health concerns for domestic and livestock animals. So it's important for pets to have good veterinary services and also year-long tick prevention.

That being said, I don't want talking about tick diseases to make people not want to go outside, because being outside and connecting with nature is really important for mental health. Just do simple things to minimize tick disease like performing tick checks in the evening, tucking your pants in your socks and using repellents. **dvm360**

Veterinary team from UC Davis removes heartworm from cat's femoral artery

The cat, which had history of heartworm disease, presented with rear leg lameness.

Stormie, a 4-year-old female Siamese cat with a history of heartworm disease since being adopted at 1 year of age, recently underwent a novel procedure to remove a heartworm from her femoral artery at the University of California, Davis, according to a university release.

Stormie and her owner live in Los Angeles but were visiting family in the the Bay Area when one of Stormie's rear legs became lame. Fearing an injury, the owner took Stormie to a veterinary emergency practice in Berkeley and informed the veterinarian of her heartworm history. After an ultrasound showed a suspected heartworm in the arterial system and a strong positive result was found on a heartworm antigen test, the veterinarian advised the client to take Stormie to the specialists at UC Davis, the release states.

The cardiology service at UC Davis confirmed the referring veterinarian's diagnosis and performed an echocardiographic examination to determine the exact location of the worm and form a treatment plan. The test showed a heartworm in the pulmonary artery, and the veterinarians also saw evidence of pulmonary hypertension associated with heartworm disease.

An abdominal ultrasound confirmed that the heartworm extended into Stormie's abdominal aorta and down her leg into the right femoral artery. The worm was cutting off the blood supply to the right leg and needed to be addressed promptly to avoid amputation.

Next, the anesthesia/critical care and diagnostic imaging teams anesthetized Stormie to perform a computed tomography (CT) angiography scan. While the scan didn't reveal any additional heartworms, it did show abnormalities in the soft tissues of Stormie's right rear leg, likely secondary to the decreased blood flow caused by the worm. It also showed evidence of inflammation in the lungs likely caused by the heartworms, the release notes.

Catherine Gunther-Harrington, DVM, DACVIM (cardiology), and Ingrid Balsa, MEd, DVM, of the soft tissue surgery service, assisted by cardiology resident Maureen Oldach, DVM, collaborated to remove the 13-cm heartworm from Stormie's right femoral artery without breaking it, the release states. After the worm was removed there was normal blood flow through the artery and the leg tissue still looked healthy, so the doctors repaired the artery and decided amputation wasn't necessary at that time. However, the release notes, amputation of the leg may be required in the future if the nerves and muscle don't heal properly.


Stormie after the 13-cm heartworm was successfully removed. Visit dvm360.com/UCheartworm to see the online version of this article with a link to a video of the heartworm removal published by UC Davis.

Stormie stayed in ICU at UC Davis for four days so the team could monitor her recovery. In addition to pain and anti-inflammatory medication, she was given an antibiotic to help weaken the remaining heartworms in her system. As the worms die they will break into small pieces that could lodge in the lungs or elsewhere in the circulatory system. To prevent this, doctors prescribed a medication to help break up blood clots and prevent new clots from forming. Stormie has also been placed on a monthly heartworm preventive she will continue for the rest of her life, the release states.

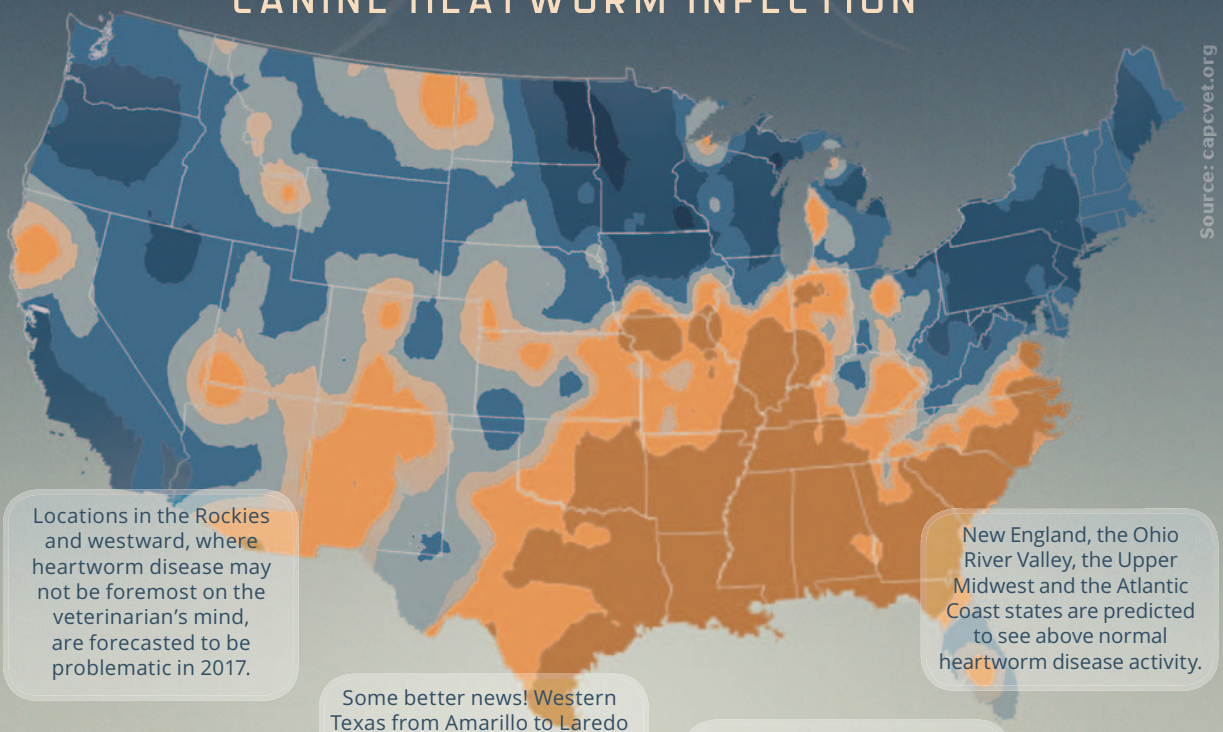
Stormie is also going through physical rehabilitation to strengthen her leg, and her owner is hopeful she'll continue to improve. **dvm360**

IMAGE COURTESY OF UC DAVIS

dvm360

MAPPING THE RISKS

CANINE HEATWORM INFECTION



THE DATA IS IN!

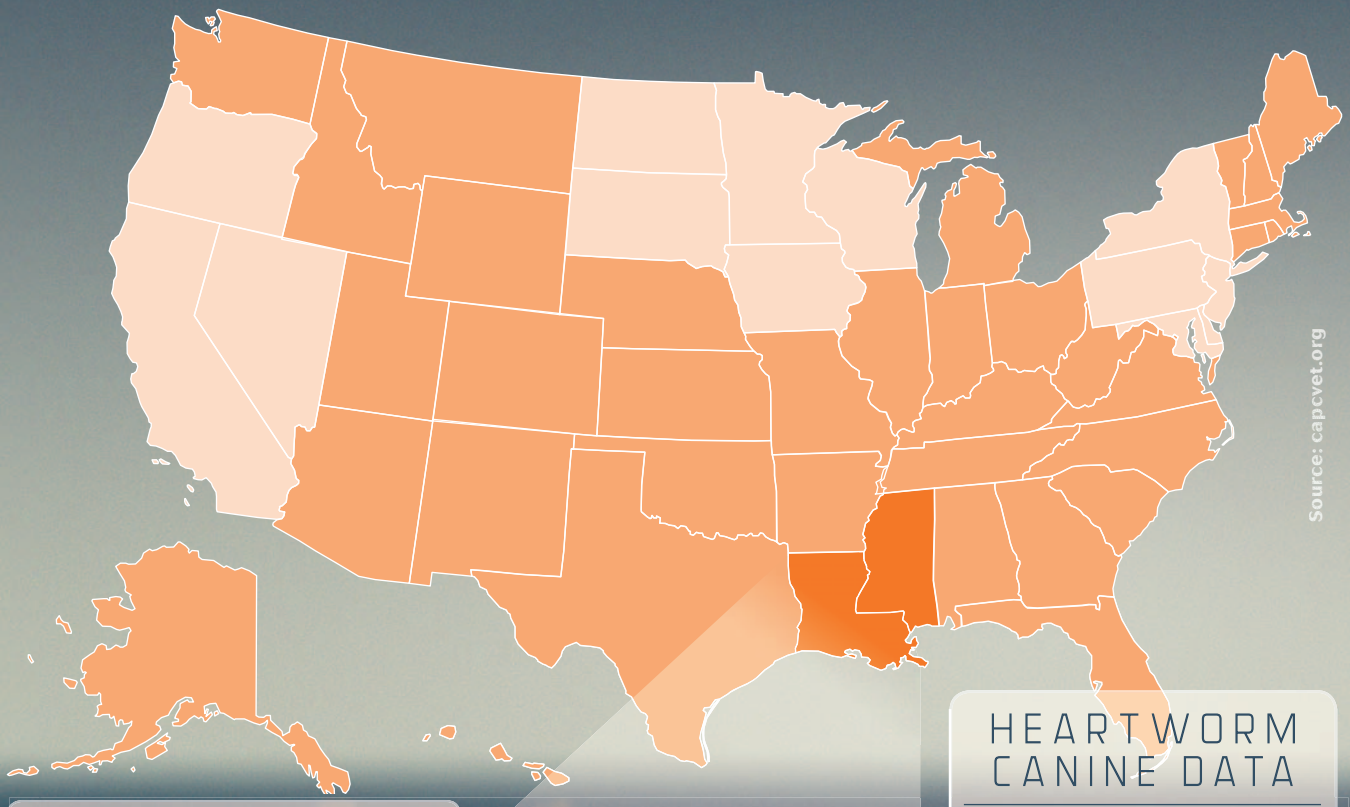
The Companion Animal Parasite Council (CAPC) has developed and maintains current and accurate maps on a variety of parasitic diseases in the United States and Canada, based on data provided by IDEXX Laboratories and ANTECH Diagnostics. These maps, found at capcvet.org, are available for your veterinary care team to use in your client education efforts—are you using them? On this page, you can see the 2017 forecast for heartworm disease, and on the next page you'll see current data on the prevalence of heartworm disease, all the way down to the county level! Keep reading to see how you can use these maps to their fullest and help reduce the risk of heartworm disease in your patients.

FORECASTED PREVALENCE 2017

- 4%-100%
- 2%-4%
- 1.5%-2%
- 1%-1.5%
- 0.5%-1%
- 0.25%-0.5%
- 0%-0.25%

WHAT'S YOUR PATIENTS' RISK OF HEARTWORM

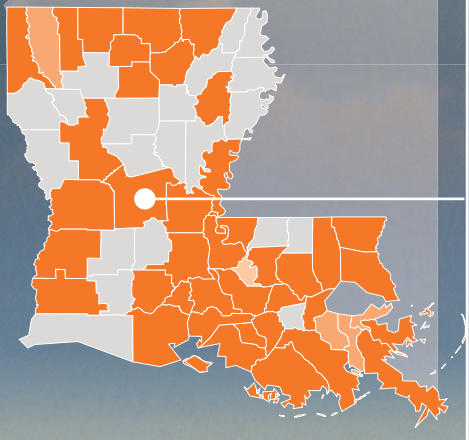
Go to capcvet.org to find out what the parasite risks are in your area, and select the parasite you want to track (in this case, heartworm). First you'll see the total number of heartworm-positive test results veterinarians have reported in the entire United States and the total number of tests conducted. Then click on your state. You'll see the totals there as well. Then click on your county—you'll see how many dogs and cats have tested positive in your immediate region. Here we're showing the data for Rapides County, Louisiana, part of the heartworm hot zone that is the Mississippi Delta. If you sign up for updates at capcvet.org, you'll get new numbers on a regular basis sent right to your email. Nine out of 10 veterinary clients say they want this info!



Source: capcvet.org

INFECTION RISK IN 2017

NO DATA — HIGH RISK



HEARTWORM CANINE DATA

US > LOUISIANA > RAPIDES PARISH

TESTED POSITIVE

11.84%

POSITIVE CASES

436

OF

TOTAL TESTED

3,683

FYI

- Cases of both canine and feline heartworm disease have been reported in all 50 states.
- CAPC recommends that all dogs be tested annually for both heartworm antigens and microfilariae, even if they're on year-round preventives.

DISEASE TODAY?

Use an old-school whiteboard to inform pet owners of local risks

Data on heartworms can provide a public service to your veterinary clients—and help protect your patients.

A simple dry erase whiteboard can change the conversation about parasite prevention from selling product to protecting patients. A 2015 study by the Companion Animal Parasite Council (CAPC) has shown that 90% of pet owners want their veterinarian to provide them with information on parasites. Posting local, timely parasite prevalence numbers in your waiting area can help stimulate conversation with your clients and provide a public service.

Step 1: Buy a whiteboard at an office supply store.

Step 2: Visit capcvet.org and click on "Parasite Prevalence Maps."

Step 3: Identify the disease you want to highlight (such as heartworm infection) and find the prevalence data for your state and county.

Step 4: Write the number of cases in your county on the whiteboard and set it out or hang it near where clients check in and out.

Step 5: Educate clients about heartworm disease when they ask about the numbers on the board.

Step 6: Change the statistics you highlight on the board according to new data and changing seasonal risks (sign up to receive updates at capcvet.org).

Want to hear more? Check out the video at dvm360.com/CAPCwhiteboard.

TIP

Consider keeping a heartworm-infected heart in a formalin jar to show to owners. Plastic models and parasite posters visualizing the disease also work.

TIP

Clients who have a hard time remembering to give a monthly preventive might do better with an injection every six months. Try telling them they only have to think about it twice a year instead of 12 times a year.

ProHeart® 6
(moxidectin)

Dogs are all ♥

That's why you protect theirs.

Only ProHeart 6 provides 6 months of heartworm disease protection in 1 injection.

Continuous protection
gives your clients peace of mind.

In-clinic administration
so you're confident patients are protected.

Twice-yearly visits
keep your patients healthy.

Learn more at proheart6protects.com

IMPORTANT SAFETY INFORMATION: PROHEART 6 should be used in healthy dogs. Do not administer to sick, debilitated, underweight dogs or dogs that have a history of weight loss. Prior to administration, PROHEART 6 certified veterinarians should continue to assess patient health through a medical history, physical examination and if deemed appropriate, diagnostic testing. Continue to use caution when administering PROHEART 6 concurrently with vaccinations. Adverse events, including anaphylaxis, have been reported following the concomitant use of PROHEART 6 and vaccines. In some cases, anaphylactic reactions have resulted in death. Use with caution in dogs with pre-existing or uncontrolled allergic disease (food allergy, atopy or flea allergy dermatitis). Dogs receiving PROHEART 6 should be tested for existing heartworms as per the product label. In people, avoid PROHEART 6 contact with eyes. If contact with the eyes occurs, rinse thoroughly with water for 15 minutes and seek medical attention immediately. PROHEART 6 is available only to veterinarians through a restricted distribution program. Only certified veterinarians and staff can administer it. See Brief Summary of full Prescribing Information on the prior page.

zoetis

MEDICINE | Neurology

Neurology alert: Bromethalin toxicosis on the rise in pets

EPA shift away from anticoagulant rodenticides means increased exposure to neurotoxin with no known antidote.

By Marc Kent, DVM, DACVIM (neurology), and Eric Glass, MS, DVM, DACVIM (neurology)

In 2008, the U.S. Environmental Protection Agency (EPA) mandated that by 2015, all consumer-marketed rodenticides had to meet specific regulations designed to reduce rodenticide exposure to children, wildlife and pets. The most important result, in our view, was the restriction of second-generation anticoagulant rodenticides, which means that non-anticoagulant rodenticides—primarily bromethalin—have taken over the marketplace.

Predictably, human exposure to bromethalin has increased.[1] Following suit, companion animal exposures have also risen.[2] We personally have studied five cats in the last six months from practices along the eastern coast of the United States with bromethalin intoxication that resulted in severe neurologic signs and eventual death.

Why bromethalin matters

Bromethalin poses a serious hazard to companion animals. First, it's difficult to prove intoxication. Moreover, bromethalin lacks both an antidote and a specific therapy to reverse its pathological effects. The combination of an increase in sales and consequently an increase in exposures along with a lack of treatment makes it imperative for veterinarians to be aware of the dangers that bromethalin poses to pets.

Mechanism of action

Bromethalin is rapidly absorbed from the gastrointestinal tract and is metabolized to a more potent metabolite, desmethylbromethalin.[3] Bromethalin uncouples oxidative phosphorylation.[4] In the central nervous system (CNS), this results in decreased production of adenosine triphosphate (ATP), leading to an intracellular influx of sodium and water (cytotoxic edema) in the brain.[3,5-7] Bromethalin also causes splitting of myelin sheaths (intramyelinic edema).[3,5-7] Brain edema results in increased intracranial pressure, which causes neurologic dysfunction and ultimately death.[3,5]

Clinical signs of bromethalin intoxication

Clinical signs of intoxication can be classified as acute or chronic related to the amount ingested. The median lethal dose (LD_{50}) for a variety of species is presented in Table 1. Ingestion of greater than two times the LD_{50} results in acute toxicosis. Signs include hyperexcitability, seizures, whole body tremors, pelvic limb ataxia and weakness, anisocoria, blindness, abnormal nystagmus, and coma. Death can result from respiratory arrest.[3,5-7] Typically signs develop within eight to 12 hours but may occur as soon as two to four hours after ingestion.[3]

Experimentally, dogs administered 6.25 mg/kg orally displayed signs within six to eight hours and died within 15 to 63 hours.[6] Cats administered 0.45 mg/kg orally displayed signs within four to seven days.[7]

Ingestion of a single dose at the LD50 level or multiple doses below the LD50 results in chronic toxicosis. Signs of chronic toxicosis are similar to acute toxicosis. They tend to manifest in days or as early as 12 to 24 hours after ingestion[3] and include lethargy, pelvic limb weakness that progresses to paralysis, and absent sensation.[3] Experimentally, animals that ingest a lethal dose may survive up to 20 days and may even recover.[5,7]

TABLE 1

Median lethal dose (LD_{50}) of bromethalin by species

Species	LD_{50}
Cat	1.8 mg/kg*
Dog	4.7 mg/kg
Rat	2.0 mg/kg
Mouse	5.3 mg/kg
Rabbit	13 mg/kg
Guinea pig	> 1000 mg/kg

Source: van Lier RB, Cherry LD. The toxicity and mechanism of action of bromethalin: a new single-feeding rodenticide. *Fundam Appl Toxicol* 1988;11:664-672.

*One study reports the LD50 for cats to be 0.54 mg/kg; see Dorman DC, Zachary JF, Buck WB. Neuropathologic findings of bromethalin toxicosis in the cat. *Vet Pathol* 1992;29:139-144.

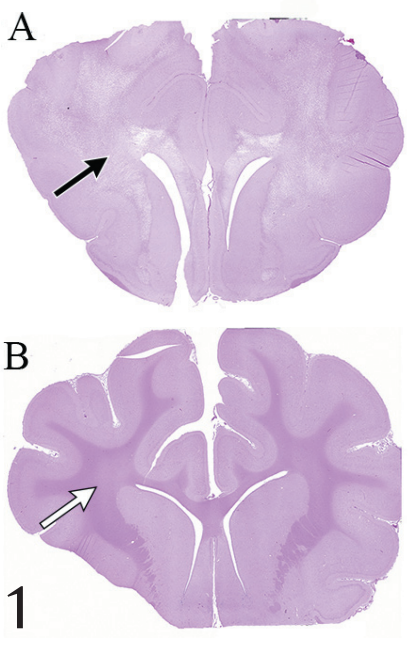


Figure 1. (A) Subgross, transverse section of the cerebrum of a cat with bromethalin intoxication. Note the loss of staining of the white matter (black arrow). (B) Subgross transverse section of the cerebrum of a normal cat brain at approximately the same level as in (A). The white matter is easily identified based on its staining (white arrow). Hematoxylin and eosin staining. Image courtesy of Drs. Marc Kent and Eric Glass.

DERMATOLOGY M4
Making a difference for dogs with atopic dermatitis: When to use Apoquel and when to use Cytopoint

Diagnosis

Establishing a definitive diagnosis of intoxication is difficult. Frequently, a definitive diagnosis is made by postmortem examination of the CNS. Grossly, the brain and spinal cord often appear normal, but foramen magnum herniation of the cerebellar may be observed (Figure 1). Microscopically there is widespread spongy degeneration (vacuolation) of the CNS white matter (Figure 2).[3,5-7] Definitive proof of intoxication requires measurement of bromethalin/desmethylbromathelin tissue concentrations.

An antemortem diagnosis can be made presumptively if someone has witnessed the animal ingesting the product. The appearance of green-blue dye in vomitus or feces may also imply ingestion (Figure 3)—the EPA mandates that an indicator dye be incorporated into all rodenticides sold on the consumer market. It's important to note that signs may not develop for days and may initially progress slowly. Consequently, owners and veterinarians may not have a high index of suspicion for bromethalin. Moreover, the results of minimal database tests (complete blood count, serum chemistry profile and urinalysis) are typically normal.

In such cases, magnetic resonance imaging (MRI) of the brain can provide valuable information regarding intoxication. T2-weighted MRI sequences can disclose marked hyperintensity of the CNS white matter as a result of edema (Figure 4). In addition, cytotoxic edema and intramyelinic edema may be observed using an MRI sequence called diffusion weighted images (DWI) and apparent diffusion coefficient (ADC) maps. White matter hyperintensity on

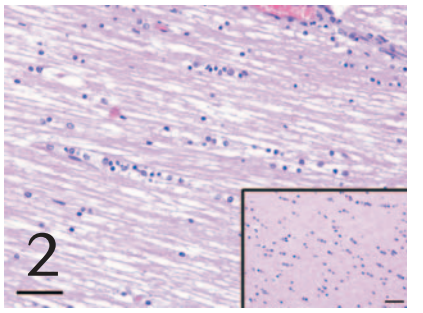


Figure 2. Severe vacuolation of the white matter is apparent in the cerebrum as a result of intramyelinic edema. Inset: Normal appearance of CNS white matter from a cat with a normal brain. The cerebral white matter is compact and avidly stains (hematoxylin-eosin; 40x magnification; bar = 50 micrometers). Image courtesy of Drs. Marc Kent and Eric Glass.

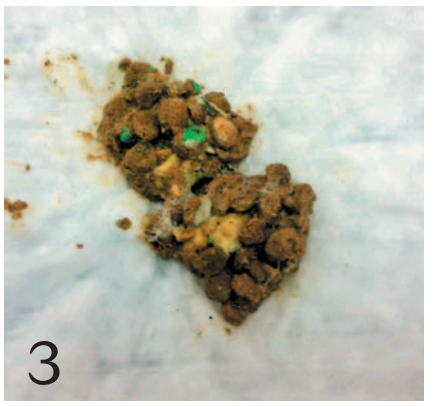
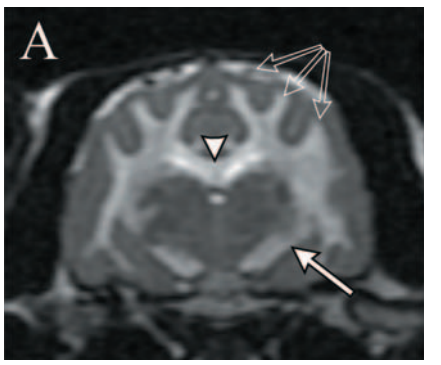


Figure 3. The vomitus from a dog that was seen eating bromethalin containing rodenticide. After administration of an emetic, the vomitus was inspected for the green-blue indicator dye, which confirms ingestion. Photo courtesy of James Hammond, DVM, DACVIM (neurology), and Jennifer Perkins, VMD, DACVIM (neurology), Piper Memorial Animal Hospital, Middletown, Connecticut.



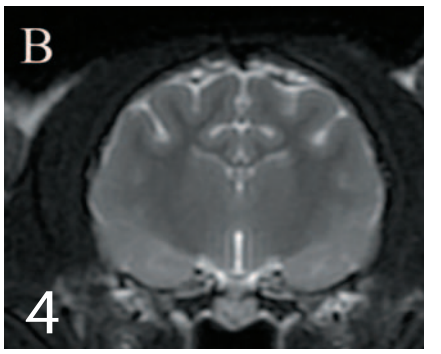


Figure 4. (A) A transverse T2-weighted image of the cerebrum at the level of the thalamus of a cat with bromethalin intoxication. The white matter of the corpus callosum (arrowhead), corona radiata (open arrows) and internal capsule (closed arrow) shows severe hyperintensity (white) consistent with edema. The topography of the MRI abnormalities exactly matches the topography of the histology. (B) A transverse T2-weighted MRI from a cat with a normal brain. Note that the white matter is normally hypointense (dark). Photo courtesy of Drs. James Hammond and Jennifer Perkins.

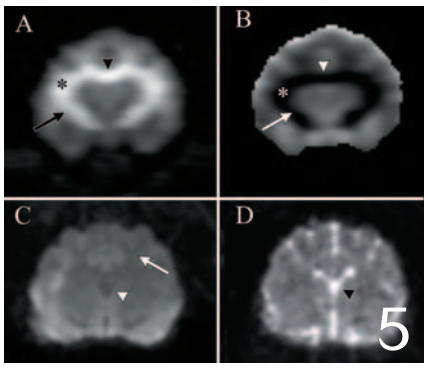


Figure 5. (A) A transverse DWI at the level of the rostral cerebrum from a cat with bromethalin intoxication. The same white matter structures—the corpus callosum (arrowhead), corona radiata (asterisk), and internal capsule (arrow)—are hyperintense (b value = 1,000 mm2/s) secondary to edema. (B) On the corresponding ADC map, the same hyperintense white matter structures are hypointense, consistent with intramyelinic edema. (C) A transverse DWI at the level of the cerebrum and thalamus of a normal cat. Note the hypointense appearance of cerebral white matter (arrow) and cerebrospinal fluid in the third ventricle (arrowhead). (D) A corresponding ADC map shows little change in the intensity of the white matter. Note that the normal appearance of cerebrospinal fluid on the ADC map is hyperintense (arrowhead). Image courtesy of Drs. James Hammond and Jennifer Perkins.

DWI and hypointensity on ADC maps strongly support intramyelinic edema (Figure 5). Although not pathognomonic, taken together, neurologic dysfunction and MRI findings suggestive of intramyelinic edema provide strong evidence of bromethalin intoxication.

Where to measure bromethalin/desmethylbromethalin concentrations

Documenting tissue concentrations of bromethalin or its metabolite, desmethylbromethalin, solidifies a definitive diagnosis. The California Animal Health and Food Safety toxicology service offers reliable and inexpensive analysis of tissues (fat and liver specimens) as well as serum.[8] Despite an expedient turnaround time, analysis still may take several days.

How to help intoxicated animals

Intravenous lipid emulsion therapy can help reduce blood concentrations in animals that have recently consumed bromethalin.[9] But sadly, in animals displaying neurologic signs, specific therapy does not exist. Instead, therapy is largely supportive involving osmotic diuretics and corticosteroids.[10] Activated charcoal may help eliminate residual chemical in the gastrointestinal tract.[10] Still, despite aggressive supportive care measures, intoxicated animals usually succumb.

What to do now

Ultimately, client education regarding the hazards of bromethalin may help prevent exposure. As mandated by the EPA, rodenticides should be used following manufacturers' guidelines and only in conjunction with bait traps in areas pets can't access.

The veterinary community should consider applying pressure to legislative agencies to seek changes in EPA policies to restrict bromethalin. Getting the word out is an imperative first step. Reaching out to your local legislator via phone, email or—best—personal contact and working through the American Veterinary Medical Association (AVMA) Congressional Advocacy Network and AVMA lobbyists can help. dvm360

References

References for this article can be found at **dvm360.com/bromethalin**.

Dr. Eric Glass is a neurologist with Red Bank Veterinary Hospital, part of Compassion-First Pet Hospitals, in the Section of Neurology and Neurosurgery. Dr. Marc Kent is a neurology professor at the University of Georgia College of Veterinary Medicine.

Making a difference for dogs with **atopic dermatitis:** When to use Apoquel and when to use Cytopoint

New dermatology drugs offer great options for managing pruritus, but navigating the best use of each can be tricky.

By Lindsay McKay, DVM, DACVD

As every general-practice veterinarian knows, dermatology disorders are one of the main reasons clients bring their dogs in to the veterinary clinic. Moreover, itchiness (i.e., pruritus) is often their chief complaint. While the causes of pruritus in dogs are many and varied, the majority are due to a hypersensitivity disorder, with canine atopic dermatitis being among the most common of these diseases.

Making the diagnosis

Before we delve into a discussion of managing canine atopic dermatitis, let's first look at how to make the diagnosis. In my veterinary dermatology practice I use a four-step approach in my allergy workup that focuses on ruling out other causes of pruritus.

1. Rule out parasites. Unfortunately, our physical exam findings and tests such as skin scrapings and flea combings are not adequate to rule in or rule out parasites such as fleas or scabies. The best method is to employ treatment trials for these types of parasites.

2. Identify infection. The next step involves performing skin and ear cytologies to identify secondary bacterial and yeast infections. Managing these infections often involves the use of both oral and topical antimicrobial therapies.

3. Consider food allergies. The third step is a diet elimination trial to assess the patient for food allergies.

4. Make the diagnosis. Our final step is to make the diagnosis of canine atopic dermatitis if we still have a pruritic dog that's relatively free of lesions.

Residual lesions at the end of these four steps would lead me to consider additional testing such as skin culture and sensitivity testing to assess for resistant bacterial skin infection or skin biopsy to look for non-allergic disease. Ultimately the diagnosis of canine atopic dermatitis is a diagnosis of exclusion once we've ruled out these other causes of pruritus.

Examining new treatment options

The current theory for the pathogenesis of canine atopic dermatitis is that pro-inflammatory cytokines derived from activated lymphocytes and other inflammatory cells lead to neuronal itch stimulation, inflammation and disruption of the skin barrier, which triggers an itch cycle causing pruritus, inflammatory skin lesions and further defects in skin barrier function.[1] This greater understanding of the pathophysiology of canine atopic dermatitis has led to the development of therapies that can better target pruritus mechanisms and control clinical signs in dogs with the condition.

Apoquel (oclacitinib) received FDA approval in June 2013 and, more recently, Cytopoint received USDA approval in December of 2016 (both products are manufactured by Zoetis). So we now have two new therapies to help manage the clinical signs of atopic dermatitis in our canine patients. But success in these cases will be greatly improved if veterinarians also (1) emphasize topical therapy to help restore the skin barrier and (2) treat and work to prevent bacterial and yeast skin and ear infections. Treatment of canine atopic dermatitis will always be multimodal as dictated by its complex pathogenesis, but we're getting closer to finding tailored treatment options that can help provide an excellent quality of life for our clients and their dogs with canine atopic dermatitis.

Apoquel is a selective janus kinase (JAK) inhibitor with activity against JAK-1- and JAK-3-dependent cytokines. It has both antipruritic and anti-inflammatory properties, which reduces levels of pro-inflammatory cytokines interleukin (IL)-2, IL-4, IL-6 and IL-13, as well as inhibiting activity of IL-31, known as the pruritogenic (or itch-producing) cytokine.

Apoquel is labeled for the control of pruritus associated with allergic dermatitis and the control of atopic dermatitis in dogs at least 12 months of age. The dosing guidelines recommend that Apoquel be given twice daily for up to 14 days and then once daily going forward. Its antipruritic effects are rapid, with demonstrated reduction of pruritus within 24 hours.[2] Apoquel is generally well-tolerated with mild gastrointestinal upset the most commonly reported side effect.[2] In addition, there are no reported drug interactions, so it can be given with many other commonly used medications such as NSAIDs, vaccinations, antibiotics or antifungals. Lastly, Apoquel does not interfere with

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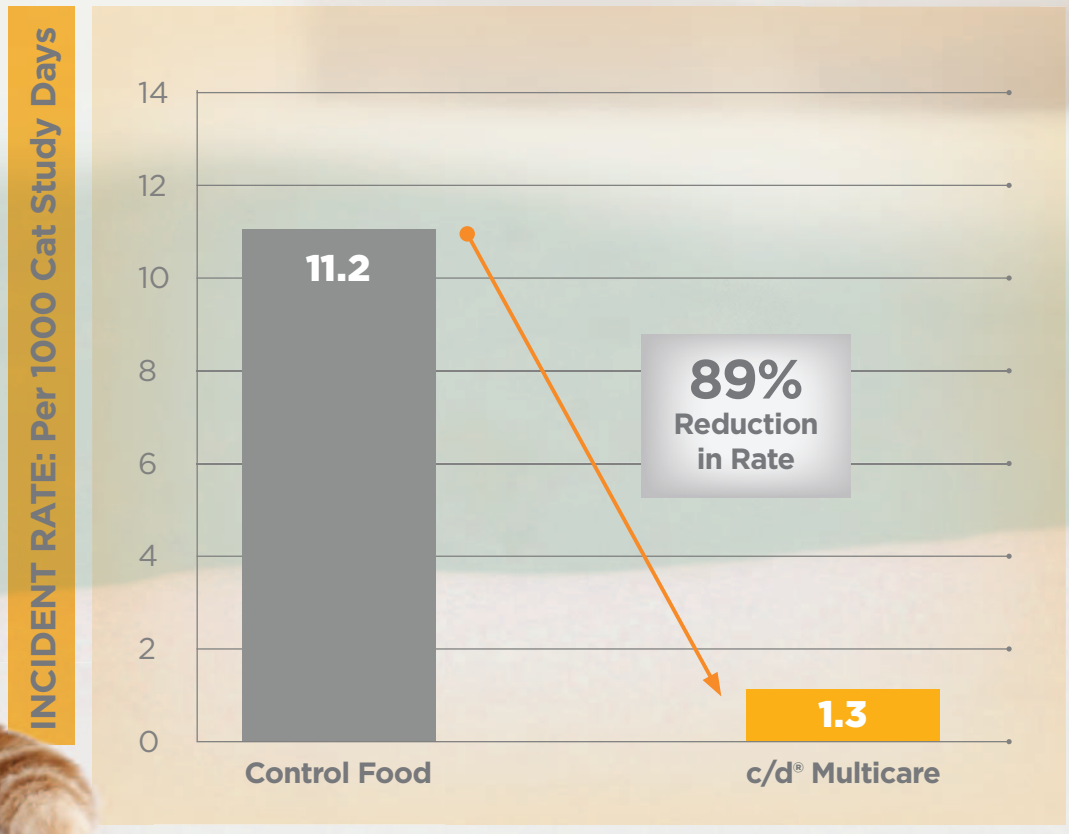

[1]Kruger JM, Lulich JP, MacLeay J, et al. Comparison of foods with differing nutritional profiles for long-term management of acute nonobstructive idiopathic cystitis in cats. *J Am Vet Med Assoc.* 2015;247(5):508-517.

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[2]Lulich JP, Kruger JM, MacLeay JM, et al. Efficacy of two commercially available, low-magnesium, urine-acidifying dry foods for the dissolution of struvite uroliths in cats. *J Am Vet Med Assoc.* 2013;243(8):1147-1153. Average 27 days *in vivo* study in urolith forming cats.

diagnostic testing, so it can be used without affecting thyroid levels or intradermal allergy testing.

Cytopoint is a monoclonal antibody therapy that binds canine IL-31 to rapidly reduce the itch associated with canine atopic dermatitis. Cytopoint was developed via a genetic engineering process known as "caninization" where the protein was made less immunogenic but still maintains highly specific binding for canine IL-31. It binds IL-31, the pruritogenic cytokine, in the extracellular space so that it cannot bind its cytokine receptor on neurons in the skin and transmit the sensation of pruritus.

Cytopoint is labeled for aid in the reduction of clinical signs associated with atopic dermatitis in dogs. It's a subcutaneous injection administered at the veterinary clinic. Cytopoint reduces pruritus within 24 hours and delivers four to eight weeks of itch relief in most patients.[3] While Cytopoint rapidly reduces itch, the return of clinical signs is gradual, allowing the veterinarian to repeat dosing as determined by the return of pruritus.

Cytopoint can be used in dogs of all ages, including those less than 12 months of age. It can also be used in dogs with comorbidities, and, like Apoquel, it does not have any known drug interactions. Also like Apoquel, Cytopoint does not interfere with any diagnostic testing, so it can be used concurrently with various types of diagnostic testing or laboratory monitoring. The most commonly reported side effects in Zoetis' field safety study was gastrointestinal upset, and that was similar to levels seen in the placebo-treated dogs.[4,5] Cytopoint requires refrigeration, and injections are best tolerated by dogs when the dose for injection is allowed to warm to room temperature.

So which treatment is best?

As a veterinary dermatologist, I was fortunate to be involved in the clinical trials that led to the approval of both Apoquel and Cytopoint, and I've seen the benefits of these new medications for controlling the signs of canine atopic dermatitis in my patients over the last several years. With any new therapy, we as veterinarians must determine the best indications for its use and what role it plays in the discussions we have with our clients, as they rely on our recommendations for therapy choice for their pets. I would like to share the guidelines I use when discussing these therapies with owners of patients with canine atopic dermatitis.

With any new therapy, we as veterinarians must determine the best indications for its use and what role it plays in the discussions we have with our clients, as they rely on our recommendations for therapy choice for their pets.

I think both Apoquel and Cytopoint are great options for dogs with seasonal environmental allergies where the symptoms last for only a few months per year. Apoquel can be started at the first onset of clinical signs, given twice daily for up to 14 days until the pruritus is controlled and then used daily for the duration of the allergy season. Cytopoint can be used in a similar manner. The client brings the patient in at the onset of the allergy symptoms for their first treatment and then Cytopoint injections can be repeated every four to eight weeks as needed.

Both Apoquel and Cytopoint can effectively be used in this manner because their onset of action is rapid—they both reduce itching within 24 hours. Thus, with only a few months of oral medication or a few injections, a pet with short-season atopy will be well-controlled for the duration of its symptoms.

Apoquel and Cytopoint can both be equally beneficial as an adjunctive treatment for managing refractory canine atopic dermatitis. I consider a patient's canine atopic dermatitis to be refractory if it's only partially controlled by a therapy for environmental allergies such as allergen-specific immunotherapy. Apoquel or Cytopoint can be used short-term to bridge the gap in a pet's allergy control if it requires additional therapy for only a few months per year. However, in my most severe patients with atopic dermatitis, I am able to use allergen-specific immunotherapy along with Apoquel or Cytopoint (and in some cases both Apoquel and Cytopoint) year-round as the patient's needs demand.

When Apoquel is best. Apoquel is my choice for providing short-term itch relief during an allergy workup. As I identify and treat secondary skin or ear infections, perform treatment trials to assess for fleas or mites, or initiate diet trials to assess for food allergies, I still need to provide immediate itch relief in my patients so they're comfortable while I determine the primary cause of their pruritus. Apoquel can be used in all these instances since it's labeled for the control of pruritus associated with any allergic disorder, including flea allergy dermatitis, scabies or food allergies, as well as canine atopic dermatitis.

Apoquel is also my first choice in a canine atopic dermatitis patient with both significant inflammation and pruritus. Apoquel inhibits both pro-inflammatory cytokines (IL 2, -4, -6 and -13) and the pruritogenic cytokine (IL-31), so it's better suited for dogs with severe clinical signs. Lastly, as an oral medication, Apoquel may be a good fit for clients who object to return visits to the veterinary clinic for repeat injections of a medication like Cytopoint or who value the convenience of giving a daily oral medication at home.

When Cytopoint is best. On the other hand, there are certain cases where Cytopoint is better for managing canine atopic dermatitis. It's a great choice for patients less than 1 year of age as it's labeled for dogs of any age (Apoquel is labeled for dogs over 12 months old). Cytopoint also has very flexible dosing and can be used in even the tiniest of dogs. I also find that Cytopoint is well-tolerated in atopic dogs with a history of medication side effects (such as polyuria and polydipsia associated with corticosteroids or lethargy with antihistamines). Cytopoint's ease of administration as an in-office injection greatly improves compliance in atopic patients, making it an excellent option for dogs with atopy that are difficult to medicate or for clients who need the convenience of a monthly treatment.

I've also found that certain clients are drawn to Cytopoint as a non-drug alternative therapy when they learn that Cytopoint uses a novel monoclonal antibody therapy to precisely target the itch of canine atopic dermatitis without possible effects on the immune system or other organ systems. Cytopoint offers an advantage in some atopic patients that also have serious infections such as systemic fungal disease or neoplasia. Cytopoint does not interfere with immune surveillance, is unlikely to add to medication side effects such as gastrointestinal upset, and does not have any known drug interactions; therefore it can be used alongside treatments for any concurrent medical issue.

In conclusion

For our patients with canine atopic dermatitis, we need to work to create a treatment plan that's personalized to the individual needs of the pet and client. Therapy plans should manage all aspects of allergies: itch, inflammation, secondary infections and the skin barrier. The itch of environmental allergies is often the most distressing aspect of this disease for pet and client. With both Apoquel and Cytopoint, we have targeted precision therapies that can be used to "switch off the itch," thereby improving both the pet and client's quality of life and their human-animal bond. Understanding the pathophysiology of canine atopic dermatitis has now brought cutting-edge medicine to the management of canine atopic dermatitis and given us two new tools to help manage this complex disease in our patients. **dvm360**

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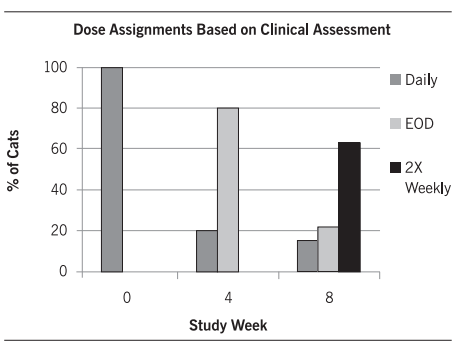
Caution:
Federal (USA) Law restricts this drug to use by or on the order of a licensed veterinarian.
Before using this product, please consult the product insert, a summary of which follows:
Indication:
ATOPICA for Cats is indicated for the control of feline allergic dermatitis as manifested by excoriations (including facial and neck), miliary dermatitis, eosinophilic plaques, and self-induced alopecia in cats at least 6 months of age and at least 3 lbs (1.4 kg) in body weight.
Dosage and Administration:
Always provide the Instructions for Assembling the Dispensing System and Preparing a Dose of ATOPICA for Cats and the Information for Cat Owners with prescription.
The initial dose of ATOPICA for Cats is 3.2 mg/lb/day (7 mg/kg/day) as a single daily dose for a minimum of 4 to 6 weeks or until resolution of clinical signs. Following this initial daily treatment period, the dose of ATOPICA for Cats may be tapered by decreasing the frequency of dosing to every other day or twice weekly to maintain the desired therapeutic effect.
ATOPICA for Cats should be administered directly on a small amount of food or orally just after feeding. Whenever possible, ATOPICA for Cats should be administered on a consistent schedule with regard to meals and time of day. If a dose is missed, the next dose should be administered (without doubling) as soon as possible, but dosing should be no more frequent than once daily.
The dispensing system includes an oral dosing syringe graduated in 1 lb increments. To dose the cat, the syringe should be filled to the nearest 1 lb corresponding to the cat's body weight (round down if 0.1 to 0.4 lb, round up if 0.5 to 0.9 lb). Each pound graduation on the syringe delivers a volume of 0.032 mL providing 3.2 mg/lb. **Do not rinse or clean the oral dosing syringe between uses.** (See **Instructions for Assembling the Dispensing System and Preparing a Dose of ATOPICA for Cats**)
See product insert for complete dosing and administration information
Contraindications:
Do not use in cats with a history of malignant disorders or suspected malignancy.
Do not use in cats infected with feline leukemia virus (FeLV) or feline immunodeficiency virus (FIV).
Do not use in cats with a hypersensitivity to cyclosporine.
Human Warnings:
Not for human use. Keep this and all drugs out of reach of children. **For use only in cats.**
Special precautions to be taken when administering ATOPICA for Cats:
Do not eat, drink, smoke, or use smokeless tobacco while handling ATOPICA for Cats. Wash hands after administration.
In case of accidental ingestion, seek medical advice immediately and provide the package insert or the label to the physician.
People with known hypersensitivity to cyclosporine should avoid contact with ATOPICA for Cats.
Precautions:
The safety and effectiveness of ATOPICA for Cats has not been established in cats less than 6 months of age or less than 3 lbs (1.4 kg) body weight.
ATOPICA for Cats is not for use in breeding cats, pregnant or lactating queens.
Cats should be tested and found to be negative for FeLV and FIV infections before treatment.
As with any immunosuppressive regimen, exacerbation of sub-clinical neoplastic and infectious conditions may occur. ATOPICA for Cats is not for use with other immunosuppressive agents.
Cats that are seronegative for *Toxoplasma gondii* may be at risk of developing clinical toxoplasmosis if they become infected while under treatment, which can be fatal. In a controlled laboratory study, cats seronegative for *T. gondii* were administered cyclosporine and subsequently infected with T. gondii, resulting in increased susceptibility to infection and subsequent expression of toxoplasmosis. Cyclosporine did not increase *T. gondii* oocyst shedding. Potential exposure of seronegative cats to *T. gondii* should be avoided (e.g. keep indoors, avoid raw meat or scavenging).
In cases of clinical toxoplasmosis or other serious systemic illness, stop treatment with cyclosporine and initiate appropriate therapy.
ATOPICA for Cats may cause elevated levels of serum glucose, creatinine, and urea nitrogen.
ATOPICA for Cats should be used with caution in cases with diabetes mellitus or renal insufficiency.
ATOPICA for Cats should be used with caution with drugs that affect the P-450 enzyme system. Simultaneous administration of ATOPICA for Cats with drugs that suppress the P-450 enzyme system, such as azoles (e.g. ketoconazole), may lead to increased plasma levels of cyclosporine.
Treatment with ATOPICA for Cats may result in decreased immune response to vaccination. Naïve cats may not develop protective titers during treatment.
Adverse Reactions:
The clinical safety of ATOPICA for Cats was assessed in a masked, controlled 6-week field study followed by a 12-week open-labeled dose-tapering field study. In these two field studies, 205 cats received treatment with ATOPICA for Cats for up to 126 days.
Two cats died or were euthanized within two weeks following study exit. One cat was diagnosed with the effusive form of feline infectious peritonitis and died following normal study exit, and one cat with pre-existing anemia that worsened during the study was diagnosed with aplastic anemia and euthanized because of a poor prognosis for recovery.
Fourteen of the 205 cats (6.8%) were withdrawn from the studies due to the occurrence of an adverse reaction. Adverse reactions in these 14 cats included weight loss, anorexia, vomiting, diarrhea, hypersalivation, lethargy, hepatic lipidosis and jaundice, upper respiratory signs, ocular discharge, cough, toxoplasmosis, lymphopenia, anemia, bacterial dermatitis, seizure, ataxia, and small cell gastrointestinal lymphoma.
The most commonly reported adverse reaction was vomiting. In most cases, vomiting spontaneously resolved with continued dosing. Adverse reactions occurred most often with daily dosing compared to other dosing regimes.

Adverse reactions reported with greater than 2% frequency in the two field studies.

Adverse Reaction*	Number (Percent) of Cases n = 205
Vomiting/Retching/Regurgitation	72 (35.1%)
Weight Loss	42 (20.5%)
Diarrhea	31 (15.1%)
Anorexia/Decreased Appetite	29 (14.1%)
Lethargy/Malaise	28 (13.6%)
Hypersalivation	23 (11.2%)
Behavioral Disorder (hiding, hyperactivity, aggression)	18 (8.8%)
Ocular Discharge/Epiphora/Conjunctivitis	14 (6.8%)
Sneezing/Rhinitis	11 (5.4%)
Gingivitis/Gingival Hyperplasia	9 (4.4%)
Polydipsia	6 (2.9%)

*Cats may have experienced more than one type or occurrence of a reaction during the studies.
The following adverse reactions were reported in less than or equal to 2% of cats treated with ATOPICA for Cats in the two field studies: bacterial dermatitis, hepatic lipidosis and jaundice, gastrointestinal small cell lymphoma, constipation, cough, toxoplasmosis, muscle wasting, muscle tremors, ataxia, convulsion, polyuria, urinary tract infection, inappropriate urination or defection, seborrhea, worsening otitis externa, papilloma, leukotrichia (whitening of hair) and excessive hair growth, anemia, lymphopenia, worsening monocytosis, worsening neutrophilia, hyperglobulinemia, increased serum creatinine and urea nitrogen, and increased alanine aminotransferase.
To report adverse effects, access medical information, or obtain additional product information call 1-888-545-5973. Alternatively, suspected adverse drug reactions may be reported to FDA at 1-800-FDA-VETS or http://www.fda.gov/AnimalVeterinary/SafetyHealth/ReportaProblem/ucm055305.htm
Information for Cat Owners:
Owners should be advised to discontinue ATOPICA for Cats and contact their veterinarian in case of signs of serious illness and/or persistent, progressive weight loss. Owners should be informed of the risks of increased susceptibility to infection and the development of neoplasia, and they should be provided advice on how to avoid exposure of their cat to *Toxoplasma gondii* infection.
Effectiveness:
A masked, controlled field study was conducted at 24 sites from various geographic locations in the United States and Canada. In this study, 217 client-owned cats with clinical signs consistent with allergic dermatitis (miliary dermatitis, excoriations including facial or neck, self-induced alopecia and eosinophilic plaques) along with non-seasonal localized or generalized pruritus, were randomly assigned in a 2:1 ratio and received either ATOPICA for Cats or a control solution (the excipients of ATOPICA for Cats without the cyclosporine). Owners administered treatment in a small amount of food or directly in the cat's mouth just after feeding once daily for up to 6 weeks. No additional therapy with antihistamines, corticosteroids or medicated shampoos was permitted.
Effectiveness was evaluated in 181 cats. Cats in the ATOPICA for Cats treatment group had a 65.1% reduction in mean total lesion score, compared to cats in the control treatment group, which had a 9.2% reduction in mean total lesion score. The percent of cats identified as treatment success by the Owner was 78.6% in the ATOPICA for Cats group compared to 26.2% in the control group. Compared to the control group, the ATOPICA for Cats group had improved mean ratings for Investigator assessment of overall improvement, Owner and Investigator assessment of pruritus, and number of body regions with lesions.
After drop-out from or completion of the masked 6-week field study, 191 cats were enrolled in a 12-week open-labeled field study to evaluate dose tapering of ATOPICA for Cats.
The graph below shows the dose assignments for each 4-week dosing period. At study entry, all cats were assigned daily doses. At Week 4, cats were assigned daily or every other day (EOD) dosing, based on clinical improvement. At Week 8, cats were assigned daily, EOD, or twice weekly (2X Weekly) dosing for the final month of the study. Cats with poor responses exited the study at Weeks 4 and 8. At study exit at Week 12, 62.9%, 21.6%, and 15.5% of the remaining 97 evaluable cats were on twice weekly, EOD, and daily dosage regimens, respectively.



ATOPICA for Cats was used in conjunction with various medications including a macrocyclic lactone and other antiparasitic agents, systemic antimicrobials, and topical skin and otic cleansers and antimicrobials.
Storage Information:
ATOPICA for Cats should only be dispensed in the original container and stored at controlled room temperature between 59 and 77°F (15-25°C). Once opened, use contents within two months for the 5 mL container and 11 weeks for the 17 mL container.
How Supplied:
ATOPICA for Cats (cyclosporine oral solution) USP MODIFIED is supplied in glass amber bottles of 5 and 17 mL at 100 mg/mL. A dispensing system is included (See **Instructions for Assembling the Dispensing System and Preparing a Dose of ATOPICA for Cats**).
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A foal is most susceptible to the dangers of roundworm infection before 18 months of age, when immunity generally develops.

Rounding up **roundworms**

Equine veterinarians can educate horse owners and farm managers about the risk of using a 'same-old, same-old' approach to deworming—and offer a custom plan of attack for each farm. *Ed Kane, PhD*

During the first year of life, *Parascaris equorum* is one of the most pathogenic parasites a foal will encounter. This roundworm can cause respiratory disease, ill thrift, weight loss, small intestine impaction, peritonitis and death, says equine parasitology expert Wendy Vaala, VMD, DACVIM (equine).[1]

Immunity usually develops by the time a horse is 8 to 18 months of age, says Dr. Vaala, who is associate director of life cycle management with Merck Animal Health. But in the meantime

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P. equorum can wreak havoc. "When it comes to young horses, especially foals and weanlings, control of ascarids should be the primary focus due their pathogenicity," Dr. Vaala says.

Complicating the problem is the increasing prevalence of drug-resistant ascarid populations due to overuse of deworming medications. "Signs that a parasite control program is failing on a breeding farm can include both overt respiratory illness as well as intestinal signs in young foals with uncontrolled *P. equorum* infection," Dr. Vaala says. A strategic approach—deworming only those horses that need it and monitoring drug efficacy through fecal egg counts (FEC) and fecal egg count reduction testing (FECRT)—helps protect horses' health.

The other major parasite in horses is the small strongyle, Dr. Vaala says—thankfully, since they're not as deadly as roundworms, veterinarians don't often see much clinical disease associated with cyathostomin infection in well-cared-for horses on good nutrition plans.

The roundworm life cycle

Here's a summary of the *P. equorum* life cycle and its effect on young horses:

- Foals ingest *P. equorum* larvated eggs from contaminated pasture, paddocks, dry lots or stalls.
- After the eggs are swallowed, larvae emerge in the small intestinal lumen, penetrate the intestinal mucosa, enter the lymphatics and are transported to the liver.
- After about a week, larvae molt in the liver and the L3 larval stage passes into the lungs through the posterior vena cava. Larvae then erupt from pulmonary capillaries to enter the alveoli.
- After two to three weeks of pulmonary migration, larvae are coughed up, swallowed and pass back into the small intestinal lumen where they develop into mature, egg-laying adult ascarids over the next two to three months.
- Eggs are passed back into the pasture or stall, where they become infective within two weeks under favorable environmental conditions. Due to their thick capsule, ascarid eggs are environmentally hardy, can withstand temperature extremes and can persist on pasture for five to 10 years.

The prepatent period in an infected horse is approximately 10 to 15 weeks. Clinical signs associated with pulmonary migration include purulent nasal discharge, cough and mild fever. Heavy burdens of late-stage larvae and mature worms may be accompanied by these same clinical signs. Large burdens of ascarid larvae and adults in the small intestine have been associated with poor growth or weight loss, unthrifty appearance, inappetance and diarrhea.

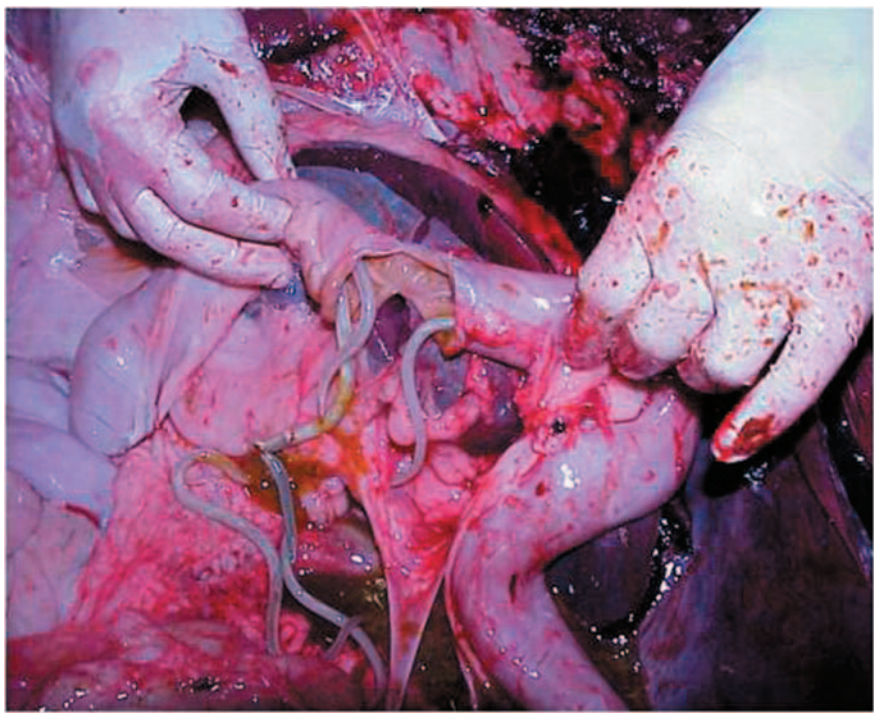
Dr. Vaala recommends the following parasitology control program in foals and young horses during their first 12 months of life:

- Perform prepartum deworming of the mare or deworm 24 to 48 hours after foaling with a macrocylic lactone anthelmintic. Use an anthelmintic with demonstrated efficacy against *P. equorum*. If the mare is dewormed pre-foaling, ensure that the effective egg reappearance period (ERP) for the drug used extends past the early postpartum period.
- Do not treat the neonatal foal unless there are parasitic-related signs of disease such as diarrhea due to *Strongyloides westeri* (confirmed by a high FEC)—use ivermectin or oxibendazole—or respiratory disease suspected secondary to *P. equorum* larval migration—use ivermectin (only if proven effective on that farm by FECRT) or larvicidal fenbendazole. Keep in mind that young foals with prepatent ascarid larval infection will not have a positive FEC.
- For a 2- to 3-month-old foal, deworm with a drug effective against *P. equorum*, such as fenbendazole, oxibendazole, py-

AAEP on roundworms

According to the American Association of Equine Practitioners Parasite Control Guidelines:

- *P. equorum* is the most important parasite infecting foals and weanlings.
- Anthelmintic resistance is highly prevalent in *P. equorum*, which should be factored into treatment decisions.
- Horses less than 3 years of age require special attention because they're more susceptible to parasite infection and at higher risk for developing disease.
- The best method for performing FECs is the modified Wisconsin technique; it's more sensitive than the modified McMaster FEC procedure.



Ascarids in the small intestine of a horse.

PHOTO COURTESY OF DR. WENDY VAALA

"Here's the message to farm managers: Work with your veterinarians; spend a little more money doing properly timed fecals to identify which dewormers are effective against which parasites and attempt to decrease the frequency of treatments ..."

—Dr. Wendy Vaala

rantel or ivermectin (if proven effective). Collect fecals 10 to 14 days after treatment from foals with patent ascarid infection and positive FEC and perform FECRT to test each drug class.

- For a 4- to 6-month-old foal (weaning age), perform a second treatment with a drug effective against *P. equorum*, such as benzimidazole or pyrantel. Perform FECRT for drugs not tested after the first treatment. Avoid drugs that kill via spastic or flaccid paralysis (such as pyrantel and ivermectin) in foals you suspect of having heavy ascarid burdens to reduce the risk of impaction colic. Consider a larvicidal dose of fenbendazole on farms with multidrug-resistant *P. equorum*.
- For 7- to 9-month-old weanlings, deworm with a drug effective against small strongyles: ivermectin, pyrantel or benzimidazole. Perform FECRT in select weanling groups with patent strongyle infections to determine drug efficacy. Incorporate cestocide treatment if tapeworms are a concern: praziquantel or a double dose of pyrantel.
- For 10- to 12-month-old weanlings and yearlings, treat with a drug effective against encysted small strongyles: moxidectin or a larvicidal five-day course of fenbendazole.

Conversation: Crucial for control

The potential lethality of a heavy *P. equorum* infection makes it a health threat that's impossible to ignore. And frequent use of dewormers unaccompanied by fecal monitoring is a recognized risk factor for development of drug-resistant ascarids and foals with heavy parasite burdens—which means conversations between farm owners and their veterinarians are essential.

"Here's the message to farm managers: Work with your veterinarians; spend a little more money doing properly timed fecals to identify which dewormers are effective against which parasites and attempt to decrease the frequency of treatments rather than going out and buying the most inexpensive tube of dewormer (which is often an ivermectin product) without first evaluating efficacy," Dr. Vaala says.

She emphasizes that much of the pathology from *Parascaris* species can occur during the prepatent period, before any eggs are seen in the feces. "You have to get ahead of the curve and anticipate the potential problem rather than wait to see the aftermath," she says. "Ascarid impactions are difficult to treat even with surgery. Postsurgical recovery can be complicated by peritonitis, ileus and systemic toxemia. Therefore, if the first indication of heavy intestinal ascarid burdens is a surgical roundworm impaction, we're late to the game. Other foals on the farm are likely harboring similar parasite burdens and the pastures are contaminated with long-lived, resistant ascarid eggs waiting to infect future foal crops."

Farm owners may be reluctant to change their deworming strate-

Dr. Wendy Vaala warns that an "open herd"—with frequent introduction of new mares and foals harboring unknown parasite burdens—is a risk factor for ascarid infection on horse farms.

gies and begin using fecal monitoring for various reasons. Perhaps they haven't yet lost a foal due to ascarid impaction or a weanling with respiratory disease associated with prepatent ascarid larval infection, or maybe they're not willing to give up frequent treatment with inexpensive dewormers in exchange for paying for diagnostics such as FECs and FECRTs. Veterinarians can have a hard time battling long-held traditions on these farms.

One thing that can help veterinarians convince these reluctant owners is to keep diagnostics affordable and targeted—to determine which horses or groups of horses are candidates for fecals. Here are valid reasons to perform fecals:

- To identify patent parasite infections
- To evaluate drug efficacy
- To screen new arrivals on the farm prior to turning them out on home pastures.
- To identify which mature horses (older than 3 years) are naturally low egg shedders and require less frequent drug treatments (usually more than 80% of the herd) and which horses are high strongyle egg shedders (often less than 10 to 20% of the herd) in need of more frequent deworming.

Smart monitoring, targeted control

When evaluating drug efficacy, Dr. Vaala collects fecals in horses that have not been dewormed recently—at least four to five weeks after administration of pyrantel or benzimidazole, eight to nine weeks after ivermectin, or 12 weeks after moxidectin. She administers a dewormer, then 14 days later collects fecals from individuals shedding significant numbers of eggs before treatment to see if the drug used was effective in reducing the egg count.

"By performing a FECRT on selected individuals I can determine what drugs work on each farm," she says. "Never assume anything. Drug efficacy can vary between farms within the same state or region. A variety of factors contribute to development of drug-resistant parasites, including a farm's history of drug use, stocking density, whether it's a closed or open herd, and pasture management practices."

Eighty percent or more of mature horses are genetically resistant to parasites and are classified as low egg shedders, Dr. Vaala says. So once a herd has been tested with a sensitive fecal assay,

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Potential barriers to success

According to Dr. Vaala, the following risk factors may counter the success of a farm's parasite control program:

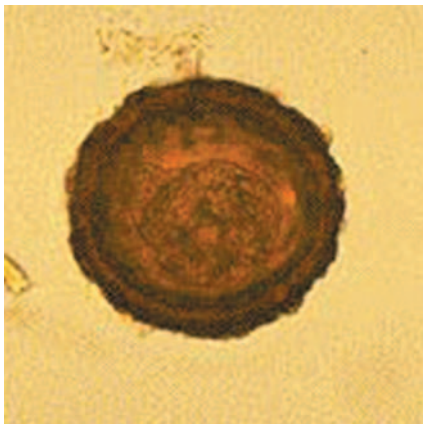
- High-stocking pasture density that limits pasture management options available to control seasonal pasture contamination with parasite eggs and larvae.
- An "open herd" with frequent introduction of new mares and foals harboring unknown prepatent parasite burdens with unknown drug sensitivity.
- A long history of intensive deworming practices for foals and weanlings starting at an unusually early age and followed by administration of the same anthelmintic class at frequent intervals without any FEC monitoring to verify drug efficacy.
- A reluctance by farm management to deviate from traditional deworming practices that have been followed for years if not decades.
- Economic restraints that limit FEC-based surveillance in terms of labor and diagnostic expenses.

When these risk factors are present, it's even more important that veterinarians keep the program highly targeted and educate farm managers about the role of FECs and FECRTs in reducing resistance to anthelmintic medications.

only the small percentage of high shedders (often just 10% to 20% of the herd) requires more frequent FECs.

"One fecal a year on every horse, whether they need it or not, does not make sense," Dr. Vaala says. "Only the small subpopulation of high shedders needs to be retested on a regular basis to determine which drugs are effective."

Young horses, due to their developing immune systems, are more susceptible to parasite infections and require a more regimented approach,



An ascarid egg.

with occasional FECs to confirm that the dewormers being used are still effective against ascarids and strongyles. "It's not unusual for more than one drug class to be needed to control both ascarids and strongyles," Dr. Vaala says. "Using the same drug class repetitively on a breeding farm is not a sustainable or effective approach."

A common mistake among horse owners and farm managers is to blame respiratory signs in young horses on a bacterial or viral infection when in fact it's prepatent infection with *P. equorum*. "The veterinarian can explain the life cycle of *P. equorum*—the larvae are not mature ascarids shedding eggs—and inform the client that snotty-nosed, coughing foals with fevers may be harboring a parasite," Dr. Vaala says. "Owners then understand that a negative FEC does not rule out disease due to prepatent infection, and if they wait until all their foals are shedding large numbers of ascarid eggs, they've waited too long and mature roundworms are shedding eggs and re-infecting pastures."

Nonchemical strategies

In addition to using affordable and sensitive FECs in a strategic approach, a farm's parasite control program should include realistic nonchemical control measures. Veterinarians can start the conversation by asking farm managers what they're already doing in terms of pasture management. Important tactics include:

- Removing manure twice weekly from mare-foal pastures. This is highly effective in reducing environmental exposure.
- Implementing a composting system that attains high enough temperatures to render *P. equorum* eggs nonviable. "If composting is done properly, the internal temperature will get high enough to kill strongyle and even ascarid eggs," Dr. Vaala says. "It's a matter of time, effort and some education. Farm owners can simply Google 'horse manure composting' and find the details."
- Rotating other livestock, such as sheep and cattle, into horse fields to reduce pasture egg burdens. This might seem like old-school husbandry, but it works. "Sheep and cattle are great biological vacuums when it comes to equine parasite eggs," Dr. Vaala says.

Such a comprehensive approach may seem like a tough sell, but you might be surprised how receptive your clients are, Dr. Vaala says. "As practitioners, we often don't realize how much owners value veterinary advice tailored for their farm," Dr. Vaala says. "If we let horse owners know that we're in the parasite control business for the long haul, and our goal is to design a comprehensive but practical program that includes FECs, anthelmintics and basic farm management practices, it might be an easier conversation than we think!

"I always tell horse owners, it's not sexy or glamorous, but if you go out and pick up manure twice a week where your mares and foals congregate in your paddocks or pastures, that will be one of the most effective (and least expensive) parasite control measures you can do—more effective than frequent purchases of dewormers that aren't working like they used to," Dr. Vaala continues. "Nonchemical management practices are far better than giving poor-performing anthelmintic medications several times a year."

Bucking tradition

It can be tough for equine practitioners to get through to farm managers regarding excessive use of anthelmintics, Dr. Vaala says. "It's hard to change the mindset of 'that's the way I've always done it,'" she says. "The top goal for veterinarians working with these intense mare-foal operations is re-education to help them break from tradition and to demonstrate a measurable benefit."

On the other hand, Dr. Vaala finds that smaller farms and owners just beginning to raise horses are usually

"My message to fellow veterinarians is to value what we can offer a farm in terms of customized chemical and nonchemical parasite control." —Dr. Wendy Vaala

more open to suggestions for proper parasite control. They also don't have huge numbers of foals, so they have room in their pastures to avoid overcrowding, which helps decrease worm transmission.

For larger commercial operations that have to pay attention to the bottom line, practitioners can help keep FECs affordable by training a technician to do the egg counts. A practice can refrigerate fecals and analyze them once a week with the same tech doing the test to ensure consistency. "Improved efficiency can help a practice can keep its overhead down, make a profit and offer an affordable diagnostic tool," Dr. Vaala says.

Large farms also don't need to test every horse every time, Vaala continues. "Consider performing fecals on groups of foals prior to weaning to determine if the drugs used to control roundworms are working," she says. "If you test your foals and the ascarid count is low or negligible, the next question is, can you get that same result with fewer treatments? If the FECs reveal high numbers of ascarid eggs, the question is, what drugs have you been using and which ones are no longer working?" Farm managers and veterinarians also need to monitor mares that come back pregnant from other farms—they're potentially returning with acquired parasites they'll pass on.

"Common sense, basic science, good animal husbandry and lots of education is going to be the best approach," Dr. Vaala says.

Unfortunately there's no magic bullet dewormer available today for equine parasites as in past decades, Dr. Vaala says. In fact, there's been no new deworming medication since the early 1990s. And deworming practices that make frequent use of the same drug class without fecal monitoring have contributed to the increasing prevalence of drug-resistant parasites. To help horse owners make better decisions, the veterinarian needs to re-enter the equation.

"We've got to do more with less until a new class of dewormer comes along," Dr. Vaala says. "And in that effort, ascarids will be our litmus test."

Conclusion

In summary, the true goal of equine parasite control is to limit infection so animals remain healthy and clinical illness does not develop.

"My message to fellow veterinarians is to value what we can offer a farm in terms of customized chemical and nonchemical parasite control," Dr. Vaala says. "It's more than just selling anthelmintics or one fecal every year for every horse. Fecals should be used strategically—to calculate egg count reduction and determine drug efficacy, to screen newcomers on the farm for patent parasite infections, or to decide if the current deworming program is controlling ascarids and strongyles."

Veterinarians can view this process as performing a "physical" on the farm itself: spending time walking around the farm and creating an all-around parasite control plan that includes sound husbandry practices, properly timed FECs on the horses that need them, and targeted use of drugs that still work. "It's a two-pronged attack—get clients to go to their veterinarian and get veterinarians to start offering practical, affordable services along with customized farm counseling," Dr. Vaala says. **dvm360**

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Ed Kane, PhD, is a researcher and consultant in animal nutrition. He is an author and editor on nutrition, physiology and veterinary medicine with a background in horses, pets and livestock. Kane is based in Seattle.

New insurance offered for companion horses

Crum & Forster sells inaugural policy for rescued miniature horse Kachina.

Crum & Forster Pet Insurance Group has launched a veterinary care insurance plan for companion horses, a novel product offering, the company says—insurance in the equine world has typically been reserved for racehorses or performance horses.

To mark the occasion, the company recognized its first policy, which was sold to cover a rescued miniature horse named Kachina at Happy Trails Farm Animal Sanctuary in Ravenna, Ohio.

"Companion horse owners, like dog and cat pet parents, need a product like veterinary care insurance that can provide financial reimbursement when the horse gets injured or becomes sick," says Dennis Rushovich, senior vice president with Crum & Forster Pet Insurance Group, in a company release. "We're proud to be the first with such an important service."

The company's ASPCA Pet Health Insurance Horse plan covers accidents, injuries, illnesses and more, and features reimbursement based on a percentage of the veterinarian's invoice. Coverage is currently available in six states: New York, New Jersey, Ohio, Pennsylvania, Virginia and Wisconsin. Every policy includes colic coverage and the ability to add on preventive care for an additional cost.

The plan is designed to be simple and user-friendly in terms of submitting claims, with an option to do so electronically online. Plan limits reset yearly, and there are options for multiple horse or pet discounts.

For more information visit www.protectyourhorse.com. **dvm360**

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Identifying a better equine ID method

Veterinarians and equine experts sound off on ideas for a better way to protect American horses from theft and disease outbreaks.

One of these horses is Mr. Ed. Check the microchips, doc.

Figuring out whose horse is whose—and the technology that makes that possible—was the subject of discussion for veterinarians, equine industry experts and health agency officials earlier this year in Denver at the "Equine Forum: Advancing ID, Technology and Electronic Health Records."

The two-day forum, hosted by the National Institute for Animal Agriculture and the United States Animal Health Association, delved deep into the issues at hand for the next generation of equine identification and the opinions and needs of those involved.

Today's technologies for horse identification and traceability are "inadequate," and the solutions should be "industry-driven with limited government involvement," according to the forum's white paper. And microchips look best: "Advances in equine microchip technology make microchips an ideal industry choice for unique, permanent, individual identification of horses," according to the white paper.

The forum touted the Jockey Club's recent success in getting 66 percent of last year's 23,000 foals voluntarily microchipped by horse owners.

The white paper addressed horse owners' concerns about health issues associated with implantation: "Science has demonstrated that a properly implanted microchip may result in mild, transient soreness and localized inflammation, which resolve in three days or less."

The bigger issue hindering success with microchips is data sharing: "Success in traceability of horses, during natural disaster, disease outbreaks or incidents of theft, is stymied by multiple data 'silos' of equine microchip numbers, a lack of data sharing and a lack of a centralized microchip database or search mechanism," the white paper states. Experts are calling for a solution similar to the American Animal Hospital Association Universal Microchip Pet Lookup maintained for small animals.

Confidentiality was of particular concern to one veterinarian at the forum.

"The equine veterinary data silo contains a great deal of client-confidential information," said Jim Morehead, DVM, of Equine Medical Associates in Lexington, Kentucky, in the forum white paper. "The veterinary community is concerned about how much information is put in the data silo and what information should follow that horse for the rest of its life."

The white paper also describes new technology, a biothermal microchip, that could be used to rapidly scan implanted horses during a disease outbreak to ensure stress-free temperature monitoring.

You can read and download the entire white paper at dvm360.com/equineID. **dvm360**

Equine microchips are too costly!

Why don't all veterinarians, horse owners and equine groups jump at the microchip option for equine identification? This forum's experts called out cost as one problem, but said those who tout this too much may be taking advantage of the current poor state of equine ID.

"Opposition to microchip use may be raised by those engaged in fraudulent business practices," said experts in the forum white paper.

"Industry initiatives, such as chip-a-thon events, can decrease overall cost and will encourage participation."

JENNAY HITESMAN/SHUTTERSTOCK.COM

What's new in canine lymphoma

Everyday helpful information, whether you treat or refer your canine lymphoma cases. *By Meghan E. Burns, DVM*

Where are we with the current state of canine lymphoma treatment? At a recent CVC, Sue Ettinger, DVM, DACVIM (oncology), offered veterinarians some answers to that question.

First, Dr. Ettinger discussed longevity associated with lymphoma treatment as indicated by clinical remission. Often, she says, owners are afraid to initiate cancer treatment because they don't want to "poison" their dogs. She reiterates to these clients that dogs don't get sick from chemotherapy—they get sick from lymphoma. While 80% of dogs do have side effects from treatment, treated dogs live significantly longer than dogs without treatment. Lymphoma treatment improves an animal's survival time and quality of life.

Let's review the basics

As a refresher, here are a few facts about lymphoma:

- 10% to 25% of tumors in dogs are lymphoma.
- 80% of lymphoma cases in dogs are the multicentric form.
- Most dogs with lymphoma (60-80%) are asymptomatic.
- B-cell versus T-cell lymphoma is an important predictor of prognosis.

Pet owners all want to know what caused their dog's cancer, Dr. Ettinger says. And the cause is multifactorial. Environmental causes, previous immunosuppression and genetics are all involved, but no direct cause has been established to date.

Here are some characteristics of multicentric lymphoma:

Dr. Ettinger says B-cell lymphoma is most common in breeds like Doberman pinschers.

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- It's the predominant cancer ingeneral practice.
- It has a rapid onset.
- It's most commonly node-based and also involves organs.
- Patients often feel well at the time of diagnosis.
- It's similar to non-Hodgkin's lymphoma in people.
- It makes up 10% to 40% of lymph mas.
- It's a negative predictor.
- Tumors tend to be hypercalcemic.
- It's common in boxers.
- Golden retrievers are equally represented with B-cell and T-cell lymphoma.

Dr. Ettinger says general practitioners should not do all diagnostics prior to referral, especially in cases where finances are a concern for the owner. She would prefer to save the owner's money for treatment and help select tests that are prognostic, practical and pertinent to the individual case and client needs. She also does not recommend prednisone before chemotherapy as it makes the chemotherapy less effective and can affect accurate staging as it treats (and kills) the lymphoma cells.

Save the owner's money for treatment and help select tests that are pertinent to the individual case and client needs.

Staging tests, in order of importance according to Dr. Ettinger:

- Lymph node aspirate
- Minimum database (complete blood count [CBC], chemistry panel, urinalysis)
- Phenotype
- Abdominal ultrasonography
- Chest radiography
- Abdominal radiography
- Bone marrow aspirate

The tests Dr. Ettinger believes are essential before treatment is started are a CBC, a serum chemistry profile, a urinalysis and a lymph node aspirate. Phenotype is important in cases where complete staging is not possible. In her practice, she does not perform a lymph node biopsy in most cases.

Dr. Ettinger finds prescapular and popliteal lymph nodes are the easiest to aspirate. Her least favorite are submandibular nodes because they're the most likely to be reactive and are draining the mouth. But if the submandibular nodes are the only ones enlarged, then aspirate them, she says.

Know your phenotype

Phenotype is one of the most important predictors of treatment outcome, as well as whether the dog is sick at time of diagnosis.

Characteristics of B-cell lymphoma:

- It makes up 60% to 80% of ly phoma cases.
- It's a positive predictor, meaning there's a higher rate of complete remission and longer remission.
- It's associated with increased survival time.
- Most B-cell tumors are high-grade.
- It's common in cocker spaniels and Doberman pinschers.

Characteristics of T-cell lymphoma:

So, is it B or T?

Flow cytometry is the test Dr. Ettinger uses most commonly to determine phenotype once cytology has confirmed a diagnosis of lymphoma, Dr. Ettinger says. This test requires living cells and involves staining those cells with labeled antibodies that bind to proteins expressed on the cell surface. Different types of lymphocytes express different proteins (for example, T cells express the protein CD3 and B cells express CD21). The test reveals how many cells of each type are present.

PCR antigen receptor rearrangement (PARR) is another phenotyping test that allows clinicians to determine the lineage of the cells present and whether they're monoclonal (indicative of neoplasia) or polyclonal (more consistent with a reactive process). This can be helpful to determine if an enlarged mandibular lymph node is lymphoma or the dog needs a dental.

Dr. Ettinger also uses the Lymphoma Blood Test (LBT) from Avacta Animal Health to monitor patients after they finish chemotherapy. LBT scores can increase less than eight weeks before relapse as determined by lymph node monitoring. In addition, the lowest scores during treatment are also prognostic for survival and time to progression (relapse).

Treatment

Chemotherapy remains the mainstay of lymphoma treatment, and the Madison, Wisconsin, chemotherapy protocol (CHOP, which includes cyclophosphamide, doxorubicin, vincristine and prednisone, with or without l-asparaginase) is the most successful and very well-tolerated, Dr. Ettinger says. Alternative protocols may be good options for cases with financial or time constraints, and it's great to be able to offer a range of options for our clients.

While newer treatment products involving monoclonal antibodies have exciting potential, there are some unanswered questions surrounding their use, Dr. Ettinger says. In one commercially available product, the B-cell monoclonal antibody is given in conjunction with chemotherapy, with nine doses administered over eight weeks. The T-cell monoclonal antibody is not adding to overall survival, and Dr. Ettinger is not currently recommending at as part of treatment for dogs with T-cell lymphoma.

In March 2017, a new chemotherapeutic was conditionally licensed for dogs with lymphoma. Tanovea (rabacfosadine—VetDC) is an intravenous chemotherapeutic that can be used as first-line therapy and in dogs at relapse. Initial studies demonstrated reasonable efficacy for dogs that have not been treated with chemotherapy and those that have relapsed. It appears to well-tolerated and Dr. Ettinger is excited to have a new option for studies looking at its use in combination with current drugs.

In conclusion

Lymphoma is one of the most successfully treated cancers in dogs, Dr. Ettinger says, and many patients with lymphoma outlive animals with other diseases such as kidney, heart and liver disease. It's important to emphasize to owners that dogs treated with chemotherapy live significantly longer than untreated dogs, and chemotherapy is generally well-tolerated in most dogs. **dvm360**

Meghan E. Burns, DVM, is a veterinary writer and founder of Connect Veterinary Consulting.

Reproductive risks in vet med: What you don't know can hurt you

Literature shows that precaution in the veterinary workplace is essential for women of childbearing age.

By Lara Bartl, DVM, DABVP (canine/feline)

Over the last several decades, veterinary professionals (both veterinarians and team members) have become predominantly women. Because of the nature of veterinary medicine, these personnel encounter a wide range of workplace exposures, including chemical, biological and physical hazards. Given that a large portion of the women in the workplace are of childbearing age, a review of the risks of these exposures specific to reproduction is timely. The goal of a recent study was to review the published material and summarize the best practices to mitigate reproductive risks as well as identify current knowledge gaps.[1]

What they did

A systematic literature search and review was performed between July 2012 and January 2016. Articles that described chemical, biological and physical hazards present in the veterinary workplace and associations with adverse reproductive outcomes were reviewed. The search found 122 sources reporting on demographic trends and hazards to female reproductive health including exposure to anesthetic gases, radiation, antineoplastic drugs and reproductive hormones. Demanding work, prolonged standing and zoonotic disease were also identified as hazards to female reproductive health. Relevance to veterinary occupational health and reproductive health were determined as was whether the articles included best practices for prevention, control and mitigation of hazards. Strength of evidence was classified as primary, supportive or anecdotal.

What they found

Demographic data supports that the increasing number of women working in veterinary medicine will result in an increased number of women of reproductive age being exposed to chemical, biological and physical hazards in veterinary practice. Awareness of

potential hazards from chemicals and pharmaceuticals, along with adoption of measures to reduce potential for exposure, are essential to prevent or reduce adverse health events. This can be accomplished through elimination or substitution of the harmful chemical, changes to work practices and use of personal protective equipment. Several studies identified an association between long work hours, prolonged standing at work, or physically demanding work including manual lifting, and preterm delivery or low birth weight for gestational age. A brief summary of the review's findings and recommendations follows.

Chemical hazards

- Antineoplastic drugs and other pharmaceuticals of risk in veterinary medicine are often similar to human healthcare. Many are carcinogenic, mutagenic or teratogenic and have been associated with reduced fertility, spontaneous abortion and fetal loss. They are identified and listed by the National Institute for Occupational Safety and Health (NIOSH). Minimum precautions include the use of gloves, masks, goggles and long-sleeved, water-resistant gowns. Written instructions for chemotherapy safety and communicating risk and prevention strategies to employees are recommended.
- Reproductive hormones, especially prostaglandins, should be avoided. Meticulous training and care should be provided for their use.
- NIOSH has published recommendations to reduce exposure and risk to anesthetic gasses. Long-term exposure to waste anesthetic gas and adverse reproductive health has not been firmly established.
- The Occupational Safety and Health Administration (OSHA) and NIOSH have published standards and guidelines including how the hazards should be communicated to workers.
- Information on veterinary-specific hazards can be found on the AVMA's website (avma.org).

Biological hazards

- Reproductive and fetal health are acutely susceptible to infectious disease before the health risk has been identified.
- Best practices include environmental controls, written infection control policies, consistent application of these policies, staff training in procedures and personal protective equipment.

Physical hazards

- Radiography, standing at work, long working hours, physically demanding work, shift and night work, and needle sticks are all identified as physical risks.
- Best practices for risk prevention include consistent application of safe workplace practices such as routine dosimetry, lead apparel and habitual workplace safety practices.
- Measures to mitigate certain physical hazards become more important as a pregnancy progresses, including adoption of recommended weight limits for lifting and adjusting work practices to address concerns associated with fatigue, prolonged standing or walking, and working long hours.
- The importance of physical work limits during pregnancy should be discussed starting in veterinary and veterinary technical schools and carried through to employee health practices in clinical settings.

Guidance documents regarding veterinary workplace safety and health are available from varied sources, including NIOSH, OSHA and AVMA.

Take-home message

Early introduction to and familiarity with reproductive health hazards and practical information about mitigating risk, with an emphasis on developing a safety-focused work culture for all veterinary personnel, are critical for making the changes necessary to meet current and future veterinary occupational health challenges. **dvm360**

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Lara Bartl, DVM, DABVP, is an assistant professor of community practice and assistant hospital director at Virginia-Maryland Regional College of Veterinary Medicine.

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Shouting into the void:
How voice search is changing the way pet owners find veterinarians

Dr. Google is so last-decade. These days, clients take their queries to Siri, Alexa and other voice technology assistants. *By Jane Harrell*

It's official: Computers now talk back. More importantly, with the sudden explosion of voice-driven technology assistants such as Siri, Google Assistant, Alexa, Bixby and Cortana, how pet owners find your practice is forever changed. Let's take a closer look at this new trend, how it impacts local search, and some quick things veterinary practices can do to continue to show up in this brave new search-engine world.

I'll bite. What is voice search technology?

In its simplest form, voice search technology is the ability to ask a device, like your smartphone or your smart-home controller, a question by speaking

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PLEASE SEE BRIEF SUMMARY ON PAGE 58.

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

BRAVECTO® (FLURALANER) TOPICAL SOLUTION

MERCK Animal Health

NADA 141-459, Approved by FDA

BRAVECTO®

(fluralaner topical solution) for Cats

BRIEF SUMMARY (For full Prescribing Information, see package insert)

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

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

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

WARNINGS
Human Warnings:
Not for human use. Keep this and all drugs out of the reach of children. **Do not contact or allow children to contact the application site until dry.** Keep the product in the original packaging until use in order to prevent children from getting direct access to the product. Do not eat, drink or smoke while handling the product. Avoid contact with skin and eyes. If contact with eyes occurs, then flush eyes slowly and gently with water. **Wash hands and contacted skin thoroughly with soap and water immediately after use of the product.**

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

Precautions:
For topical use only. Avoid oral ingestion. Use with caution in cats with a history of neurologic abnormalities. Neurologic abnormalities have been reported in cats receiving Bravecto, even in cats without a history of neurologic abnormalities. Bravecto has not been shown to be effective for 12-weeks duration in kittens less than 6 months of age. Bravecto is not effective against *Dermacentor variabilis* ticks beyond 8 weeks after dosing. The safety of Bravecto has not been established in breeding, pregnant and lactating cats.

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

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

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

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

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

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

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

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

Distributed by:
Intervet Inc (d/b/a Merck Animal Health)
Madison, NJ 07940

Made in the USA.

Rev. 9/16

159363 R3

MERCK Animal Health

aloud and having it answer you back. Originally, the answer came in written as well as spoken form; however, more and more platforms are moving toward spoken results first.

OK, but how does voice search give me answers?

Depending on the device you're using, "answers" are pulled from a variety of digital sources, such as Google's search result pages, Yelp, Kayak and other "experts." However, instead of seeing a long list of possible resources to click through, searchers are given either a single answer or a shorter list for convenience. In many cases, these lists and rankings have to do with additional directories—like your practice's Google My Business, Bing or Yelp pages, for instance.

Here's an example: If I ask my Google Assistant, "Who is the best veterinarian on the Upper West Side?" I'll get a list of three practices with high ratings. I can refine that by asking, "Are they open now?" and Google Assistant will retain the first search and tell me the hours for the first practice listed.

So why should I care about voice search?

While the world of search engine marketing evolves daily, few changes have affected how pet owners are searching—and the ones that have haven't been adopted as quickly as voice search. Here are some quick facts:

> Voice search use is exploding. Voice search technology has been significantly enhanced over the last few years, and pet owners are taking notice. Google reports that 20 percent of all mobile searches are already voice searches. Share of searches by voice-based programs is increasing exponentially with the growing use of smart-home technology—think Alexa and Google Home. In fact, experts believe that a third to half of all web-based searches will be done without a screen by 2020—that's 33 to 35 billion voice-activated searches every month.

> It's not just millennials who are doing it. In a recent study by Thrive Analytics, investigators found that the number of individuals using voice search grows 30 percent each year, and not just among tech-savvy youngsters. In fact, nearly 40 percent of people over 44 years old are using mobile personal assistants (compared with 71 percent of 18- to 29-year-olds and 59 percent of 30- to 43-year-olds). Suffice it to say, whether your veterinary practice targets baby boomers or millennials, voice search is going to impact how your customers find you.

"Google reports that 20 percent of all mobile searches are already voice searches, and experts believe that a third to half of all web-based searches will be done without a screen by 2020. That's 33 to 35 billion voice-activitated searches every month."

> Voice search is changing how pet owners ask for and get answers about local services. "We've taught ourselves to think like computers when we use search engines through a keyboard," notes SEOPressor.com, but this is evidently changing.

Beyond the fact that pet owners no longer have to look at a screen to enter a search or get results, voice search lends itself to some key differences in how pet owners ask for help finding local businesses in the first place. Break away from the screen and a much more conversational approach to a search is adopted. "Consumers aren't going to be typing in individual keywords," Jayson DeMers, founder and CEO of content marketing firm AudienceBloom, recently wrote for *Forbes* magazine. "Instead, they'll be asking questions and giving commands."

Veterinary practices that cater to these longer search strings and address the natural way people ask questions stand a better change of showing up in the results. For example, practices that include landmarks as key indicators on their website or sites like Yelp are more likely to appear when a pet owner asks for, say, the best veterinarian near Washington Square Park.

> Voice search is changing how pet owners are given answers about their pet's care. "The world of search is evolving and veterinary practices need to be prepared to be present within the results of the modern searches," says Bill Schroeder, senior vice president of InTouch Practice Communications. While on-screen search engine results pages show a snippet of the answer Google assumes the searcher is looking for, below that, the user can quickly find other sources of info answering typical pet care questions. This isn't so easy when Alexa or Google Home just begins reading aloud the first result.

All right. You've sold me on the power of voice search. Now what can my veterinary practice do to stay competitive?

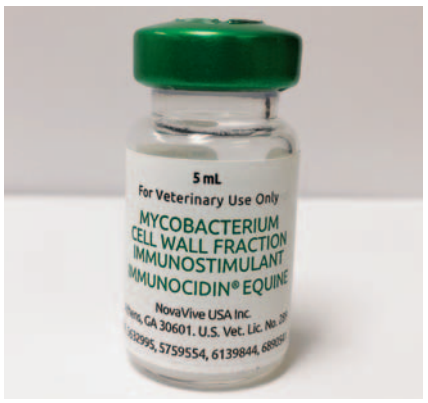
To get a leg up on your veterinary voice-search-friendly competition, Schroeder suggests including Q&As on your practice website that relate directly to questions pet owners might be asking their devices. Include terms like "who," "what," "where," "how" and others that someone would use in normal, everday conversation.

Above all, think local. While your practice website may not ever be the No. 1 result for "Why is my dog limping?" you still have a good shot at "Is it safe for my dog to swim in the pond near me?"

Something else to keep in mind is that the world of search is ever-changing. While voice-search technology is the most recent development and seems to be here to stay, the technology of how search engines help consumers find answers will continue to evolve—which means your practice's digital media needs to change as well. Unfortunately, "set it and forget it" websites are a thing of the past.

The bright side? These same technological changes make it easier for you to find an abundance of tools, resources and experts to help you keep up. Don't worry. You're not alone—Alexa is listening. **dvm360**

Jane Harrell is president of 'cause Digital Marketing. She previously served as head of pet owner communications for IDEXX Laboratories and senior producer for Petfinder.com. Send questions or comments to dvm360news@ubm.com.



Immunocidin Equine

Immunotherapy for sarcoid tumors

NovaVive is launching an equine-specific version of its Immunocidin product for equine sarcoid tumors. The new product is packaged in 5-ml vials and administered via intratumoral injection, although untreated sites frequently undergo regression as well.

For fastest response visit NovaVive.ca

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Surgitron Dual RF

The Surgitron Dual RF energy source has a three-button handpiece with patented 4.0 MHz radiowave technology that allows you to activate cut, cut/coag blend, or hemo modes with the press of a button. The system offers 120 watts of power in monopolar and bipolar modalities to meet your clinical needs.

For fastest response visit ellman.com

PNP Robotics

Smart anti-anxiety dog den

The ZenCrate, an anti-anxiety dog den, automatically detects when an animal goes inside the enclosure and immediately begins playing calming music. The acoustics of the enclosure are designed to quiet sounds from the outside and keep the music inside. The reduced light exposure and confined geometry of the enclosure also help calm the animal once it enters the enclosure, and vibration-damping technology helps attenuate the physical vibrations from outside, such as thunder or heavy machinery. The ZenCrate accommodates most dogs up to 90 lbs.

For fastest response, visit zendogcrate.com

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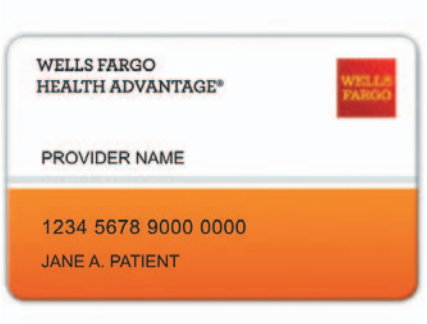

Wells Fargo

Practice financing

Wells Fargo helps veterinarians grow their businesses by providing tools, guidance and resources. Financing plans feature low clinic costs (discount rates), reduced everyday rates for two popular plans (no interest if paid in full within six months or 12 months), financing options, easy mobile and online applications, paperless processing and fast payments. Plus, financing from Wells Fargo helps clients pay for routine procedures, surgery, emergencies and more. Features include special financing offers, monthly payments, competitive APR with instant credit access on approved accounts, revolving line of credit for future care, simple online account tools and mobile banking.

For fastest response visit wellsfargo.com/vet

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Vets First Choice

Digital prescription management

Vets First Choice helps veterinarians use the latest technologies to better manage patient prescriptions, practice inventory and overall client communications for improved patient care and financial results. The company provides veterinarians with a digital prescription management platform, a modern, professional online store, a fully accredited pharmacy service, access to thousands of products, and a friendly, effective way to communicate with pet and horse owners. The system improves compliance and puts veterinarians back in control of their own pharmacy. Setup is easy, fast and free.

With the service veterinarians receive access to more than 8,000 SKUs, including compounded meds, diets, supplements and generics, as well as a client reminder service to make compliance easier. What's more, a recent pharmacy study group found that when clients pay for products separately, they are more willing to pay for more services.

For fastest response visit vetsfirstchoice.com

Arrowhead Animal Health

Colorful vet wrap for large and small animals

Arrowhead Animal Health designed Arrow-Vet Co Cohesive Stretch and Tear Vet Wrap, a cohesive wrap/tape, to be stronger, stretch better and grip itself tighter than other products on the market. Arrow-Vet Co comes in 2-in-wide rolls (commonly used in small animal veterinary care) and 4-in-wide rolls (commonly used to support working animals, livestock and horses). It also comes in a variety of colors, including white, blue, navy, yellow, black, beige, purple, neon orange and neon pink. When stretched, each roll is five yards long.

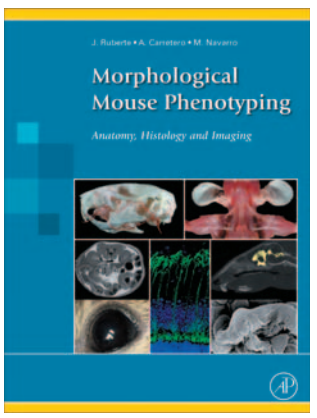
For fastest response, visit arrowheadanimalhealth.com

Norbrook Laboratories

Chewable generic NSAID for dogs

Norbrook Laboratories recently launched Carprieve Chewable Tablets for Dogs in the United States for the relief of pain and inflammation associated with osteoarthritis. This nonsteroidal anti-inflammatory drug (NSAID) is also indicated for the control of postoperative pain associated with soft tissue and orthopedic surgeries in dogs. Carprieve Chewable Tablets have the same active ingredient (carprofen) and dosing regimen and have demonstrated bioequivalence in the target species to the pioneer. They are available in 25-mg, 75-mg and 100-mg strengths and in 30-, 60- or 180-count bottles.

For fastest response, visit norbrook.com



Morphological Mouse Phenotyping: Anatomy, Histology and Imaging

Mouse anatomy reference book

Morphological Mouse Phenotyping: Anatomy, Histology and Imaging by Jesus Ruberte Ana Carretero and Marc Navarro is an atlas of explanatory diagrams and texts, with more than 2,200 original images that guide the reader through normal mouse anatomy, histology and imaging. Targeted toward researchers, lab animal veterinarians and human pathologists working with mice, the book presents a complete description of normal mouse morphology using correlative radiography, computed tomography, magnetic resonance and ultrasound images.

For fastest response visit elsevier.com/books/morphological-mouse-phenotyping/ruberte/978-0-12-812805-3

Nutramax Laboratories

Economy-sized joint supplement for cats and dogs

Nutramax Laboratories introduces Dasuquin Advanced Joint Health Supplement for dogs. Dasuquin Advanced builds on the avocado-soybean unsaponifiables (ASU), glucosamine, and chondroitin sulfate combination in Dasuquin. The enhanced formula adds Boswellia serrata extract, NMXCC95 Curcumin longa extract, and alpha-lipoic acid to the product. It is available in chewable tablets in small-to-medium dog and large-dog strengths and is packaged in blister packs in convenient dispensing cartons.

For fastest response visit nutramaxlabs.com

Dechra

Dermatological mousse

Dechra Veterinary Products has added their two most popular formulas, MiconaHex+Triz and TrizCHLOR 4, in an easy-to-use mousse to their dermatology product offering. The mousses are available in 7.1 fluid ounce pump dispensers. MiconaHex+Triz Mousse has 2% chlorhexidine, 2% miconazole, TrizEDTA, and Dechra's ceramide complex. TrizCHLOR 4 has 4% chlorhexidine and TrizEDTA. Both contain no alcohol so they are non-irritating to ulcerated or abraded skin and are labeled for dogs, cats, and horses.

For fastest response visit dechra-us.com

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Walkin' Pets

Wheelchairs for smaller breeds

The fully adjustable MINI Walkin' Wheels wheelchair accommodates toy dog breeds, cats and other small animals weighing from 2 to 10 lbs. The MINI Walkin' Wheels is simple to use and adjusting it for the right fit is quick and easy. Only two measurements and the pet's weight and breed/species are needed to place an order, which can be shipped the same day.

For fastest response visit handicappedpets.com

Two essential ER monitors

Emergency and critical care specialist Dr. Garret Pachtinger shares the monitors he couldn't live without and explains why they're so vital.

When asked to name his top two essential ER monitors, CVC educator Garret Pachtinger, VMD, DACVECC, doesn't hesitate: the pulse oximeter and the end-tidal CO_2.

"The pulse oximeter is a great, noninvasive tool to determine if our patients have adequate oxygen levels," says Dr. Pachtinger. While he admits it isn't perfect or even the gold standard for measuring oxygen levels, Dr. Pachtinger says his appreciation for the pulse oximeter stems from the fact that it's an "inexpensive tool you can use over and over on all of your patients to make sure their oxygen levels are normal." And he also points out that you can use the pulse oximeter with patients under anesthesia to make sure they're oxygenating well.

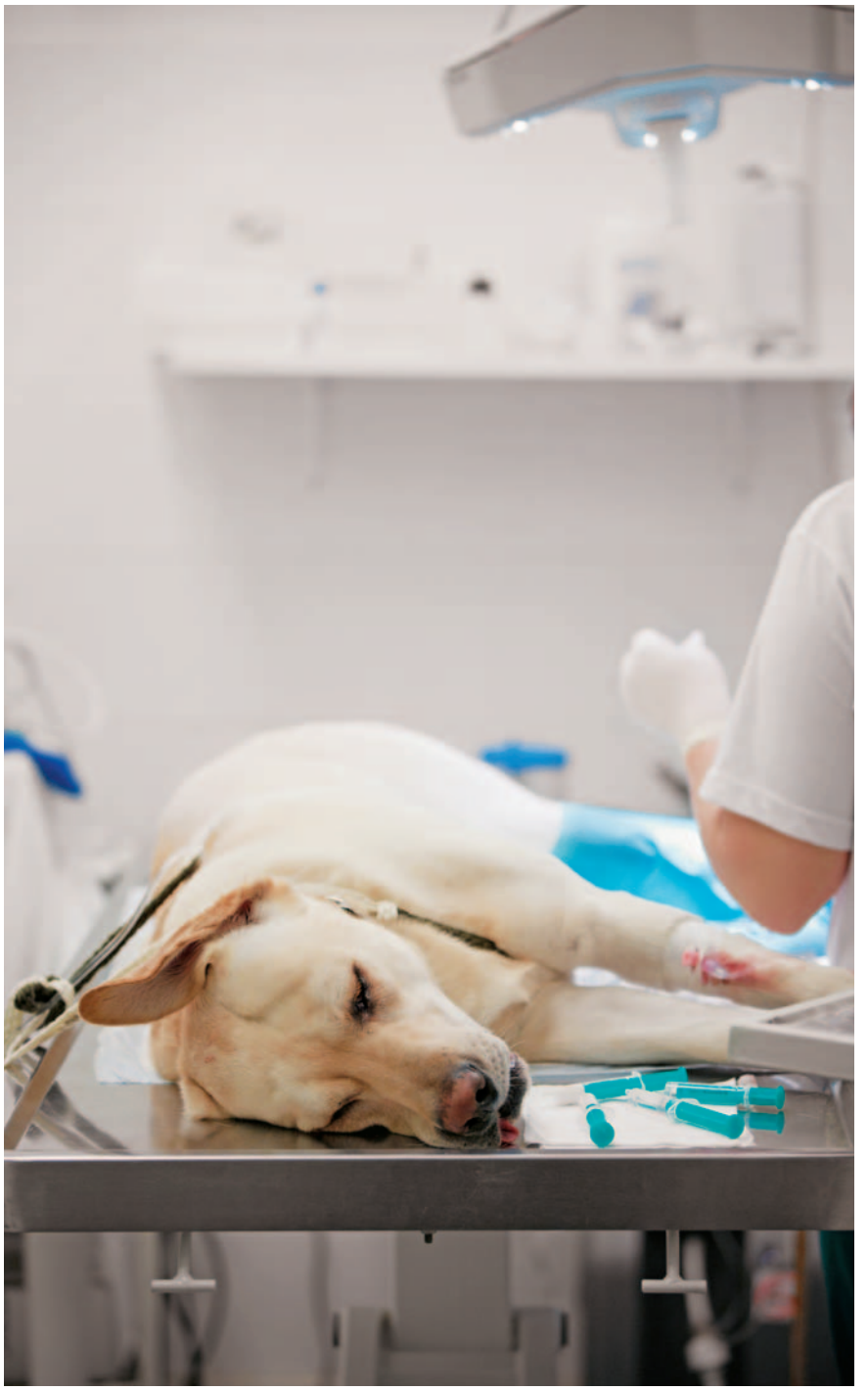
Dr. Pachtinger recommends getting a pulse oximeter that provides a waveform associated with the number reading to ensure correlation with the heartbeat and the pulse.

"The waveform gives me a lot more confidence that the number the monitor is reading—whether it's a 92 and I'm worried, or it's a 97 and I'm happy—really correlates to that patient," he says.

But Dr. Pachtinger says he doesn't rely *too* heavily on the technology. He encourages emergency clinicians to use their hands, eyes and ears in addition to the monitor.

"Auscult patients and feel their pulses," he says. "If the pulse oximetry machine is reading a 96 but has a heart rate associated with it of 70, and you auscult the patient or feel the pulse and it's really 120 or 140, it's not reading appropriately."

The other monitor in Dr. Pachtinger's repertoire of essential ER monitors is the end-tidal carbon dioxide (CO_2) monitor: "It helps us measure ventilation. If a patient's CO_2 levels are too high or too low, that can cause catastrophic events. Is that patient under anesthesia not breathing fast enough? Do we need to breathe for them to blow off that CO_2?"



For a patient that's arrested, an end-tidal CO_2 monitor can provide the first hint that the patient's coming back to life, says Dr. Pachtinger. Here's his take:

"Normally, if the patient doesn't have any spontaneous circulation, CO_2 levels are going to be low (8s, 9s and maybe 10s). Or if you've intubated the patient, not down the trachea as you should, but down its esophagus accidentally in the rush of an arrest, maybe that end-tidal CO_2—cause there's not a lot of CO_2 in the stomach—will be 0, 1 or 2. But if you've intubated the patient properly ... even before you feel it have a good heartbeat or auscult it or see the electrocardiogram dramatically change, return of spontaneous circulation, or ROSC, may show those CO_2 levels come back up to the 20s or even 30s, saying you're doing a good job—the patient is coming back to life."

Listen to more vital thoughts on monitors from Dr. Pachtinger at **dvm360.com/ermonitors**. dvm360

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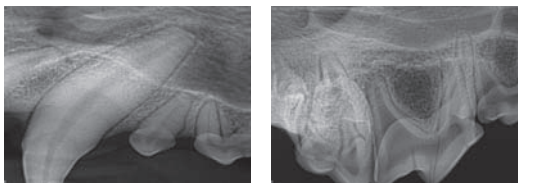

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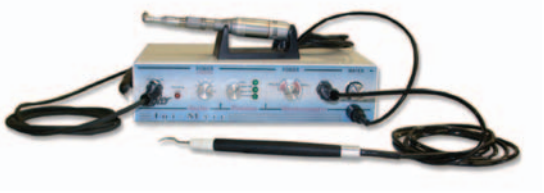

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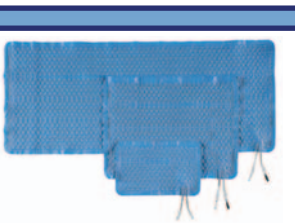

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CVC San Diego
(800) 255-6864, ext. 6
thecvc.com/sd

August 25-28, 2017
CVC Kansas City
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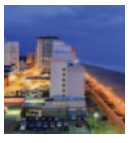

May 18-20, 2018
CVC Virginia Beach
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thecvc.com/vb

Here are the CE opportunities coming in the next few months

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The Veterinary Economics Hospital Design Conference
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August 25-28
CVC Kansas City
Kansas City, MO
(800) 255-6864, ext. 6
thecvc.com

August 26
Veterinary Dental Extraction Course
Hartford, CT
(941) 276-9141
veterinarydentistry.net

August 26-27
Veterinary Ophthalmic Surgery for the General Practitioner
Las Vegas, NV
(866) 800-7326
wvc.org/course/ophthalmic-surgery-for-the-general-practitioner-surgery-of-the-eyelids-orbit-2

August 27
Comprehensive Extracapsular Stifle Stabilization Course
Boston, MA
(774) 230-4195
securosuniversity.com

August 27
Vet and Tech Dental Course—Veterinary CE for Veterinarians and Technicians
Hartford, CT
(941) 276-9141
veterinarydentistry.net/vet-tech-dental-course-hartford-connecticut-2017

August 27-28
One Health Innovations Research Symposium: Preventing the Next Pandemic
Kansas City, MO
(816) 753-7700
kclifesciences.org

August 28-29
Fracture Repair in Toy Breed Dogs and Cats
Las Vegas, NV
(866) 800-7326
wvc.org/course/fracture-repair-in-toy-breed-dogs-cats-3

September 8-9
Equine Pre-Purchase Examination—A Discipline-Specific Interactive Approach
Dover, NH
(844) 870-6097
vetpd.com

September 8-10
Fundamentals of Dentistry—3-Day RACE Accredited Series
Baltimore, MD
(410) 828-1001
animaldentaltraining.com

September 9-10
Dermatology for the General Practitioner
San Diego, CA
(619) 640-9583
sdcvma.org

September 9
Veterinary Dental Extraction Course
Charlotte, NC
(941) 276-9141
veterinarydentistry.net

September 9-10
San Diego County VMA Veterinary Conference — Dermatology
San Diego, CA
(619) 640-9583
sdcvmadeb@aol.com

September 10
Vet and Tech Dental Course, North Carolina
Charlotte, NC
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veterinarydentistry.net

September 11-12
Human Resources Bootcamp
Philadelphia, PA
(303) 674-8169
vmc-inc.com

September 13-16
Veterinary Management School (VMS)
Lakewood, CO
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aaha.org/vms

September 14-15
Financial Boot Camp
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vmc-inc.com

September 14-17
New England Veterinary Conference
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September 15-17
Principles of Fracture Repair
Las Vegas, NV
(866) 800-7326
wvc.org/course/principles-of-fracture-repair-3

September 16
31st Annual Feline Conference (A Day on Feline Nutrition)
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(608) 251-2300
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September 17
It's What's Up Front That Counts!
Milwaukee, WI
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September 23
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Atlanta, GA
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September 24
It's What's Up Front That Counts!
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September 24
Vet and Tech Dental Course
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September 29-30
Equine Hoof Health
Middleton, WI
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September 29
Pacific Northwest Veterinary Conference and Trade Show
Tacoma, WA
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wsvma.org

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A veterinarian's best friend

I've always spoken to others about the importance of the human-animal bond. Until Hank, I hadn't realized just how incredible it is.

My oldest child Emili just *had* to have him. He was brought into the clinic by an animal control officer because someone had found him and didn't want him to be killed. He was about 2 months old at the time and was as cute as any dog I'd ever seen. Who would have thought that little Hank would grow up to be a hundred pounds?

I have no idea what breed he was—probably some sheepdog mix, because he had too many toes. He was white with black spots and a sweet raccoon face. He had saggy top lips that become kind of endearing, and his eyes—oh, his eyes—they poured emotion.

Emili was about 12 at the time, and she took good care of Hank as he grew and became a massive rascal. But in the end he was my dog. I don't fully understand the human-animal bond, but I do know that a dog and a person can just *have* something that makes them buddies. And Hank and I had it.

As soon as Hank got big, he became an outside dog—the keeper of Brock Hill (where our house is) in Dawson County, Texas. He took naturally to the job as chief of security. He never strayed too far and never allowed a passing coyote or dog to feel welcome. If a snake wandered by, he would amble in, grab it by the tail and shake it so fiercely I thought he would surely shake his own head off. He'd been bitten by rattlesnakes so many times he didn't even swell up after a bite.

One day I was working in the yard, about to bend down and grab a rake, when Hank came barking and growling straight at me. I was shocked—he'd never acted so aggressive. I quickly realized that a nearby bush was his focus. He pushed me out of the way and grabbed the 5-foot diamondback rattler (which hadn't even rattled) by the tail and shook it until it had no head. That thing would have surely got me had Hank not been there to save me.

We talked a lot after that. Hank was about 2 years old at the time, and I was forever indebted to him. I told him over and over how thankful I was that he'd rescued me, but he seemed to think it was just his job and I shouldn't even mention it anymore, so I eventually dropped it.

You see, I like to take walks. I wrote a book that was composed in my brain on the dusty county roads of West Texas. I never took one step of those walks without Hank next to me. I told him the stories that were rolling through my mind, out loud, and looked to him for guidance on their content. He would drop out a long tongue, point those caring eyes at me, and almost nod or shake his head in approval or rejection.

It was a long, slow process of bonding for him and me. We had an understanding: He took care of my emotions, I took care of his life. We never spoke much of it to each other; we just knew it. He was a constant presence in my world and I in his. We were friends, the best kind of friends, no big expectations.

It wasn't long until I came to the natural conclusion that I needed him. I'd sit on the back porch after a long day at work when things went bad and tell him about it while I rubbed his big ears. He would listen, just listen, and change his expression at just the right moments to let me know he was concerned. I became so accustomed to it that it became ritual. Just Bo and Hank, dealing with life, unknowingly forming an important bond.

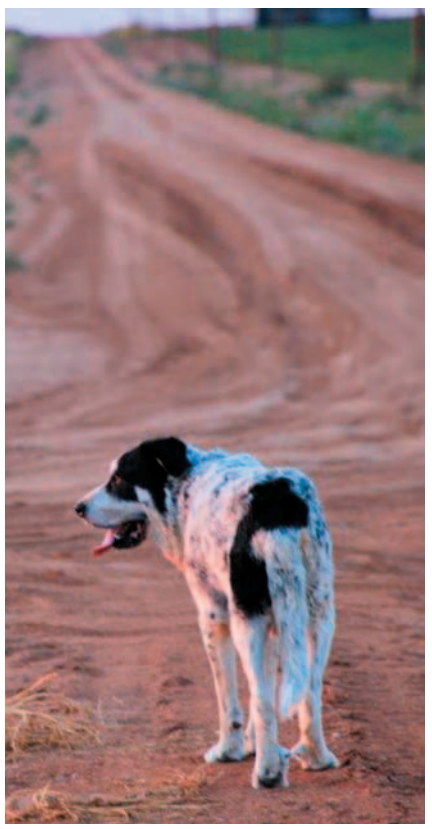
Many dogs came through the Brock house during those years. As a veterinarian, I always had transients on hand that needed a place to get started. Hank welcomed them but let them know immediately that he was the boss. Through all of the dogs that came and went, Hank was the constant. He was always my dog. No other dog could come to West Texas and get my attention away from him.

For 15 wonderful years, Hank and I held each other's hearts. Our morning routine became habitual: I'd leave for work at 7 every morning, and he'd be sitting on the high point just west of our pond, surveying his kingdom.

Two days ago I headed out to see Hank lying in his usual spot. When I went to see why, I discovered he had passed on. Once I realized it, I just stood there and looked at him. He seemed peaceful and content. He'd died looking across his kingdom in the place he'd found the most happiness.

I found myself broken. I wish I would have told him more often how much I needed him. How much I still need him to listen and love me without condition. Social interaction with people is so complicated, but interaction with Hank was as simple as breathing.

If you've loved a dog, you know these feelings all too well. If you have not, you will most likely laugh me off as a sissy. But I don't care. I salute you, Hank the mutt. You made a world of difference to one old veterinarian who sees animals every day, and you helped me see the world through the eyes of a dog. You were special, you were important and I'll miss you. I'll miss you so bad. **dvm360**



An unforgettable bond with an unforgettable dog (Photo courtesy of Dr. Bo Brock).

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

ILLUSTRATION BY MATT COLLINS

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Increased SDMA result?

IDEXX SDMA® Test Algorithm

When SDMA* result is ≥**20 µg/dL**

Perform a complete urinalysis

When SDMA result is **15–19 µg/dL**†

Perform a complete urinalysis

Other evidence of kidney disease?

- Inappropriate urine specific gravity (USG) of <1.030 in a dog or <1.035 in a cat
- Active urinary sediment, particularly casts, white blood cells, or bacteria
- Proteinuria or urine protein:creatinine (UPC) ratio >0.5 in a dog or >0.4 in a cat
- History of weight loss, decreased appetite, polydipsia, polyuria
- Physical examination findings, such as palpable kidney abnormalities
- Creatinine, BUN, and/or phosphorus above reference interval
- Creatinine increasing within reference interval
- Anemia
- Other diagnostic findings (abnormal kidney imaging, unexplained hypertension)

YES

NO → **Recheck in 2–4 weeks** → **If SDMA remains increased**

Kidney disease probable—act immediately

Follow IMM protocol

Investigate

To identify an underlying cause, perform:

- Urine culture and MIC susceptibility
- Infectious disease testing (Lyme disease, leptospirosis, ehrlichiosis, FeLV, FIV, FIP, toxoplasmosis)
- Diagnostic imaging (stones, pyelonephritis)
- History/possibility of toxin exposure?
- History/exposure to potentially nephrotoxic drugs?

For confounding conditions, assess:

- Hydration status
- Blood pressure
- Urine protein:creatinine ratio
- Thyroid status

Manage

Treat appropriately

- Underlying disease if identified
- Clinical dehydration
- Persistent hypertension
- Persistent proteinuria
- Hyperthyroidism

Provide kidney support immediately

- Feed kidney-supportive diet
- Provide fresh, clean water sources
- Discontinue all potentially nephrotoxic drugs if possible

Adjust anesthesia protocols

- Provide intravenous fluids, before, during, and upon recovery
- Provide oxygen, before, during, and upon recovery
- Maintain and monitor blood pressure and body temperature
- If needed, use narcotic for pain management

Monitor

Underlying or confounding disease identified

Monitor as indicated

Underlying or confounding disease not identified

Recheck in 2 weeks

SDMA returns to normal

- Kidney function has returned to normal
- Monitor confounding conditions and other underlying disease if present

SDMA remains increased but stable

- If SDMA and creatinine are stable, chronic kidney disease (CKD) is diagnosed
- Initiate appropriate treatment based on International Renal Interest Society (IRIS) CKD staging

SDMA continues to increase

- If SDMA and/or creatinine are increasing, consider ongoing, active kidney injury
- Perform additional diagnostics to determine cause and to guide treatment

Learn more at **idexx.com/takeaction**

*Symmetric dimethylarginine.

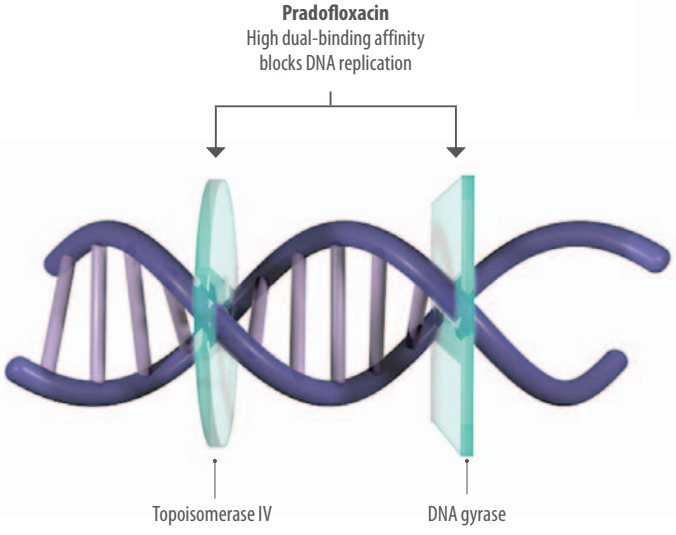
†SDMA reference interval is 0–14 µg/dL. However, in puppies, the SDMA reference interval is 0–16 µg/dL. SDMA reference interval studies are underway for kittens and greyhounds, and results may also be slightly higher and should be interpreted in light of other findings.

IDEXX


BAYER
Veraflox®
(pradofloxacin)
Oral Suspension for Cats
Efficacy. Safety. Ease-of-use.
Put it to the test.

Advanced Efficacy

Veraflox® (pradofloxacin) Oral Suspension for Cats isn't just another fluoroquinolone. This advanced antibiotic therapy features dual targeting that provides a different spectrum and potency than previous generations of fluoroquinolones.[1]*



Unique dual molecular targeting

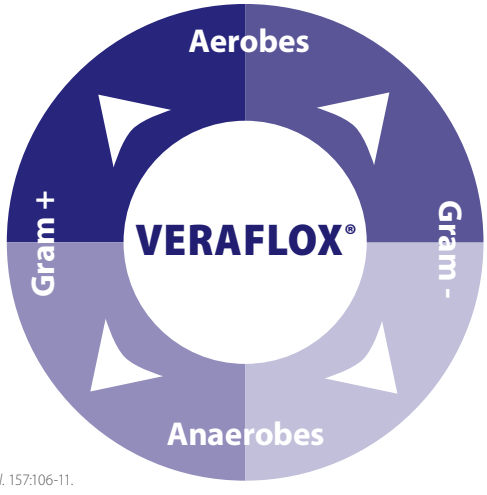
Veraflox® delivers enhanced bactericidal activity by attacking the two enzymes that are essential for bacterial DNA replication.[2]

This unique dual molecular targeting ability not only provides an advanced spectrum of activity and a high rate of *in vitro* activity against target pathogens, it also may reduce the probability of selecting resistant bacterial strains.*

An enhanced spectrum of bactericidal activity*

Veraflox® is bactericidal, providing activity against Gram-negative, Gram-positive and anaerobic bacteria thanks to advanced dual molecular targeting.

It is indicated for the treatment of skin infections (wounds and abscesses) in cats caused by susceptible strains of *Pasteurella multocida*, *Streptococcus canis*, *Staphylococcus aureus, Staphylococcus felis* and *Staphylococcus pseudintermedius*.



* The clinical significance of *in vitro* data has not been demonstrated

[1]Silley P, Stephan B, Greife H, Pridmore A. (2012). Bactericidal properties of pradofloxacin against veterinary pathogens. *Vet Microbiol.* 157:106-11.

[2]Korber B, Luhmer E, Wetzstein H, Heisig P. (2002). Bactericidal mechanisms of pradofloxacin, a novel 8-cyanofluoroquinolone . In: *42nd Interscience Conference on Antimicrobial Agents and Chemotherapy*; San Diego, CA: American Society for Microbiology; Abstract F-567:188.

[3]Freedom of Information Summary: NADA 141-344.

[4]Messias A, Gekeler F, Wegener A, et al. (2008). Retinal safety of a new fluoroquinolone, pradofloxacin, in cats: assessment with electroretinography. *Doc Ophthalmol.* 116(3):177-191.

[5]Data on file. Bayer.

Federal law restricts this drug to use by or on the order of a licensed veterinarian. Federal law prohibits the extra label use of this drug in food-producing animals. For use in cats only. Quinolone-class drugs have been shown to cause arthropathy in immature animals of most species tested, the dog being particularly sensitive to this side effect. Pradofloxacin is contraindicated in cats with a known hypersensitivity to quinolones.

Proven Safety

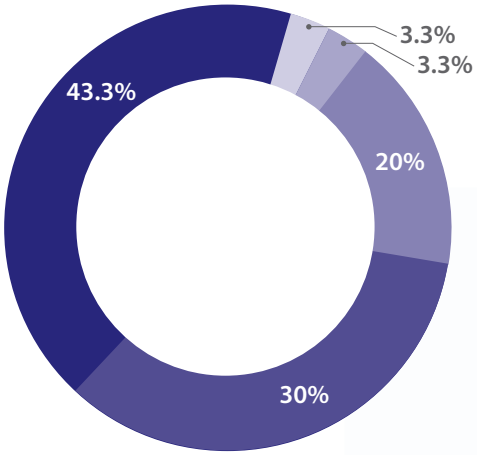
Veraflox® is an antibiotic you can prescribe with confidence. It has been proven safe for kittens as young as 12 weeks of age[3] in extensive safety and clinical trials, including a rigorous study on ocular safety.

Subjects received up to 6.7 times the label dose for 23 days and were examined according to protocol based on the international standard for electroretinography, optical coherence tomography and retinal histology. No ocular toxicity was observed during this study.[3,4]

Easy Administration

Oral antibiotics don't have to be a hassle. One simple dose per day is all you need to properly administer Veraflox®. And since we mask the bitterness of the active ingredient in our oral suspension with a vanilla flavor, most cats readily accepted it.

Cat owners reported they administered it easily or without difficulty 73.3% of the time.[5]



Patient Acceptance Scoring Key

- 5 = no difficulties
- 4 = easy to administer
- 3 = moderate refusal
- 2 = difficult to administer
- 1 = unacceptable to patient

See just how effective, safe and easy this next-gen fluoroquinolone can be.

PUT VERAFLOX® TO THE TEST.

Ask your lab to include Veraflox® on your next sensitivity test.

Veraflox® (pradofloxacin)

Oral Suspension for Cats

VerafloxOS.com

The use of fluoroquinolones in cats has been associated with the development of retinopathy and/or blindness. Such products should be used with caution in cats. The safety of pradofloxacin in cats younger than 12 weeks of age has not been evaluated. The safety of pradofloxacin in cats that are used for breeding or that are pregnant and/or lactating has not been evaluated.

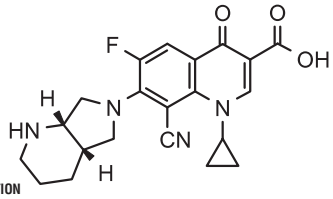
Veraflox®
(pradofloxacin)

Oral Suspension for Cats

25 mg/mL
Do not use in dogs.
Federal law prohibits the extralabel use of this drug in food-producing animals.

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

DESCRIPTION
Pradofloxacin is a fluoroquinolone antibiotic and belongs to the class of quinoline carboxylic acid derivatives. Its chemical name is: 7-[(4aS) octahydro-6H-pyrrolo [3, 4-b] pyridine-6yl]-8- cyano-1-cyclopropyl-6-fluoro-4-oxo-1,4-dihydro-3-quinoline carboxylic acid. Each mL of VERAFLOX Oral Suspension provides 25 mg of pradofloxacin.



INDICATION
VERAFLOX is indicated for the treatment of skin infections (wounds and abscesses) in cats caused by susceptible strains of *Pasteurella multocida, Streptococcus canis, Staphylococcus aureus, Staphylococcus felis,* and *Staphylococcus pseudintermedius.*

DOSAGE AND ADMINISTRATION
Shake well before use. To ensure a correct dosage, body weight should be determined as accurately as possible. The dose of VERAFLOX is 7.5 mg/kg (3.4 mg/lb) body weight once daily for 7 consecutive days. Use the syringe provided to ensure accuracy of dosing to the nearest 0.1 mL. Rinse syringe between doses. A sample of the lesion should be obtained for culture and susceptibility testing prior to beginning antibacterial therapy. Once results become available, continue with appropriate therapy. If acceptable response to treatment is not observed, or if no improvement is seen within 3 to 4 days, then the diagnosis should be re-evaluated and appropriate alternative therapy considered.

CONTRAINDICATIONS
DO NOT USE IN DOGS. Pradofloxacin has been shown to cause bone marrow suppression in dogs. Dogs may be particularly sensitive to this effect, potentially resulting in severe thrombocytopenia and neutropenia.

Quinolone-class drugs have been shown to cause arthropathy in immature animals of most species tested, the dog being particularly sensitive to this side effect.

Pradofloxacin is contraindicated in cats with a known hypersensitivity to quinolones.

WARNINGS
Human Warnings:

Not for human use. Keep out of reach of children.

Individuals with a history of quinolone hypersensitivity should avoid this product. Avoid contact with eyes and skin. In case of ocular contact, immediately flush eyes with copious amounts of water. In case of dermal contact, wash skin with soap and water immediately for at least 20 seconds. Consult a physician if irritation persists following ocular or dermal exposure, or in case of accidental ingestion. In humans, there is a risk of photosensitization within a few hours after exposure to quinolones. If excessive accidental exposure occurs, avoid direct sunlight. Do not eat, drink or smoke while handling this product. It is recommended that used syringes be kept out of reach of children and disposed of properly.

Animal Warnings:

For use in cats only. The administration of pradofloxacin for longer than 7 days induced reversible leukocyte, neutrophil, and lymphocyte decreases in healthy, 12-week-old kittens (see Animal Safety section). If an unexplained drop in leukocyte, neutrophil, and/or lymphocyte counts is noted during pradofloxacin therapy, discontinuation of treatment is recommended.

PRECAUTIONS
Prescribing antibacterial drugs in the absence of a proven or strongly suspected bacterial infection is unlikely to provide benefit to treated animals and may increase the risk of the development of drug-resistant animal pathogens.

The use of fluoroquinolones in cats has been associated with the development of retinopathy and/or blindness. Such products should be used with caution in cats.

Quinolones have been shown to produce erosions of cartilage of weight-bearing joints and other signs of arthropathy in immature animals of various species.

The safety of pradofloxacin in immune-compromised cats (i.e., cats infected with feline leukemia virus and/or feline immuno-deficiency virus) has not been evaluated.

Quinolones should be used with caution in animals with known or suspected central nervous system (CNS) disorders. In such animals, quinolones have, in rare instances, been associated with CNS stimulation that may lead to convulsive seizures.

The safety of pradofloxacin in cats younger than 12 weeks of age has not been evaluated.

The safety of pradofloxacin in cats that are used for breeding or that are pregnant and/or lactating has not been evaluated.

DRUG INTERACTIONS: Compounds (e.g., sucralfate, antacids and multivitamins) containing divalent and trivalent cations (e.g., iron, aluminum, calcium, magnesium, and zinc) may substantially interfere with the absorption of quinolones resulting in a decrease in product bioavailability. Therefore, the concomitant oral administration of quinolones with foods, supplements, or other preparations containing these compounds should be avoided.

The dosage of theophylline should be reduced when used concurrently with quinolones. Cimetidine has been shown to interfere with the metabolism of quinolones and should be used with care when used concurrently. Concurrent use of quinolones with oral cyclosporine should be avoided. Concurrent administration of quinolones may increase the action of oral anticoagulants.

ADVERSE REACTIONS
In a multi-site field study, 282 cats (ages 0.3 to 19 years) were evaluated for safety when given either VERAFLOX at a dose of 7.5 mg/kg (3.4 mg/lb) or placebo (vehicle without active ingredient) at a dose of 0.14 mL/lb (0.3 mL/kg). Each group was treated once daily for 7 consecutive days. Adverse reactions are summarized in Table 1.

Table 1: Number of Adverse Reactions Among Cats Treated with Pradofloxacin (N=190) or Vehicle (N=92)*

Adverse Reactions	Pradofloxacin	Vehicle
Diarrhea / loose stools	7	2
Leukocytosis with neutrophilia	4	6
Elevated CPK levels	4	4
Sneezing	4	1
Hematuria	2	2
Hypersalivation	2	1
Pruritus	2	0
Inappetence	1	3
Lethargy	1	2
Cardiac murmur	1	1
Reclusive behavior	1	1
Vomiting	1	1
Bacteriuria	1	0
Lymphadenopathy	1	0
Polydipsia	1	0
Upper respiratory infection	1	0

* Some cats may have experienced more than one adverse reaction or more than one occurrence of the same adverse reaction during the study. The Material Safety Data Sheet (MSDS) provides additional occupational safety information. For customer service or to obtain product information, including a copy of the MSDS, contact Bayer HealthCare at 1-800-633-3796. To report suspected adverse events, contact Bayer HealthCare at 1-800-422-9874.

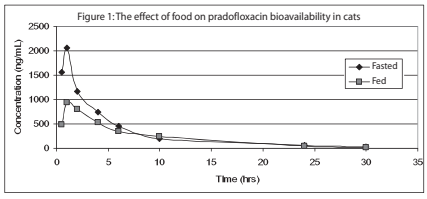
For additional information about adverse drug experience reporting for animal drugs, contact FDA at 1-888-FDA-VETS or online at http://www.fda.gov/AnimalVeterinary/SafetyHealth

CLINICAL PHARMACOLOGY
Pharmacokinetics:

Pradofloxacin is rapidly absorbed following oral administration of VERAFLOX to fasted cats, with peak serum concentrations occurring in less than 1 hour. However, food markedly diminishes the serum bioavailability of pradofloxacin; mean peak serum concentrations (Cmax) are reduced 53% and mean exposures (AUC) are decreased by 26%. The relative bio-availability of pradofloxacin, when administered as the 2.5% oral suspension to fed and fasted cats, is provided in Table 2 and Figure 1.

Table 2. Mean (1 SD) serum pradofloxacin derived pharmacokinetics parameters in cats (N =12) following a 5mg/kg oral dose of VERAFLOX under fasted and fed conditions.

	VERAFLOX 5 mg/kg Dose	
Parameter	**Fasted**	**Fed**
Cmax (ng/mL)	2116 (549)	999 (400)
Tmax (hr)	0.8	1.4
AUC0-24	9111 (1939)	6745 (1524)
Half-Life (hr)	7.3 (1.7)	6.4 (1.2)



Approximately 30% of the total drug concentrations are bound to plasma proteins in drug concentrations ranging from 150 to 1500 ng/mL. Dose proportional increases in drug concentrations are observed when the oral suspension is administered to fasted cats in doses ranging from 2.5 mg/kg to 10 mg/kg. Due to its short elimination half life, there is minimal pradofloxacin accumulation following multiple daily administrations.

Pharmacodynamics:

Pharmacodynamics was determined using *in vitro* susceptibility that showed the pathogens *Pasteurella multocida, Staphylococcus pseudintermedius,* and *Streptococcus* spp. had a pradofloxacin MIC_{90} of ≤0.015 to 0.12 ug/mL. The pharmacodynamics metrics (C_{max}/ MIC_{90} and AUC/MIC_{90}) were estimated using linear regression analysis of free drug steady-state pradofloxacin pharmacokinetics parameters from fasted cats and a pradofloxacin MIC_{90} value of 0.12 ug/mL. The 95% Confidence Intervals about predicted mean $Cmax/MIC_{90}$ and AUC/MIC_{90} values were 15 to 17 and 70 to 81, respectively. It was concluded that the magnitude of the C_{max}/MIC_{90} and AUC/MIC_{90} values is predictive of product effectiveness when an oral dose of 7.5 mg/kg body weight of the pradofloxacin liquid formulation is administered to fasted cats. In addition, effectiveness was shown for cats dosed at 7.5 mg/kg body weight and fed free choice, or within two hours of dosing, in a field study.

Microbiology:

VERAFLOX is bactericidal, with activity against Gram-negative, Gram-positive, and anaerobic bacteria. The mechanism of action is dual targeting through inhibition of DNA gyrase and topoisomerase IV.

The minimum inhibitory concentrations (MICs) for pradofloxacin against *Pasteurella multocida, Streptococcus canis, Staphylococcus aureus, Staphylococcus felis,* and *Staphylococcus pseudintermedius* isolated from skin infections (wounds and abscesses) in cats in a U.S. field study from 2008 to 2009 are listed in Table 3. Only two isolates from two pradofloxacin Treatment Failure cases had elevated pradofloxacin MICs (non-hemolytic *Staph. aureus* - MIC = 2 µg/mL; *E. coli* - MIC = 4 µg/mL).

Table 3. Activity of VERAFLOX against Pathogens Isolated from Cats Treated with VERAFLOX in a Clinical Trial in the US in 2008.

Disease	Pathogen	Clinical Treatment Outcome	Number of Isolates	Sample Collection (Time Relative to Treatment)	MIC_{50} µg/mL	MIC_{90} µg/mL	MIC Range µg/mL
Skin Infections	*Pasteurella multocida*	Success	40	Pre-Treatment	0.008	0.015	≤ 0.004 - 0.03
		Failure	11	Pre-Treatment	0.008	0.008	≤ 0.004 - 0.015
	Streptococcus canis	Success	13	Pre-Treatment	0.12	0.12	0.03 - 0.25
		Failure	2	Pre-Treatment			0.06 - 0.12
	Staphylococcus aureus	Success	10	Pre-Treatment	0.12	0.12	0.015 - 0.12
		Failure	0				
	Staphylococcus felis	Success	13	Pre-Treatment	0.03	0.06	0.03 - 0.12
		Failure	1	Pre-Treatment			0.06
	Staphylococcus pseud-intermedius	Success	10	Pre-Treatment	0.06	0.06	0.03 - 0.06
		Failure	1	Pre-Treatment			0.03

EFFECTIVENESS
The clinical effectiveness of VERAFLOX was demonstrated in a multi-site (16 sites) field study. In this masked and randomized study, the effectiveness of VERAFLOX was compared to a placebo control (vehicle without active ingredient). Of the 282 cats enrolled in this study, 190 were treated with VERAFLOX once daily at 7.5 mg/kg (3.4 mg/lb) body weight for 7 consecutive days and 92 were treated with placebo once daily at 0.3 mL/kg body weight for 7 consecutive days. The effectiveness database included 182 cats: 66 placebo (vehicle)-treated cats and 116 VERAFLOX-treated cats. The analysis of this effectiveness database showed that the cure rate was greater in the VERAFLOX group on Day 15, as summarized in Table 4. Study cure rates were determined approximately 15 days after initiation of therapy. The statistical evaluation of the primary effectiveness endpoint (Study Cures) showed that VERAFLOX was different from placebo with 73.4% VERAFLOX study cures versus 38.9% placebo study cures.

Table 4: Day 15 Case Classification

Treatment Group	Percent Cures
VERAFLOX N= 116	73.4%
Placebo N= 66	38.9%
P-value	0.0053

ANIMAL SAFETY
Target Animal Safety Study: Safety was evaluated in 32 healthy, 12-week-old kittens administered VERAFLOX once daily at doses of 0, 7.9, 23.7, or 39.5 mg/kg (0, 1, 3, and 5 times the recommended dose) for 21 consecutive days. Additional control (0X) and high-dose (5X) animals were maintained for 45 days after treatment cessation. There were statistically significant decreases in neutrophils, lymphocytes, and monocytes in the 3X and 5X groups compared to the controls. During the treatment period, one 3X cat and three 5X cats had absolute neutrophil counts below the reference range. Bone marrow cytology results consistent with bone marrow suppression (myeloid hypoplasia) were seen in the 3X neutropenic cat and two of the three 5X neutropenic cats. The 3X cat was neutropenic on the last day of the study prior to scheduled euthanasia, while absolute neutrophil values for the three 5X cats returned to normal either during treatment or after the cessation of treatment. The most frequent abnormal clinical finding was soft feces. While this was seen in both treated and control groups, it was observed more frequently in the 3X and 5X kittens.

Ocular Safety Study: Ocular safety was evaluated in 20 healthy adult cats using pradofloxacin in capsules administered orally, once daily at doses of 30 mg/kg and 50 mg/kg for 23 days. No effects were seen in the following investigated ocular parameters: ophthalmic examinations, ERGs, and optical coherence tomography. Cats receiving 50 mg/kg/day of pradofloxacin showed mild weight loss. Cats receiving 30 and 50 mg/kg/day of pradofloxacin exhibited hypersalivation and vomiting throughout the study. Dose-dependent reductions in white blood cell counts were noted in the pradofloxacin-treated cats. One cat receiving 30 mg/kg/day of pradofloxacin exhibited minimal photoceptor degeneration on light and electron microscopy of a type that differed from enrofloxacin-treated cats (comparator used in this study); the effects of pradofloxacin on these retinal changes is unknown.

Pilot Toxicity Study: In an oral toxicity study, 4 cats received pradofloxacin at 50 mg/kg/day for 25 days. All cats exhibited vomiting and hypersalivation. One cat exhibited fluoroquinolone-induced neurologic signs (decreased mobility, staggering, and vocalization) on Day 5 of the study.

STORAGE CONDITIONS
Store below 30°C (86°F).
After initial opening, VERAFLOX has demonstrated in-use stability of 60 days.

HOW SUPPLIED

Code Number	Bottle Size
84364593	15 mL
84364607	30 mL

NADA 141-344, Approved by FDA
81083770
84364593 / 84364607, R.0
Made in Germany

Bayer

Bayer HealthCare LLC
Animal Health Division
Shawnee Mission, Kansas 66201, U.S.A.

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