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I scream, you scream ...

we all scream for mobile veterinary practice?

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November 2016 | Volume 47 | Number 11 | dvm360.com

The future of veterinary medicine is here. *Are you ready?*

Technology and innovation are moving veterinary medicine to take a closer look at telemedicine, pet guardianship, wearable technology for pets—and beyond.

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VFD: The law every food animal doc needs to know

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Marriage, divorce and veterinary medicine

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Starting salaries are up! Don't get too excited, though

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Dr. Greenskin ponders practice ownership

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UBM

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REFERENCES: 1. Pollmeier M, Toulemonde C, Fleishman C, Hanson PD. Clinical evaluation of firocoxib and carprofen for the treatment of dogs with osteoarthritis. *Vet Rec.* 2006;159(17):547-551. **2.** Data on file at Merial.

Please see Brief Summary on page 3.

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Volume 47, Issue 11

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Board orders one-year suspension for Lindsey

Veterinarian in bow-killing case will also complete a probation period and required annual CE in animal welfare. *By Katie James*

The Texas Board of Veterinary Medical Examiners (TBVME) has ordered a one-year license suspension for Kristen Lindsey, DVM, the veterinarian at the center of a controversial bow-killing case. Lindsey will also be required to complete a four-year probation period with monitoring by a board-approved veterinarian, who will make quarterly reports to the board. In addition, she must complete an additional six hours of continuing education in animal welfare on top of the 17 hours annually required, according to Loris Jones, public information officer for the board.

The TBVME reached its decision at its October 18 full board meeting, at which the board heard the terms of the proposal for decision the administrative law judges assigned to the case. In the proposal, the administrative law judges had recommended a five-year suspension of her license, with four years of that suspension being fully probated with quarterly reporting, required continuing education in veterinary jurisprudence and animal welfare or other such classes the board deemed fit. The judges also recommended a community service requirement of at least 100 hours to be completed at a feline rescue, free spay-neuter clinic or similar facility.

The judges' recommendation came after an attempt to resolve the case in mediation failed, an administrative hearing was held and Lindsey's subsequent motion for a partial retrial was denied after judges found Lindsey failed to show good cause.

The case against Lindsey began in 2015 when she posted an update on her Facebook page about an allegedly feral cat that she'd shot and killed with a bow and arrow, accompanied by a photo of the smiling veterinarian holding her kill.


Kristen Lindsey

"My first bow kill ... lol," the Facebook post read, accompanying the photo of Lindsey holding the cat by an arrow that appeared to be shot through its head. "The only good feral tomcat is one with an arrow through it's [sic] head! Vet of the year award ... gladly accepted."

The public outcry was swift and overwhelming, though an Austin County grand jury wasn't able to find sufficient evidence to charge Lindsey with criminal animal cruelty. The TBVME, however, found Lindsey in violation and moved to revoke her license.

Lindsey's lawyer appealed the TBVME decision immediately after the October 18 board meeting. **dvm360**

The future of veterinary medicine is here. *Are you ready?*

You're not crazy. Change and innovation are happening faster everywhere, including veterinary practice. Here's your gut check so you're not left out of the glorious future of pet care.

By Jessica Vogelsang, DVM

In the Monday of the future, your receptionist picks up the phone and listens to Mrs. Jones request an appointment for her cat Fluffy because she suspects diabetes.

"Have you noticed any changes in her eating or drinking?" asks the receptionist.

"No," Mrs. Jones replies, "but her litterbox just told me she's lost a pound and has glucose in her urine." Your smart software handles the back-and-forth "does this day work for you?" logistics, freeing up your receptionist to check on Ranger, who's in because his collar reported a 25 percent decrease in activity over the last month. Instead of Googling a variety of incorrect differentials, Ranger's owners used your practice's convenient triage service and realized he needed to come in right away.

We live at a turning point in history when it comes to technology, and the future of veterinary medicine is overflowing with possibility and opportunity. There's only one thing standing in the way: veterinarians.

Digital evolution is crazy fast

The "drag me kicking and screaming only when there's no other option" approach has long been the default reaction of our profession when confronted with the changing face of technology, which wasn't a big issue when fun-

FON NONGKRAN/SHUTTERSTOCK.COM

damental change took place over the course of decades and the only thing at stake was a phone with or without a cord. Now substantial evolutions happen in years or even months—and that changes everything.

Digital evolution is taking place not on a linear scale but an exponential one, a trend that didn't really take off until the turn of the millennium. Life in 1975 versus 1985 wasn't all that different, at least as far as available technology goes. In contrast, consider this: Just 10 years ago, smartphones didn't exist. (The iPhone debuted January 2007.) Every single way that mobile technology has changed our lives occurred in that time.

The fundamental nature of how clients obtain and process information has moved out of the clinic and onto the web. Who would have anticipated a decade ago that a client could broadcast your exam live on the internet and crowdsource the veracity of your diagnosis in real time using a phone? And if that's what's happened in the previous 10 years, what will 2027 look like for veterinarians?

Staying ahead of the game and anticipating the changes in store for us is a daunting prospect. Fortunately, Adam Little, DVM, has been thinking about it quite a bit. As director of veterinary innovation and entrepreneurship at Texas A&M University, it's his job and his passion to explore the future of the profession—and rather than finding it daunting, he's exuberant about what he sees in store.

'Most vet practices think they're innovating. They're not.'

In order to understand the types of changes Little speaks of when he says "disruptive innovation," one first needs to know what innovation truly means. Little points to the car company Tesla as an obvious example.

"If you talked to car companies five years ago, they'd all say they're innovative," he says. But while the big automakers were congratulating themselves on hybrids and Bluetooth integration, Tesla created the first all-electric vehicle that drove like a sports car, dissolved the traditional car dealership model and created self-driving technology that carries people over 1.5 million miles a day. But most importantly, says Little, Tesla created a model where cars can be upgraded and changed with the push of a button. That's disruption.

"Most vet practices think they're innovating," Little says. "They're not."

In other words, most of us are the Ford in this equation, sitting in bewilderment as our clients zip right on past us to the Tesla store.

3 biggies on the horizon

Despite the relatively static nature of veterinary practice as far as our day-to-day job functions, changes are happening all around us. Take Rover, for example, an on-demand pet-sitting company that recently raised $40

dvm360 leadership CHALLENGE
Forecats & predogtions

PATRYK KOSMIDER/SHUTTERSTOCK.COM

million in investments.

"The veterinary industry would never see that as being disruptive to their space," Little says. "[But] HBO didn't see Netflix as a disruptor."

Little is looking at technology and apps like Rover and extrapolating how they might apply to veterinary medicine in three distinct categories:

1. Clients want to gather data faster. Little sees big changes already happening in American homes. Such wearable technology as the Whistle and Voyce monitoring collars have already established themselves in the consumer space as the dog version of activity trackers, but the next level goes even further—into diagnostic samples.

"*Where* information is generated has shifted from the four clinic walls," Little says. Sure, a collar that tells you your dog's heart rate or hours spent sleeping is one thing, but what about that litterbox we dreamed up earlier that tells whether a cat is PU/PD or losing weight? Or a device paired with an app that allows owners to monitor a diabetic pet at home? They're coming.

Consumers enter a pet's name, signalment and other data and out pops a personalized, pre-portioned homemade diet sent right to their doorstep.

"All of a sudden, tasks that were reserved to the domain of the clinic begin to shift," says Little. "An app similar to Rover that shows up overnight and offers the ability to manage diabetics at home changes things."

2. Clients want genetically individualized veterinary care. Little's second area of interest is genomics, using a pet's individual genome to provide a perfectly individualized plan of care in everything from drug therapy choices to diet. While that technology is still on the horizon, Little points to a pet food company that delivers individually formulated pet foods directly to the pet owner's home as evidence that consumers are looking for this. Consumers who visit that company's website enter a pet's name, signalment and a variety of other data points and out pops a personalized, pre-portioned homemade diet sent right to their doorstep.

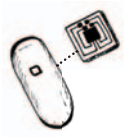
Let's get ahead of ourselves

Collars will tell us our pet's mood

Transdermal blood glucometers for animals

At least half of exams will be virtual

Everything you order online will automatically reorder



Pills with sensors will tell veterinarians whether the medications they prescribed were given

DNA-targeted immuno-therapy that will genetically equip a patient's T cells to eradicate cancer cells

More veterinarians will make in-home visits

2021

Pet food prices will increase due to protein scarcity—industry will look to insect protein sources

Many small clinics will consolidate

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While this company caters to maintenance diets for now, Little predicts a future where owners and veterinarians in search of specialized diets can enter similar information and receive a prescription formulation via home delivery.

"We know prescription diet compliance is terrible after the first couple of bags," he says. "It gets difficult to manage that relationship." But in addition to individualized client choice, we can't underestimate their need and expectation for convenience—and how that in turn generates profit.

"Amazon Prime customers generate three times the revenue of regular customers," Little says. As veterinarians begin to incorporate genetic information into diet and therapy recommendations, highly personalized services like this will continue to grow.

3. Clients want telemedicine. You only need to look to your own doctor's office to see which way the winds are blowing. The number of medical video consultations is expected to grow fourfold in the next four years, according to research company Tractica. And if consumers want it for themselves, they'll want it for their pets too.

As things currently stand, the opportunity for veterinarians to practice medicine directly with new clients via mobile technology is limited by individual state practice acts, many of which (but not all) require an in-person examination to establish a valid veterinarian-client-patient relationship (VCPR). This has led to a confusing mishmash of on-demand websites and apps offering everything from advice posing as entertainment to second opinions and triage, skirting in and out of questionably legal territory.

Veterinarians may never agree to virtual physical exams the way human medicine has accepted them, but there are still huge opportunities for telemedicine to make a difference. While many practice acts forbid using telemedicine to establish a relationship with a new client, they say nothing about using it to provide improved care to current clients. Nor do they mention teleconsulting, in which referring DVMs do remote consults with specialists.

This is what has Little really excited, as it's a win for clients, DVMs and specialists alike. A pet owner who may or may not go through the process and expense of making a separate appointment at a different specialty facility may be more than happy to have their regular veterinarian talk to that specialist right there during their appointment.

"Specialists would love the

What will veterinary medicine look like in 5, 15 and 30 years? We adapted a CVC session by Ernie Ward, DVM, to create a timeline of things to come.

CVC unconventional

Most CVC sessions will be talking about the latest stem cell technology

Genetic profiling will lead to disease predictions ("Your dog has a 42% chance of getting type 2 diabetes") and nutritional profiling

Dogs will train themselves

Robots will perform routine surgeries

Natural language interspecies communication will be possible, which will cause problems for meat-eaters

Machines will be indistinguishable from human beings—clinics will have AI receptionists

People will be able to order custom companions ("I want a black-and-white dog that can run marathons with me.")

2031

2046

Water scarcity will lead to things like waterless grooming

Infectious diseases will continue to emerge and expand

Little reminds us that technology itself will always play a secondary role in the veterinary profession—and that's a good thing.

opportunity to be a part of those decisions" in which clients would normally decline referrals, says Little. "We want to create a model where the collaboration between specialists and clinicians happens in real time on a micro scale."

'It's not about an app; it's a relationship business'

For those who cringe at the idea of keeping up on apps and technologies in the coming years, Little reminds us that the technology itself will always play a secondary role in the veterinary profession—and that's a good thing.

"It's not about an app, it's a relationship business," he emphasizes. "People trust us and really do enjoy those individual relationships. These are tools to help us build that.

"While the models will need to change, there are opportunities for veterinarians to be a part of that. I believe the goal of veterinarians is to provide the best care to the most number of patients. We want a better life for animals and the people who depend on them."

And that will never change. **dvm360**

Dr. Jessica Vogelsang, a certified veterinary journalist, is a regular contributing writer for a number of publications, author of the memoir All Dogs Go to Kevin *and creator of the popular blog Pawcurious.com.*

Meet Nubia, the cloned Jack Russell

On Sept. 1, 2016, ViaGen Pets delivered the first American-born cloned puppy, a Jack Russell terrier named Nubia, to her owner. With that delivery ViaGen became the first American company to offer pet cloning services in compliance with U.S. regulatory standards and humane pet care practices, according to a release from the company.

ViaGen anticipates increased demand for cloning and genetic preservation of companion pet DNA in the near future. The price tag? Fifty thousand dollars for a cloned puppy and $25,000 for a cloned kitten. Pet owners who want to preserve the option for the future can have their pet's DNA cryopreserved for for $1,600 plus $150 per year.

So how does it work? The veterinarian takes a skin punch biopsy—four samples from the ventral abdomen is ideal, ViaGen representatives say—and sends them to the company to produce a cell line. Samples can be taken at any point during a pet's life or after death if collected within a few hours or the body is refrigerated, company representatives say.

>>> Nubia, a commercially cloned Jack Russell terrier that was delivered to pet owners in September.

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The cells are developed into cloned embryos, which are placed in a surrogate selected according to the pet's expected birth weight. The surrogate carries the fetus to term and stays with it until weaning. After a veterinary exam produces a clean bill of health, the ViaGen team delivers the cloned pet to its owner.

ViaGen characterizes a cloned pet as the original pet's "identical twin separated in time." The company emphasizes to clients that phenotype is a combination of genetics and environment, so the clone may have differences resulting from differences in environment, but that many of the personality traits pet owners love are indeed genetic.

"I am the owner of a cloned stallion, says Blake Russell, ViaGen Pets CEO. "I don't want to overstate, but it is remarkable how similar he is to the original horse."

Joel Ehrenzweig, DVM, who consults with ViaGen, maintains that offering cloning and cryopreservation options to grieving pet owners can mitigate the effects of emotional stress and burnout experienced by many veterinary professionals.

"Losing a pet can be devastating. Talking to bereaved pet owners about genetic preservation and cloning is a win-win for veterinary practitioners looking to offer compassionate options that soften the finality of pet loss," Ehrenzweig says in the ViaGen release. "ViaGen Pets technology can help dissipate compassion fatigue within a practice by offering end-of-life options and facilitating client transition through the grief process."

To produce a clone, the technician replaces the nucleus of a donor egg with one of the founder's frozen cells. ViaGen's proprietary treatment process joins this egg and cell together to produce an embryo, which a ViaGen embryologist then implants in a surrogate mom. An identical genetic twin is delivered after a normal gestation period. Research has shown that cloned animals have the same health traits and life expectancy as other pets, the company says.

ViaGen has been cloning horses and livestock for more than a decade. **dvm360**

>>> Is it real or is it Memorex? ViaGen produces identical genetic twins using a proprietary treatment process.

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Is the idea of 'pet guardians' out of this world?

Experts weigh in on whether a future where people care for furry wards would be better than one where pets are owned.

By Brendan Howard, Business Channel Director

"Pet owner" is so 20th century. We're in the future! We call our pets "fur babies." We dote on them as parents, using coochy-coochy-coo language. And many Americans already act as if they're just as valuable as any two-legged *Homo sapiens* marching around the house.

So we got to wondering: could the near future (or the distant future) see American pet owners turned into pet guardians? Would we not own animals but be responsible for them in the way parents are responsible for children—as guardians who care for wards?

We asked experts. They said it's not gonna happen. Why? Because the reasons given in support of this shift are largely myths. Here's a closer look.

Myth: Pet guardianship means animals will get better medical care

Many state laws give parents the right to decide on medical care for their children, but child protection agencies can step in when parents' medical choices could be fatal, when the children wouldn't have reasonably good quality of life, and when the medical community agrees the care is needed for that child. Could that happen with pets? Would pet owners be required by law to bring pets in for wellness visits (once, twice, three times a year!), pay for medically required procedures (no more skipping surgeries and dental work) and attend to pets' emotional needs (home enrichment and top-notch training, here we come!)?

Probably not. For one thing, who

VADIM SADOVSKI/SHUTTERSTOCK.COM

would enforce these guardianship standards?

"All of this adds up to an obligation to the state to report and live up to state standards," says Mark Cushing, JD, a founding partner of the Animal Policy Group, which provides government relations and strategic services for various animal health, veterinary and educational interests. "The assumption is that you're not valuing your pet, and the only way we can get you to play with your pet, feed it and take care of it is the hammer of the state via guardian supervision."

That mentality actually goes against what has led Americans to spend more and more money on pets year after year: the evolving and growing human-animal bond. "That bond is what's motivated people to get pets, to own pets, to take better care of their pets and to be better educated about their pets' health," Cushing says.

While the veterinary industry continues to impress on pet owners the importance of pets in people's lives (and the money that can be spent to make their lives better), continuing this line of thinking all the way to legal pet guardianship could irreparably harm the profession—and the natural, organic nature of the human-animal bond.

"Our slogans are, 'We treat pets like family," Cushing says. "That flows from the human-animal bond way of looking at things."

Myth: Pet guardianship means courts will allow damages for pain and suffering

Families can spend thousands and thousands of dollars on pets during their lifetimes, treating them better than their own flesh and blood and bonding with them in a way they seldom do with people. Is it fair that, if someone accidentally or purposefully hurts or kills that beloved family member, the courts and the law value the pet using nothing but its replacement cost?

The thing to remember, says Jim Wilson, DVM, JD, author of Law and Ethics of the Veterinary Profession, is that people in court don't even get special damages for most other people. "Human beings typically receive noneconomic damages in court only in cases of parents, spouses and children," Wilson says. "And sometimes not that much."

As a Texas judge remarked in 2013, "it would be off if Texas law permitted damages for loss of a Saint Bernard but not for a brother Bernard," Wilson notes.

However, Wilson believes the economic damages allowed by courts could potentially rise over time. Pet owners can already sue for replacement cost, veterinary care, lost-animal search costs, lost income from a working animal, transportation costs and funeral costs. Considering the increasing amount of money pet owners are willing to spend on their pets—including in many of these categories in situations of pet loss—this could mean higher legal awards. And that could mean higher malpractice insurance costs for veterinarians.

Wilson cites a study in California maintaining that increasing economic damages to $5,000 per pet could double a veterinarian's annual malpractice premium—but that's only from $250 to $500, which most veterinary professionals could manage. "I believe our profession could live with expanding economic damages to $10,000 or $20,000," he says. "I don't think we could survive with expanding noneconomic damages."

A wild increase in noneconomic damages, Wilson argues, could eventually price pet owners out of the market for good veterinary care in the same way human healthcare costs have continued to skyrocket. In the end, "we'd be depriving pets of care," he says.

Myth: Pet guardianship means we'll learn to respect animal pain, cognition and welfare

Many people believe that a shift to pet guardianship would open people's eyes to the interconnectedness of life and human beings' responsibility to help animals live out their lives well—not just for our sake but for their own sakes.

"We've got a long way to go," says Bernie Rollins, ethicist and author of An Introduction to Veterinary Medical Ethics. "In Britain now they've got a pet welfare law that says you can't tie up a dog all day outside. Most of us don't have that law."

Would a new legal relationship to animals bring about more compassion, more understanding and a willingness to provide a better world for animals?

Maybe. But is it really the law keeping pets from better care and owners from that greater understanding?

Wilson thinks some of the attitude behind the fight for pet guardianship comes from a judgmental attitude toward today's pet owners, an attitude he can relate to because he used to—used to—feel the same way.

"I used to believe that if you couldn't afford proper veterinary care, you shouldn't own a pet. But then I worked with low-income pet owners," he says. "These people come to the emergency clinic with the same love and affection for their pets as I had. These pets were important to these people. And in terms of what that bond brings to their lives, the companionship and the perpetual friendship, I can't deny the importance of that human-animal bond."

Wilson, like many other experts, isn't sure a shift to a world of pet guardians, not pet owners, policed by bureaucracies and yielding bigger court awards leads more pets to better veterinary care.

The future looks good, Wilson argues, because people are coming to value their pets more on their own. And veterinarians should be involved in their practices, in their communities, in associations and in legislatures to make sure no one forgets the crucial role they play in whatever future comes for pets and the people who love them. **dvm360**

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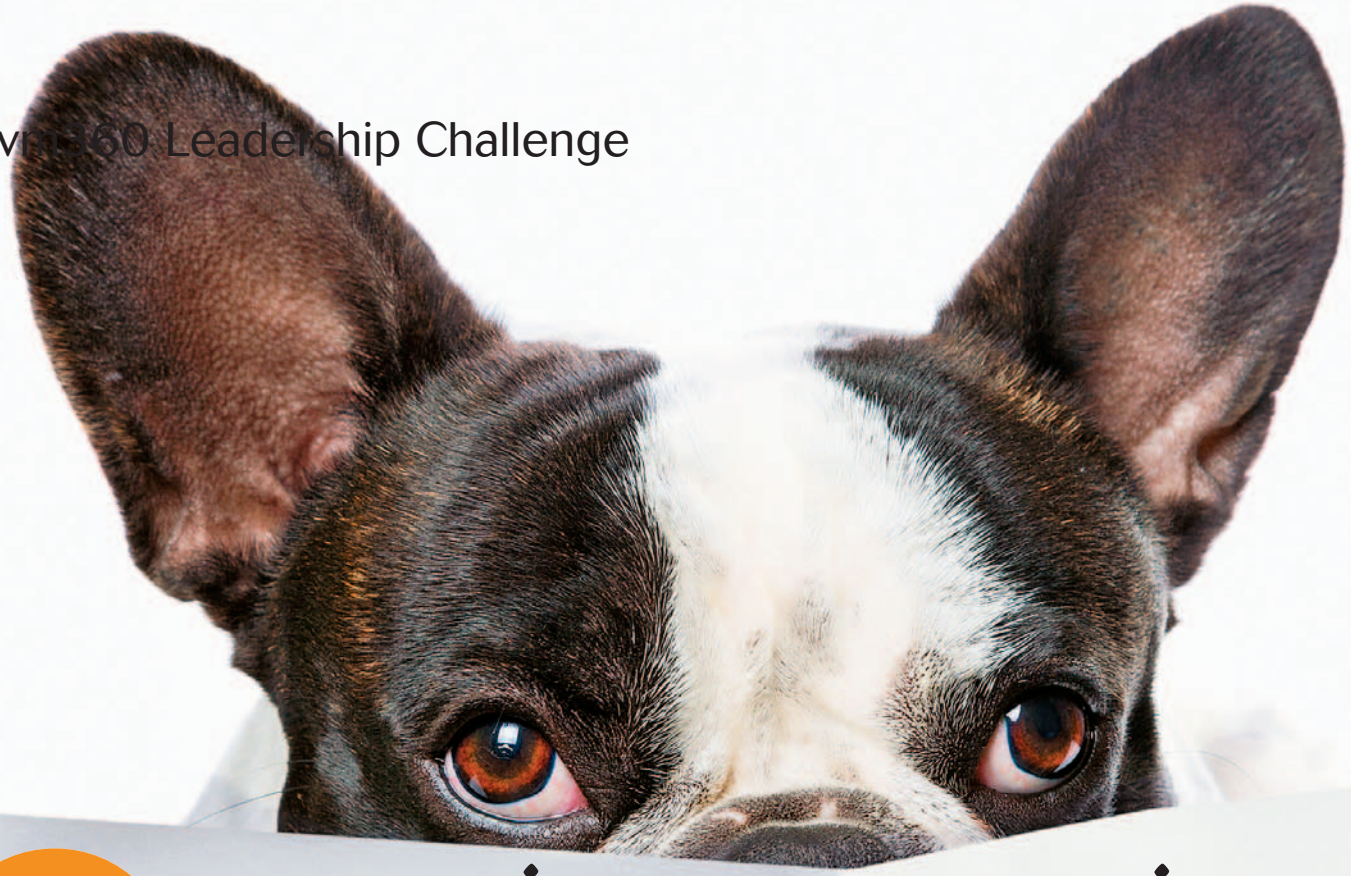

10 veterinary stories that blew us away in 2016

Some extraordinary, some disquieting—at least in terms of implications for the future of veterinary medicine. Take a retrospective tour with us.

By Mindy Valcarcel, Medicine Channel Director

You've seen us looking toward the future on what's to come in veterinary medicine in this issue. But it's interesting to take stock of how far the veterinary profession has come, even within a one-year timespan (OK, we're cheating a bit since it's not even December yet). But we did look at the breaking news in dvm360 magazine since January of this year and found these articles that may get you dreaming—or cringing in the corner—for what is to come.

FIVE POSITIVE PORTENTS

1 Wonder procedures. Whether borrowing techniques used in another species or using good-old ingenuity on the fly, veterinarians are always coming up with new ways to fix common problems with fewer complications:

- Cutting-edge approach solves the riddle of a sphynx's blocked ureter
- Dry-eyed at last: Nasolacrimal stenting procedure corrects a cat's tear duct obstruction

2 Wonder drugs. As knowledge of the way we all tick biologically increases, here is one example of pharmaceutical companies really using that knowledge to fix or enhance pets that need a boost when something is wry:

- Aratana Therapeutics receives FDA approval of canine appetite stimulus

3 Animal welfare of primary importance. This innovation combines technological savvy (a fake dog that really breathes and bleeds!) along with doing away with the need for actual cadavers to allow students to practice surgical techniques hands-on:

- Realistic dog model created in effort to replace canine cadavers for veterinary surgical teaching

4 Truly high-tech in every practice. So we're not quite to a Star Trek tricorder yet, but other innovations, such as almost-immediate delivery of needed tests or drugs by drones, is right here right now—as soon as commercial use is cleared, that is:

- The Future of Veterinary Medicine: Drones in veterinary practice

5 Pets will live forever! Well, this really is a dream, but compounds are being investigated that can at least extend life and keep pets (and people) feeling youthful longer:

- Rapamycin: A real fountain of youth?

So that's the good news, ready for the not so good?

FIVE HAIR-RAISING HARBINGERS

1 Devastating disease outbreaks. It seems like diseases are now passing more readily between species and harmful parasites are carrying worse and worse diseases, surviving in harsher climates and spreading like wildfire. Is the zombie apocalypse really that far away?

- Canine flu now affecting cats
- Senator introduces legislation to fight diseases such as Zika
- 2016 tick update: Populations are spreading

2 Veterinary practice dictated by legislature. Whether state or federal, laws are being passed that can affect the treatment options you can offer in your practice:

- NJ politician introduces statewide declaw ban

3 The need for expensive veterinary malpractice insurance. We know human doctors have to carry a lot of liability insurance because of the litigious nature of people. We're all carefully watching those cases that are trying to establish pets as more than just possessions, putting veterinarians in the same boat:

- Georgia Supreme Court rules pet owners can recover veterinary costs in negligence cases

4 Obese becomes the norm. Like people, the percentage of overweight or obese pets keeps growing. Will obese become the benchmark and the whole scale shift up?

- Annual survey finds swelling numbers in overweight pets

5 No one can pay back their student loans. One thing that's stressing a lot of veterinarians is the amount of debt it takes now to get through veterinary school and the relatively low-paying jobs that come their way once they graduate, when compared with other medical professions. Will these pressures ease or become insurmountable?

- Can we quantify the true cost of veterinary student debt? dvm360

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Mind blown

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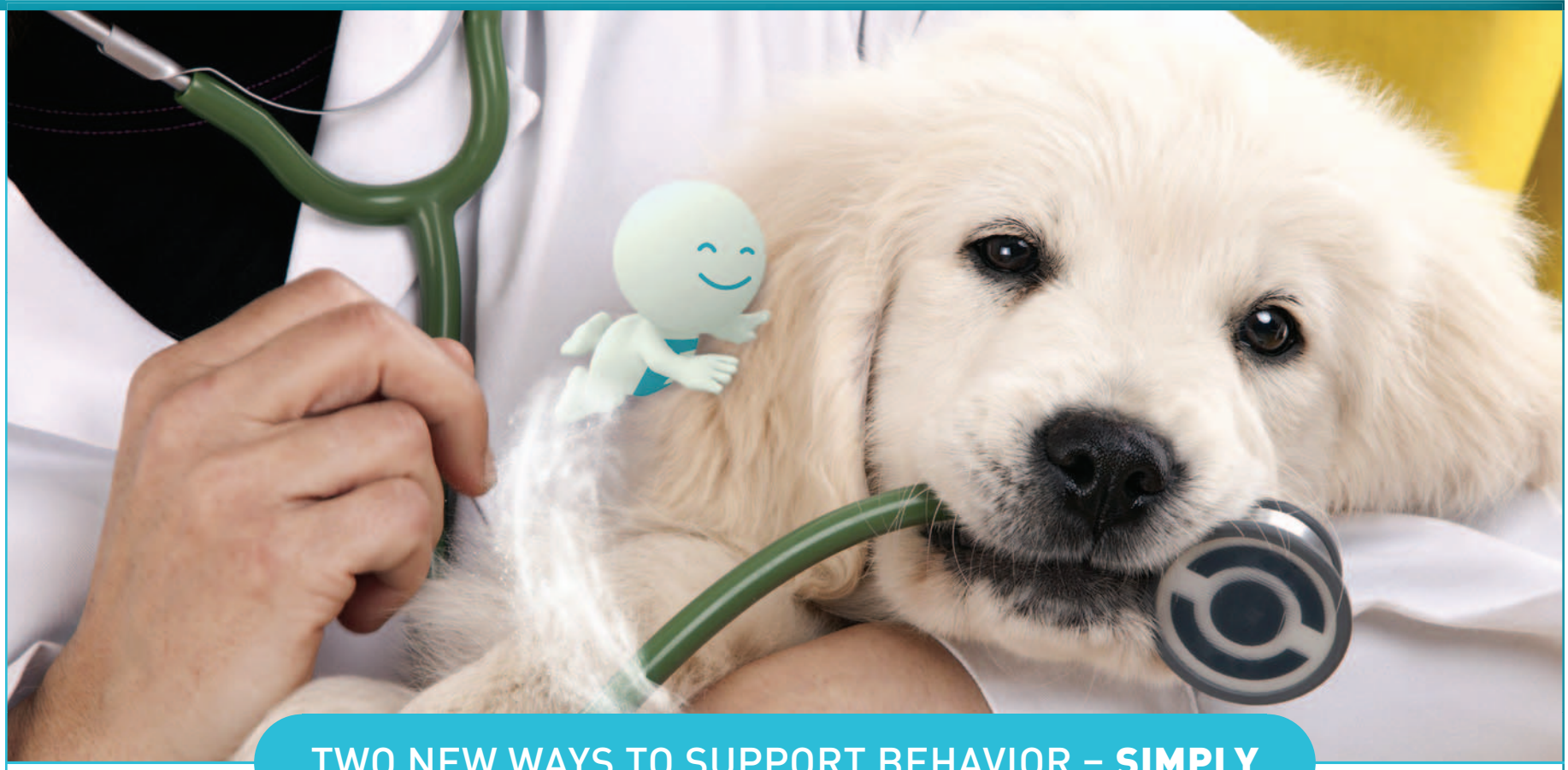

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VFD: The law every food animal doc needs to know

Antibiotics that are medically important to people will soon be off-limits for growth promotion in livestock, and veterinarians will decide what's medically necessary. *By Carla Huston, DVM, MS, DACVPM*

In recent years there has been a growing concern that the use of antibiotics in veterinary medicine, specifically those used in food animals, are contributing to antibiotic resistance in people. A report from the U.S. Food and Drug Administration (FDA) released in December 2015 states that most antimicrobial drugs approved for use in food animals are marketed for use in feed (74 percent) or water (22 percent). Furthermore, the report indicates that 97 percent of these drugs are dispensed OTC, or without veterinary supervision.

Given the concern over antibiotic resistance, recent regulations have proposed phasing out the use of medically important antibiotics in food animals for production purposes and to ensure that licensed veterinarians oversee other uses of these drugs. The most recent of these, FDA Guidance for Industry (GFI) No. 213, becomes effective Jan. 1, 2017. Here are the important changes taking effect:

> No more antibiotics for growth promotion. The use of medications in feed considered "medically important" in human medicine will be restricted to the treatment, control or prevention of bacterial diseases of animals, under the oversight of a veterinarian. This removes the growth promotion, feed efficiency and milk production uses from the labels of all currently approved medically important drugs used in feed.

> "Medically important" antibiotics in feed or water require a veterinarian. Any listed "medically important" antibiotics currently available in feed for animals will require a veterinary feed directive (VFD). In addition, medically important antimicrobials available to be used in water will require a veterinary prescription. Livestock producers will be required to obtain a VFD from their veterinarian for medicated feeds such as chlortetracycline (CTC) for anaplasmosis control and medicated milk replacers. However, ionophores, coccidiostats and anthelmintics as well as a few other antimicrobials will be exempt as they're considered "not medically important" in human medicine.

> VFDs must be filled through approved feed mills or feed distributors. As long as the feed distributor (co-op, feed mill, etc.) has a "letter of intent" on file with the FDA as well as an "acknowledgment letter" with the drug supplier or feed manufacturer, they'll be able to keep a stock of medicated feeds on hand to distribute to customers with a valid VFD. A veterinarian can write a VFD for multiple locations within a state owned by the same person as long as the feed is acquired from the same distributor.

> Veterinarians are responsible for the VFD. Veterinarians will be responsible for all information contained on the VFD. The veterinarian must be licensed in the state where the animals reside. A VFD will include both an expiration date and a specified duration of use. The expiration date refers to how long the VFD is valid for. This will be determined by either the product label or by the veterinarian's assessment of the animals' medical needs and cannot exceed six months from the time of issuance. The duration of use refers to the amount of time an animal or group of animals should be fed the medicated product. The duration of use will be specified by the label for that particular drug.

Other details on the VFD include

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Drugs moving from OTC to VFD on Jan. 1, 2017*

Starting next year, the FDA is requiring veterinarians to oversee administration of these drugs in livestock to ensure they are medically necessary:

- chlortetracycline
- chlortetracycline-sulfamethazine
- chlortetracycline-sulfamethazine-penicillin
- hygromycin B
- lincomycin
- OTC oxytetracycline
- oxytetracycline-neomycin
- penicillin
- sulfadimethoxine-neomycin
- tylosin
- tylosin-sulfamethazine
- virginiamycin

**This list is adapted from the FDA Center for Veterinary Medicine. Additional drugs may be approved but aren't currently marketed for livestock. The most current list of VFD drugs can be found at dvm360.com/vfddrugs.*

number and type of animals being treated, condition being treated and level of antibiotic to be delivered. Telephone orders aren't allowed, although electronic means may be used to deliver the initial VFD request. The producer, veterinarian and feed distributor must keep records for two years. VFD manufacturers must keep product manufacturing records for one year.

> VFDs require a valid relationship. Dispensing, prescribing or authorizing a prescription or VFD product requires a valid veterinarian-client-patient relationship (VCPR). It's illegal for a veterinarian to dispense or write a prescription or VFD for animals or herds they haven't seen or are unfamiliar with. Under the FDA Animal Medicinal Drug Use Clarification Act, this relationship exists only when all of the following conditions are met:

A valid veterinarian-client-patient relationship is one in which:

a. A veterinarian has assumed the responsibility for making medical judgments regarding the health of (an) animal(s) and the need for medical treatment, and the client (the owner of the animal or animals or other caretaker) has agreed to follow the instructions of the veterinarian;

b. There is sufficient knowledge of the animal(s) by the veterinarian to initiate at least a general or preliminary diagnosis of the medical condition of the animal(s); and

c. The practicing veterinarian is readily available for follow-up in case of adverse reactions or failure of the regimen of therapy. Such a relationship can exist only when the veterinarian has recently seen and is personally acquainted with the keeping and care of the animal(s) by virtue of examination of the animal(s), and/or by medically appropriate and timely visits to the premises where the animal(s) are kept.

Many states have their own definition of the VCPR, so veterinarians should review their state practice act and be familiar with the VCPR as it applies to them. But keep in mind that the FDA has determined that some states' definitions are not sufficient for VFD purposes—in these cases, the federal definition applies. (Check the FDA's current list at dvm360.com/vfdstates.)

In this new era, it's more important than ever that veterinarians stop and review the laws governing their livestock practice. Work with your clients to evaluate current and future medicated feed usage. Review the principles of judicious use of antimicrobials and herd health management practices. You may be able to reduce the need for antimicrobials with such disease prevention strategies as calving management, fly control and low-stress preconditioning programs for calves. Evaluate your and your clients' medical record-keeping practices, because new rules will require additional recordkeeping and documentation. The work you do today can help you better understand the VFD process and ensure that future implementation of any new drug laws in your practice will be even smoother and more painless. dvm360

Carla L. Huston, DVM, PhD, DACVPM, is an associate professor in the Department of Pathobiology and Population Medicine at Mississippi State University's College of Veterinary medicine.

Marriage, divorce and **veterinary medicine**

Does your professional life affect your personal life? One veterinarian gives her thoughtful response on mixing love, work, marriage, children, divorce and life. *By Dani McVety, DVM*

I knew someone would ask me this question eventually, but I underestimated the effect it would have on me. At a University of Missouri Veterinary Business Management Association meeting, I ended my presentation as usual by opening it up for questions—my favorite part! Immediately a hand went up: "Does your professional life affect your personal life?"

I was silent. Yes, I could graze over this question, but there was a larger opportunity here: to plant seeds in the minds of veterinary students that may give them permission to follow their dreams, to feel empowered to proceed confidently on the path that they've chosen—thank you, Henry David Thoreau—even if they're meeting resistance from others in their personal life.

After a few wordless moments, I said, "I'm going to give you a very authentic answer."

What I said

Yes, your professional life will affect your personal life. It will affect everything you do and every relationship you'll have. Being a veterinarian is a dream come true, and for me, it's a passion. It also comes with a price. But not everyone will understand this.

I got married one month before veterinary school started, at the age of 22. He started law school at the same time. And as our lives began to grow, we truly had the perfect marriage. Three years later we had our first child—in veterinary school, on purpose—and our second shortly after graduation. My business began to expand very quickly and new opportunities arose.

My life evolved from veterinary student to mother to veterinarian to businesswoman to speaker and author. At the same time, my husband's career as an attorney was blossoming. There was a long period of time where I remember sleeping less than four hours a night. Sleep was what I gave up instead of losing time with my family. But I

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was never unhappy. On the contrary, I was completely and utterly fulfilled. Unfortunately, this fulfillment wasn't from my marriage. It was mainly from my work and my children.

If you haven't realized it yet, we have to make a number of difficult decisions in veterinary medicine, ones not everyone agrees with.

Not many people understand what it's like to hold life and death in your hands, to have something as simple as money to be such a large part of the equation, part of your medical protocol even, and then have a client throw disgraces at you because they assume you're only "in it for the money"—which is so ironic, of course.

Not many people know the feeling of making yourself push the plunger on a syringe that delivers death to a pet that you feel is "treatable," given more time or funds. You do it anyway because it's the only option left. These things take a toll on you as a person, and you either get stronger because of it or you shut off the emotions and pretend they don't exist. We all handle them differently, but one thing is for certain: this job affects you to the core.

Yes, my passion for my work as a veterinarian played a huge role in the collapse of my marriage. You see, I'm one of those people who believes in loving my job, in loving the way I spend most of my waking hours and in using that work to make the world a better place. In fact, I'm not ashamed to say that it's how I define myself and my contribution to society. That definition comes with a cost, however. And I paid a big price for it.

Do I wish the outcome was different? For many reasons, yes, I do. But "coulda-shoulda-woulda's" are ridiculous. My ex-husband is still a dear friend to me, and his girlfriend is one of the kindest, gentlest souls I've ever met. We live a half-mile apart, and our children are happy, safe, protected and loved beyond measure. No one gets married expecting to get divorced, especially when you spend a third of your life with someone, like I did. But I am happy. Truly, peacefully, happy.

The most important lesson I learned on this journey: fulfillment is a feeling. It's not a job. It's not a person. And it's not a place. Fulfillment is purely a feeling. So find that feeling, and live it each day. Not many people will understand what it's like to be a veterinarian, and that's OK. As long as you're confident in what this career means to you, that's all that matters. **dvm360**

Dr. Dani McVety is owner of Lap of Love Veterinary Hospice and In-Home Euthanasia in Lutz, Florida.

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Oh, my aching back!

A request for a referral to a human chiropractor to treat two patients with sore spines leaves this veterinarian with a major headache.

Lisa Goodwin had two dachys that she absolutely adored. The dogs were inseparable and shared everything from pampered lifestyles to—you guessed it—bad backs. As is the case with many dachshunds, both dogs had several bouts with intervertebral disc pain.

Fortunately, the dogs were not severely afflicted and responded well to rest and conservative treatment. Their veterinarian, Dr. Higgins, recommended prescription medication in conjunction with holistic support, weight control and limited vigorous physical exercise.

Now the dogs were getting older and their owner wanted to explore additional therapies to ease their senile arthritis and back pain. Recently Ms. Goodwin had spoken to a friend who'd had excellent results when her dogs were treated by a chiropractor.

Ms. Goodwin put a call in to Dr. Higgins and told him that she wanted to take her dogs to her friend's chiropractor because her friend's dog was much improved after recent visits. In order to do this, she needed a letter for the chiropractor stating that her dogs did not have any conditions that would make chiropractic manipulation contraindicated. On the surface it seemed like a simple request. In reality this created a big dilemma for Dr. Higgins.

Dr. Higgins practiced in one of the scores of states that prohibits the practice of chiropractic medicine on animals by anyone who is not a licensed veterinarian. The chiropractic doctor that Ms. Goodwin chose for her two dogs practiced just across the river in a neighboring state. In this state the practice of animal chiropractic by a licensed human chiropractor was perfectly legal. Two different states, two different veterinary practice acts and a well-intentioned client.

Dr. Higgins called Ms. Goodwin and explained that in their home state human chiropractors were not allowed to treat dogs. He suggested putting her

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THE DILEMMA |

Marc Rosenberg, VMD

in touch with a veterinarian trained in animal chiropractic manipulation. He referred her to the website of the American Veterinary Chiropractic Association. Unfortunately the closest member veterinarian was 50 miles away from Ms. Goodwin's home.

Dr. Higgins was at a crossroads. As a licensed veterinarian in his state, a referral to a human chiropractor could be interpreted as a violation of state regulations. On the other hand, he had made an effort to locate a veterinary chiropractor for his client and none was available within a reasonable distance. Ms. Goodwin maintained her desire to have her dogs see a chiropractor and did not see an issue in using the services of the chiropractor in the neighboring state.

Dr. Higgins considered his patient's needs, his client's preference and his mandate to provide written prescriptions for drugs or referrals when requested. He provided the referral letter as required from the neighboring state chiropractor and asked Ms. Goodwin to see that he got copies of any treatments her dogs received.

Did Dr. Higgins make the right call in referring his patients to a nonveterinary professional for medical treatment, or should he have refused based on his state's practice act mandates?

Rosenberg's response

There is no doubt that Dr. Higgins wanted to assist his patients and satisfy his client. He certainly made an effort to direct Ms. Goodwin to a veterinary chiropractor in his home state. When all failed and faced with conflicting state mandates, he made a judgment call. I would have done the same thing. This being said, I know that just as many colleagues would agree as disagree with my decision.

Difficult decisions and conflicting regulations are part of a veterinarian's constant challenges. If these decisions are made in a well-intentioned, ethical manner, we have done our job. An old mentor once said to me, "You are trained to think, not react—that's why they pay us the big bucks." I would guess we all know which part of that statement is true. **dvm360**

Dr. Marc Rosenberg is director of the Voorhees Veterinary Center in Voorhees, New Jersey. Although many of the scenarios in "The Dilemma" are based on real-life events, the veterinary practices, doctors and employees described are fictional.

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[1] Heit, M.C., et al. Cardiovascular and respiratory safety of Alfaxan®CD RTU in cats premedicated with acepromazine, medetomidine, midazolam or butorphanol.in ACVIM.2004
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See brief summary on page 24

Starting salaries are up! (But let's not get too excited)

Rising demand should not lead to a call for more veterinarians. Here's why.

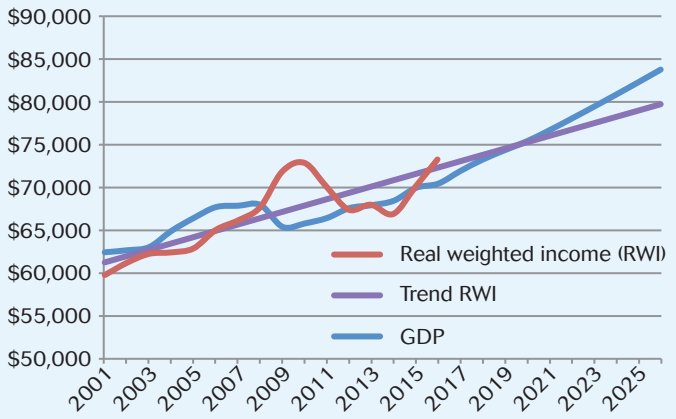
After a period of lower demand—and associated depressed salaries—for veterinarians, economic reports indicate an uptick in both, which might be a cause for optimism among new graduates.

After four years of decline, the mean starting salary for new graduates from the 28 U.S. veterinary colleges has risen sharply over the last two years, this year ending above the long-term trend. What's more, this increase has occurred with a record number of new graduates finding full-time employment before they graduate: In 2012, this number dipped to a low of 598; in 2016 it reached 1,446.

The significant growth of incomes and the number of new jobs in the past two years is evidence of the tightening job market for new veterinarians. Further evidence can be found in American Veterinary Medical Association (AVMA) data, which shows that the ratio of new applicants to available jobs declined to below 1 for the first time since the last recession began. Let's take a closer look.

TABLE 1

Starting salaries: Actual vs. trend and GDP



Source: AVMA Veterinary Economics Division

Trends in new graduate salaries

The simplest way to do a forecast is to determine the average increase over time and extend that increase into the future. Trend indicates, on average, what the annual increase in salary will be if all other factors remain constant. Another way to look at it is that the average annual increase captures the effect of all other factors that generally improve over time, such as population growth, general price levels (inflation) and the number of pets.

In Table 1, the actual real weighted income (starting salary—red line) of new graduates is plotted against trend (purple line); you'll note actual income falls both above and below the trend line. If the past 16 years are any indication, we can expect starting salaries to see periods where the actual income exceeds what's been predicted and periods where it's less than predicted. For the trend to continue, any rise in income above the trend must be offset with declines in income below the trend.

Let's consider the last two periods when actual starting salaries exceeded trend (2006 to 2011) and were less than trend (2012 to 2015). If you're paying attention, this should cause a bit of bewilderment—during the recession and shortly thereafter, increases in starting salaries were above the long-term average, but once the economy started its expansion, increases were less than the long-term average.

More consistent with economic theory, practices observed a decline in the demand for services as the economy contracted and an increase when it improved. We also know that the demand for veterinary services translates into a demand for veterinarians, and the greater the demand for veterinarians, the higher their price (income). Enter excess capacity, the indivisibility of labor and the adaptive (vs. rational) expectations of veterinary employers.

Excess capacity

Every veterinary practice has ebbs and flows in its rate of business growth. During the ebbs they have available but unused services (underemployment), and during the flows they may have employees working more hours than they wish (negative underemployment). For the last two years, the profession has, as a whole, experienced negative underemployment—more veterinarians who want to work less for lower compensation than who want to work more for higher compensation.

Such negative underemployment at the individual practice level, however, might not be sufficient to warrant hiring another veterinarian. And it is extremely difficult to hire a quarter or half of a veterinarian (the indivisibility of labor). But eventually the demand for services reaches a point where a practice can no longer meet it, and a new veterinarian is hired. Hence there is a delayed response in hiring to growth in the economy—first, because it takes some time for consumers to start spending on their pets again, and second, because veterinary employers wait until the demand for their services exceeds their ability to supply it.

Adaptive vs. rational

Rational expectations are created by considering all publicly available information and making decisions in anticipation of future events. Adaptive expectations lead to decisions in which the immediate future is expected to resemble the immediate past. Waiting to hire a new veterinarian until demand for services exceeds the ability to provide them is adaptive, while anticipating excessive demand based on market information is rational.

Knowing that the health of the general economy affects the demand for veterinary services—and, thus, veterinarians' income levels—we can use gross domestic product (GDP) to predict starting salaries (blue line in Table 1). Notice that starting salaries would have been expected to be above trend during the economic expansion (2001 to 2008), to be below trend during the recession (2008 to 2009) and to move back toward the trend during the current expansion.

But salaries did not move with GDP. The market was much more volatile (experiencing year-to-year changes) and took more than three years to react to the changes in GDP. The sharper increases and decreases in starting salaries (volatility) are partially the result of the three-year lag in response and are a sign of an inefficient (a slow-adapting) market caused by adaptive expectations that are typically the result of insufficient market information.

Based on the past, we can expect the market for veterinarians to continue to tighten and new graduate salaries to continue to rise sharply next year and in 2018. We should not, however, take this as a signal to increase the number of veterinarians in the market. The ebb in the economy is in sight, and, with it, we'll see a return to more excess capacity in practices and more underemployment for veterinarians. **dvm360**

Dr. Michael Dicks is director of the AVMA's Veterinary Economics Division.

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ADVANCES IN PET CANCER:

Innovation in research, scientific collaboration, therapy, and prevention

"Having worked in veterinary oncology for 30 years, the future looks brighter than ever before. There are advances being made in molecular diagnostics, genomics, and proteomics that give me such incredible hope that we'll be able to treat and eventually cure the majority of cancers that we see."

—Gerald Post, DVM, MEM, DACVIM (Oncology), Practice Owner, The Veterinary Cancer Center, Norwalk, CT

"Many pet owners have a perception that the advances happening in veterinary medicine arise from progress made in the human field. However, research in veterinary oncology is itself a tremendously productive area of activity that is increasingly well-received by, and relevant to, the human medical community."

—Rachael Thomas, PhD, Research Assistant Professor, Genomics, College of Veterinary Medicine, North Carolina State University, Raleigh, NC

It is a terrible fact that cancer is the #1 disease-related killer of dogs and cats. It cuts short the lives of beloved pets who are already too-short-lived in the opinion of their human companions. But scientists in both human medical and veterinary medical research laboratories around the country are working diligently to conquer the scourge of cancer and improve the quality of life of patients living with a cancer diagnosis. And the "C-word" is no longer necessarily a death sentence for pets. There are many new diagnostic and therapeutic advances being made that general practitioners should be aware of.

In the summer of 2016, a group of veterinary experts in oncology met to discuss the innovative research, new technology, medical advances, and important collaborations occurring in pet cancer diagnostics and treatment, with a focus on the benefits for general practitioners, their clients, and patients.

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ROUNDTABLE PANELISTS

For more biographical information on each of these experts, visit dvm360.com/OncologyRoundtablePanel

MODERATOR:

David J. Waters, DVM, PhD

Director, Center for Exceptional Longevity Studies, Gerald P. Murphy Cancer Foundation, West Lafayette, IN

PARTICIPANTS:

Kim Cronin,
DVM, DACVIM (Oncology)

Co-founder, Senior Medical Oncologist, and Medical Director of the New England Veterinary Oncology Group (NEVOG), Waltham, MA

Gerald Post,
DVM, MEM, DACVIM (Oncology)

Principal and Practice Owner, The Veterinary Cancer Center in Norwalk, CT; Co-founder of Innogenics, a specialty oncology reference laboratory

Rachael Thomas,
PhD, FRSB CBiol

Assistant Professor, Genomics, Department of Molecular Biomedical Sciences, College of Veterinary Medicine, North Carolina State University, Raleigh, NC

Jackie M. Wypij,
DVM, MS, DACVIM (Oncology)

Assistant Professor, Department of Veterinary Clinical Medicine, College of Veterinary Medicine, University of Illinois at Urbana-Champaign, Urbana, IL

Panelist photographs by Gary Hartman Photography

What recent advances in pet oncology have had the greatest impact on pets and clients?

Dr. Gerald Post: I'd say the increased use of diagnostics. The utility of diagnostics has exploded over the past 20 years, as more general practitioners and more specialty practices are available to veterinary clients. The increased number and accessibility of specialists is significant, from both a diagnostic and therapeutic standpoint.

Dr. Kim Cronin: I agree. A lot of the prices have started to come down, and it's in line with what our clients are now able to afford. The other exciting thing is that a number of companies have really stepped up to the plate, and they're now looking to commit significant resources and money to the field of veterinary oncology.

Dr. Jackie Wypij: Diagnostics and other tools are now in the hands of veterinarians with more training and more safety. So clients and pets benefit, which I think is wonderful.

Dr. David Waters: I think the other thing that feeds into this is the concept that the "C-word" is no longer equivalent to a death sentence. Therefore, clients are interested in pursuing diagnostics. Also, you have an increased accessibility to specialists and many more board-certified oncologists that can either do the work or consult with general practitioners.

Dr. Post: The two things I say most often in my job are, "Cancer is not a death sentence," and "Age is not a disease." As our clients see their friends and family members living longer with cancer, and even beating cancer, they believe maybe that's also true for their pets.

Dr. Rachael Thomas: And patients can still maintain a good quality of life during that period.

Dr. Wypij: That's where medications are changing, too. Instead of saying, "What drug can we give that's going to kill cancer cells?" we say, "Can we target the cancer and can we stimulate the body systems to help us?" That change is being driven by what we can use to regulate the process, not what we can use to kill this thing.

Dr. Cronin: That's where a lot of the molecular biology and genetics research comes in. We want to find out exactly what it is that has been dysregulated so that we can figure out how we can change it or re-regulate it so that it's no longer an uncontrolled process.

What new pet cancer research is on the horizon? How will that change the landscape for veterinarians and their clients?

Dr. Post: Immuno-oncology and genomics are the two big advancements in veterinary oncology on the horizon. Checkpoint inhibitors have revolutionized some human cancer treatments and are being actively developed for veterinary use. Certainly genomics—whether it be sequencing of tumors or gene expression analysis—are here and being used in veterinary medicine.

Dr. Thomas: The ongoing refinement of canine and feline genomic sequence assemblies enables the veterinary community to move toward new diagnostic and prognostic tools that are incredibly sensitive but also incredibly rapid. Because of that, we can provide clinicians and pet owners with prompt feedback that allows them to assess the collective impact of a series of integrated tests, all within a relatively short period of time. The ability to use genomics as a mechanism for early detection is tremendously powerful, and becoming more so.

Dr. Waters: So the idea behind genomics, the rationale perhaps, is driven by heterogeneity. Heterogeneity is the hallmark of cancer. We need to move beyond the more primitive idea of organ-based classification of tumors to molecular signature. Genomics is the way to look inside the tumor and ask, "What is this particular patient's tumor?" It is consistent with the whole idea of personalized medicine. I think that's where things are moving. We're only going to be as good as our categories. Today, we say breast cancer, osteosarcoma, or whatever, instead of saying, "Here is this tumor's molecular signature. Here are the potential targets for this particular patient's tumor." The genomics will bring us the information so that we can grow increasingly sophisticated categories. Back in the day, leukemia was one disease; now, we see it as 15 different diseases.

Dr. Cronin: In the past, lymphoma was treated as one disease in dogs. Now with some of the diagnostics being so accessible, like flow cytometry and PARR (PCR for antigen receptor rearrangements), we know that golden retrievers have their own unique form of T-cell lymphoma that has a very different prognosis. I think that we need to look at other cancers in a similar fashion, which will allow us to tailor treatment to the patient and give owners more accurate information about the prognosis. The other thing is that the focus of research now is turning away from chemotherapy. Things like immunotherapy and small molecule inhibitors are now giving you different therapeutic options that may be more effective and have fewer side effects.

Dr. Wypij: Another huge advancement is collaboration. It's no longer individual researchers working on their project. Now we have projects such as the Comparative Oncology Trials Consortium (COTC) that utilizes the combined resources of multiple institutions. (See **ccrod.cancer.gov/confluence/display/CCRCOPWeb/Home** for more information.) Because of that, a COTC trial for rapamycin in osteosarcoma included 160 dogs.[1] For veterinary oncology, that's a huge number. It will be exciting to see more and more of those collaborations develop between industry and academia and potentially expanded to include the expansive caseloads of private practices as well.

> "The ability to use genomics as a method for early detection is incredibly powerful and becoming more so."
>
> Dr. Rachael Thomas

Dr. Waters: To achieve better cancer control, we should be looking beyond better cancer treatment and diagnostics to the idea of cancer prevention. We're pretty primitive in our thinking about this, I believe. A key question arises: Should the prime goal of cancer control research be the avoidance of cancer development or the avoidance of cancer mortality? I believe the second goal is a much more realistic one to achieve. And if we set this as our goal, we will need to take creative steps to confront the difficulty of finding cancer-resistant populations for study. In veterinary medicine, the ongoing investigation of highly successful aging in Rottweilers is directly addressing this challenge—studying in detail those individuals within a cancer-prone breed who are resistant to cancer mortality.[2,3]

Dr. Post: Yes. What better way to find information about either cancer resistance or susceptibility than to study dogs, where you can get an answer in 10 to 20 years, when it would take 50 to 100 years, or longer, to get the same answer in people. Also, with dogs, you can study their environment and what they eat to a much greater extent. I believe what's missing is a more extensive collection of baseline epidemiologic data. For the most part, we don't know what the risks are of, say, an average golden retriever getting T-cell or B-cell lymphoma. The Golden Retriever Lifetime Study by the Morris Animal Foundation intends to answer at least some of these questions. (For more information, see the sidebar "Pet Cancer Resources—Learn More" on p. 5 or visit **caninelifetimehealth.org**)

Dr. Cronin: The other hard part is that your susceptibility to cancer is not only from your genetics, but also from your environment, your diet, your exercise, and general lifestyle. There are so many complex interactions; it's really hard to tease out one specific thing and say it is a cause, even when it comes to diet.

> "Here we have an opportunity to better understand the role our nutitional choices play in either increasing or decreasing the risk of cancer."
>
> Dr. Gerald Post

Dr. Thomas: We participated in a study looking at risk factors for lymphoma and hemangiosarcoma in golden retrievers.[4] There were some powerful genomic risk factors in both, but equally there was disease that could not be predicted on the basis of heritable genomic signatures alone. What's also evident from this kind of approach is that when you apply potential risk factors to populations outside the geographic area that you studied, you can start to see some differences. Looking at U.S. versus European pet populations, for example, you can identify confounding cultural factors from how people interact with their pets, how pets are housed, trends in their diet, as well as their level of exercise, and spay/neuter status—all of which can vary based on geography.

Dr. Wypij: Unfortunately, we often don't have information about the pet's lifestyle because so many of our patients are rescued. Advancement would also require improved communication and the ability to transfer the animal's life history and medical history along with them. Sure, I can tell what they're eating right now, but I've only known them for six months.

Dr. Post: But most people own their pets from puppyhood. If there was a way for owners to input answers to questions on their smartphones every six months or so, which would then be portable, no matter where they went, and accessible by every veterinarian, the amount of information we could gather would be huge. It's a challenge, but I think the solution to the problem is technologically available.

Dr. Thomas: The enthusiasm with which the typical pet owner just gives you whatever information you ask for in these kinds of studies is incredible. We have this amazing community of people who are so willing to impart information. It is the responsibility of veterinary researchers to establish what information should be prioritized and come up with some well-powered, well-designed studies and questions that will predict the factors that we're not even currently thinking about, but that we do need to think about further down the line.

What role does nutrition play in lowering the risk of cancer in dogs and cats?

Dr. Post: I think nutrition plays a major role in affecting our risk of cancer. The problem is: How do we prove that? Again, the dog is a fantastic model to answer that question, if we believe that nutrition plays a key role. Here we have an opportunity to better understand the role that our nutritional choices play in either increasing or decreasing the risk of cancer.

Dr. Cronin: I do think of nutrition as being very important—not only what dogs should eat before they get cancer, but what they should eat after they get cancer. That is the #1 question we are asked by our clients: Should I change their diet? What should I feed them? There's not a lot out there about it. I think diet is an area where there's a huge opportunity for research, and it's what our clients want to know.

Dr. Wypij: In a recent Canadian study,[5] about 25% of clients had changed their pet's diet related to a diagnosis of cancer, somewhat in response to veterinarian input, but nearly 60% cited the Internet as one of their most valuable resources. Communication and collaboration between nutritionists, commercial pet food companies, and clinicians could provide more scientific information to help clients make the best choices.

Dr. Cronin: Many of our clients will spend any amount of money for their pets, and they're willing to spend money on diet. But to tell them what the ideal diet is, I don't think that we know that. Clients want to participate in their pet's treatment, and one way that they look to do this is through home-cooked diets. However, if you look at the research that's out there, many of those diets are not balanced or, if they're balanced in the beginning, they tend to drift away from what the original recipe was. So, clients who mean to do well are probably doing the wrong things for our patients because the information is not out there.

Dr. Waters: An important idea is U-shaped thinking. More is not necessarily better. We should seek the optimal middle. The prevailing notion, that the best food has

the highest antioxidant or the highest whatever, sets up the opportunity to do harm. We have clients who want to optimize health through nutrition but are at risk for inadvertently supplementing their dogs out of the ideal optimal middle.

Dr. Post: I believe pet owners are becoming increasingly aware that a maximum or high dose doesn't equate to an optimal dose. I think the perception about the organic and whole foods movement is helping to change the way people view where their nutrients are coming from. But we're still a long way from correlating diet and cancer. There's even limited evidence in people. What a wonderful opportunity for both human and veterinary nutritionists to study cancer risk as it relates to diet by following groups of pets and changing certain parameters.

Dr. Cronin: It's an educational process not only for veterinarians but also for pet owners. As a society, sometimes we try to fix things with pills. If you can fix it with a pill, you don't look at the whole nutrition picture. You can just take a multivitamin, add a supplement, and that's going to fix what's wrong with your basic diet. I think that we have learned that it is not that simple and that there is a complex set of interactions when it comes to nutrition and supplements.

Dr. Thomas: It seems like the average owner is becoming much more of an expert at reading labels. But there's always still this fear of seeing an ingredient that they can't pronounce. It's a real tradeoff behind making a diet seem appealing to the owner who is going to buy it, but also making sure that it's optimally healthy for the dog or cat that's going to eat it.

Dr. Cronin: Food is happiness, and when pets don't eat, owners feel as though either they're failing their pet or they're making the wrong decisions. It comes down to this: You could have the best diet in the entire world, but if your patient won't eat it, then it really doesn't matter what's in it.

PET CANCER RESOURCES – LEARN MORE

Golden Retriever Lifetime Study

The Morris Animal Foundation's Golden Retriever Lifetime Study is the largest and longest observational study ever undertaken in the U.S. to improve the health of dogs.

The study is dedicated to helping better understand and explain why diseases, including cancer, develop and provide clues about how diet, exercise, environment, and genetics may impact lifelong health and well-being.

The study, launched in 2012 and fully enrolled in 2015, follows more than 3,000 golden retrievers throughout their lives. At annual visits, study veterinarians take blood, nail clippings, fur, and other samples and also complete a veterinary questionnaire for the canine participants. Collected data are evaluated continually by veterinary epidemiologists.

The study is supported by ongoing fundraising efforts and sponsors including The Blue Buffalo Foundation. To learn more, visit **caninelifetimehealth.org**

Pet Cancer Awareness Program

Blue Buffalo Company created the Blue Buffalo Foundation and the Pet Cancer Awareness Program (PCA) in 2003 to raise awareness, provide information, and help find a cure for cancer.

Cancer is the #1 disease-related killer of dogs and cats. By generating greater awareness of the early warning signs, the Foundation is helping clients take the first steps toward protecting their beloved pets.

Information is critical. The more veterinary clients know about how to reduce the cancer risk to their pets, and what to do if their dog or cat develops cancer, the more they are empowered to help.

Research is expensive. PCA helps fund universities and clinics that study the causes, prevention, and treatment of canine and feline cancer. The Foundation also raises funds to support organizations that help needy families cover costly pet cancer treatments they otherwise couldn't afford. With the help of Petco, the Blue Buffalo Foundation and the Petco Foundation have become the leading contributors to pet cancer research. To learn more, visit **petcancerawareness.org**

Blue Buffalo Veterinary Clinical Trials Office

The Clinical Trials Office (CTO) at The Ohio State University College of Veterinary Medicine was established in 2007 and now oversees more than 35 clinical trials each year. These studies have resulted in the development of new treatments for cancer (lymphoma, nasal cancer), heart disease, and arthritis.

In May 2016, Blue Buffalo Company announced it will award a $6 million gift to support the growth of the CTO, a program that facilitates studies to improve patient care and advance medical knowledge for both animals and people.

Veterinarians and veterinary technicians in the CTO work closely with faculty, staff, residents, and interns at the Veterinary Medical Center, as well as with participating clinics to oversee clinical trials and ensure the highest standard of patient care. To learn more, visit **vet.osu.edu/vmc/cto**

Dr. Post: I think people would be much more likely to try to fix their pet's diet with a complex fix, changing the whole diet rather than adding a pill. If you ask people to change what they eat, you're going to encounter huge resistance. But if you tell pet owners, "Hey, you need to feed your pet differently. It's going to increase your pet's overall health," they're much more likely to do that than to change their own diet.

But how does that supplement change for an animal that is fed a specific diet or on a particular nutritional plan? I don't know that we know that. So, it is hard to know whether we should or should not recommend supplements because we only know about them in a very limited context. We can probably say that about a lot of things.

> "You could have the best diet in the entire world, but if your patient won't eat it, then it really doesn't matter what's in it."
>
> Dr. Kim Cronin

Dr. Waters: I believe there is still a lot of work to do before making definitive statements about nutrition and lowering cancer risk in dogs. Perhaps we can learn from the frustrations experienced by investigators studying diet and human cancer risk. For example, there has been a lot of information generated on gene-diet interactions in human colorectal cancer. But neither studies of genes involved in key nutrient metabolic pathways, nor studies of colorectal cancer risk loci, have been replicated by unbiased, genome-wide studies of gene-diet interaction.[6]

Dr. Wypij: In dogs, I think making correlations between genes and nutrition will require studies such as the Golden Retriever Lifetime Study, where you have the genetic information about the animals with the ability to serially and prospectively collect information and map their environment.

Dr. Waters: My bias is that it's going to be more about the dietary pattern than individual nutrients. The dietary pattern provides the context in which you're asking a particular nutrient to have some sort of effect. It gets back to context.

What supplements or ancillary treatments are you recommending in addition to traditional chemotherapy, radiation, and surgical treatment?

Dr. Post: Certainly veterinarians are using polysaccharopeptides with increasing frequency. In addition to the traditional cytotoxic chemotherapy, radiation, and surgical treatments, our practice has used targeted chemotherapy, metronomic chemotherapy, antiangiogenic therapy, and therapy to modulate the immune response.

Dr. Waters: But are you using any supplements or ancillary treatments that would be intended to either lower the toxicity of or enhance the efficacy of the conventional therapies?

Dr. Wypij: There is evidence in human patients. For example, there are systematic reviews showing that antioxidants actually improve quality of life and reduce the side effects from chemotherapy. There really is minimal evidence that antioxidants would hurt the effects of chemotherapy; there are very few chemotherapy agents with anti-cancer activity via free radical production.

Dr. Post: I routinely use antiemetic medications prophylactically, rather than waiting to use them in a vomiting patient.

Dr. Cronin: A lot of our clients prefer that option too. It's all about preventing things, rather than treating them once they develop. It used to be we'd instruct clients to call us if they noted any side effects. Now, we are more proactive and give them medications to go home with, in case they need them.

Dr. Wypij: One supplement we routinely recommend for hemiogiosarcoma is the herbal formula Yunnan Baiyao. Anecdotally, I've been very pleased with how well dogs did while taking the supplement. There are some in vitro studies as well that it has some potential antineoplastic effects against the tumor cells.[7]

Dr. Cronin: Turkey tail mushrooms (I'm-Yunity®) and Yunnan Baiyao are two supplements that I will routinely recommend for some of my patients. When it comes to alternative and complementary medicine, we may not have published data or a comfort level, but that does not mean that there is a lack of benefit. We want the scientific proof, because as scientists we are trained to think like that. But in some cases there is not that proof. Acupuncture, for example, can improve quality of life, even though it may not impact the cancer. So it speaks to

the philosophy of looking at the individual as a whole, and not just at the disease process.

Dr. Waters: It's whole organism thinking.

As you think about oncology research, what new studies need to be done to care for pets with cancer?

Dr. Wypij: There's a lot of information especially coming out of Europe about which breeds develop which cancers. We have so much data in the The Veterinary Medical Databases (See **vmdb.org**). What oncologists see may not be representative of what general practitioners see, but we generally do hit the "big" cancers in our research (for example, osteosarcoma, lymphoma, and mast cell tumors). However, there are certain cancers that we see all the time, such as multiple myeloma and thyroid carcinoma, for which few people are researching new treatment options.

Dr. Cronin: You may not be able to research a cancer in a mixed-breed population, though, unless you understand the genomics of the cancer. When looking at specific breeds, it may be easier to determine what the genetic abnormalities are, and then we can build on that information for mixed-breed dogs. We're no longer looking at cancers in organ systems but rather as a molecular signature. For example, if a golden retriever has a form of lymphoma with a specific molecular signature, you can look at what type of treatment is best for that particular patient as an individual, not just as a golden retriever with lymphoma.

Dr. Post: I think it's important that we also appreciate that practitioners see a lot of mixed-breed dogs. Not everybody sees purebred dogs.

Dr. Waters: Right. There will always be the challenge of smartly translating the study results in a particular breed to another breed. Research generates clues, not much proof. The question is how can we get the best glimpses of Nature, the best clues to biology, so that we can make the best predictions.

Dr. Thomas: We need to keep in mind that the clinical presentation of the cancer may appear the same in multiple individuals, but the path by which an individual developed that disease can be quite different.

Dr. Cronin: Researching breed-specific disease allows you to start somewhere, because you know that their genetics are going to be similar, so you can pick out some of those things. And then you can look at it in mixed-breed dogs.

Dr. Thomas: The typical lifespan of different breeds is also something we have to consider when comparing the genetics of cancer cases and healthy individuals, since the age that defines a healthy senior in one breed can be very different in another.

> "In dogs, I think making correlations between genes and nutrition will require studies such as the Golden Retriever Lifetime Study."
>
> Dr. Jackie Wypij

Dr. Post: We did a short survey about why people did or didn't treat their pets for cancer, and the biggest factor was the age of the pet at the time of diagnosis. As I mentioned earlier, age isn't a disease; that's a really common misconception. Nevertheless, the cutoff age seemed to be 10 years. Owners say, "If my dog's over 10, I'm not going to treat her cancer because she's too old." My clinical experience doesn't support this reasoning. Some of the best-responding patients we see in terms of no toxicity are the older patients.

Dr. Waters: Yes, and there's some evidence that the biological behavior of tumors that develop in older hosts is less aggressive.

Dr. Post: Words are important. When I talk to clients about chemotherapy or radiation therapy, I make a point of saying it's not something we do *to* the dog or cat. It is something we do *for* them. That's a big difference. Most therapies we use are designed to improve the pet's quality of life as well as treat the disease, because most of the morbidity is disease-related, not treatment-related.

Dr. Cronin: The American College of Veterinary Internal Medicine now has an initiative to teach pet owners so that they understand what a specialist is and how a specialist works with their veterinarian, that it's really a partnership that allows for better care.

How would you describe the current state of collaboration in human and animal health when it comes to cancer diagnostics and treatment?

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Dr. Post: It's just starting but expanding rapidly. There is the Animal Cancer Foundation, and most of the people at this table have believed in the power of the Comparative Oncology Program for years. It's heartening and wonderful to see that. I would say it is taking hold. I would point to the meeting last year at the Institute of Medicine (IOM) where researchers talked at a national level about how pets with cancer can be used in translational research.

> "A key question arises: Should the prime goal of cancer control research be the avoidance of cancer development or the avoidance of cancer mortality?"
>
> Dr. David Waters

Dr. Cronin: If you look in the major human oncology journals or go online, there are so many more articles now that are talking about the importance of a comparative model, and this has been beneficial for veterinary medicine. We get funding, when we normally wouldn't get funding. We have access to treatments earlier. So it's really a mutual benefit. Before, the idea of a comparative model was limited to the veterinary journals; now you see it in the human medical journals, which is exciting.

Dr. Thomas: It's no longer just about seeing animal disease as a model, for human medicine, but also about evaluating the disease for the broader value of understanding the underlying biological mechanisms. This may have a more general application to a whole range of different cancers and other diseases in multiple species. I think the openness of the more prominent journals to publish veterinary-based research articles has expanded tremendously.

Dr. Waters: But there's still trailblazing to do. When I look at the One Health initiative, it would seem like there should be a lot of momentum behind comparative oncology. My sense is that there's a lot more emphasis on zoonotic and transmissible diseases, rather than on oncology. I wonder what could be done to try to reshape this emphasis. One of the things that has been holding us back in terms of this human/animal health collaboration when it comes to oncology is that once drug companies get an Investigational New Drug (IND) application, they're worried that treatment of pet dogs might reveal something about toxicity or something unexpected that could derail human studies. As a very positive signal for comparative oncology, a recent paper has successfully addressed many of these concerns.[8]

SUMMARY

The specialty of oncology in veterinary medicine has come a long way in the past couple of decades. Owners and their pets are already benefiting from new and more affordable diagnostic technology and therapeutic options and the increase in access to board-certified cancer specialists. With the ongoing long-term canine studies and the rapidly growing human/veterinary research collaboration, the veterinary profession should expect even further advances, which will one day make it possible to make evidence-based recommendations about environmental factors, including nutrition, so that veterinarians and clients, together, can significantly reduce cancer mortality in pets.

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MEDICINE | Dentistry

The ABCs of veterinary dentistry: **"F" is for furcation disease**

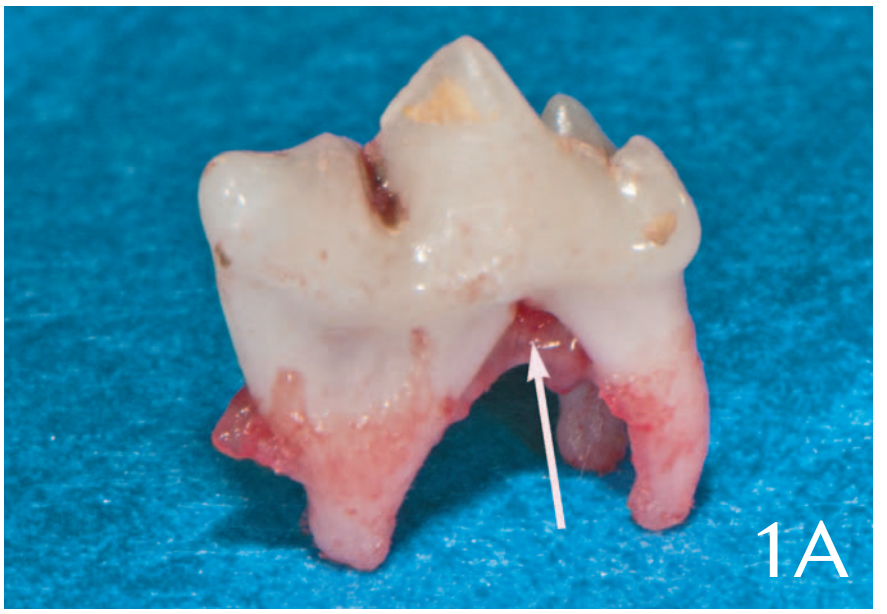
A buildup of calculus and plaque in this area can make a tooth prone to attachment loss, causing serious, painful disease if not caught early. *By Jan Bellows, DVM, DAVDC, DABVP, FAVD*

The furcation is a normal anatomical region where the roots begin to diverge in a multirooted tooth. Normally, this area is sealed from the oral environment by the periodontium (gingiva, periodontal ligament, alveolar bone, cementum). But accumulation of plaque and calculus buccally often results in periodontal inflammation and infection, and extension of periodontal disease between the tooth roots directly exposes the furcation to the oral environment. This results in attachment loss that allows food and debris to lodge in the space (Figure 1A).

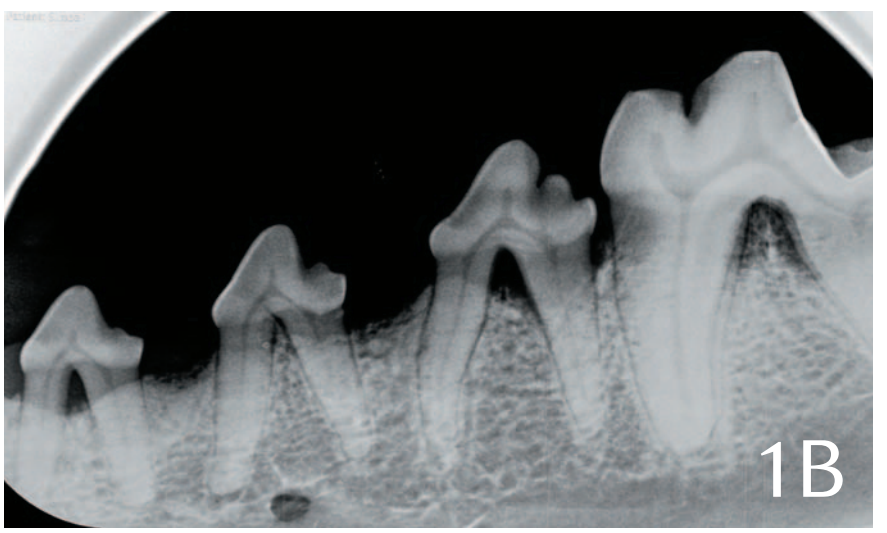
Intraoral radiographs are helpful in diagnosing furcation invasion. Radiolucency in the furcation suggests furcation disease. The slightest radiographic change in the furcation should be investigated clinically. Interradicular (between the roots) bone loss is usually greater than it appears in the radiograph (Figure 1B).

The most common cause of furcation disease is extension of periodontal infection, resulting in interradicular bone resorption and formation of a progressive defect (Figures 2A-2C, see next page).

Congenital enamel infolding defects can also lead to furcation and endodontic disease. The resulting irregular furcation tooth surfaces do not allow for complete attachment of the periodontal ligament in the area. Additionally, in some of these congenital defect cases, the infolded enamel allows oral bacteria to enter the exposed root canal, leading to pulpal necrosis evidenced by periapical lucency on radiographs. When present, root canal therapy or extraction is indicated (Figures 3A-3D, see next page).



>>> Figure 1A. The furcation (arrow) of a dog's maxillary fourth premolar. Note the line of decreased periodontal ligament attachment secondary to periodontal disease.



>>> Figure 1B. A radiograph of the left mandible revealing furcation disease affecting the second and fourth premolars and the first molar.

Furcation disease is classified into three stages:

> Furcation involvement stage 1 (F1) is diagnosed when a periodontal probe extends less than halfway under the crown in any direction of

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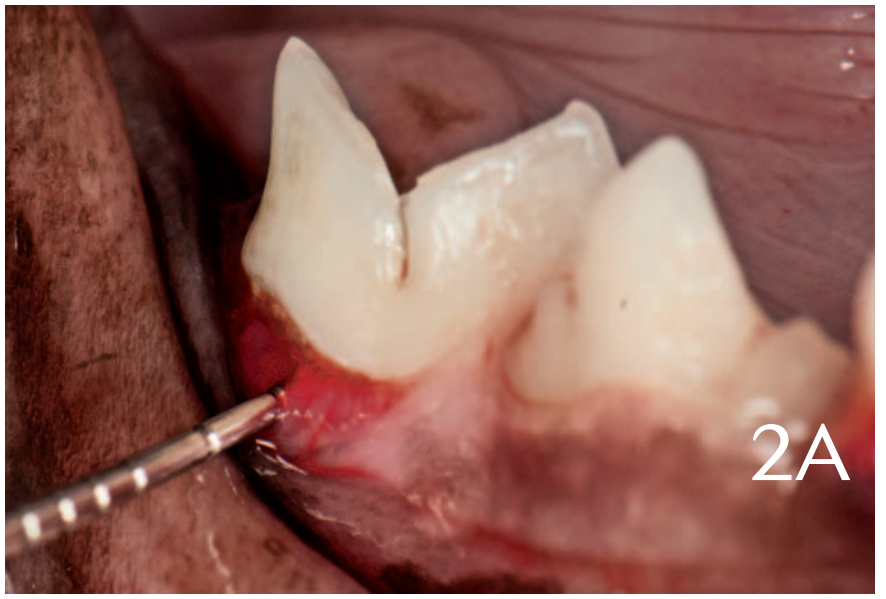
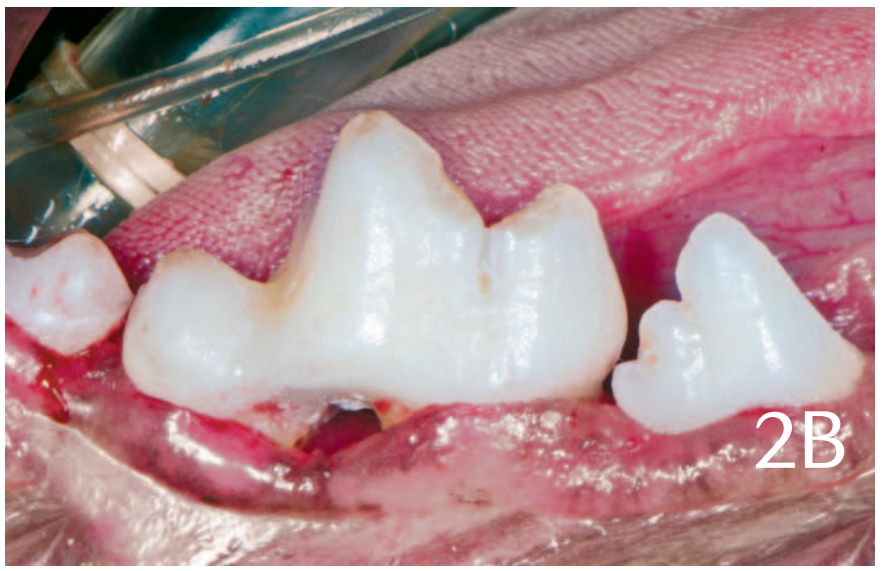
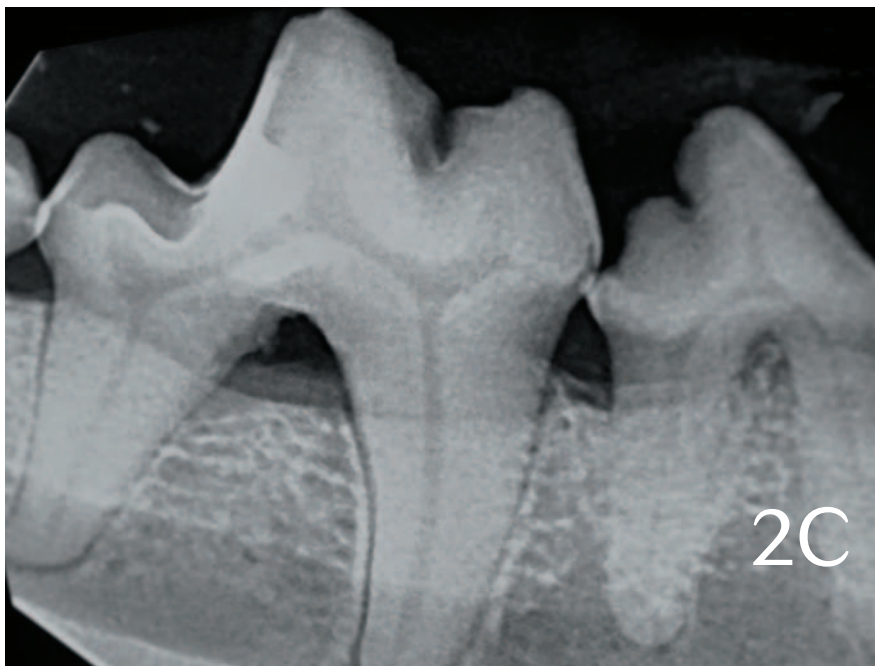


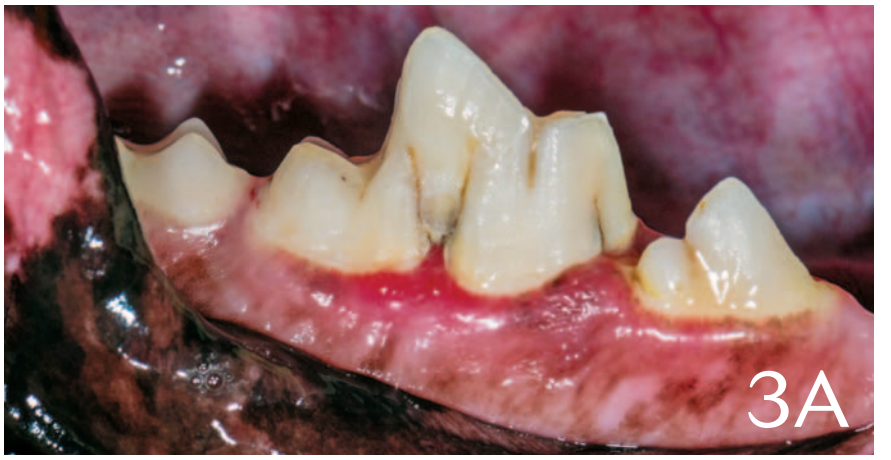
>>> Figure 2A. Advanced periodontal disease resulting in furcation exposure in a cat's right mandibular first molar.



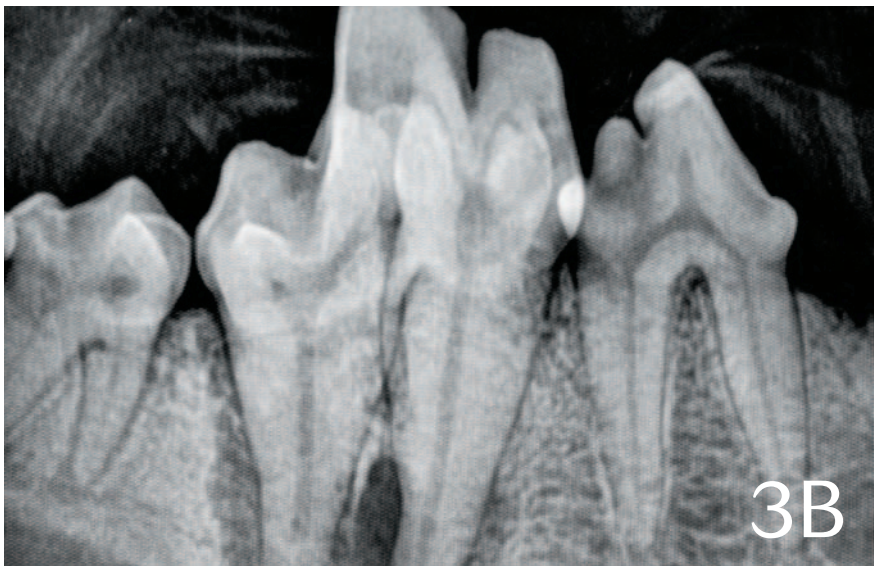
>>> Figure 2B. A through-and-through furcation exposure in a dog's right first molar.



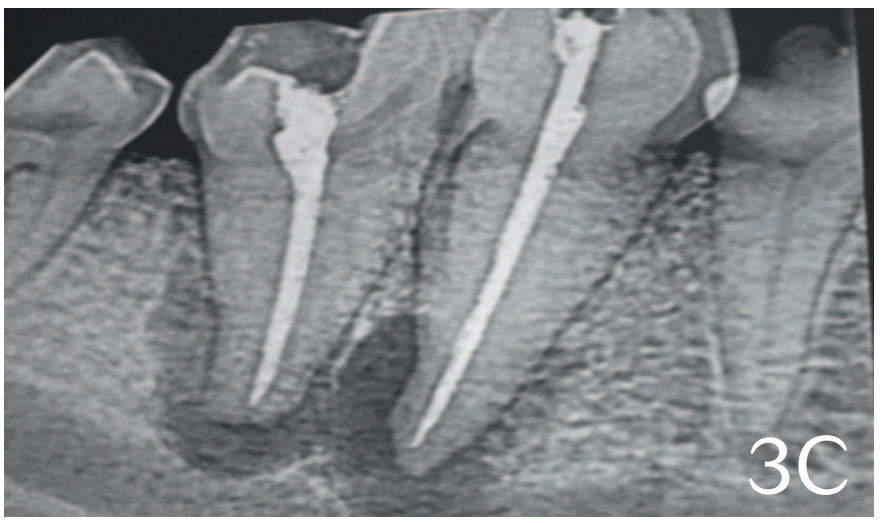
>>> Figure 2C. A radiograph of the dog in Figure 2B confirming the furcation.



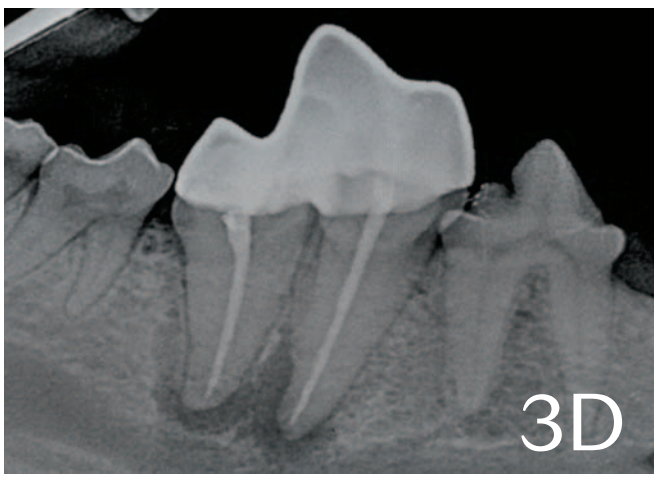
>>> Figure 3A. A congenital infolding enamel defect on the buccal surface of the right mandibular first molar.



>>> Figure 3B. A radiograph confirming the defect and periapical lucency consistent with pulpal necrosis.



>>> Figure 3C. A radiograph obtained after root canal therapy was used to correct the defect.



>>> Figure 3D. A follow-up radiograph four months after treatment revealing decreased periapical lucency consistent with resolving disease.

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89%

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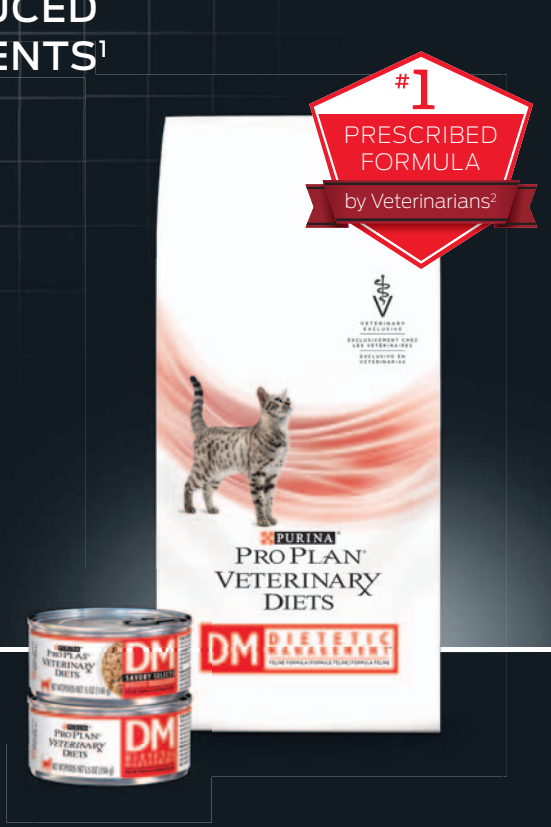

Purina® Pro Plan® Veterinary Diets DM Dietetic Management® loaf revolutionized the world of feline diabetes by introducing a high protein/low carbohydrate approach to promoting glucose control, which may help reduce the insulin requirements for diabetic cats.[1] That's why they're the #1 veterinarian prescribed formulas for the nutritional management of cats with diabetes.[2] And with multiple varieties to choose from, your patients can find their #1 diet, too.

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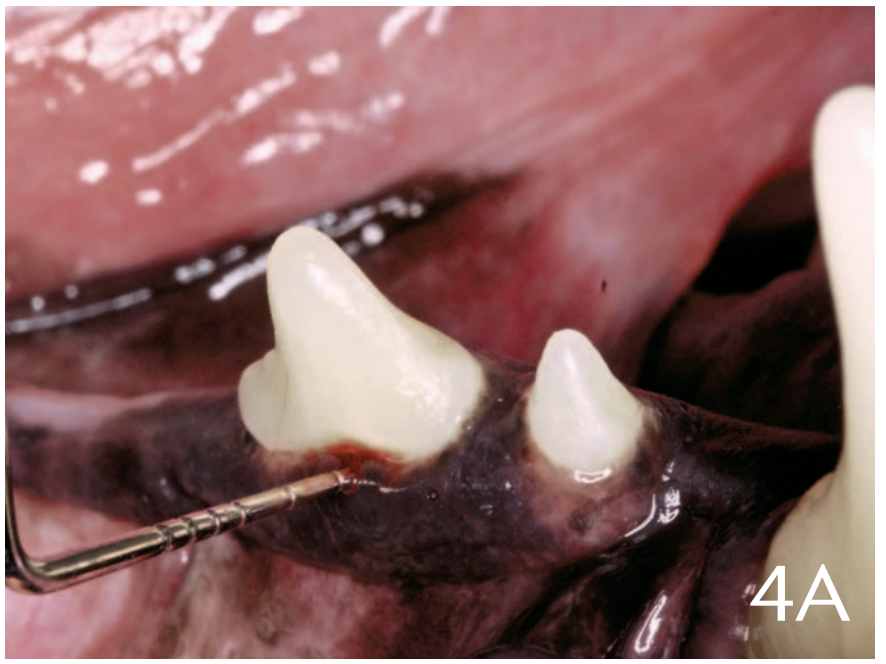
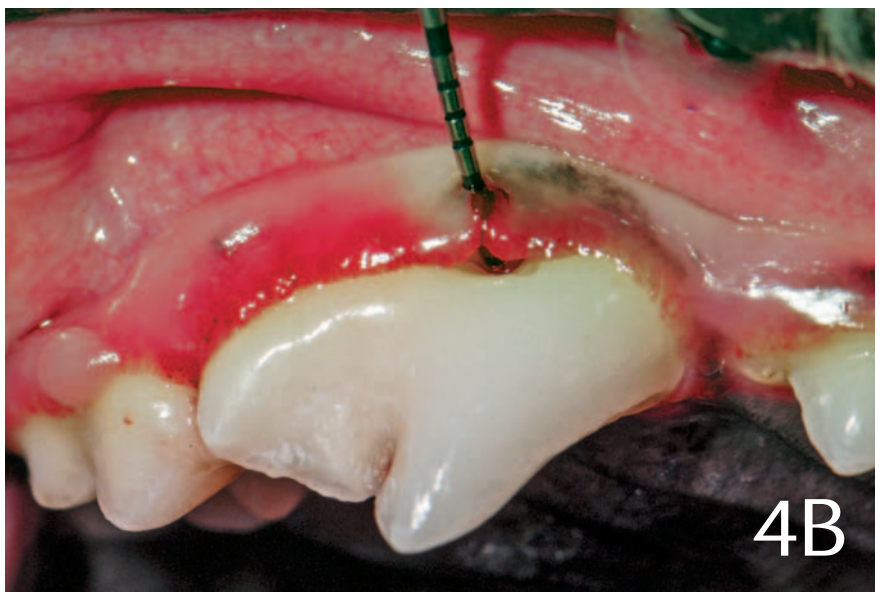
[1] Frank et al. "Use of a high-protein diet in the management of feline diabetes mellitus." Veterinary Therapeutics, Vol. 2, No. 3, Summer 2001. 238-246.

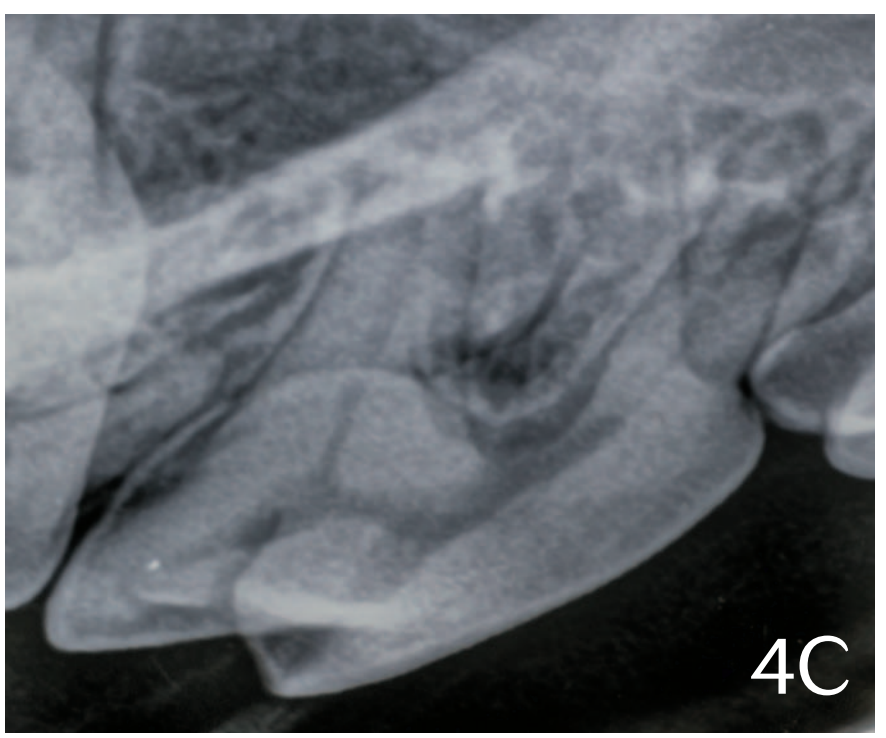
[2] Based on dollar and unit sales of Purina® Pro Plan® Veterinary Diets DM Dietetic Management formulas as a percentage of total diabetes therapeutic diet sales as reported by GfK Retail and Technology US LLC, Vet Panel Market Database, 52 w/e 8/13/16.



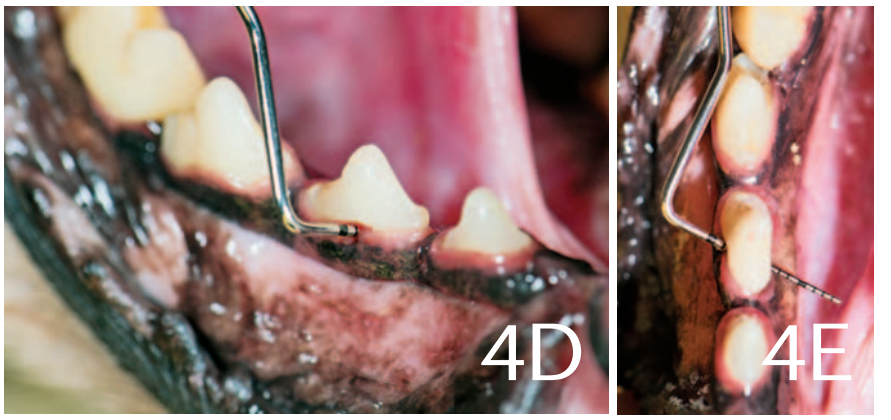
>>> Figure 4A. A periodontal probe extending 3 mm into the right mandibular second premolar furcation.



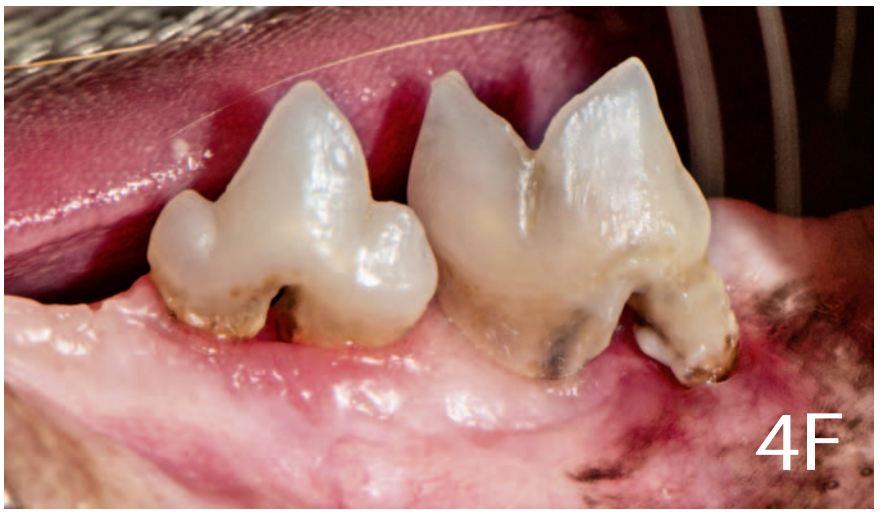
>>> Figure 4B. A periodontal probe extending more than half way into the furcation buccally but not exiting palatally.



>>> Figure 4C. A radiograph revealing minimal lucency in the furcation area.



>>> Figure 4D and 4E. A periodontal probe extending into furcation of the right mandibular third premolar through and through.



>>> Figure 4F. Furcation exposures in the left mandibular fourth premolar and first molar in a cat.

a multirooted tooth with attachment loss. A portion of alveolar bone and periodontal ligament is intact at the furcation (Figure 4A).

Treatment of F1 involvement includes thorough dental scaling using a curette as well as ultrasonic cleaning, root planing, polishing and irrigation. Twice-daily plaque control using a toothbrush, dental wipes, cotton-tipped applicators and Veterinary Oral Health Council (VOHC)-accepted products help decrease the rate of periodontal disease progression in the furcation.

> Furcation involvement stage 2 (F2) exists when a periodontal probe extends more than halfway under the crown of a multirooted tooth with attachment loss but does not exit on the other side (is not through-and-through). The undermined furcation is occluded by gingiva or bone on one side. The lesion is essentially a cul-de-sac (Figures 4B and 4C).

Treatment is similar to F1 involvement with the addition of root planing and consideration of guided tissue generation using bone graft and a physical barrier to prevent epithelial migration into the furcation area. This intervention allows bone migration, differentiation and maturation in the area.

> Furcation exposure stage 3 (F3) exists when a periodontal probe extends under the crown of a multirooted tooth, through-and-through from one side of the furcation to the other. The periodontium is destroyed to such a degree that the furcation is open and exposed. An explorer can easily pass from side to side (Figures 4D-4F).

Extraction is the treatment of choice, although advanced mucogingival surgery can be performed with a guarded prognosis.

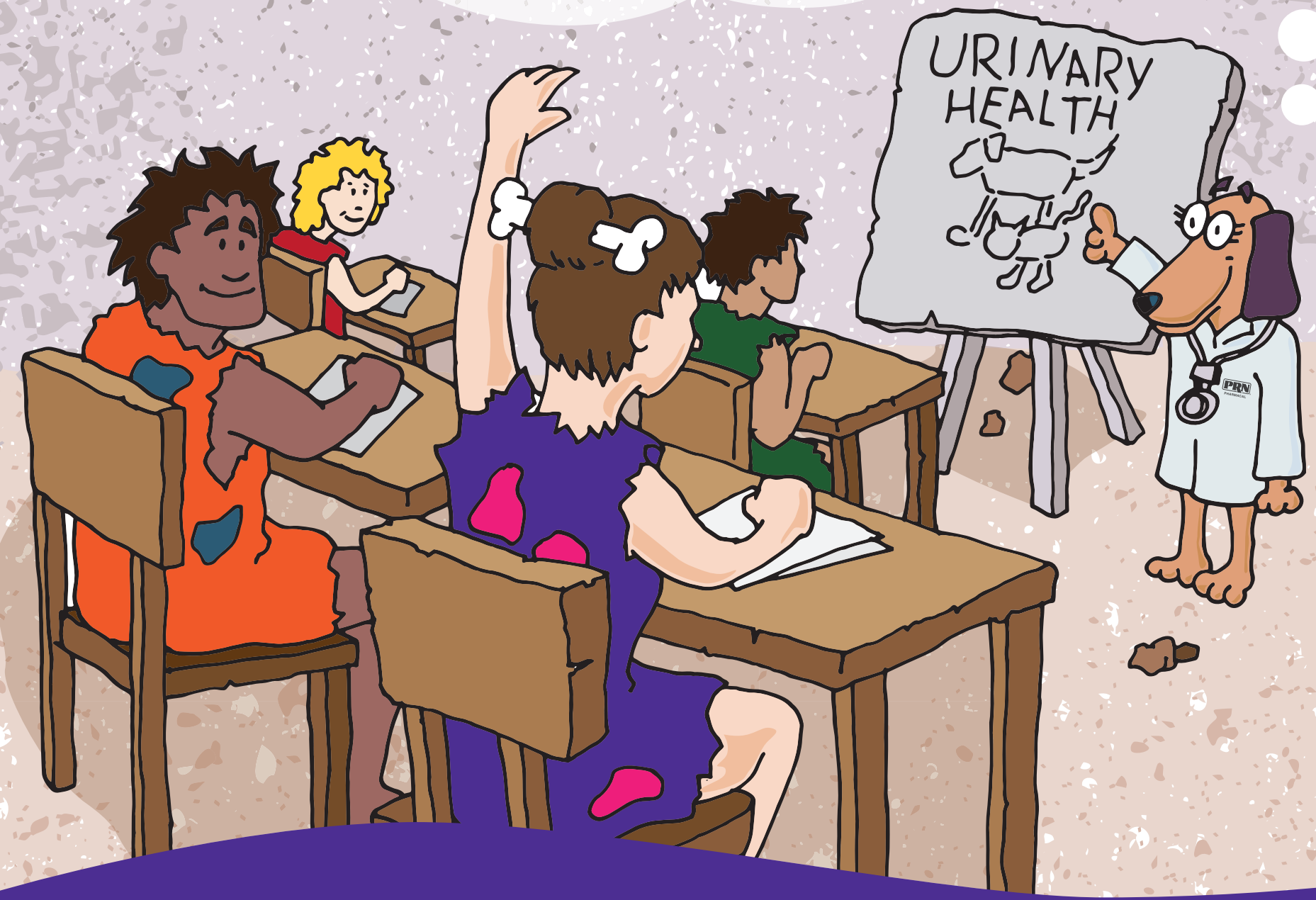
A thorough exam = early detection

Remember, all of your canine and feline veterinary patients need to have a complete examination while anesthetized to best clean and evaluate dentition. Furcation disease is often silent and can be treated when found early to decrease the rate of progression and discomfort. **dvm360**

Dr. Jan Bellows owns All Pets Dental in Weston, Florida. He is a diplomate of the American Veterinary Dental College and the American Board of Veterinary Practitioners. He can be reached at (954) 349-5800; email: dentalvet@aol.com.

PUDDLES THE CAVE DOG VETERINARIAN SAYS:

BE AS SMART AS ME WHEN IT COMES TO PEE!



PUDDLES LEARNED THE FACTS ABOUT URINARY HEALTH - NOW YOU CAN, TOO.

Puddles knows how important urinary health is — she used to have a problem with inappropriate pee. Her very smart veterinarian diagnosed and treated the medical condition that caused it, and Puddles was so excited that she went to veterinary school. Now Dr. Puddles and her friends at PRN are pleased to offer free urinary health classes online. All courses are accredited by RACE and eligible for CEU credits.

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Cats with joint pain, rejoice!

Recent study findings suggest NV-02, a feline anti-nerve growth factor antibody, could be used as a safe, long-term analgesic in cats with pain related to degenerative joint disease. *By Michael Nappier, DVM, DABVP*

Many adult and geriatric cats have evidence and clinical signs of degenerative joint disease (DJD). Unfortunately, long-term pain relief for feline patients has always been problematic as no drugs have been approved for long-term pain control in cats. Long-term use of meloxicam is approved in Europe but is strongly discouraged in the U.S. due to concerns about renal damage.

Neutralizing antibodies against nerve growth factor (NGF) have been proven to provide long-term analgesia in both humans and rodents. A newly developed feline anti-NGF antibody, NV-02, was recently examined to determine its efficacy in treating DJD-associated pain and mobility impairment in felines. The study was also designed to determine how long the analgesia would last.

Study overview

The authors recruited 36 cats for the study who had owner-reported mobility impairment, pain noted in at least two joints or spinal segments during an orthopedic exam and radiographic evidence of DJD in at least two of those painful joints or spinal segments. A complete blood count (CBC), blood chemistry, T4 test and urinalysis were performed to make sure the participants were otherwise healthy, and clients completed both a feline musculoskeletal pain index (FMPI) and a client-specific outcome measures (CSOM) questionnaire. Each cat was fitted with an accelerometer and was monitored for two weeks to determine baseline activity.

On day 14, FMPI and CSOM questionnaires were again completed before the cats were given an injection of either the placebo or the drug. The feline participants were randomly assigned into three groups of twelve cats according to treatment: placebo, low dosage NV-02 and high dosage NV-02. All involved in the study were blinded as to which treatment each cat received.

The cats were then monitored for nine weeks, and FMPI/CSOM scores were recorded at two intermediate points (days 35 and 56). At the end of the nine weeks, FMPI/CSOM scores were again logged, and a CBC, blood chemistry and urinalysis were repeated.

Findings

The results of the study demonstrated a clear positive response to treatment with the novel anti-NGF antibody—an effect that was seen for both objectively measured activity and owner-assessed subjective data (despite the presence of a large caregiver placebo effect).

Although differences in FMPI score results were not as striking between placebo and NV-02 groups, CSOM scores and accelerometer data showed clear differences. The response to treatment lasted approximately six weeks, and increase in activity compared favorably to previous studies done with meloxicam. Researchers also found that the drug was well tolerated and no related adverse events occurred during the study.

Reason to rejoice

The feline anti-NGF antibody NV-02 was demonstrated to provide safe and effective relief from DJD in cats for approximately six weeks with a single injection, bolstering the hope of being able to use NC-02 as an effective long-term drug to treat DJD-associated pain in cats. Since the study, the drug has been named frunevetmab and has been recommended for further investigation of safety and efficacy. **dvm360**

Reference

Gruen ME, Thomson AE, Griffith EH, et al. A feline-specific anti-nerve growth factor antibody improves mobility in cats with degenerative joint disease–associated pain: A pilot proof of concept study. *J Vet Intern Med* 2016;30(4):1138-1148.

Dr. Michael Nappier is assistant professor of community practice in the Department of Small Animal Clinical Sciences at the Virginia-Maryland College of Veterinary Medicine.

GETTY IMAGES

IN BRIEF | News

Who doeth all things well: Remembering Alf Wight, aka James Herriot

"They didn't say anything about this in the books," Alf Wight, better known by his pseudonym James Herriot, begins in his renowned work *All Creatures Great and Small*.

Wight's tales are some of the most significant in veterinary literature, not only for his stories of animals and the delight and pride he instilled into the myriad future practitioners, but also for the way he perceived and portrayed the human-animal bond before anyone ever thought to call it that.

Herriot's stories inspired a generation of professionals and turned the veterinary profession into a desirable dream despite the … err, mess. Whether he's viewed as a hero of the sweet joys of rural life and practice or a hindrance to the profession that needs to be laid to rest, it's undeniable that Wight changed the world's outlook on veterinarians and left a long-standing legacy behind.

Wight inspired millions of readers and to some degree changed the way the veterinary profession is viewed. Under the name Herriot he made known the express joy, sadness and sometimes triumph that goes on every day in the veterinary world and among its clients, patients and veterinary staff. Even as his 100th birthday passed on October 3, Wight is remembered through colleagues, friends, family and veterinarians alike who all have found inspiration through Herriot's tales. **dvm360**

Boehringer Ingelheim to sell veterinary vaccine portfolio to Elanco

Boehringer Ingelheim Vetmedica has agreed to sell its portfolio of U.S. canine, feline and rabies vaccines, as well as the manufacturing and R&D site, to Elanco Animal Health for a price of $885 million, according to a company release. This price includes the estimated cost of acquired inventory. The sale is conditioned on antitrust approval and the Boehringer Ingelheim/Sanofi asset swap that was signed in June 2016.

"This agreement is an important step toward a successful acquisition of Merial," says Dr. Albrecht Kissel, president and CEO of Boehringer Ingelheim Vetmedica, in the release. "This was a highly complex decision from a business and from an emotional perspective. It was certainly not taken lightly, particularly in view of the history and significant positive developments of this business over the past years.

"We are confident that, under Elanco's leadership, customers will continue to have access to these innovative vaccines and the portfolio will have strong support," Kissel says.

The sale to Elanco is anticipated to close in early 2017 subject to approval by the Federal Trade Commission and other contingencies, the release states.

Vaccine lines included in the proposed sale include Duramune, Lepto-Vax, Bronchi-Shield, ULTRA Duramune, Fel-O-Vax, CaliciVax, ULTRA Fel-O-Vax, Fel-O-Guard, Rabvac, Rabvac 3 and Rabvac 1. **dvm360**

GLP-1 analogs: An emerging veterinary treatment for diabetes?

Researcher: Monthly injections could soon replace daily insulin in cats.

Chen Gilor, DVM, PhD, DACVIM, is excited about an emerging diabetes therapy in human medicine that may soon revolutionize the treatment of diabetic pets as well.

Gilor, who is an assistant professor at Ohio State University College of Veterinary Medicine, spoke at a recent CVC about glucagon-like peptide (GLP)-1, a hormone secreted from the gastrointestinal tract after eating that stimulates insulin secretion during hyperglycemia. Analogs of this hormone—which scientists discovered in gila monster saliva—are being used to treat type 2 diabetes in people fairly early in the disease, Gilor says.

Dr. Chen Gilor

>>> GLP-1 analogs were first discovered by scientists in the saliva of the gila monster. "Which shows that we should always support pure science," says Dr. Chen Gilor, who is studying these drugs as a diabetes therapy in cats.

"GLP-1 analogs are perfect in that they don't just stimulate insulin secretion—they're safe to use even in euglycemic animals because their effect is only meaningful in hyperglycemia," Gilor says. "GLP-1 analogs can be as effective as insulin in treating type 2 diabetes in people."

Gilor and his colleagues at Ohio State have been studying the effects of these drugs in cats. While people who are treated with GLP-1 analogs receive weekly injections rather than daily or even twice-daily injections with insulin, the frequency of administration could be even more dramatic in pets.

"We are hoping to show in the near future that even once-a-month injections of these GLP-1 analogs will be useful for the treatment of diabetes in cats," Gilor says. **dvm360**

Kansas State researchers investigate the threat of influenza from amphibians

Equine flu. Canine flu. Do we have to worry about frog flu now too?

If you needed another reason to wash your hands after handling a frog other than warding off salmonellosis, researchers at the Kansas State University College of Veterinary Medicine have a new set of zoonoses to concern you that could be acquired from our amphibian friends—viral disease.

Yongming Sang, PhD, is leading a project investigating the role of inferons in amphibians and how it might translate to viral transmission to people. The first publication of their work, featured in *Nature's Scientific Reports*, discusses intronless interferons in amphibians, all signaling the need to more closely observe these vertebrates.

>>> Ribbiting news about the zoonotic threat of amphibians. Photo courtesy of Kansas State University.

"Amphibians have a previously unknown complexity within their antimicrobial interferon system, which is highly and differentially responsive to influenza infections," says Sang in a release from Kansas State. "This suggests the need to study the possible role of wild amphibians as overlooked reservoirs/end hosts for influenza and other zoonotic pathogenic infections."

Amphibians have been known to possibly harbor influenza A virus (IAV). "We tested the susceptibility of frog cells to different subtypes of IAVs isolated from several animal species, including avian H9N2, equine H3N8, human H1N1 and swine H1N2 and H3N2 viruses," Sang says.

The results? Pig isolates were the most infective in amphibian cells, showing a closer relationship between frogs and pigs than pigs and humans. According to the release, Sang says future studies may provide ways to control vectored or zoonotic infections. **dvm360**

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EQUINE | Business

Battling fatigue from working late?

Consider an equine call group

Once upon a time, equine practitioners did their after-hours work solo. A new generation wants to do things differently. *By Kyle Palmer, CVT*

As it becomes harder and harder to find equine-only and mixed animal practitioners, one glaring problem crops up again and again: responsibility for after-hours emergencies. How you handle those calls will have a significant impact on how good your practice's job opening looks and how willing doctors are to stick around long-term after accepting your offer.

Obviously, this is a bigger issue for one-to-two-doctor practices—the fewer doctors on the payroll, the fewer doctors rotating after-hours responsibilities. It stands to reason that Dr. Ivalife is going to burn out faster if she's on call 50 percent of the time vs. 25 percent of the time. Even so, that distinction may just be putting off the inevitable: Some doctors don't want to work emergency and late-night shifts at all.

Here are the hurdles equine practice owners and managers need to jump to create an equine or mixed practice that attracts the best new veterinarians.

"We've always done it this way"

I could spend several paragraphs explaining the problem, but it's easily

>>> Late-night calls appeal to some equine practitioners. Others ... not so much.

BUDIMIR JEVTIC/SHUTTERSTOCK.COM

outlined in one sentence: Employees today don't want to work as many hours as they used to.

That shift isn't limited to certain industries or just to doctors. It's generational. Today's veterinary professionals prioritize time away from work over increased earning opportunities, and that has a direct impact on their enthusiasm about working after hours.

Seasoned practitioners can (and do) recall that they routinely used to work until after 7 p.m. then go see emergencies after that, finally ending up at home too late to spend quality time with their family. They can (and do) recall that when they first started, they had to pay their dues and see most of the emergencies and that an equal rotation was considered a "gift." They can (and do) recall that their work ethic reminds them that they were hired to do emergency work and as such, they will always consider it their duty.

These things are all true.

And all irrelevant.

Today's practitioners are parents who want to go to their children's after-school activities, eat family dinners and balance work with a meaningful home life. This is something practice owners and managers need to address.

For practices with fewer doctors, splitting on-call duties without help can be crippling. Again, those same seasoned practitioners will note how they always did it, still do it and will continue to do it until retirement. Maybe, but how stable are their home lives? Do the spouse and children share the doctor's commitment to being a one-man (or one-woman) show all night long, every night? There's no question that such dedication is honorable and commendable. It's just not sustainable.

"We can't risk asking help from local competitors"

While companion animal practice can offer a solution to these problems with the availability of a nearby emergency clinic, such options don't usually exist for equine practice. Companion animal practitioners choose not to see emergencies or simply cherry-pick the ones they want and refer the difficult ones. Equine practitioners are stuck with whatever comes their way: colic, dystocia, traumatic injury and more. They're often knee-deep in disaster without the support of their staff or colleagues. It's easy to see how burnout can develop.

One possible solution is the a local equine call group. Reaching out to local or even regional competitors with an offer to share a call rotation can significantly reduce the impact on any one doctor. When this option is brought up to some practitioners, they panic: What if a client likes this other doctor better after the emergency call and jumps ship? I have news for them (that, deep down, the naysayers already know): Many clients are already clients of other practitioners.

Many horse owners have a "backup" option when they can't be seen by their regular doctor—or when they can't be seen exactly when they want to be seen. The fact that horse owners are willing—at times—to see Dr. Al Ternate but still elect to return to Dr. First Choice the next time they need help should provide comfort to those afraid of losing clients because of a single emergency visit.

The problem is easily outlined in one sentence: Employees today don't want to work as many hours as they used to.

Paradoxically, spreading the work around can actually bond you more closely to horse owners. A call group shows clients that your doctors have the confidence to let them see other colleagues. Your doctors aren't defensive practitioners who put their financial interest ahead of their clients' needs. Your doctors care enough about always having emergency options available that you're willing to share those duties.

"We can't share information fast enough"

Ten years ago, sharing on-call duties would have been harder because of the difficulty in getting emergency-visit records into regular practice files. No longer. In this day of electronic records, sharing records is a keyboard (or smartphone or tablet) click away. Agreeing on this cooperation in advance allows for a regular expectation of records sharing and will expose anyone who isn't a team player very quickly. Even better, this regular sharing and cooperation on tough cases can help create a bond among practitioners that can only be good for the industry. No doctor is an island anymore, and growing participation in regional practitioner associations is a measurement of that mentality.

"We can't sort out the logistics"

I've explained how this works for equine practices. What about for the mixed practice? Consider a split rotation. Pair a regional call group for horses with an automatic referral for companion animals.

For practices using an answering service, it's easy to screen the clients' needs and send them in the appropriate direction. For practices using a direct call-forwarding system, consider placing a simple answering machine in the loop. Not only does that $30 device provide a buffer between you and the hangups, nonemergency questions and wrong numbers, it lets you leave specific instructions on which numbers to call for specific needs.

In mixed-use practices, doctors who want extra compensation (read: new graduates with huge debt) or doctors who want the fantastic client bonding that comes with after-hours work (when Dr. Ima Vaylable is on call, he or she is the clients' only choice) can elect to participate in both groups by seeing both horses and companion animals on their night. For the rest of your great doctors, consider directing them to the call group of their choice and stop pushing them in a direction they don't want to go.

For every practitioner faithfully doing his or her part after hours, there are two doctors in those jobs looking for a daytime-only gig that's guaranteed to get them home by 5:30 p.m. every night. Failing to recognize and address after-hours burnout might be just the nudge your great doctors need to leave. If you're having trouble recruiting or retaining associates, take a closer look—this issue may be to blame. **dvm360**

Kyle Palmer, CVT, a frequent contributor to dvm360 magazine and dvm360.com, is a practice manager at Silver Creek Animal Clinic in Silverton, Oregon.

>>> Patrick Succo, a veterinary student at Colorado State University, with Blue, a horse at CSU's Equine Center. Succo helped to launch a veterinary outreach program to teach animal care and medical skills to high school students, livestock producers and pet owners in the Navajo Nation.

CSU veterinary student brings inspiration to Navajo high school

Patrick Succo was a 16-year-old student living in the Navajo Nation when he was inspired to become a veterinarian. Ten years later, the now 26-year-old Colorado State veterinary student is inspiring students at his alma mater to follow in his footsteps.

Succo's professional epiphany occurred while he was a student at Monument Valley High School in Kayenta, Arizona, according to a press release from Colorado State University. A member of the school's FFA chapter, Succo saw his dream of becoming a veterinarian materialize when his teacher organized an instructional clinic with professional veterinarians.

Now that he's well into his veterinary program, Succo's dream has taken on a new component. He wants to use his position as a veterinary student to help build a partnership between the CSU Doctor of Veterinary Medicine program and his former high school, with goals of both equipping Navajo high school students with basic veterinary skills in a region where livestock is an important source of income and motivating them to pursue higher education. This past June, his goals began to take shape.

Succo was the impetus behind a five-day veterinary summer camp put on for 60 high school students at Monument Valley High School's Agri-Science Center in June. Succo and fellow CSU veterinary classmates provided instruction on a wide range of topics pertaining to pets, equine and livestock, including vaccinations, parasitology and wound and dental care. Knowing that cattle, sheep and horses are vital to Navajo agriculture, they were central features in several of the workshops.

"I think we made a huge impact on the kids, their community, and the health of the animals in Kayenta," Succo said in the release. "Kayenta community members are looking forward to more partnerships with our CSU veterinary school, and they would love to have us back next time."

Kayenta community members aren't the only ones reaping benefits in this partnership, however. Leaders from Colorado State's veterinary program are now considering how a partnership with Monument Valley's Agri-Science Center could build medical skills and cultural competencies with its students.

Succo's work may eventually extend beyond Kayenta, as well. "Other schools and animal-related programs in the Navajo Nation have been contacting me about potentially sending veterinary students to their schools," Succo said in the CSU release. "I think we made a great first impression." **dvm360**

PHOTO COURTESY OF COLORADO STATE UNIVERSITY

>>> This Peruvian Paso horse exhibits cribbing behavior. Laser surgery, a last resort for desperate horse owners, is showing success in a number of patients, according to one expert.

Cribbing in horses:
A surgical approach to treatment

Cutting-edge advice from an LSU professor for this behavioral vice in your veterinary equine patients. *By Mindy Valcarcel, Medicine Channel Director*

Cribbing is a compulsive behavioral disorder in which a horse habitually bites down on a horizontal surface with its incisors and sucks in air, often making a grunting or gulping noise. You know it if you've seen it. In one study of U.S. horses, the overall prevalence of this behavior was 4.4%.[1] In that study, Thoroughbreds were the breed most commonly affected at 13.3%.

Why do horses conduct this odd behavior? "It's the same as people having certain vices," said Laura Riggs, DVM, PhD, DACVS, an associate professor at Louisiana State University's Department of Veterinary Clinical Sciences, at a recent CVC. "Biting your fingernails, little kids sucking on their thumbs—these are all things that cause a response in the brain—decreased cortisol levels, decreased heart rate."

Dr. Laura Riggs

That's the why. There's a physiologic reward. So which horses are affected? Riggs said this behavior is only seen in domesticated animals, not in wild horses, likely because of horse management practices. "If you look at feral populations of horses that are happy out running around, that don't get put in stalls, that don't get put in pen situations and that are not really manipulated, they just don't do it," said Riggs. "It is a result of our management of horses—our necessary management of horses because we ride them, we need them to be at our access, we train them for different disciplines. But it does have a detrimental effect on some horses."

What about horses that you've seen

THOMAS BARRAT/SHUTTERSTOCK.COM

cribbing out in pasture? "Those are likely horses that at some point had a management where they were stalled more often than a horse in the pasture," said Riggs.

The concern is that cribbing wears down the incisors and is linked to issues of unthriftiness, poor performance, dental issues, gas colic and strangulating lesions such as epiploic foramen entrapment, said Riggs.

How to curb the cribbing? Interventions are available that make the cribbing behavior physically difficult to perform or painful but are often not effective. Some of these interventions have included muzzles, pressure collars made of metal plates or leather, or shock collars. Out of desperation owners have even turned to the questionable practice of placing hog rings between a horse's incisors so that when it does crib the hog rings are pushed up into the horse's gums, causing pain.

Medical management in the form of chemical modulators of brain activity, such as the selective serotonin reuptake inhibitor fluoxetine, though more palatable from an animal welfare standpoint, is rarely effective either.

So some owners have turned to surgical intervention to make it impossible for the horse to crib. The most commonly used surgical method is a modified Forssell's procedure.

The original Forssell's procedure involved removing a lot of muscles—myectomy of the sternomandibularis, omohyoideus and sternothyrohoideus. Riggs said this resulted in poor cosmesis and had highly variable results.

The modified Forssell's procedure combines myectomy of much less muscle tissue than the original procedure—along with neurectomy. The omohyoideus and sternothyrohoideus muscle are resected along with the ventral branch of the spinal accessory nerve.

Riggs discussed a version of the modified procedure performed with a veterinary laser that has had positive results with good cosmesis. She participated in a study that looked at the long-term outcome,[2] and of 90 horses that were available for follow-up, 76 had stopped the cribbing behavior for a year or more—an 84.4% success rate.

But Riggs said that no one method is completely effective; some horses did return to cribbing after a period of time. "What was associated with success was how long that horse had been cribbing. Surgery tends to be a last resort for some of these horses, but in actuality horses that had been cribbing for less than two years, those horses did so much better."

Riggs said that drains and daily bandage changes are needed postoperatively. The drains can be removed after three to five days. Antibiotics and nonsteroidal anti-inflammatory drugs are also prescribed. **dvm360**

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2. Baia P, Burba DJ, Riggs LM, et al. Long term outcome after laser assisted modified Forssell's in cribbing horses. *Vet Surg* 2015;44:156-161.

Missouri veterinary team tackles the case of the foal with no mother

Reproduction expert uses hormones and technique to convince retired mare to act as mother to foal rejected by biological dam.

The University of Missouri equine veterinary team was recently successful placing a foal that had been rejected by its biological mother with an adoptive equine mother, allowing it to receive the physical and behavioral benefits associated with a normal equine foalhood, according to *MIZZOU*, the magazine of the university's alumni association.

It all began when a mare named Davina was about to foal on a 100-acre property near St. Louis. The owner and veterinarian soon realized Davina had colic, which did not respond to medication and quickly progressed to an emergency situation. Davina's owners transported her to the University of Missouri's Veterinary Health Center, where the team prepared for surgery.

Operating on a mare near full-term is risky for mother and foal. The fetus may sense its mother's distress and delivery could commence during the procedure, according to *MIZZOU*. Or the surgical team might have to perform an emergency Cesarean section to deliver the foal before correcting the cause of the colic.

The surgery, anesthesia and medicine teams were all on duty when Davina went into the operating room. The uterus did indeed block the surgeons' path to the colic, which was a section of small intestine trapped between the stomach and spleen. Shannon Reed, DVM, MS, DACVS, professor of equine surgery, performed the C-section to deliver the foal—named Ren—and correct Davina's colic.

Although the delivery went well, the next day Davina rejected Ren. Because the foal was delivered by C-section, Davina experienced neither vaginal birth nor its accompanying cascade of hormonal events, which help unite mother and child. Ren was, in effect, an orphan.

Several methods exist to feed an orphan foal. In one approach, a lactating goat is taught to hop up on a straw bale to achieve proper elevation for nursing. Or people can bottle-feed foals formulated milk replacement and otherwise serve as mother. But this is fraught with problems, says theriogenology professor Dietrich Volkmann, BVSc, MMedVet, DACT.

A horse raised by a human is, behaviorally speaking, not a horse. "It thinks it's one of us. Because horses eventually grow quite large, they become dangerous when they try to play their games with us, their fellow beings," Volkmann told *MIZZOU*. "For example, when foals play with each other, they buck and they kick. They'll play that same game with you, and you may become accidental damage."

Setting boundaries is a problem as well. "We humans are not prepared to kick the foal like the mare would, as if to say, 'No, you are out of line, you must never do that again,'" Volkmann says.

Earlier in his career, Volkmann worked at Cornell University with a colleague who pioneered a sort of adoption process for horses. It could work for Ren.

Step one: Find a mare that had nursed a foal at least once in her life and who was available now to adopt Ren. Retired mares are common enough, and Ren's owner quickly found Ubiquitous for the job.

Step two: Order a set of hormones to prepare Ubiquitous' udder for lactation. Within a few days, Ubiquitous was hormonally transformed into a pregnant horse, except she had no fetus.

Step three: Withhold Ren's feedings so he would be hungry for Ubiquitous' milk. "Now you are playing a relatively dangerous game," Volkmann says. "If you don't feed the foal enough, it might become weak and collapse. This can happen very quickly, so we had to feed Ren just enough to keep him going but not so much that he would have no interest in the udder."

Step four: Put Ubiquitous in a stall facing Ren. Volkmann then commenced a simulated birth by stimulating Ubiquitous' vagina, which triggered her milk flow. He also manipulated her cervix, which releases oxytocin to induce mothering behavior.

"Suddenly," Volkmann says, "Ubiquitous nickered, which is very maternal speak. When she did that, we brought Ren a little closer. Then we guided Ren to the udder. Once foals taste that milk and get hooked on it, then we've got a mare and a foal. It's perfect. This one went according to the textbook."

Elapsed time in the stall? About 10 minutes.

This procedure need not be reserved for potential winners of the Triple Crown. "We simulated the hormonal profile of pregnancy," Volkmann says. "And, voilà, we can fake pregnancy, and we can fake birth, and then we can fake motherhood.

"Plus," he says, "it's easy. Anybody who is comfortable doing reproductive work on horses—which means being on the wrong end of the horse, the kicking end—can do this. The first time, I read a half-page instruction and did it. It worked then and has never failed." **dvm360**

>>> Ren, now a healthy 1-year-old gambolling at Stonebridge Farm in Luebbering, Missouri, had a complicated birth requiring surgery at MU's Veterinary Health Center. His well-being owes much to an adoption orchestrated there.

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Currently, no animal cell-based products are FDA-approved, the agency says.

FDA reviews veterinary regenerative medicine and animal cell-based products

In the fast-growing field of veterinary regenerative medicine, says the U.S. Food and Drug Administration (FDA), cellular material—such as living cells, serum or other products derived from cells—are used in animals with the hope of repairing diseased or damaged tissues or organs. For example, in a horse with tendonitis, the damaged tendon may heal with scar tissue that isn't as strong or elastic as the original tendon, the FDA says. The goal is to transplant living cells into the injured tendon, stimulating it to regenerate and heal. Regenerative medicine is an active area of research for developing new therapies for animals.

Products containing cellular material for use in animals are called animal cell-based products, according to the FDA. Animal stem cells are a subset of cell-based products.

Most animal cell-based products meet the legal definition of "drug" because they are intended to treat, control, or prevent a disease or other condition, such as osteoarthritis, or to affect the structure or function of the body, such as improving fertility, the FDA says. Therefore the agency regulates these products as animal drugs. Before cell-based drugs can be legally marketed, they must be reviewed and approved by the FDA.

An animal cell-based product that is marketed without FDA approval is an unapproved animal drug. The agency emphasizes that it is illegal to market an unapproved cell-based product because it hasn't gone through the required review process and may not be safe, effective, properly manufactured or properly labeled. Currently, no animal cell-based products are FDA-approved, the agency says.

In June 2015, FDA issued Guidance for Industry (GFI) No. 218, which discusses the approval requirements for animal cell-based products that meet the legal definition of "drug" and how the agency intends to regulate them.

The FDA also sent a letter to all U.S. veterinary schools informing them of the June 2015 guidance. The FDA stated in the letter that veterinary schools that manufacture, market or investigate animal cell-based products should be aware of the regulatory requirements and their responsibilities regarding these products.

In recent years, the scientific community has made significant advances in developing cell-based products for use in animals, the FDA states, but the ultimate proof rests in obtaining high-quality data from well-conducted, well-controlled and well-designed scientific studies.

Because of the complex nature of these products, the FDA is encouraging individuals, universities and drug companies interested in these products to contact the agency at 240-402-7002 or AskCVM@fda.hhs.gov. **dvm360**

Christopher J. Allen, DVM, JD | LETTER OF THE LAW

Don't hate: negotiate (that employment contract)

When it comes to your professional negotiations, bark less, purr more.

In business, most folks prefer to avoid drama—even those who thrive on it in their personal lives. Work-related contentiousness draws most people out of their comfort zone. That's when bad things happen—and bad decisions are made.

Negotiating an employment contract between a clinic and an associate can be one of those work-related experiences that turns into a dramatic, nerve-wracking event. Tensions run high for the interviewing doctor, who wants to fill a vacancy with a qualified, personable veterinarian, and for the job seeker, who may be desperate to find a position that's a good fit.

And practically speaking, minimizing drama and edginess during contract negotiation is an important goal: keeping cool will likely yield a better outcome for both the interviewing practice owner and the applicant. But there's much more to being a good negotiator than simply taking deep breaths and trying not to sweat. The key is appropriate preparation and confidence that you're entering the negotiations armed with clear objectives and a coherent strategy. Here you'll find a number of pointers I've developed over decades of interviewing associates and advising clinic owners and job seekers.

Step 1: Avoid self-delusion

During the job application/contract negotiation process, it's easy for both sides to mentally slither back into their comfort zones, essentially kidding themselves. Here's an example: If an interviewer claims his practice has wonderful teamwork and a mentoring environment, the interviewee tends to take that claim at face value. The applicant may tuck away any lingering concerns about whether that clinic is a nurturing professional environment and move on to other contractual points.

But is this clinic actually a warm, fuzzy place where the job seeker will be happy? Well, if this is important to the job applicant, she needs to probe

past the interviewer's superficial comments. For example: "Have most of the associates who've worked here in the past few years stayed on past their initial contract?" If the clinic is a revolving door, the associate may want to schedule a significant shadowing period before signing up, particularly if the contract contains a substantial noncompete commitment.

Step 2: Hone your communication skills

When negotiating an employment agreement, the applicant should imagine he's in the exam room with a client as he responds to questions and poses questions of his own. In an animal hospital, the practice owner wants to know her associates are well-mannered, pleasant and confident—but not headstrong or pushy. The interview and contract negotiation are how the practice learns whether the applicant can project those qualities.

So the potential associate needs to decide in advance how he will present his job desires and requirements and the written agreement that codifies it. If he can articulate the reasons he's worth a more generous salary or a smaller employee contribution to his health insurance premium, his potential employer is more likely to give the request a fair hearing.

Being blunt and shooting from the hip can be costly. You could say, "Well, my last three job interviewers offered me a lot more money than this clinic." But consider a more thoughtful approach, which could be something like, "I believe I'll be very productive for the practice, and well worth closer to the average salary the AVMA has published for graduating doctors in this region of the United States."

Step 3: Don't jerk the clinic around

Follow the Golden Rule: Treat the clinic and your potential new boss the way you want to be treated.

> Follow up the initial interview with a thank-you note. Handwritten is best, email better than nothing.

> After you receive a draft contract, read it right away and decide if you want a lawyer or consultant to review it. *Do not* wait 10 days to make up your mind, then call an advisor, expecting there will be no issues and it will get an immediate rubber stamp of approval. When you unnecessarily delay bringing contract issues to the attention of the hiring clinic, you look uninterested—and, worse, unconcerned with the clinic's staffing shortage.

> If you have certain nonnegotiable issues and the practice can't accommodate them, don't do what I've seen too many interviewees do: shake the interviewer's hand, says you're looking forward to possibly working at the clinic, then drop off the face of the earth. If you don't want or can't take the position, let the practice know promptly and courteously. Someday you may want that job. And if you dis the place, they won't forget.

Step 4: Choose your negotiation battles

Negotiating the details of an associate employment contract is by definition an adversarial undertaking. It's the same as when a TV network wants a star for one of its specials—except those parties each have lawyers and agents who hammer out the details relatively free of emotion.

Still, the dealmaking framework is the same. The clinic has limited financial resources and the job applicant has financial obligations and personal commitments. So negotiate like the multimillion-dollar crowd.

> Know the contract inside and out. If you don't think you understand parts or you believe the language is intentionally vague, get a professional's advice. Make a list of points referenced by page, paragraph and section before the negotiation. This will keep you from neglecting points and wasting time hunting for terms … "I think I remember it being in there ... "

> Prepare a "prioritized" list. Come to contract talks armed with a list of terms that are essential and terms that are negotiable. As the negotiation meeting goes on past 45 minutes, you will get tired, less efficient and less focused. It's also harder as time passes to be patient with the other side. Approach the key points first in the warmest, most cheerful way you can. If you simply must get a set salary of $100,000 to meet your expenses and the hospital is offering a base $80,000 adjusted by production, focus immediately on compensation. There's no point in getting into DEA license fees or gym memberships if the clinic can't promise you something you need. And there's no need to imply that the interviewer is a cheapskate; just politely explain that "my loans/mortgage/childcare/etc. unfortunately forecloses the option of accepting a position that pays less than a guaranteed $X."

> Know the dollar value of benefits on your wish list. If you get a contract and it has, for example, three fewer vacation days than you want and a health insurance program different from your last, you should be fully versed in the employer's cost of each of those items. Know the per diem price of a day of vacation at the salary offered. Know the cost to your former employer to pay 100 percent of the gold healthcare program you were enrolled in as well as the approximate price your new employer would bear at 80 percent of the premium for the bronze plan listed in the draft contract.

Keep calm and negotiate on

The better prepared you are to enter into the negotiation process with your potential employer, the more successful you'll be. Additionally, when you're making a presentation of any kind—and that's exactly what your "demands" list is—the better you know the topic and the cooler you'll be under pressure. The cooler you are under pressure, the less likely you are to neglect to negotiate an issue that may come back to bite you after you sign on that oh-so-important dotted line. **dvm360**

Dr. Christopher Allen is president of Associates in Veterinary Law PC, which provides legal and consulting services to veterinarians. Call (607) 754-1510 or email info@veterinarylaw.com.

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To be (a practice owner) or not to be?

After an unexpected conversation with Dr. Codger, Dr. Greenskin has an important decision to make about her future at the veterinary clinic. Will she fish or cut bait?

Huh? What just happened? Dr. Greenskin sits up after abruptly waking from a fading dream and looks around, waiting for the fog to clear. Then the headache registers. Squinting now, waiting for another wave of nausea to pass, she decides that last glass of white Zin was not the best idea after all. So another lesson comes to pass for the young veterinarian: Her alcohol tolerance just isn't what it used to be back in the good ol' college and vet school days.

But can you blame her for overindulging just a tad? Dr. Greenskin has been going through a massive whirlwind of considerations and emotions since the last little "talk" she'd had with the boss-man.

Does Dr. Codger seriously think she would make a good practice owner? Is this really the best thing she could do for her career? How the heck could she even afford to buy a practice? With the already incessant stress of her current debt load, taking on a huge business loan and all of that responsibility just sounds like too much to bear.

And does Old Codger even care whether she might be successful as the new practice owner, or is he just looking to cash out quickly, get out of Dodge and use all of Greenskin's newly incurred debt to live happily ever after?

Is this an opportunity or not?

The search for advice and leadership skills

Over the next few weeks, Dr. Greenskin reaches out to everyone she knows. She is constantly signing into Tweetybook and Instaspace, posting on walls all day long. The thing is, none of this really helps. She gets different answers from everyone. She feels as if the whole world is looking at her, waiting and wondering, what will Dr. Greenskin do? She goes back to the basics, making her lists of pros and cons, which are stacking up with no clear winner.

Meanwhile, at work in the clinic, Dr. Greenskin is quietly practicing leadership and business skills when she gets the chance. Instead of scurrying out of the pharmacy when she senses the front staff and technicians are about to have another scuffle, she begins playing the role of moderator and tries to keep the peace. She looks more closely at her invoices and daily transaction totals. While considering all of the hospital's expenses, she wonders how a business like this one can stay afloat at all. Is this the kind of daily stress that is going to bring her a long-term sense of autonomy and purpose?

Sooner than she had anticipated, Greenskin finds herself once again confronted by none other than her dear friend Doc Codger.

A blunt discussion

"Well, it's already been a month since our last chat, Greenskin," he mutters while rummaging around in the milky cold "sterile" tray. "I'm talking with some other parties about the future of this practice, so I really do need an idea of whether this is something you are interested in or not." He sees that Dr. Greenskin is looking a bit overwhelmed, so he continues. "Look, I know it's a whole lot to think about, and it can be overwhelming. For what it is worth, I am more than willing to mentor you through the process as much as you feel you need. I truly think you would do a great job here and that you could take this practice to the next level."

Dr. Greenskin turns her filter on and refrains from muttering, "Yeah, you mean like new sharp Metzenbaums 'next level'?"

Instead, she faces the old vet and gets it all out. "I also think I could do this and do a great job at it. But I am very concerned about the effect this kind of move will have on my quality of life and well-being. I also have been looking over the numbers you sent me, and I am worried that with the asking price for the practice, I will actually have very little room to improve things here. We need some new equipment, and parts of the hospital need to be remodeled badly. With the amount of debt I would incur taking over the business as-is, I don't see any room left for making improvements."

Dr. Codger winces and responds (perhaps a little too honestly now), "You young kids, all you care about is having a nice cushy life and no responsibility. If you want to do it, then work for it! You'll make the loan payments if you just keep working hard, all the time, every day, and night, and weekend. Oh, and another thing, you need to answer your phone every time it rings, got it?!"

Dr. Greenskin stares at her Birkenstocks while Codger finishes up a coughing fit before continuing. "Here's the deal. There are corporate outfits that are ready to hand over a check for even more than I told you the asking price was. They're ready to come in and do what it takes to take it to the next level, whether it be remodeling, new equipment, even new doctors!"

Greenskin feels that familiar burning sensation behind her ears and is back on the offensive. "There you go, you Old Timers ready to just go ahead and cash out no matter what the consequence of selling every veterinary clinic to a corporate entity! I hope you know that, while the decision may work out well for you financially, you old crusty vets are the ones selling out our profession to corporate America! We young vets can and will work hard, but there's no way I can even pretend to compete with the sharks out there. What do you want to do, Dr. Codger?!"

Both stand in silence, digesting each other's arguments. The new kennel assistant scurries past, red-faced, having clearly overheard some very important-sounding arguing between the two doctors.

The silence continues through the rest of the afternoon as the hospital quiets down. Where will the next meeting lead? Find out in the next Old School, New School! **dvm360**

Having a tough time adjusting to your old crotchety employer? Is your inexperienced associate just not fitting in? Send stories, ideas and comments to **dvmnews@ubm.com**

Dr. Jeremy Campfield works in emergency and critical care private practice in Southern California.

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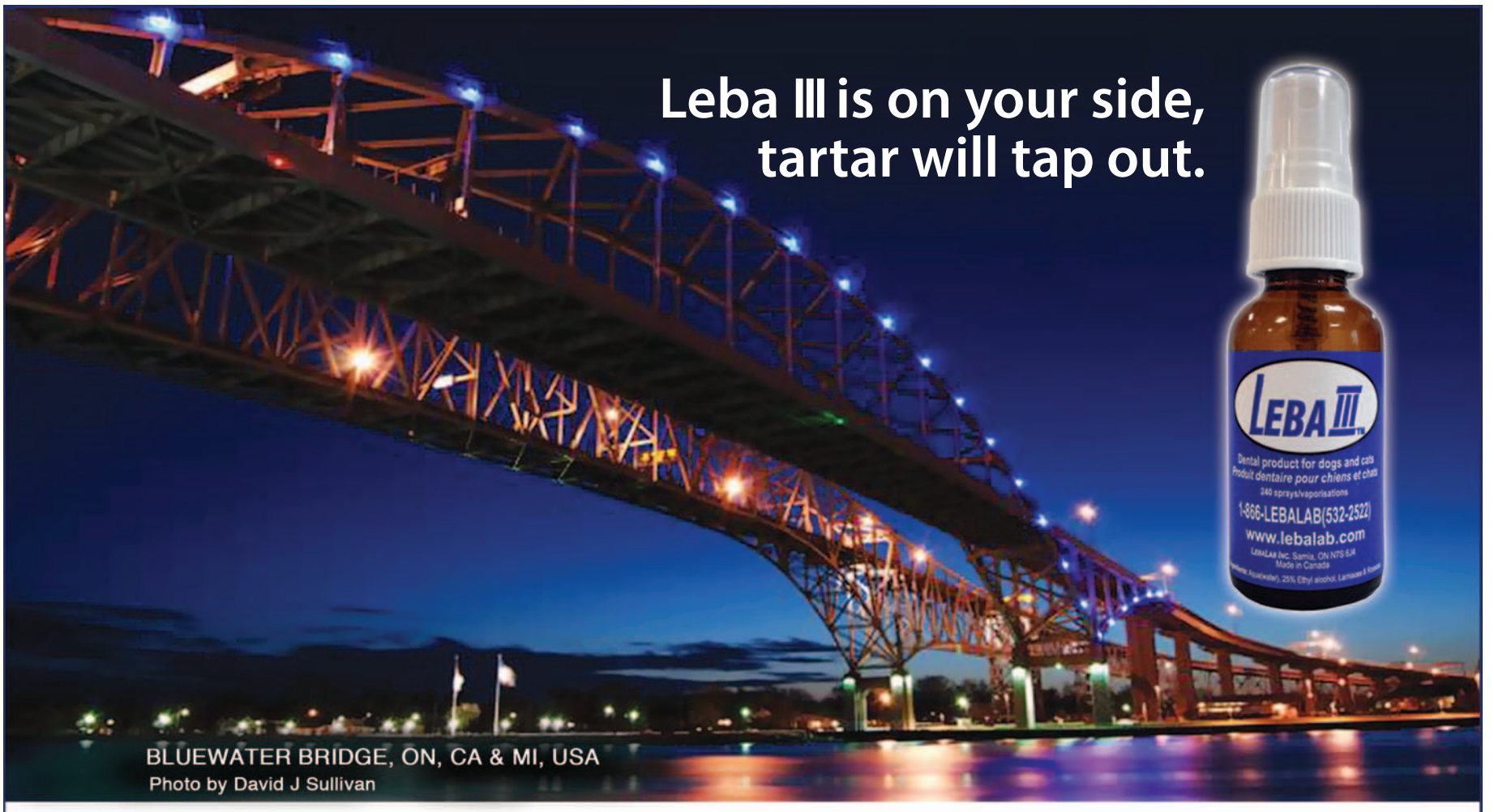

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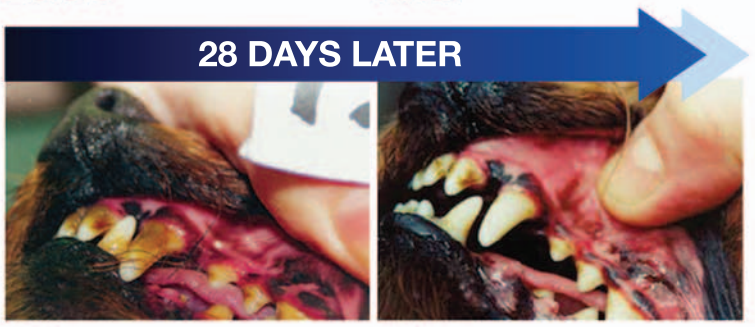

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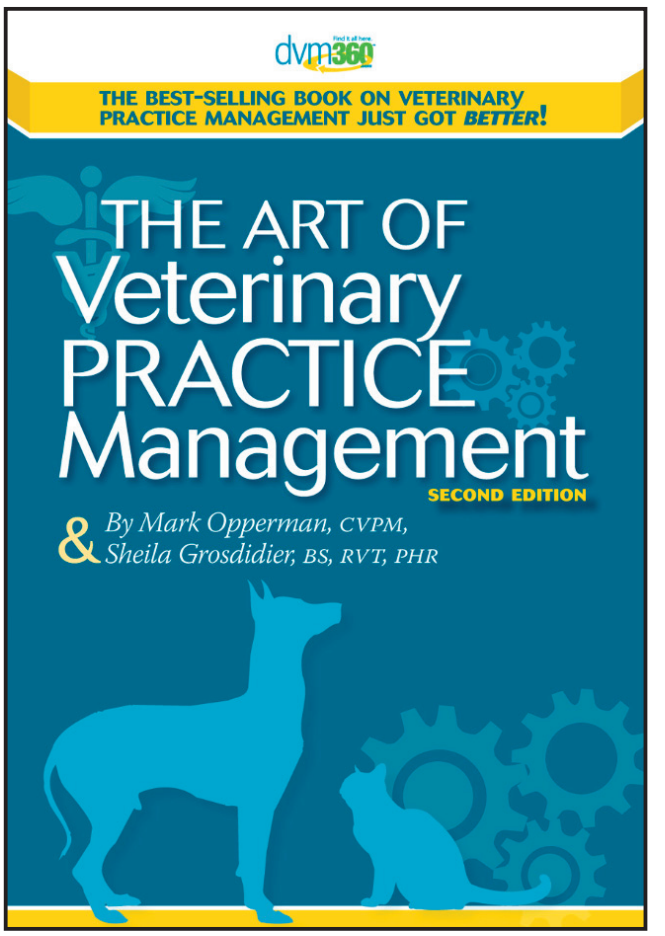

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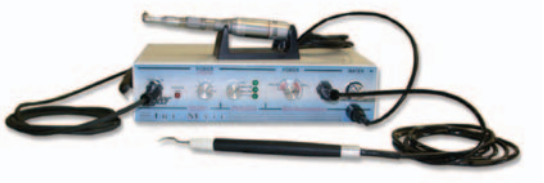

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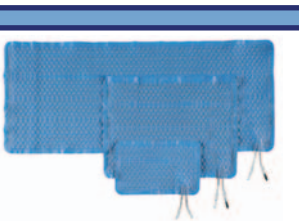

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Diagnostic Imaging

Identification Systems

Employment

Medical Equipment

Medical Services

Medical Products

Parasitology

Pet ID Products

Rehabilitation Prod

Tags

Mobile Veterinary

X-Ray Equipment

Recruitment

Iowa

Iowa Veterinary Specialties is located in Des Moines, Iowa and is a well-equipped facility, well established and supported by a highly skilled and dedicated staff. We are seeking full and part time veterinarians to join a fast paced, progressive Emergency Department. IVS doctors practice high-quality medicine in a friendly, supportive and professional environment. We offer competitive pay and excellent benefits. We strive for best client and patient care, exceeding expectations. Applicant must be a compassionate individual with good interpersonal skills, a positive attitude and excellent communication skills. Contact Julie Kelso at jkelso@ivsdsm.com

New Jersey

Animal & Bird Health Care Center is looking to add an Associate Veterinarian to our staff. We are located in Cherry Hill, NJ, just 15 minutes from Philadelphia, and less than one hour from the Jersey Shore. Our clinical team includes an ABVP (Avian) Boarded Diplomate, as well as specialists in Small Animal Internal Medicine and Cardiology. Our CVTs and highly trained support staff are dedicated to the practice of high quality, compassionate medicine for both exotic and small animal species. Our hospital is equipped with digital radiology, an advanced dental suite including digital dental radiography, in house fully integrated laboratory, Storz endoscopy and ultrasound. We offer a competitive compensation package, including 401K, healthcare, and continuing education allowance. Candidates should have at least 3 years' experience and interest in, or experience with, exotic species. Please forward your CV to cynthia.ryderabhcc@gmail.com.

Practice for Sale

National

Equine: North Carolina – Reduced Price. Estimated ADI $164K. 6,250sf, +/-5.5 acres. NC12.
Feline: Missouri – Upscale Area! Profitable and Growing 2,200sf leasehold. MO1.
Mixed: Iowa – Profitable in Beautiful Area! 3,696sf, +/-.38 acres, 95% SA. IA1.
Mixed: Montana – Reduced Price. 2-building facility w/+4 acres. Estimated ADI $206K. MT1.
Mixed: Texas - Multi-Doctor, Gross +/-$2.6M. +/-5.5acres. Turn-Key. TX5.
PS Broker
800.636.4740
psbroker.com
info@psbroker.com

Evolution Dog Wash

Turnkey dog wash system

The Evolution Dog Wash is a self-serve wash that allows pet owners to clean their dogs without making a veterinary appointment, making it an attractive service for current and prospective clients. The customer inserts payment then selects wash time and options on the unit's front panel. It offers multiple bath choices, including eco-friendly dog shampoos, conditioner and a two-speed commercial dryer. Owners can wash their dogs in just a few minutes.

For fastest response visit evolutionveterinary.pagedemo.co

Zoetis

Expanded label approval

Lepto Eq Innovator, an equine leptospirosis vaccine, has received approval for use in broodmares for all three trimesters of pregnancy. Field studies that examined vaccine use in the first, second and third trimesters showed no systemic or local reactions to vaccination. Prior to launching Lepto Eq Innovator, Zoetis conducted intensive safety and efficacy trials showing 0 percent urinary shedding in vaccinated horses challenged with *L. pomona*.

For fastest response visit leptoequinnovator.com

SwedenCare USA

Feline dental treats

SwedenCare USA introduces ProDen PlaqueOff Dental Bites for Cats to help cat owners manage plaque and tartar buildup. Use also supports the function of healthy teeth and gums while promoting better overall health in cats. The bites are crunchy, tasty treats containing a specific seaweed that has been harvested for its ability to benefit oral care. The bites are free of grain, gluten, additives, sugar and artificial preservatives and are also vegetarian.

For fastest response visit plaqueoffusa.com

Medical Pet Shirts

Pet coverings

Medical Pet Shirts are designed to be a lower-stress, more comfortable alternative to the e-collar. Available to licensed veterinarians only, full-body shirts have a pocket on the underside to hold pads or cold packs, single front leg sleeves, double front leg sleeves, a pocket for holding telemetry, and an attachment for hind leg sleeves. All products are cotton with Lycra added and can be used for postsurgery protection, hot spots, incontinence and more.

For fastest response visit medicalpetshirts.com

T-Cyte

T-Cyte Therapeutics

Canine OA treatment

T-Cyte Therapeutics has launched its Lymphocyte T-Cell Immunomodulator (LTCI) as a USDA-approved treatment option for canine osteoarthritis (OA). LTCI is administered by veterinarians via injection under the dog's skin and has been shown to increase the number and function of precursors of a regulatory T-cell population, thereby dampening the immune-mediated process associated with OA. LTCI is a safe treatment option for use in dogs that cannot use NSAIDs.

For fastest response visit tcyte.com

Boehringer Ingelheim Vetmedica

Low-dose Lyme vaccine

Boehringer Ingelheim has introduced ULTRA Duramune Lyme, a 0.5-ml vaccine for healthy dogs 9 weeks of age or older as an aid in the prevention of disease caused by *Borrelia burgdorferi*. ULTRA Duramune Lyme provides the same protection as Duramune Lyme in a reduced-volume injection. It generates an immune response to multiple outer surface proteins that can target outer surface protein expressions of *B. burgdorferi*.

For fastest response visit ultravaccines.com

BRAKKE CONSULTING, INC.
THE EXPERTS IN ANIMAL HEALTH

Brakke Consulting

Generic medication study

Brakke Consulting has published a new report on the U.S. veterinary generic drugs market. The report includes a review of the regulation of veterinary drugs, estimates of the market size and profiles of leading generic drug manufacturers. For the report, Brakke surveyed several hundred veterinarians to learn more about which types of generic products they carry, perceptions of generic drugs and trends they are seeing at the practice level.

For fastest response call (972) 243-4033 or email LFondon@BrakkeConsulting.com

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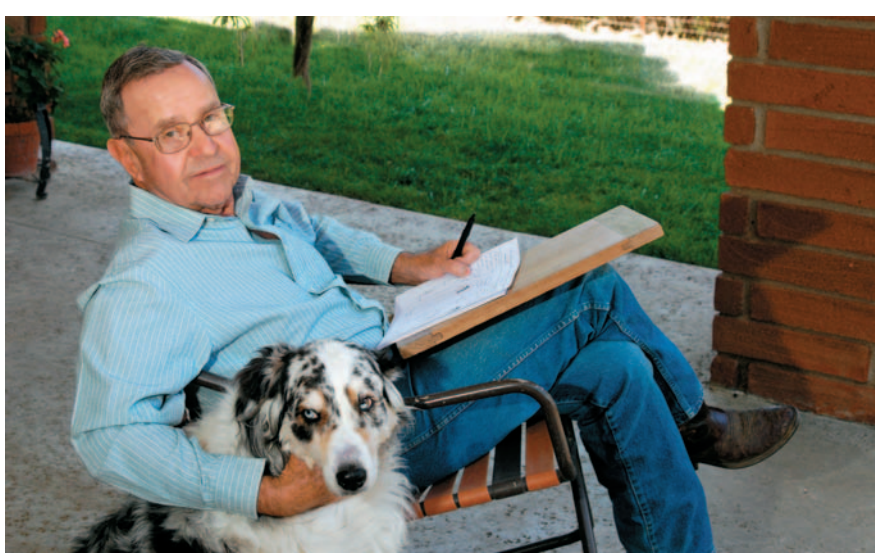
Good humor man

When life gives you a veterinary mobile unit that looks like an ice cream truck, you might as well sell popsicles.

The need to support myself during my pre-veterinary years at the University of Arizona led me to accept a wide array of odd jobs. I spent summers working with animals—wrangling dudes, working as a ranch hand and packing for the U.S. Forest Service. When school was in session I washed dishes between classes in the school cafeteria. On weekends I picked cotton and fruit, cut brush for a surveyor, served as a kennel boy for a veterinarian, gardened for a suburban developer, unloaded bricks and performed other less glamorous work.

But my tastiest job? That award goes to my position as an ice cream truck driver. After I received my DVM degree, I thought my ice cream truck driving days were over. I was wrong … sort of.

My first few years in practice, I used a station wagon to make house, farm and ranch calls. Then I started seeing ads in veterinary journals for customized mobile units (now used by most large animal practitioners). Equipped with a refrigerator-freezer, a sink with running water and lots of room for equipment, I was sold—literally. I bought the first one west of the Mississippi River, mounted it on the back of a pickup truck and got to work.



One of my best clients was Greenfield Ranch, a polled Hereford operation. The first time I drove into the ranch with my new ice cream truck-like mobile unit, owner Allen Carling-Smith met me with a serious expression on his face and deadpanned his order: "I'll have three strawberry popsicles, please."

For the next two years, every call I made to the ranch began with a request for popsicles of various flavors. Finally, I purchased a few popsicles and stuck them in the unit's freezer. The next time I pulled up to Greenfield Ranch, Allen greeted me with his usual order. But on this occasion, I promptly got out of the cab, opened the freezer and handed him three popsicles.

Allen cracked up and, I was told, did so again when he received his monthly bill—which included a line item for popsicles: 15 cents.

My appearance wasn't always popular, however. Once when visiting a horse at a suburban home, I parked next to a real ice cream truck. When the driver turned and saw me, she put her hands on her hips and scowled while muttering furiously under her breath, convinced I was invading her territory. So I calmly walked over to her and said, "Hi, colleague. I'm here to distribute free Good Humor ice cream samples to everybody on this street."

Mobile units have since become commonplace, so no one makes popsicle jokes (or accuses me of encroaching on their ice cream territory) anymore. Sadly, you can't get a popsicle for a nickel any longer either. **dvm360**

Robert M. Miller, DVM, is an author, cartoonist and speaker from Thousand Oaks, Calif. His thoughts in "Mind Over Miller" are drawn from 32 years as a mixed-animal practitioner. Visit his website at www.robertmmiller.com.

More Miller

Find the legacy of Dr. Robert M. Miller's columns and cartoons written for *Veterinary Medicine* magazine online at **dvm360.com/miller**.

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*Source: Among veterinary brands. Survey conducted in February 2016 of small animal veterinarians who recommended oral joint health supplements.

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Zeke is why SDMA matters

The IDEXX SDMA Test can help you unmask chronic kidney disease in hyperthyroid cats

Name	Gender	Breed
Zeke	**Male**	**Domestic shorthair**

Zeke's story

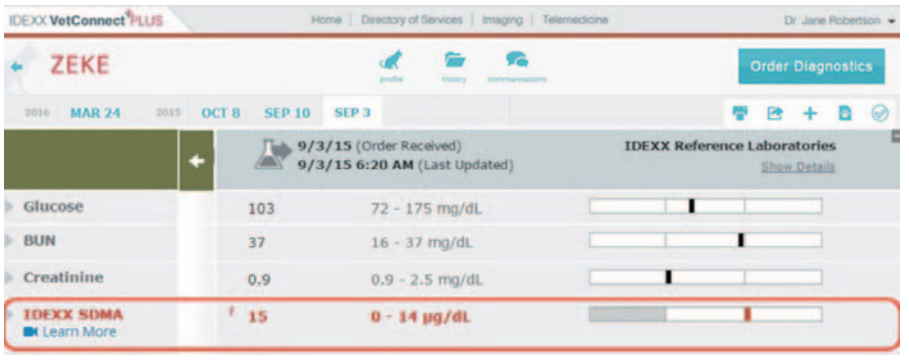
Zeke presented with weight loss even though he had increased appetite. He was first diagnosed with hyperthyroidism, and while his creatinine was normal, increased SDMA* prompted further investigation.

Result

The IDEXX SDMA™ Test identified chronic kidney disease (CKD) in Zeke despite his reduced muscle mass.

The IDEXX SDMA Test should be a part of every chemistry panel you run to assess kidney function

Creatinine can't identify kidney disease in many hyperthyroid cats like Zeke, because it is reduced by weight loss and hyperfiltration.[1] But SDMA isn't impacted by muscle mass[2,3] and appears only slightly blunted by hyperfiltration.[4] The more reliable IDEXX SDMA Test can help identify 6 times more hyperthyroid cats with possible kidney disease than creatinine.[4] The IDEXX SDMA Test has been included in the International Renal Interest Society (IRIS) Chronic Kidney Disease (CKD) Staging and Treatment Guidelines as a useful adjunct for diagnosing CKD and ensuring that pets are treated for the appropriate stage of CKD.[5]



The IDEXX SDMA Test is the new standard of care for veterinary medicine and your patients. The IDEXX SDMA Test is included in all routine IDEXX Reference Laboratories chemistry panels at no additional charge.

Find out all there is to know about the IDEXX SDMA Test.

Sign up to receive in-depth resources and information at idexx.com/sdmainfo

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4. Data on file at IDEXX Laboratories, Inc. Westbrook, Maine USA.
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*Symmetric dimethylarginine.

IDEXX