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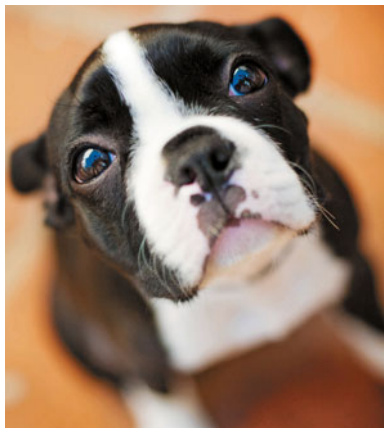
October 2013 | Volume 44 | Number 10 | dvm360.com

Facing patient fear head on

Dr. Karen Overall helps teams alleviate pets' anxiety during veterinary visits.

page M1



Too much supply or too little demand?

Debate at Banfield Pet Health Summit sparks discussion over how to steer profession. *By Julie Scheidegger*

An assemblage of CEOs and executive vice presidents, university deans and association board members, nonprofit directors, salespeople, consultants, analysts, practitioners, past practitioners and, yes, members of the veterinary media gathered for the Banfield Pet Healthcare Industry Summit in Portland, Ore., recently to discuss the very thing everyone's talking about.

If the American Veterinary Medical Association (AVMA) says the profession is experiencing a 12.5 percent excess capacity in veterinary services, is the problem oversupply of veterinarians or underdemand for veterinary services?

Eleanor Green, DVM, DACVIM, DABVP, dean of the Texas A&M University College of Veterinary Medicine, and Mike Thomas, DVM, PhD, founder of Noah's Animal Hospitals in the Indianapolis area, took the stage Aug. 13 to debate the issue with *dvm360's* own News Channel Director

See page 24

Plus: Medicine is the easy part, p. 34

>>>Tanzanian locals line up with their dogs for a village-based rabies vaccination program. At a typical village, 500 to 1,000 dogs may be vaccinated in a given day. Global animal health researcher Guy Palmer, DVM, PhD, says that with concentrated effort, rabies can actually be eradicated in sub-Saharan Africa.

How veterinary medicine can *save* the *world*

PART 2: PROTECTING THE PLANET

According to one researcher, veterinarians' understanding of issues affecting global health is unmatched—which requires their involvement on the world stage. *By John Lofflin*

Guy Palmer is not afraid to talk about social responsibility. He's not willing to write off the less-developed world as somebody else's problem. He's not afraid to discuss solutions to seemingly intractable problems.

He's not afraid to say these are his problems precisely *because* he's a veterinarian.

Palmer, DVM, PhD, anchors the Paul G. Allen School

See page 24

It's the @client of the #future. OMG!

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Veterinarian feels her patients' pain

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Refusal to spay in a pyometra case

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New products for veterinary practices

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AWWW

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CE so *good* —it's *scary*

CVC San Diego falls frighteningly close to Halloween this year (Oct. 31-Nov. 3). So put on your brave face and get ready for 500-plus hours of expert insight, real-world training and practical instruction. Don't forget to trick-or-treat yourself to a special CVC Halloween Bash on Nov. 1. Visit **thecvc.com/sd** for more haunting details.

How to spot a hoarder

{Coverage from CVC Kansas City

Now you'll be able to see the signs

With an estimated 2,000 new hoarding cases reported annually and 250,000 reported animals victims, Jyothi Robertson, DVM, says it's crucial for veterinarians to know about the different kinds of animal hoarders and common characteristics of each one. Log on to **dvm360.com/hoardertypes** to start studying up and hopefully you can protect your patients in the future.

In case you missed it

{The most-read item last issue

Is routine care contributing to lifelong patient anxiety?

Research suggests that veterinarians may be missing their best opportunity to prevent relinquishment and suffering in pets. The secret to boosting their quality of life: implementing a fear and anxiety assessment at each visit. See **dvm360.com/petanxiety** or scan the QR code to read more.

The fantastic Five

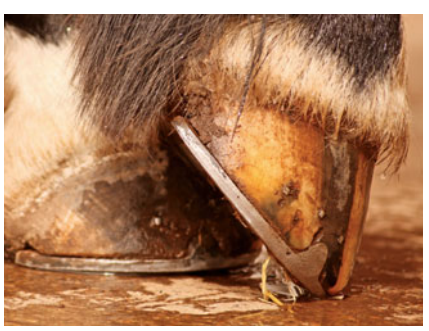
{Veterinary updates in record time

We promise, it'll only take a minute—or five

This episode of The Five comes to you from CVC Kansas City and features expert advice about how to implement fear-free tactics in your practice. Also, Shawn McVey, MA, MSW, talks about how to deal with clients who complain about costs. Plus, Stephen Divers, BVetMed, DACZM, gives a diagnostic tip for practitioners seeing exotic animals. Your host is dvm360 News Channel Director Kristi Reimer—visit **dvm360.com/five** or scan the QR code to watch it now.

Equine medical updates

{New research and therapies to boot



Time for equine

At the "Equine News Hour" at CVC Kansas City, Thomas Divers, DVM, DACVIM, DACVECC, offered attendees a sampling of research and practical developments that can aid equine veterinarians with their patients. For all of the details, visit **dvm360.com/equinehour**.

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Volume 44, Issue 10

ON THE COVER

How veterinary medicine can *save* the *world*

PART 2: PROTECTING THE PLANET

Veterinarians have a leadership role to play on the global health stage. **Cover, page 24**

And one doctor learns that practicing medicine is actually the easy part. **Page 34**

PLUS

Too much supply or too little demand? **Cover, page 24**

COVER PHOTO COURTESY OF DR. GUY PALMER

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WHERE DID I GO WRONG?

| Michael A. Obenski, DVM

OMG! It's the @client of the future #lookout

My new clients won't look up from their phones. My older clients won't shut up. I'm not sure which is worse.

One day as I was walking down the hall, I heard strange noises coming from the examination room. They were a mixture of electronic beeping sounds and clicks—almost as if someone were playing video games on the computer. I knew that this theory was unlikely, given that our exam room doesn't have a computer. (That's right! Our record-keeping system consists of a Bic pen and myself.)

I entered the room to find Mrs. Qwerty typing away madly on her tablet thing while her cat, Cyber, quietly slept on the floor.

"Just a minute, Doctor," she said. "I'm almost done."

Then she offered an explanation for her rude behavior.

"I'm typing up a complete medical history for you to read on your e-mail. That way, it'll all be written down for you, and if I get a text or tweet or phone call while I'm here, you won't need to interrupt me with questions."

I informed her that she'd better begin sharing information verbally—immediately, if not sooner. She put the tablet down but took out her smartphone. The next thing I knew, she was thumb-typing like crazy.

"I'm tweeting my friends to tell them I'm at the vet and not to interrupt me until we're done. I thought that would be the considerate thing to do," she said between keystrokes.

After informing her that the office call would begin now or never, I finally was able to proceed with the exam. Luckily, the diagnosis was easy and the prognosis good. When I sent her out front to settle the bill with the receptionist, her thumbs went wild again.

"I'm texting my sister to let her know that Cyber is going to be OK," she told me. "She loves him as much as I do. In fact, she was so worried about him that she wouldn't come into the exam room with me. She's out in your waiting room."

After she left, my receptionist showed me a copy of the medical history Mrs. Qwerty had e-mailed us. I didn't understand it at all. There wasn't any punctuation or capitalization. Funny abbreviations were everywhere—things like OMG, IMHO and LOL. I'm definitely not up to date on all of that stuff. The only one I'm familiar with is E-I-E-I-O. That means you're getting a message from Old MacDonald.

The next thing on my schedule that day took me from the current era of cutting-edge communication to the land of corded telephones and snail mail letters—it was a visit from Mr. Fossil and his dog, Relic. The man is one of my favorite clients; however, I hate to see him walk in the door. He always feels obligated to educate me on how things used to be done "back in his day."

He says things like, "You know, Doc, when I was a boy, a visit to the veterinarian was only about $4—and that included the medicine."

And of course he always knows of a better medical treatment option than the ones we use now. His advice always consists of such comments as, "That expensive worm medicine isn't that great. Can't you just give him a dose of gun powder?" and "Those fancy flea treatments don't work any better than a little kerosene in the bath water."

Mr. Fossil is destined to stay in his century forever, just as much as Mrs. Qwerty is compelled to move with the times. At least that's what I thought until something happened that rattled my faith in the natural order of things—Mr. Fossil reached into his pocket and pulled out a smartphone. My universe turned upside down.

"Hey, Doc," he said. "I found this in your parking lot. What the heck is it?"

And just like that, all was right with the world once again. **dvm360**

Dr. Michael Obenski owns Allentown Clinic for Cats in Allentown, Pa.

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[1] Negre A, Bensignor E, Guillot J. (2009). Evidence-based veterinary dermatology: a systematic review of interventions for *Malassezia* dermatitis in dogs. *Vet Dermatology*. 20:1-12.

[2] Mueller RS, Bergvall K, Bensignor E, et al. (2012). A review of topical therapy for skin infections with bacteria and yeast. *Vet Dermatology*. 23:330-341.

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Live *from* CVC Kansas City, *it's a* Fear-Free Friday Night!

CVC Kansas City goes "fear-free" via late-night-style talk show hosted by Dr. Marty Becker.

By Ashley Barforoush

>>> Marty Becker, DVM, chats with his daughter, dog-training expert Mikkel Becker (above) about fear-free tactics, including feeding dogs10 treats per minute during an exam.

>>> In the opening monologue, Ernie Ward, DVM, discussed giant school debt loads, the oversupply of veterinarians—and zombies.

"America's Veterinarian" Marty Becker, DVM, channeled the late night talk show host buried not-so-deep inside himself at the Fear-Free Friday event at CVC Kansas City. He introduced the crowd to his latest experiment: creating a fear-free veterinary practice.

A series of veterinarians and animal experts joined Becker, a frequent dvm360.com contributor who makes regular appearances on *The Today Show* and *Dr. Oz*, on the stage and shared different tips and techniques to help veterinarians take the "pet" out of "petrified" and bring pet owners back to the veterinary clinic.

Ernie Ward, DVM, kicked off the show with an opening monologue that poked fun at current problems in the profession. He touched on the oversupply of veterinarians, but made it clear that he was far from concerned.

"I know we're going to need as many veterinarians as possible—especially with the impending zombie apocalypse," Ward says. "You see, after the zombies have been defeated and order has been restored, pet owners will need someone to blame for the rising cost of pet care."

(*Ba-dum-CHING* went the drum from the Fear-Free Band standing by.)

Soon after, Becker got real with the audience about simple ways veterinarians can make their veterinary practice a more welcoming place for pets. Some of the tips included:

> Play soothing music in your veterinary practice exam rooms.

> Dispense pheromones throughout the veterinary hospital.

> Spray down staff member's smocks and scrubs with pheromones an hour before each appointment. ("They think we've got Milk-Bone underwear on," Becker says.)

> Make Thundershirts available for pets to wear during the appointment.

> Use indirect lighting.

> Talk more softly and slowly in the presence of pets.

Later in the night, Margie Scherk, DVM, DABVP (feline), the past president of the American Association of Feline Practitioners (AAFP), took a seat on the talk show couch and spilled some of her secrets to making cats less stressed during the exam.

"I've started examining them on the floor," Scherk says. "Cats don't like you in their face or looking down on them, so I put myself on their level and examine from the back to the front."

On the flip side, Becker's daughter, dog-training expert Mikkel Becker, revealed tricks to help keep dogs calm. Hint: Tell clients to bring pets hungry and use treats—lots and lots of treats. She even suggested feeding dogs 10 treats per minute during the exam. Tony Buffington, DVM, PhD, DACVN, a nutritionist at Ohio State University who has conducted pioneering research on enriching indoor pets' lives, also weighed in and said he actually thought 10 treats per minute was a bit slow. He responded to concerns that this method of training might be unhealthy for the pet.

"The only way an animal is going to become obese with this is if they never leave the hospital," Buffington says.

dvm360 contributor Andy Roark, DVM, MS, was another highlight of the night, playing a crotchety old veterinarian in his video "Top 10 reasons you should NOT practice fear-free medicine." He brought up very legitimate excuses for being anti-fear-free like, "I just bought a new first aid kit and I plan to use it," and "I want to feel the excitement ... of excrement."

Becker ended the Fear-Free Friday night on a more serious note by sharing his fear-free strategy when it comes to veterinary medicine.

"I focus first on the emotional well-being of the pet and then I swivel my focus to the physical well-being and health of the pet," Becker says. "We need to practice competent medical care *and* compassionate emotional care—it's not an either/or situation."

For more tools and information on how to reduce stress in your patients and keep clients coming back to your clinic for an enjoyable—not fear-filled—experience, keep a close eye on **dvm360.com/fearfree**. dvm360

PHOTOS BY GREGORY KINDRED

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[1]Lulich JP, Kruger JM, MacLeay JM, et al. *J Am Vet Med Assoc.* 2013 (in press). Average 28 days *in vivo* study in urolith forming cats.
[2]Kruger JM, Lulich JP, Merrils J, et al. *Proceedings.* American College of Veterinary Internal Medicine Forum 2013.

HillsVet.com/cdMulticare

>>> At the Animal Health Investment Forum in Kansas City, startup and midstage companies seek funding to bring their products to market.

Entrepreneurs seek to bring new products to animal health market

Animal Health Investment Forum participants look for backers for innovation.

At the KC Animal Health Investment Forum, nervous developers speak to curious investors about products that may exist only in a lab but that could revolutionize veterinary medicine and other animal health industries.

At this year's forum, which took place Aug. 27 in conjunction with CVC Kansas City, startup companies pitched their dreams. Here are some of the highlights:

> Antiviral drugs for animals similar to the HIV "cocktail" used in humans. Drugs to treat feline herpes and feline immunodeficiency virus are currently in clinical trials.

> A host-directed immunotherapy product that "reawakens" the body's own immune defenses to fight infection, according to developers. With this product, a small peptide engages and activates the cells responsible for innate immunity, minimizing the need for antibiotic use—and the need for bacteria to develop evasive mechanisms, which causes bacterial resistance. The drug, currently being tested in pigs experiencing exudative epidermitis ("greasy pig" syndrome) due to *Staphylococcus hyicus*, can be used in bacterial, viral and fungal infections.

> Sustained-release formulations added to drugs that developers say will mitigate the risk of a burst of active ingredients and minimize frequent visits to the veterinarian.

> An equine monitoring device—wireless, noninvasive and monitored remotely—worn on a horse's foot or ankle that tracks blood pressure, pulse, hydration, respiration and blood volume. The device was adapted from Department of Defense technology used to monitor soldiers' health.

> Disease-modifying drugs based on recombinant proteins adapted from products being used in human medicine. In active development are a canine erythropoietin to treat nonregenerative anemia and a B-cell-depleting monoclonal antibody to treat atopic dermatitis, lymphoma and type 1 diabetes.

> Agricultural LED lighting that recreates the spectrum chickens or other animals actually see, resulting in energy savings and increased production, developers say.

> Non-allergenic equine protective gear fashioned from Latex and neoprene. These boots and hoof wraps are technologically advanced, developers say, protecting joints without introducing other problems such as heat damage, allergies and mechanical injuries. dvm360

>>> Victoria Stilwell of Animal Planet's *It's Me or the Dog* addressed Kansas City Animal Health Corridor Homecoming participants Aug. 26. Stilwell, a trainer who uses positive methods to manage severe canine aggression, says evidence is mounting against the effectiveness of dominance-based methods.

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[1]Data on file. Bayer HealthCare, Animal Health.

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See brief summary on page 14

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DESCRIPTION:

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INDICATIONS:

Baytril® (brand of enrofloxacin) Injectable Solution is indicated for the management of diseases in dogs associated with bacteria susceptible to enrofloxacin.

CONTRAINDICATIONS:

Enrofloxacin is contraindicated in dogs known to be hypersensitve to quinolones.

Based on the studies discussed under the section on Animal Safety Summary, the use of enrofloxacin is contraindicated in small and medium breeds of dogs during the rapid growth phase (between 2 and 8 months of age). The safe use of enrofloxacin has not been established in large and giant breeds during the rapid growth phase. Large breeds may be in this phase for up to one year of age and the giant breeds for up to 18 months. In clinical field trials utilizing a daily oral dose of 5.0 mg/kg, there were no reports of lameness or joint problems in any breed. However, controlled studies with histological examination of the articular cartilage have not been conducted in the large or giant breeds.

ADVERSE REACTIONS:

No drug-related side effects were reported in 122 clinical cases treated with Baytril® (enrofloxacin) Injectable Solution followed by Baytril® Tablets at 5.0 mg/kg per day.

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ANIMAL SAFETY SUMMARY:

Adult dogs receiving enrofloxacin orally at a daily dosage rate 52 mg/kg for 13 weeks had only isolated incidences of vomition and inappetence. Adult dogs receiving the tablet formulation for 30 consecutive days at a daily treatment of 25 mg/kg did not exhibit significant clinical signs nor were there effects upon the clinical chemistry, hematological or histological parameters. Daily doses of 125 mg/kg for up to 11 days induced vomition, inappetence, depression, difficult locomotion and death while adult dogs receiving 50 mg/kg/day for 14 days had clinical signs of vomition and inappetence.

Adult dogs dosed intramuscularly for three treatments at 12.5 mg/kg followed by 57 oral treatments at 12.5 mg/kg, all at 12 hour intervals, did not exhibit either significant clinical signs or effects upon the clinical chemistry, hematological or histological parameters.

Oral treatment of 15 to 28 week old growing puppies with daily dosage rates of 25 mg/kg has induced abnormal carriage of the carpal joint and weakness in the hindquarters. Significant improvement of clinical signs is observed following drug withdrawal. Microscopic studies have identified lesions of the articular cartilage following 30 day treatments at either 5, 15 or 25 mg/kg in this age group. Clinical signs of difficult ambulation or associated cartilage lesions have not been observed in 29 to 34 week old puppies following daily treatments of 25 mg/kg for 30 consecutive days nor in 2 week old puppies with the same treatment schedule.

Tests indicated no effect on circulating microfilariae or adult heartworms (*Dirofilaria immitis*) when dogs were treated at a daily dosage rate of 15 mg/kg for 30 days. No effect on cholinesterase values was observed.

No adverse effects were observed on reproductive parameters when male dogs received 10 consecutive daily treatments of 15 mg/kg/day at 3 intervals (90, 45 and 14 days) prior to breeding or when female dogs received 10 consecutive daily treatments of 15 mg/kg/day at 4 intervals; between 30 and 0 days prior to breeding, early pregnancy (between 10th & 30th days), late pregnancy (between 40th & 60th days), and during lactation (the first 28 days).

DRUG INTERACTIONS:

Concomitant therapy with other drugs that are metabolized in the liver may reduce the clearance rates of the quinolone and the other drug.

Enrofloxacin has been administered to dogs at a daily dosage rate of 10 mg/kg concurrently with a wide variety of other health products including anthelmintics (praziquantel, febantel), insecticides (pyrethrins), heartworm preventatives (diethylcarbamazine) and other antibiotics (ampicillin, gentamicin sulfate, penicillin). No incompatibilities with other drugs are known at this time.

WARNINGS:

For use in animals only. The use of this product in cats may result in Retinal Toxicity. Keep out of reach of children.

Avoid contact with eyes. In case of contact, immediately flush eyes with copious amounts of water for 15 minutes. In case of dermal contact, wash skin with soap and water. Consult a physician if irritation persists following ocular or dermal exposure. Individuals with a history of hypersensitivity to quinolones should avoid this product. In humans, there is a risk of user photosensitization within a few hours after excessive exposure to quinolones. If excessive accidental exposure occurs, avoid direct sunlight.

For customer service or to obtain product information, including Material Safety Data Sheet, call 1-800-633-3796.

PRECAUTION:

Quinolone-class drugs should be used with caution in animals with known or suspected Central Nervous System (CNS) disorders. In such animals, quinolones have, in rare instances, been associated with CNS stimulation which may lead to convulsive seizures.

Quinolone-class drugs have been associated with cartilage erosions in weight-bearing joints and other forms of arthropathy in immature animals of various species.

The use of fluoroquinolones in cats has been reported to adversely affect the retina. Such products should be used with caution in cats.

08715583-80003870, R.8 July, 2010
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Baytril® (brand of enrofloxacin) Antibacterial Tablets are indicated for the management of diseases associated with bacteria susceptible to enrofloxacin. Baytril Antibacterial Tablets are indicated for use in dogs and cats.

CONTRAINDICATIONS:

Enrofloxacin is contraindicated in dogs and cats known to be hypersensitive to quinolones.

Dogs: Based on the studies discussed under the section on Animal Safety Summary, the use of enrofloxacin is contraindicated in small and medium breeds of dogs during the rapid growth phase (between 2 and 8 months of age). The safe use of enrofloxacin has not been established in large and giant breeds during the rapid growth phase. Large breeds may be in this phase for up to one year of age and the giant breeds for up to 18 months. In clinical field trials utilizing a daily oral dose of 5.0 mg/kg, there were no reports of lameness or joint problems in any breed. However, controlled studies with histological examination of the articular cartilage have not been conducted in the large or giant breeds.

ADVERSE REACTIONS:

Dogs: Two of the 270 (0.7%) dogs treated with Baytril® (brand of enrofloxacin) Tablets at 5.0 mg/kg per day in the clinical field studies exhibited side effects, which were apparently drug-related. These two cases of vomition were self-limiting.

Post-Approval Experience: The following adverse experiences, although rare, are based on voluntary post-approval adverse drug experience reporting. The categories of reactions are listed in decreasing order of frequency by body system.

Gastrointestinal: anorexia, diarrhea, vomiting, elevated liver enzymes
Neurologic: ataxia, seizures
Behavioral: depression, lethargy, nervousness

Cats: No drug-related side effects were reported in 124 cats treated with Baytril® (brand of enrofloxacin) Tablets at 5.0 mg/kg per day for 10 days in clinical field studies.

Post-Approval Experience: The following adverse experiences, although rare, are based on voluntary post-approval adverse drug experience reporting. The categories of reactions are listed in decreasing order of frequency by body system.

Ocular: Mydriasis, retinal degeneration (retinal atrophy, attenuated retinal vessels, and hyperreflective tapeta have been reported), loss of vision. Mydriasis may be an indication of impending or existing retinal changes.
Gastrointestinal: vomiting, anorexia, elevated liver enzymes, diarrhea
Neurologic: ataxia, seizures
Behavioral: depression, lethargy, vocalization, aggression

To report adverse reactions, call 1-800-422-9874.

ANIMAL SAFETY SUMMARY:

Dogs: Adult dogs receiving enrofloxacin orally at a daily dosage rate of 52 mg/kg for 13 weeks had only isolated incidences of vomition and inappetence. Adult dogs receiving the tablet formulation for 30 consecutive days at a daily treatment of 25 mg/kg did not exhibit significant clinical signs nor were there effects upon the clinical chemistry, hematological or histological parameters. Daily doses of 125 mg/kg for up to 11 days induced vomition, inappetence, depression, difficult locomotion and death while adult dogs receiving 50 mg/kg/day for 14 days had clinical signs of vomition and inappetence.

Adult dogs dosed intramuscularly for three treatments at 12.5 mg/kg followed by 57 oral treatments at 12.5 mg/kg, all at 12 hour intervals, did not exhibit either significant clinical signs or effects upon the clinical chemistry, hematological or histological parameters.

Oral treatment of 15 to 28 week old growing puppies with daily dosage rates of 25 mg/kg has induced abnormal carriage of the carpal joint and weakness in the hindquarters. Significant improvement of clinical signs is observed following drug withdrawal. Microscopic studies have identified lesions of the articular cartilage following 30 day treatments at either 5, 15 or 25 mg/kg in this age group. Clinical signs of difficult ambulation or associated cartilage lesions have not been observed in 29 to 34 week old puppies following daily treatments of 25 mg/kg for 30 consecutive days nor in 2 week old puppies with the same treatment schedule.

Tests indicated no effect on circulating microfilariae or adult heartworms (*Dirofilaria immitis*) when dogs were treated at a daily dosage rate of 15 mg/kg for 30 days. No effect on cholinesterase values was observed.

No adverse effects were observed on reproductive parameters when male dogs received 10 consecutive daily treatments of 15 mg/kg/day at 3 intervals (90, 45 and 14 days) prior to breeding or when female dogs received 10 consecutive daily treatments of 15 mg/kg/day at 4 intervals: between 30 and 0 days prior to breeding, early pregnancy (between 10th & 30th days), late pregnancy (between 40th & 60th days), and during lactation (the first 28 days).

Cats: Cats in age ranges of 3 to 4 months and 7 to 10 months received daily treatments of 25 mg/kg for 30 consecutive days with no adverse effects upon the clinical chemistry, hematological or histological parameters. In cats 7-10 months of age treated daily for 30 consecutive days, 2 of 4 receiving 5 mg/kg, 3 of 4 receiving 15 mg/kg, 2 of 4 receiving 25 mg/kg and 1 of 4 nontreated controls experienced occasional vomition. Five to 7 month old cats had no side effects with daily treatments of 15 mg/kg for 30 days, but 2 of 4 animals had articular cartilage lesions when administered 25 mg/kg per day for 30 days.

Doses of 125 mg/kg for 5 consecutive days to adult cats induced vomition, depression, incoordination and death while those receiving 50 mg/kg for 6 days had clinical signs of vomition, inappetence, incoordination and convulsions, but they returned to normal.

Enrofloxacin was administered to thirty-two (8 per group), six- to eight-month-old cats at doses of 0, 5, 20, and 50 mg/kg of body weight once a day for 21 consecutive days. There were no adverse effects observed in cats that received 5 mg/kg body weight of enrofloxacin. The administration of enrofloxacin at 20 mg/kg body weight or greater caused salivation, vomition, and depression. Additionally, dosing at 20 mg/kg body weight or greater resulted in mild to severe fundic lesions on ophthalmologic examination (change in color of the fundus, central or generalized retinal degeneration), abnormal electroretinograms (including blindness), and diffuse light microscopic changes in the retina.

DRUG INTERACTIONS:

Compounds that contain metal cations (e.g., aluminum, calcium, iron, magnesium) may reduce the absorption of some quinolone-class drugs from the intestinal tract. Concomitant therapy with other drugs that are metabolized in the liver may reduce the clearance rates of the quinolone and the other drug.

Dogs: Enrofloxacin has been administered to dogs at a daily dosage rate of 10 mg/kg concurrently with a wide variety of other health products including anthelmintics (praziquantel, febantel, sodium disophenol), insecticides (fenthion, pyrethrins), heartworm preventatives (diethylcarbamazine) and other antibiotics (ampicillin, gentamicin sulfate, penicillin, dihydrostreptomycin). No incompatibilities with other drugs are known at this time.

Cats: Enrofloxacin was administered at a daily dosage rate of 5 mg/kg concurrently with anthelmintics (praziquantel, febantel), an insecticide (propoxur) and another antibacterial (ampicillin). No incompatibilities with other drugs are known at this time.

WARNINGS:

For use in animals only. In rare instances, use of this product in cats has been associated with Retinal Toxicity. Do not exceed 5 mg/kg of body weight per day in cats. Safety in breeding or pregnant cats has not been established. Keep out of reach of children.

Avoid contact with eyes. In case of contact, immediately flush eyes with copious amounts of water for 15 minutes. In case of dermal contact, wash skin with soap and water. Consult a physician if irritation persists following ocular or dermal exposure. Individuals with a history of hypersensitivity to quinolones should avoid this product. In humans, there is a risk of user photosensitization Odental exposure occurs, avoid direct sunlight.

For customer service or to obtain product information, including Material Safety Data Sheet, call 1-800-633-3796.

PRECAUTIONS:

Quinolone-class drugs should be used with caution in animals with known or suspected Central Nervous System (CNS) disorders. In such animals, quinolones have, in rare instances, been associated with CNS stimulation which may lead to convulsive seizures.

Quinolone-class drugs have been associated with cartilage erosions in weight-bearing joints and other forms of arthropathy in immature animals of various species.

The use of fluoroquinolones in cats has been reported to adversely affect the retina. Such products should be used with caution in cats.

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Feeling their *pain*

One veterinarian explores her ability to communicate with patients and says she actually experiences their discomfort. *By Ashley Barforoush*

The first time Jodie Santarossa, DVM, communicated with one of her veterinary patients, she was shy to admit it.

"I kept wanting to dismiss what was happening as coincidence," says Santarossa, owner of BrightSide Vet—a practice that focuses on equine medicine, especially horses involved in elite sporting endeavors—in Sherwood Park, Alberta. "I'd touch a spot on the horse that I perceived as painful in my own body and the horse would react."

From migraines to temporomandibular joint (TMJ) disorders to burning muscles, Santarossa says she feels empathic pain for patients and can sometimes physically feel their symptoms. While she's becoming increasingly more comfortable with this form of communication, she wasn't always so sure. For one, she didn't think the Western veterinary community would approve. And secondly, she wasn't sure how to explain the events herself.

"I was very much in the closet," Santarossa says. "I started to have these experiences, and I had this internal struggle where I could believe it was real, but there was no way for me to validate it."

For the past six years Santarossa has been on a search for validation and continues to explore and study the world of "energy medicine," as she calls it. A few months back she attended an animal communication workshop near her practice instructed by Carol Gurney, author of *The Language of Animals: 7 Steps to Communicating with Animals*. Gurney is also the founder of the Gurney Institute of Animal Communication in Agoura, Calif., which offers the only professional animal communication certification program in the world.

"Carol is teaching us to discover the innate ability within all of us to listen on a deeper level, to perceive things with a greater level of conscious awareness, specifically in the realm of animal communication," Santarossa says.

>>> Jodie Santarossa, DVM, interacts with a freshly-showered Thoroughbred stud named Rascal Cat. Santarossa is so in touch with her patients and racehorses that she can sometimes sense where their pain is located on her own body.

Does this mean every person leaves the seminar ready to have a heart-to-heart with her next patient? Far from it, Santarossa says. Like mastering any profession, becoming an animal communication expert takes extensive education, experience and time, she says.

"There's a balance between the art and science," Santarossa says. "You can have that feeling or awareness, but in order to validate what we're doing as vibrational practitioners, we need to have the scientific information down so that it's validated to our clients, our skeptics and our colleagues."

She's actually in the midst of an Eastern meets Western medicine research experiment right now. She's combining forces—quite literally—with certified animal chiropractor Kyla Awes, DC, of Plymouth, Minn., and Bart Halsberghe, DVM, of the Animal Rehab Institute in Gilroy, Calif., and the Peninsula Equine Medical Center in Menlo Park, Calif. These two also believe in the integration of Eastern and Western philosophies.

"The three of us do our exams—I do my energetic reading," Santarossa says. "And we've started to correlate the sensations in my body with Kyla and Bart's findings."

Santarossa is the first to admit that the symptoms she feels aren't a substitute for a diagnosis and that objective metrics are essential to monitoring a patient's progress. She still allows about 45 minutes to complete the "traditional" physical exam, taking the horse's temperature, pulse and respiration rates and collecting measurements. As a sign of respect, during this process, Santarossa asks the animal questions like, "May I please examine in your mouth?" and "Can I look in your eye?"

"I speak to them like I would if I was a human doctor talking to a patient," Santarossa says. "It's asking permission and acknowledging that they're there—not like we're having all these conversations about them in their presence."

After collecting all of the hard data, she'll stop for a moment. This is where the more controversial evaluation comes into play—she'll do an energy reading of her own body.

"I'll be aware that my left deltoid is burning, I have a pain in my groin, I have TMJ pain on my right—and I'll take note of all of these things," Santarossa says.

Some of the conditions she feels aren't identified anywhere else in the horse's exam. Santarossa says it's her chance not to replace science with her energy reading, but to simply contribute more information to the patient's comprehensive medical assessment.

"How many times have my clients jokingly said, 'If only your animals could talk'?" Santarossa says. "It turns out they can. I just didn't know how to listen previously." **dvm360**

Do her clients think she's crazy?

Jodie Santarossa, DVM, says some veterinary clients seek her out specifically for her energy-based work and the intuitiveness of her practice.

"But I live at the racetrack too, and a huge part of my clientele aren't entirely sure I'm not in the Twilight Zone sometimes," Santarossa says. "I don't go into specifics with a lot of my clients. I'll just say something like, 'I get a sense that this horse doesn't want to be a racehorse,' or 'I get a sense this horse has GI issues.'"

Or Santarossa will sometimes just work quietly on the horse and won't explain exactly all of the ways she's examining the animal. However, she says clients still perceive a difference.

"Some don't want to understand, or question, or consider the possibilities [of Eastern medicine]," Santarossa says. "They're just happy their horse feels better."

PHOTO COURTESY OF DR. JODIE SANTAROSSA

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Illinois

Clinical trials for anti-cancer drug in dogs paves way for human trials

University of Illinois veterinarian, chemist work to develop cancer drug that can help both animals and humans.

An anonymous donor has invested $2 million in a drug that spurs cancer cells to self-destruct while sparing healthy cells. The drug, PAC-1, has been tested in mouse models of cancer and in pet dogs with spontaneously occurring lymphomas and osteosarcomas at the University of Illinois. Working with Illinois chemistry professor Paul Hergenrother, PhD, who discovered PAC-1's anti-cancer capabilities in 2006, professor of veterinary clinical medicine Tim Fan, DVM, PhD, coordinated the clinical trials of the drug in canine patients at the University of Illinois Veterinary Teaching Hospital.

"In addition to paving the way for the human trial, we have helped many veterinary patients that would not have otherwise received treatments for their cancer," Fan says in a university release. If PAC-1 makes it through the U.S. Food and Drug Administration's investigational new drug review, the first human clinical trial of the drug will begin in mid-2014.

>>> Timothy Fan, DVM, PhD (left), professor of veterinary medicine, and Paul Hergenrother, PhD, professor of chemistry, shown with Hoover the research dog, have been collaborating on an anti-cancer drug at the University of Illinois.

Alabama

An organized dogfighting operation was broken up in the Southeast, resulting in a dozen arrests and the seizure of 367 pit bulls in Alabama and Georgia. According to the Associated Press, the defendants were charged with conspiring to promote and sponsor dog fights and arranging for dogs to be at the fights in several southern and eastern Alabama counties and in Holly Springs, Miss., between 2009 and 2013. Dogs at one Elba, Ala., home were reportedly covered in fleas and secured by heavy chains to car axles buried in the ground. Officials said some pit bulls were so malnourished their ribs were sticking out and others had bad wounds that required emergency care.

Alaska

The mayor of Talkeetna, Alaska—a 16-year-old yellow tabby cat named Stubbs (yes, the mayor is a cat)—is recovering after being mauled by a dog. Reports say Stubbs suffered a punctured lung, broken ribs, a fractured sternum and a five-inch gash on his side. The town of about 800 residents is located 110 miles north of Anchorage, Alaska. When Stubbs was a kitten, he won the mostly ceremonial mayoral post after residents, unhappy with the human candidates, elected the cat as a write-in candidate—where he has served for the past 16 years. Stubbs was found in a box full of kittens in front of the town's general store. Apparently born without a tail, the store manager named him Stubbs and adopted him.

Stubbs was stabilized after the attack by Talkeetna veterinarian Jennifer Pironis, DVM, of Golden Pond Veterinary Services. He was then transferred 61 miles to Wasilla, Alaska, where Amy Lehman, DVM, performed surgery. Lehman told an Anchorage NBC affiliate that Stubbs was able to get up and eat on his own six days after the attack. As of Sept. 5, Lehman said she expects Stubbs will be able to return home in another week, but he will be confined to "crate rest." His grateful constituents are happy to hear that with rest and healing, Mayor Stubbs' prognosis is good.

California

Pet owner Karen Kelly has sued Advanced Critical Care and Internal Medicine Inc. of Tustin, Calif., and four veterinarians for $1 million. In her suit, filed with the California Superior Court in Orange County, Calif., she says the veterinary practice accused her of animal cruelty when she was purportedly unable to afford a $10,000 surgical procedure after her dog was hit by a car. She also alleges that the practice used extortion by threatening to make a report against Kelly if she failed to pay for the surgery for her dog. Kelly says she signed an agreement to pay a $1,308.75 bill associated with what the hospital had already done for her dog, but the lawsuit claims she signed the agreement under severe duress. Kelly is seeking damages in the case for civil extortion, intentional infliction of emotional distress and negligent infliction of emotional distress.

Kansas

The Salina Police Department arrested Adam Bowers, 34, in late August after he allegedly walked into Atherton Veterinary in Salina, Kan., picked up a snow shovel, and threatened David Atherton, DVM. Lt. Scott Siemsen told the *Salina Journal* that Bowers had been involved in a domestic disturbance with a woman

PHOTO COURTESY OF THE UNIVERSITY OF ILLINOIS BOARD OF TRUSTEES

in the street outside before entering the clinic. Once inside, he ordered staff to call his doctor and police, threatening Atherton before police arrived.

Kentucky

The Kentucky Veterinary Medical Association says that in August, a horse from Hart County died of eastern equine encephalitis—the first case of the disease in the state since 2008. The Kentucky Department of Agriculture listed the horse as a 10-year-old gelding Tennessee walking horse that was not vaccinated.

Maryland

The Maryland Department of Agriculture is warning residents of the spread of canine influenza in the state, specifically in Montgomery County. Between Aug. 21 and 31, 20 cases of influenza were diagnosed and two dogs died. The Montgomery County Recreation Department went as far as to cancel its popular end-of-summer "Pooch Pool Party" as a cautionary measure. Dog parks remain open, but signs have been posted that list symptoms of the virus. Dog owners are asked to be aware of symptoms and contact their veterinarian with concerns.

Mississippi

A Mississippi State senior veterinary student was served a search warrant for the student's off-campus home that revealed dozens of rare and very large snakes and other exotic animals including African cats, birds, frogs and tortoises. Starkville Police Chief David Lindley told the *Clarion Ledger* that officers exposed an elaborate breeding operation for exotic animals.

He said the living room was filled with row after row of full reptile cages. Although authorities are investigating, the student is currently charged only with misdemeanor city violations and was ordered to remove the animals from the city because they violated local ordinances. The city apparently didn't have proper facilities in order to seize the animals, so faculty and staff from Mississippi State's veterinary school offered assistance "to make sure the matter is handled appropriately," spokesman Sid Salter told the newspaper.

New Jersey

Monmouth University in West Long Branch, N.J., recently announced a partnership with St. George's University in Grenada to offer a combined BS/DVM degree. A St. George's release says students will complete their undergraduate degree in biology or health sciences at Monmouth University in four years, and upon meeting established admission criteria, progress into St. George's University School of Veterinary Medicine. Qualified veterinary students will be eligible to complete the first three years of veterinary study in Grenada and their final clinical year at affiliated veterinary schools in the United States, Canada, Australia or Ireland. "St. George's University joined forces with Monmouth University so that we can both positively address the physician and veterinarian shortage and help the state of New Jersey educate and train well-qualified professionals," says Charles R. Modica, chancellor of St. George's, in a release. dvm360

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To read further background on the heated debate, scan the QR code, above, with your mobile device.

President of Alabama state veterinary board sues VMA

Battle continues to wage on in veterinary community. *By Julie Scheidegger*

The relentless battle of nonprofit spay-neuter clinics in Alabama continues on the pages of lawsuits and subpoenas. The Alabama State Board of Veterinary Medical Examiners (ASBVME) subpoenaed the records of William Weber, DVM, owner of Eastwood Animal Clinic and the owner of record at the Alabama Spay/Neuter Clinic, both in Irondale, Ala., in August. In addition, the president of the ASBVME, Robert Pitman, DVM, sued the Alabama Veterinary Medical Association (ALVMA) in June, stating that the association engaged in "conduct not in the interest of members."

The lawsuit was filed after the legislative session ended leaving both sides without a victory, either for the ASBVME-backed Senate Bill 25 or the ALVMA-backed House Bill 188. It also followed ALVMA's decision to require membership to the association to be considered for nomination to the ASBVME. The ALVMA provides the governor with three names for nomination to the board of which the governor chooses one to serve. Gov. Robert Bentley has said he will not select a new appointment until Pitman's lawsuit is settled.

The term of ASBVME Vice President Ronald Welch, DVM, was set to expire Sept. 16. Welch has been an active supporter of the ASBVME's efforts to restrict the nonprofit spay-neuter clinics in the state. He and Pitman are still listed on the ALVMA website as association members. "Welch was eligible to be nominated, but he was at the bottom of the list of seven veterinarians," former ALVMA President Bill Allen, DVM, says. "You can tell how the people in the room felt about it."

Allen says the tension among Alabama veterinarians is "very uncomfortable." They have taken sides either with the ASBVME and the allied Alabama Veterinary Practice Owners Association (AVPOA), which desire a very limited role for nonprofit clinics—some believing there is no place for them at all—or with the ALVMA, which wants to establish defined but fair regulations for the state's four clinics that meet appropriate standards of care. Allen says the division has held up both sides' bills. "The legislators couldn't get a feel for what the majority of veterinarians wanted," he says.

Since the groups have not been able to pass legislation on the issue, the ASBVME continues to push on through legal channels with the subpoena of Weber. "Technically, it's still illegal for [the Alabama Spay/Neuter Clinic] to operate with a 'nonveterinary' owner," Allen says in reference to the state's veterinary practice act. Although Weber is named as the clinic's owner and is regarded as the doctor of record for the clinic, he does not work at the clinic but contracts the work of Margaret Ferrell, DVM. There is debate on whether Weber meets the requirements of the state's veterinary ownership requirement.

The subpoena requested that Weber appear before the board with all documents pertaining to the operations of Eastwood Animal Clinic and the Alabama Spay/Neuter Clinic, including surgical and controlled substance logs, calendars, and medical information relating to all surgeries conducted or supervised by Weber from March 20, 2007, to the present. It also requested financial documents and tax forms, along with documents, correspondence, memos, notes and e-mails pertaining to license applications or renewals. The subpoena states that it was issued "with regard to a confidential proceeding to determine if any provisions of the Alabama Veterinary Practice Act or its Administrative Code have been violated." Presented to Weber on Aug. 7, it gave him until Aug. 10 to produce the documents and appear before the board.

Weber's lawyer, Chris Waller, filed a complaint to quash the subpoena based on Weber's inability to comply with only three days' notice and his right to an attorney. Waller was unavailable to represent his client on Aug. 10. A rescheduled date for Weber's hearing has not been confirmed but was likely to occur at a Sept. 11 ASBVME meeting. dvm360

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AAHA mandates dental anesthesia, intubation for accredited hospitals

Rule applies to all dental procedures, including cleaning.

The American Animal Hospital Association (AAHA) recently announced that it will now require accredited veterinary hospitals to anesthetize and intubate patients for dental procedures—including dental cleanings. The new standard will apply to any AAHA practices scheduled for an accreditation evaluation on or after Nov. 1.

According to an AAHA release, the 2013 AAHA Dental Care Guidelines for Dogs and Cats prompted the association to update the dentistry section of its standards. The report, approved and endorsed by the American Veterinary Dental College, states that cleaning a companion animal's teeth without general anesthesia and intubation is unacceptable and below the standard of care.

"At AAHA, we hold our accredited practices to the highest standard of veterinary excellence. We firmly believe that accredited practices should be practicing the best veterinary medicine," says Kate Knutson, DVM, AAHA president, in the release. "The guidelines state that general anesthesia with intubation is necessary to properly assess and treat the companion animal dental patient. Because AAHA practices are expected to practice the highest level of veterinary excellence, AAHA's leadership felt it necessary to update this dental standard so that they reflect best practices outlined in the guidelines."

Anesthesia with intubation is necessary to remove plaque and tartar from the entire tooth, at least 60 percent of which is under the gum line, AAHA states in the release. "General anesthesia with intubation also facilitates pain-free probing of each tooth and provides the required immobilization necessary to take intraoral dental films," the release reads. "Without anesthesia, a veterinary professional can only partially clean the exposed crown, which is more cosmetic than therapeutic." dvm360

Next month in dvm360
More practices are embracing so-called "anesthesia-free dentistry," but at what cost? Our next issue will have more on this trend.

Tufts researchers say TNR not best method to control feral cat population

Scientists and veterinarians from Tufts University recently developed a computer model to compare the predicted efficacy of vasectomy and hysterectomy versus the trap-neuter-release (TNR) method to reduce the feral cat population.

Based on a simulated cat population, the model showed that trap-vasectomy-hysterectomy-release (TVHR) reduced the population by half with an annual capture rate of 35 percent. With TNR, 57 percent of cats had to be removed or captured to reduce the population by a quarter. During the 6,000-day simulation (longer than the typical feral cat's lifespan), the virtual cats were tracked daily while cats were added and subtracted based on a colony's natural life cycle.

Researchers found that with a 35 percent TVHR rate, the colony could be eliminated within 11 years. The capture rate would have to reach 82 percent for TNR to eliminate the colony in 11 years.

The paper, by Robert J. McCarthy, DVM, MS, DACVS, and colleagues from Tufts, explains where it believes TNR fails—dominant males that are castrated become sexually inactive and are replaced in the breeding hierarchy by the next most dominant male. It is also difficult to capture all resident cats, so sexually intact cats repopulate an area quickly.

With TVHR, however, production of reproductive hormones continues. A male cat's life span, sexual drive and social status aren't altered with a vasectomy, so he'll fend off competing males who intrude into his area even though he can't produce offspring, researchers say. And an intact female that mates with a vasectomized male enters into a prolonged 45-day pseudo-pregnancy period, which further reduces the chance of fertile mating.

To view the research, go to avmajournals.avma.org/toc/javma/243/4. dvm360

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Oversupply or underdemand?

> Continued from page 1

Kristi Reimer as moderator.

"There is no oversupply of veterinarians—there is underdemand," Green told those gathered. "We're still called one of the most viable professions. Our focus should be on demand, not supply." She said the profession must be creative in order to increase demand and that oversupply should be an opportunity for innovation.

"I wish I had your rose-colored glasses," Thomas countered, adding that as the number of veterinary colleges increases along with class sizes and debt loads, the problems of the profession will also grow as demand remains flat.

For Green, the key ingredients for converting potential demand into actual clients will be service, marketing and value. But Thomas questioned the effectiveness of those tactics in a still tepid economy. "We need to yield to the wisdom of the market," he said. That means capping class sizes and not creating new veterinary schools.

But Green said academia was not the problem. "How do we look at the masses who want our education and say no?" she said, adding that the quality of applicant was not waning—and that discouraging students from becoming veterinarians would hurt the profession. "Why can't we start bragging about it instead of crying about it?" she asked. "There's a need out there for us. No one ever shrunk themselves to greatness and neither will we."

The discussion that followed seemed to trend toward Green's glass-half-full approach to the profession's future as members of the crowd took to the microphone. Patty Olsen, DVM, PhD, chief veterinary advisor for the American Humane Association, said, "Market the heck out of it [the profession]. We have lots of services to provide. Why shy away from that?"

David Haworth, DVM, PhD, president and CEO of the Morris Animal Foundation, spoke for his table, saying, "We believe there is an inherent, unrealized value in veterinary medicine."

Others, however, backed Thomas' concerns surrounding how to effectively market the value of veterinary medicine—"We've tried these strategies before and they haven't worked," Thomas told the crowd—and questioned whether that would be enough. John Volk, senior consultant with Brakke Consulting, said that if demand is need plus ability to pay, the profession needs to "find ways to increase demand and add lower costs."

Those from the AVMA pointed directly to the Partners for Healthy Pets pet owner campaign and its advertisements aimed at getting more clients in for annual exams for their pets. According to CEO Ron DeHaven, DVM, MBA, the campaign is designed to change the conversation from a strategic ideal to an actionable outcome.

Banfield Chief Medical Officer Jeffrey Klausner, DVM, MS, DACVIM, expressed Banfield's view that the profession seize potential demand. Clint Lewis, U.S. president of Zoetis, echoed the sentiment, saying he couldn't see how cutting the supply of veterinarians would be good for the profession. "We all need to be doing our part to make sure this industry is vital," Lewis said when he took the stage to accept the John Payne Industry Leadership Award. "So goes the industry, so goes Zoetis; so goes the industry, so goes everybody in this room." **dvm360**

Save the world

> Continued from page 1

for Global Animal Health (named for Bill Gates' famous computing buddy and Microsoft cofounder, who donated $26 million toward the program and facility in 2010) at Washington State University College of Veterinary Medicine.

The Allen School's core philosophy places its researchers squarely at center of "the animal-human interface." For Palmer, that's the place where emerging diseases incubate. It's the place where antimicrobial resistance mutates. It's the place where rabies kills children and desperately poor nutrition creates physical and cognitive stunting. And, he contends, it's a place where veterinarians belong.

"Veterinarians not only have a role to play in global health and the full development of people," he says, "but they have a role they *must* play. That is, there are some skill sets that need to be brought to the table and veterinarians have them; they're missing in other disciplines in global health. The situation literally requires veterinarians to take leadership roles."

Palmer's journey to the villages of sub-Saharan Africa and other remote corners of the globe began in the middle of the American landscape at Kansas State University in Manhattan, Kan. He was at K-State, two hours west of his boyhood home, to study private-practice veterinary medicine. But a series of mentors—Harry Anthony at K-State and Travis McGuire at Washington State—steered his interests into a broader world, especially Africa.

"I began to really appreciate the role of animals in people's daily lives and how they affect their education, their health, the stability of their communities," he says. "It brought home to me the importance of veterinary medicine. I feel quite strongly that veterinarians should not be afraid to talk about social justice or feeding the world. We have a very strong role to play and we shouldn't be shy about doing so."

The role of animals in the daily lives of people in sub-Saharan Africa isn't exactly like the human-animal bond most small animal practitioners understand so well. It's more about survival. Nutrition. Secondary education. Political stability.

Deaths per year from rabies: 50,000, mostly children…

Palmer's work today at the Allen School follows three streams: zoonotic disease, developmental human stunting and antimicrobial resistance.

One of the top zoonoses he studies is rabies—a disease, he says, that can actually be eradicated in communities in Africa because it's strictly carried in the dog population. Without a reservoir of the disease in wildlife, vaccination programs can successfully eliminate the deadly problem in areas isolated by natural barriers. That's the good news.

The bad news is that rabies still takes 50,000 lives a year, most of those deaths among children in sub-Saharan Africa and South Asia. Dogs in rural Africa are mostly owned by boys, who are often bitten on the neck, face or head. "Those areas are more highly innervated and they're also close to the cranial nerves, which is the way rabies uses to move up into the brain," he explains. "Children are at much higher risk."

Palmer and his colleagues have seen an almost linear correlation in Africa between a bitten child's distance from a clinic where he could receive post-exposure prophylaxis and death. "When they're a distance away, their odds increase dramatically of dying," he says. "There's no money for transport. They simply can't get there."

The challenge for Palmer and others is to build self-sustaining rabies vaccination programs in Africa. Today, most programs are supported by nongovernmental organizations, which "go away when they can't fundraise or they get donor fatigue." So Palmer is working with economists and epidemiologists in London and Glasgow to devise vaccination programs with lower costs and community control. And the signs point to progress—last May, Kenya for the first time initiated its own rabies eradication program.

Palmer says a vaccination level of 60 percent of the dog population in a community can eliminate rabies since it's not carried in local wildlife—an important discovery he credits to researchers at the University of Glasgow. "If we can control it in dogs," he says, "we can get to an elimination point where you would not have to continually vaccinate."

For comparison, consider human measles. Measles has a reproductive rate of about 15, which means a child who goes to school with measles will likely infect 15 other children. For rabies, the rate is 1.2—an infected dog is likely to transmit the disease to just one other dog. "So if you get that to drop below one, obviously the infection dies out on its own," Palmer explains. "You don't have to vaccinate the full population. In fact, if there are three dogs out there and two are vaccinated, it's just an odds ratio that our rabid dog is more likely to bite one of the vaccinated dogs."

Natural barriers also make rabies elimina-

A 'new breed' of veterinarian

The research conducted by Guy Palmer, DVM, PhD, is part of the varied work carried on by 24 faculty members at the Paul G. Allen School for Global Animal Health at Washington State University. Thirty-four graduate students currently study with the faculty through a multidisciplinary experiential curriculum, and last May the first two doctoral graduates received the school's certificate in global animal health. They are the first of what the school describes as a "new breed of veterinarian."

tion possible. In Tanzania, where one of the Allen School's initiatives is located, Lake Victoria is on one side and a mountain range on the other, so the community is "basically an island free of rabies," Palmer says. His goal is to knit together strings of rabies-free islands across the region.

This is important from a veterinary medical perspective but also from a psychological perspective. "It breaks down the overwhelmingness," he says, both for local community leaders and for folks at home who contribute financially.

"Veterinarians need to take the absolute lead in this area," Palmer says. "They need to say this is a controllable problem responsible for 50,000 deaths a year and we can do something about it." He thinks private practitioners in the States can promote rabies elimination among their clients—dog owners who "a priori love dogs and also have a social conscience."

"If we can bring the awareness to them—the idea that this isn't a one-off thing; this isn't hopeless; there's actually an elimination goal—we can galvanize them," he says. A veterinarian might explain to potential supporters, for example, that as developing countries get wealthier, they'll have the veterinary infrastructure and the finances for dog owners and private veterinary practitioners to take responsibility. "As you can imagine, that's not in the foreseeable future. But by talking about an elimination strategy, we've begun to change the way people look at the issue," Palmer says.

Plus, Palmer finds hope in the long lines of boys—and a few girls—who bring their dogs to ad hoc vaccination clinics for rechecks. He says the dogs aren't feral; they all have owners. They help protect the compound, but mostly their role is companionship. In a country where people have few documents, the children who come for rechecks always seem to have their vaccination papers clutched in their hands, and they relish logging in their dogs' names.

"The dogs are mostly owned by little boys and they like tough-guy names," Palmer says. "There are a lot of Simbas and Chuis—a name for leopards—and Rambos, Saddams and Osamas. These names really crack me up. And they're marvelous dogs. They're about 35 pounds, have fantastic dispositions and, as you can imagine, they're tough as nails."

>>>Palmer says a potential solution to the problem of stunting is to change the way animal protein is allocated in households—to make sure, for example, that pregnant and nursing women get eggs.

Stunting: As many as 50 percent of children can be affected

The second stream of Palmer's research agenda seeks physical, cultural and, ultimately, political answers to the problem of developmental stunting in sub-Saharan Africa. The United Nations Children's Fund (UNICEF) estimates that 800 million people in the world are stunted. In some villages of sub-Saharan Africa, nearly half the children are affected by the syndrome.

Why does a human ailment draw a veterinarian's attention? For one thing, Palmer says, humans become stunted because they don't get enough protein in the first 1,000 days of life—and malnutrition and protein production are areas veterinarians deeply understand. "These children never really get to their physical norms," Palmer says. "Their height shows up as reduced but their weight for height may actually look quite normal. The tragedy is that physical stunting is just the outward sign. There's also a good deal of cognitive stunting."

Cognitive stunting has far-reaching effects—Palmer has met with U.S. Rep. Adam Smith, the ranking member of the House Armed Services Committee, on the issue because Washington is seeing a connection between this disease and massive instability in parts of the world.

"People ask me, 'Why does this matter to us?'" Palmer says. "Well, this matters to us because young men who are cognitively stunted are not healthy for anybody." Cognitive stunting is associated with societal volatility when these unstable, underdeveloped, vulnerable children become boy soldiers, get involved with terrorist cells and so on. The U.S. government interest in stunting and its effects is keen, Palmer says.

But the condition is not always immediately recognizeable. Malnutrition has two faces, Palmer explains. One face is that of the starving child who is simply not getting enough calories. Those children are ravenous, he says. When relief workers put a high-energy supplement in front of them in the form of gruel, they devour it.

Protein malnutrition has a different face. These children aren't skin and bones; they're just stunted in terms of height and cognitive ability. Surprisingly, they aren't hungry. In fact, they generally refuse food. Even when they're put on an emergency feeding program, they improve temporarily and then relapse into protein malnutrition and chronic malabsorption syndromes, Palmer says.

This is not a battle veterinarians should be afraid to join, Palmer says. His words pick up strength as he wades into the issue. "Physicians are not afraid to jump into those kinds of problems," he says. "Yet veterinarians have often seemed reluctant."

Physicians, he continues, tend to look at stunting as a problem that begins with

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the food going into the mother. But they don't think about what happens before that. "Where does the food come from? What's the access? What's the availability? What's the affordability?"

Veterinarians, on the other hand, have tended to do the opposite, which is focus on animal productivity. "We're not afraid to look at those issues, but we want to stop when it gets to the household," he says.

And the household may be that critical interface between science and custom that goes well beyond the comfort zone of either physicians or veterinarians. The nagging question here relates to the distribution of food within the family. In a January lecture at the university, Palmer suggested that a partial solution to stunting could be as simple as families allocating eggs to pregnant mothers.

"Veterinarians cannot be afraid to talk about maternal child nutrition," he says. "We understand every aspect of that. There is really nothing very unique about a human mother versus a bitch or a cow or anything else. We understand the basic principle and we need to be willing to cross that divide."

But the relationship between livestock and human health in the parts of the world where Palmer works is not simply about nutrition. He suggests imagining a rural Kenyan suddenly transported to an American city. He'd look around and think everyone in America was wealthy. But if he stayed around awhile, he'd notice big differences in wealth. The same is true, Palmer says, for a visitor to Kenya. If the visitor looked around long enough, he'd see several strata of wealth. And looking around, of course, is what researchers do.

"If you walk onto a premises and you can see four head of cattle, I'll bet if you look at the questionnaire where we ask about malaria nets—the question is, 'Did you sleep under a bed net last night?'—that family will have answered 'yes,'" Palmer says.

Four head of healthy livestock makes a huge difference in quality of life for a family in the developing world, he says—the difference between being able to afford a malaria net and being exposed to disease, for example. Four head means the family's assets are higher, nutrition is better and children are more likely to attend secondary school. "There is very good economic data on this," he says. "You see this tremendous effect that correlates very strongly with the presence of healthy livestock."

A virus travels around the world in 24 hours—guess what: so does antimicrobial resistance

Keeping animals healthy creates a thorny problem that's the subject of Palmer's third research stream: antimicrobial resistance. Families with four head of livestock, or even 10 head, are not likely to use antibiotics on their animals. But as cities and populations grow, much of the world's demand for protein will generate huge pressure to protect livestock investments with antibiotics—often antibiotics that have been banned in the United States for more than three decades.

So even as the developing world craves more protein to feed its hungry, the method it uses to produce protein is a ticking time bomb. At the end of the fuse is the next dangerous microbe for which mankind has no remedy. Palmer says the idea that the developed world can protect itself from antimi-

>>> "Here's a good example of the many inventive ways people bring their dogs [to be vaccinated]," Palmer says.

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[3] Opinion Research Corporation, Heartworm Prevention Medication Study, 2012. Data on file at Merial.
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See brief summary on page 28

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crobial resistance by enacting strict antibiotic controls for meat production is simply "a fool's paradise."

"There's a lot of talk about how we need better inspection of animal products coming into the U.S.," he explains. "You get no argument from me on that. But we need to realize that inspections don't actually solve the problem, because people come and go."

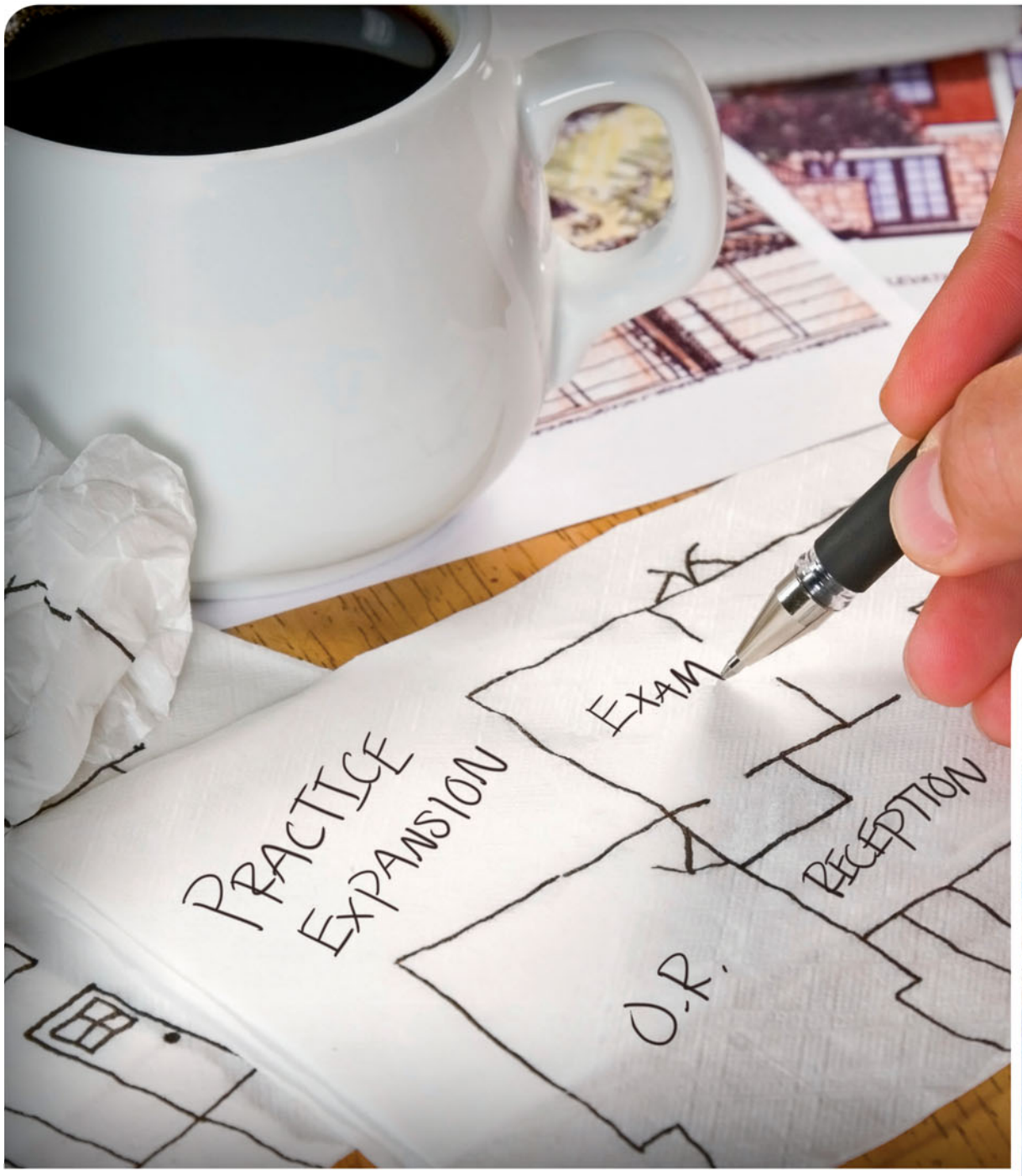
People can pick up antibiotic resistance wherever they are, Palmer continues, especially in areas where antibiotics are used very heavily. "We find antibiotic residues in eggs in Nigeria, for example, without any problem," he says. "So the eggs I'm enjoying in the hotel in Nigeria, the resistance in them shows up in Kansas City 24 hours later. They say a pathogen can travel around the globe in 24 hours. So can antimicrobial resistance."

In fact, in a February article published by the Institute of Medicine of the National Academies, Palmer and WSU colleague Douglas R. Call cited a 2001 study suggesting that antibiotic-resistance traits travel the globe at exponentially *higher* levels than pathogens.

A good example of the complexity of the problem can be found in Denmark, Palmer wrote, where strict inspection and strict laws have dramatically reduced the levels of antibiotics in pork and poultry. Unfortunately, pork and poultry also enter Denmark from other far less careful parts of the world. The emerging question is whether people will be willing to pay a premium for strictly controlled livestock products. The problem is exacerbated in the poorest countries where the dangers of antimicrobial resistance are pitted against the dangers of starvation. "No one can argue this isn't a fantastic achievement for Denmark," Palmer says. "The problem is that the rest of the world doesn't look like Denmark. Only Denmark looks like Denmark. This is great for Denmark, but you can't apply it to India. It isn't going to work."

The world doesn't just want cheap food; it needs cheap food, Palmer says. In particular, it needs cheap protein sources. "It's very easy to say, 'Well, Nigeria should really crack down and regulate their antimicrobial use in animals,'" he says. "They should. But that's probably not their highest priority."

In rural sub-Saharan Africa, the typical livestock-producing family owns an average of 10 chickens. They don't use antibiotics to protect their investment. If they lose a chicken, they get another from a neighbor and they're back in business. Tyson Foods, on the other hand, has an enormous investment to protect, so the company spends heavily on the latest biosecurity techniques. A slip-up would cost it millions. But in the developing world, midlevel producers are emerging with flocks of 500 or 1,000 birds, and that's where the most frightening problem lies, Palmer says. "Biocontainment is now replaced by antibiotics," he explains. "The danger is not only amounts, but which antibiotics they use. Specifically, chloramphenicol is used in Nigeria. It's sold on the street. You can find it in the eggs. And



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it's been banned for any use in food animals in the U.S. for 30 years."

This challenge, Palmer says, will confront veterinarians who work on the world stage for decades. Global population is expected to peak around 2050, he says, so enormous pressure will build worldwide for animal protein production. If better systems aren't developed, if new ideas aren't brought to bear on the problem, if political will isn't strengthened, Palmer says, much of that animal protein "will be covered in antibiotics."

Taking the world stage

Marguerite Pappaioanou, DVM, MPVM, PhD, a retired captain in the U.S. Public Health Service, sounded the same alarm 11 years ago when she spoke to veterinary students at University of California-Davis in a talk titled "Improving Global Health in the 21st Century: Veterinary Medicine Steps Up to the Plate to Protect and Promote Human Health and Well-Being." Her topics in that address mirror Palmer's today—zoonotic disease, antimicrobial resistance, the delicate but dangerous balance between public health and the developing world's need for animal protein.

Today, Pappaioanou says the global challenges are no less onerous. It's a battle Pappaioanou has been fighting for decades. She joined the Centers for Disease Control in 1983 and has conducted research in Bolivia, Mexico, Cameroon, Cyprus and the Philippines. She now serves as the CDC liaison to the Food and Drug Administration for food safety. In February she moderated a panel in Bangkok, Thailand, telling the audience that outbreaks of zoonotic disease could be stopped if authorities would just cooperate across borders.

Forging cooperation and political will are also roles veterinarians need to play on the world stage, she says. While making a case for the strengths veterinarians bring to the table, she has charged the profession in the past with being reluctant to provide leadership on controversial issues and risk speaking out—waiting to be invited by others to participate fully on the global front.

"I spent many years working with other professions and and you just didn't see them hanging back," she says. "They'd just do it. They'd see a need and they didn't wait to be asked."

However, she says, the veterinary profession is making progress, particularly in veterinary schools where alliances with public health and human medical schools are more prevalent and among recent graduates who are opting for the sort of work Palmer does.

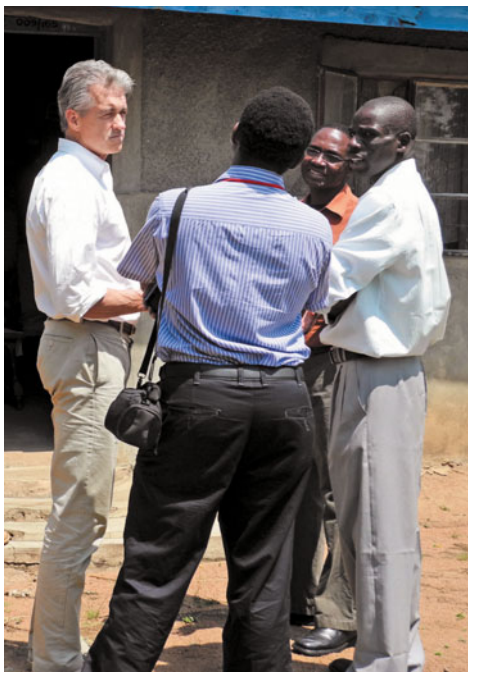
Obviously, Palmer didn't need to be cajoled to get involved. He thinks, as Pappaioanou does, that veterinarians should be part of the global think tank addressing these daunting problems. Their biomedical training is precisely the expertise needed in Kenya and Nigeria and elsewhere, he says, to help improve human health and to search for novel solutions to problems like rabies, developmental stunting and antimicrobial resistance.

And he thinks many younger students entering veterinary colleges just need nurturing to break outside the norm of clinical practice and devote their careers to these broader issues. But he's not so hopeful about the way many veterinarians have been reluctant to take their talents to the dance.

In fact, he uses the same metaphor as Pappaioanou to describe the role veterinarians have been reluctant to play.

"If you are a professional," Palmer asks, "are you going to stand at the corner of the dance hall and wait for somebody to ask you to dance? If you do, you're not getting the job done. You've got to actually step out there and make these things happen. I think we need to do a better job of taking the talents of our profession and encouraging veterinarians to push beyond those limits and not be afraid to use not only their biomedical training but their full understanding of the issues, of political systems and economics, across the board."

In fact, he emphasizes, the health and future of the planet require nothing less than that. dvm360



>>> Veterinarians from the Allen School (Palmer is at left) discuss research addressing household welfare and health as related to animal ownership in Asembo, Kenya.

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'The medicine is the *easy part*'

How veterinary medicine can *save* the *world*

PART 2: PROTECTING THE PLANET

Volunteers with World Vets learn that caring for donkeys requires earning their Maasai owners' trust. *By Jessica Vogelsang, DVM*

"This doesn't look much like a marketplace," Teri said. I was inclined to agree.

Our red pickup emblazoned with "Arusha Society for the Protection of Animals (ASPA)" had pulled to a stop in what appeared to be the middle of nowhere. To our left, a dusty, empty crossroads led off into the African bush. To the right, a handful of donkeys lackadaisically browsed the ground for something to eat. Teri and I jumped out of the pickup bed, wiped dust from our brows, and looked around for the Maasai we were expecting to meet us.

>>> **First a harness, then medicine.** Teaching a Maasai boy to fashion a simple harness for his donkey out of twine (rather than beating the animal with a stick) was an important first step in gaining his trust.

"Did we come on the wrong day?" we asked our host. Livingstone Masija, the ASPA director who'd arranged the week's mobile clinics, laughed. "It's early," he said.

I'd arrived in Tanzania earlier in the week along with seven other volunteers with World Vets, an international veterinary aid organization that sends more than 50 teams a year to places around the globe. While many World Vets trips focus on small animals, this project was all about donkeys.

When I'd applied, I'd made it clear I was a small animal practitioner with limited equine experience. I needn't have worried. As I was to learn, the medicine is often the easy part.

International volunteerism in both human and veterinary medicine can be a contentious topic, questions of motive and long-term impact dogging those who set out with their hearts in the right place but no idea of the intricacies of arranging a multinational medical mission. Can the supplies be legally exported from the U.S. and imported into the target country? Is there a local organization with a specific goal we can help with? Will local veterinarians resent the team's work? And most of all, do the locals even want us there?

To these ends, World Vets has always worked closely with local aid organizations that can provide direction on the work most needed. In this case, Masija had asked us to provide preventive care to the donkeys of the nomadic Maasai, who use the animals extensively as beasts of burden.

We'd arrived with boxes of vaccines, dewormers, medications and harnesses. But first we needed some patients.

As Masija promised, the road soon began to show signs of life. Maasai wrapped in bright colors strode behind donkeys loaded with barrels and sacks, setting them down along the side of the road to expose gallons of grains and beans. Before long an entire market had popped up around us.

We looked at the donkeys wandering by and saw lots of skin lesions: abrasions caused by the friction of the twine holding barrels to their back. Masija, a gentle man with a generous smile, gestured for us to follow as he strode into the market. We slung our backpacks filled with supplies over our shoulders and followed him.

Our group of scrub-clad *mzungu* drew plenty of attention, some curious, some mistrustful. Our endeavors would have been next to impossible without Masjia to translate and explain what we were doing. Dewormers were accepted almost universally. Vaccines were a tougher sell.

One of our group was looking at a lesion on the back of a donkey tied to a fence when a woman came up, waving her hands forcefully and yelling. We backed away. Masija went up to the woman and spoke to her, and she shook her head. A younger woman next to her also shook her head, the hoops on her ears swaying as she turned her back and walked away.

Masija then walked over to us. "She says the last time a veterinary group came through, they gave her animals bad vaccines and the animals died. Her husband beat her. She doesn't want that to happen again."

As a fixture in the area, Masija had a much deeper understanding than we did of this community. He rushed after a 12-year-old who was beating his donkey with a stick, prodding him to move down the road. The donkey was darting back and forth, dropping grain from his sack every time he changed directions.

Masija pulled him over to our alcove and, picking up a piece of twine, expertly tied it into a harness. Slipping it over the donkey's head, he demonstrated how much easier it was to direct the animal with this gentler approach. The boy's eyes lit up and he took more twine, enough for the rest of his donkeys.

"You see?" said Masija. "If they believe what we are doing makes the animals better workers, they agree to let us help them." By elevating the economic value of the animal, Masija says, he is more likely to get buy-in about the intrinsic worth of animal welfare. First a harness, then medical care. The building of trust, he told us, doesn't take hours. It takes years.

Bit by bit we worked our way through the market, weaving grain sacks into pads to cushion the donkeys' backs, drawing crowds of giggling children over to watch us for a minute, an hour. Masija blew up a basketball and tossed it into the road, laughing as the children chased it. Kyle, a member of our group who is also an avid runner, gave his shoes to a man who was wearing strips of leather tied to his feet. In an unusual show of emotion for a Maasai, the man gave Kyle a huge hug and asked me to take a picture.

As we piled our emptied syringes and bottles into the truck at the end of the day, I marveled at the challenges of the day. The medicine was simple. The trust building, however, was going to take some time. Watching the kids run after our truck, waving and smiling, I decided we were off to a good start. **dvm360**

Dr. Jessica Vogelsang, known as Dr. V. among her readers, is a regular contributing author for a number of well-known publications. Visit her blog at pawcurious.com.

PHOTO COURTESY OF DR. JESSICA VOGELSANG

Canine Cushing's Case Files:
THE INS AND OUTS OF DETECTION AND TREATMENT

Hyperadrenocorticism affects many adult dogs. Whether the disease is pituitary-dependent (80% to 85% of spontaneous cases) or adrenal-dependent (15% to 20% of cases), the clinical and laboratory abnormalities associated with it result from chronic hypercortisolemia. Clinical signs of hyperadrenocorticism at the time of diagnosis can vary widely, and they develop so gradually that owners often mistake the signs for "normal" aging. Being aware of the more subtle signs of canine hyperadrenocorticism can be key to early diagnosis and initiation of therapy.

Whenever possible, pituitary-dependent hyperadrenocorticism and adrenal tumors should be differentiated to help guide therapy and patient monitoring. Early diagnosis and management of canine hyperadrenocorticism may not only improve the patient's clinical signs but may also keep the more severe consequences of Cushing's syndrome from developing.

COMMON CLINICAL SIGNS OF CANINE HYPERADRENOCORTICISM

- Polyuria (owners may complain of housesoiling)
- Polydipsia
- Polyphagia (owners may complain of food stealing or excessive begging)
- Alopecia
- Recurrent skin disease
- Lethargy
- Pendulous abdomen
- Excessive panting
- Thin skin

Other clinical signs may include hypertension, comedones, seborrhea, heat intolerance, hyperpigmentation, calcinosis cutis, bruising, facial paralysis, failure to cycle, clitoral hypertrophy, testicular atrophy, poor hair regrowth after surgery, recurrent urinary tract infections, demodicosis in a middle-aged or older dog, and a first incidence of pyoderma in an older dog.

Case file: HOLLY

8-year-old spayed female German shepherd weighing 33.3 kg (73.3 lb)

Patient history and initial referral findings

Holly's primary care veterinarian had diagnosed hyperadrenocorticism based on her history and clinical signs and the results of routine laboratory tests and a low-dose dexamethasone suppression test. Holly was treated for hyperadrenocorticism with trilostane (75 mg given orally once a day) obtained from a compounding pharmacy.

Six months later, Holly developed lethargy, vomiting, and abdominal distention and had markedly increased hepatic enzyme activities. The trilostane was discontinued and Holly was referred to MidWest Veterinary Specialty Hospital for an abdominal ultrasonographic examination. Peritoneal effusion secondary to a ruptured gallbladder mucocele was identified, and Holly was successfully managed with cholecystectomy and appropriate supportive critical care.

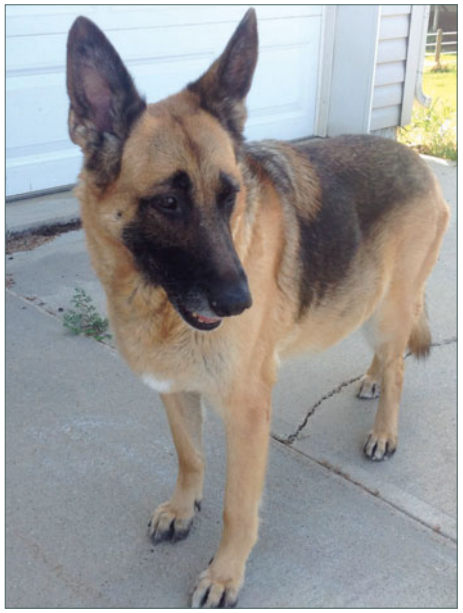


FIGURE 1. When presented, 8-year-old Holly was experiencing increased panting, polyuria, and polydipsia. She had patchy dorsolateral truncal alopecia and a pendulous abdomen.

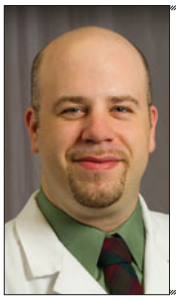
Follow-up referral evaluation

About one month after recovery from the cholecystectomy, Holly was again presented to MidWest Veterinary Specialty Hospital for evaluation of hair loss, increased panting, and polyuria and polydipsia. Holly's owners stated that she was otherwise clinically normal at home. Abnormalities identified on physical examination were patchy dorsolateral truncal alopecia with cutaneous hyperpigmentation, a pendulous abdomen, and moderate dental tartar with gingival inflammation (*Figure 1*).

The results of a serum chemistry profile revealed increased alkaline phosphatase, alanine aminotransferase, asparagine aminotransferase, gamma-glutamyl transferase, and creatine kinase activities; hyperbilirubinemia; and hypercholesterolemia. The complete blood count results identified leukocytosis with a mature neutrophilia and monocytosis. Urinalysis showed a urine specific gravity of 1.027, bilirubinuria (1+; reference range = negative) and trace proteinuria (< 100 mg/dl; reference range = negative). All of these findings were deemed consistent with hyperadrenocorticism.

Confirmatory test results

The results of an adrenocorticotropic hormone (ACTH) stimulation test revealed a baseline cortisol concentration of 12.4 µg/dl (reference range = 2 to 6 µg/dl) and a one-hour post-ACTH cortisol concentration of 28.7 µg/dl (reference range = 8 to 18 µg/dl). The abnormal ACTH stimulation test results in combination with Holly's history, clinical signs, and other abnormal laboratory test results confirmed hyperadrenocorticism.



Christopher G. Byers, DVM, DACVECC, DACVIM
Dr. Byers is the faculty criticalist/internist at MidWest Veterinary Specialty Hospital in Omaha, Neb., and is an adjunct associate professor in the Department of Clinical Sciences at Kansas State University's College of Veterinary Medicine.

The previous abdominal ultrasonographic examination and direct adrenal visualization at the time of exploratory laparotomy for cholecystectomy identified that both adrenal glands were normal size and shape, which is consistent with pituitary-dependent hyperadrenocorticism. Medical therapy options were discussed with the family, who elected treatment with VETORYL® Capsules (trilostane).

Treatment and follow-up

Treatment with VETORYL Capsules was begun at a dose of 3.6 mg/kg given orally once daily in the morning with food. The family was advised to keep a daily journal to document Holly's frequency of panting, water consumption, urination frequency, appetite voracity, and activity level. They were also asked to document any episodes of vomiting or diarrhea and to call with any questions or concerns. Holly's family was also advised to consult with her primary care veterinarian regarding prophylactic dental care.

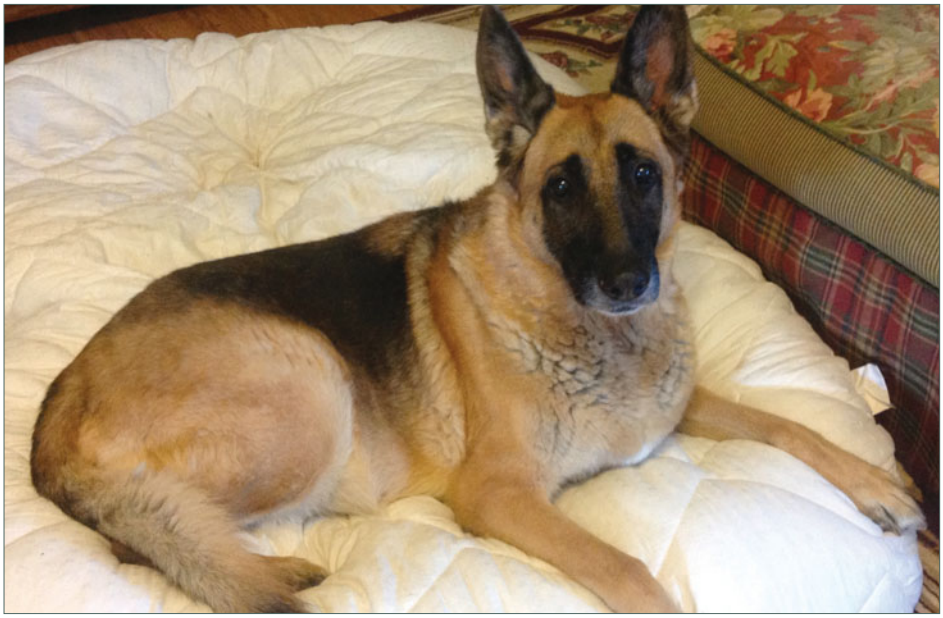


FIGURE 2. At her three-, six-, and nine-month post-treatment recheck appointments, Holly was clinically normal.

Initial follow-up visits

At the two-week recheck visit, Holly's family reported reductions in her panting frequency, polydipsia, and polyuria. Her appetite was normal, and she had no episodes of vomiting or diarrhea. Holly's activity level was unchanged and still normal. A post-ACTH stimulation cortisol concentration measured 4.5 hours after administration of her VETORYL Capsules dose was 1.5 µg/dl, indicating adequate inhibition of glucocorticoid production. Based on these results and the improvement in her clinical signs, the initial VETORYL Capsules dosage was continued, and Holly was scheduled for a 30-day post-treatment recheck examination.

At the subsequent visit, the family reported Holly was doing exceptionally well at home with resolution of her excessive panting, polyuria, and polydipsia. Furthermore, her hair coat was markedly improved in fullness and luster, hyperpigmentation was not evident, and her abdomen was not pendulous. A serum chemistry profile revealed that her liver enzyme activities were improved, with only an elevated gamma-glutamyl transferase activity (previously 185 U/L; this visit = 15 U/L; reference range = 0 to 14 U/L). No abnormalities were identified on a complete blood count or urinalysis. A post-ACTH stimulation cortisol concentration measured four hours after the VETORYL Capsule dose was 1.7 µg/dl, indicating adequate inhibition of glucocorticoid production. The initial VETORYL Capsules dosage was continued, and a 90-day post-treatment recheck examination was scheduled.

Holly's long-term response

At her three-, six-, and nine-month post-treatment recheck visits, Holly continued to be clinically normal (*Figure 2*). The ACTH stimulation tests revealed post-ACTH cortisol concentrations of 3.1 µg/dl at three months, 2.3 µg/dl at six months and 2.3 µg/dl at nine months of VETORYL Capsules treatment. Holly was treated successfully by her primary care veterinarian for a presumptive bacterial urinary tract infection seven months after starting therapy. No adjustments were made in the VETORYL Capsules treatment protocol.

Dr. Byers' perspective

The use of VETORYL Capsules for the management of pituitary-dependent hyperadrenocorticism readily inhibits glucocorticoid production to promote resolution of common clinical signs caused by hyperadrenocorticism — most notably polyuria, polydipsia, increased panting, and hair coat changes — and biochemical derangements associated with this disease. The use of properly dosed VETORYL Capsules is strongly recommended rather than compounded trilostane to ensure maximal efficacy and safety during medical management of hyperadrenocorticism.[1]

When using VETORYL Capsules, encourage families to keep a detailed journal of their dog's daily activities, appetite, and thirst. In addition, advise owners to immediately report any possible adverse events, such as hyporexia or anorexia, vomiting, and diarrhea. Information about a patient's clinical condition is essential when interpreting post-ACTH stimulation cortisol concentrations and making recommendations for VETORYL Capsules dosage adjustments.

VETORYL® Capsules (trilostane) are the only FDA-approved drug indicated for the treatment of pituitary-dependent and adrenal-dependent hyperadrenocorticism (PDH and ADH) in dogs. Trilostane, the active ingredient, blocks hormone production in the adrenal cortex by competitive enzyme inhibition and is clinically effective in treating dogs with PDH and ADH; however, it does not affect tumor growth.

- The use of VETORYL Capsules is contraindicated in dogs that have demonstrated hypersensitivity to trilostane.
- Do not use VETORYL Capsules in animals with primary hepatic disease or renal insufficiency.
- Do not use in pregnant dogs. Studies conducted with trilostane in laboratory animals have shown teratogenic effects and early pregnancy loss.
- The most common adverse reactions reported are poor/reduced appetite, vomiting, lethargy/dullness, and weakness.
- Occasionally, more serious reactions, including severe depression, hemorrhagic diarrhea, collapse, hypoadrenocortical crisis or adrenal necrosis/rupture may occur, and may result in death.

REFERENCE

1. Cook AK, Nieuwoudt CD, Longhofer SL. Pharmaceutical evaluation of compounded trilostane products. *J Am Anim Hosp Assoc* 2012;48:228-233.

This case was solicited from the prescribing veterinarian and may represent an atypical case study. Similar results may not be obtained in every case.

Compromising on your Cushing's treatment could have a compounding effect.

VETORYL® CAPSULES (trilostane) are the only FDA veterinary-approved treatment for pituitary-dependent and adrenal-dependent hyperadrenocorticism. So when you choose Vetoryl Capsules, you can be confident knowing you're not taking unnecessary risks with the health of your patients or your practice.

	Vetoryl Capsules (trilostane)	Compounded trilostane
FDA approved for veterinary use	YES	NO
Proven safety and efficacy in dogs	YES	NO
Consistent strength, purity, and quality in every dose	YES	NO
Veterinary technical support, adverse event reporting	YES	NO
Legal liability to clinic	NO	**YES**

Vetoryl Capsules are available in doses for all sizes of dogs. Contact your veterinary distributor to order today or visit Dechra-US.com to learn more.

"Trilostane content of compounded capsules may vary from the prescribed strength, and dissolution characteristics may not match those of the licensed product. The use of compounded trilostane products may therefore negatively impact the management of dogs with hyperadrenocorticism."[1]

[1]*Pharmaceutical Evaluation of Compounded Trilostane Products (Cook, et al, JAAHA 48:4, Jul/Aug 2012)*

VETORYL® Capsules
(trilostane)

As with all drugs, side effects may occur. In field studies, the most common side effects reported were poor/reduced appetite, vomiting, lethargy, diarrhea, and weakness. Occasionally, more serious side effects, including severe depression, hemorrhagic diarrhea, collapse, hypoadrenocortical crisis, or adrenal necrosis/rupture may occur, and may result in death. VETORYL Capsules are not for use in dogs with primary hepatic or renal disease, or in pregnant dogs. Refer to the prescribing information for complete details or visit www.Dechra-US.com. 01AD-VET47904-1112

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OCTOBER 30-NOVEMBER 6, 2013
2013 Muller-Ihrke Veterinary Dermatology Meeting on Maui

OCTOBER 31-NOVEMBER 2, 2013
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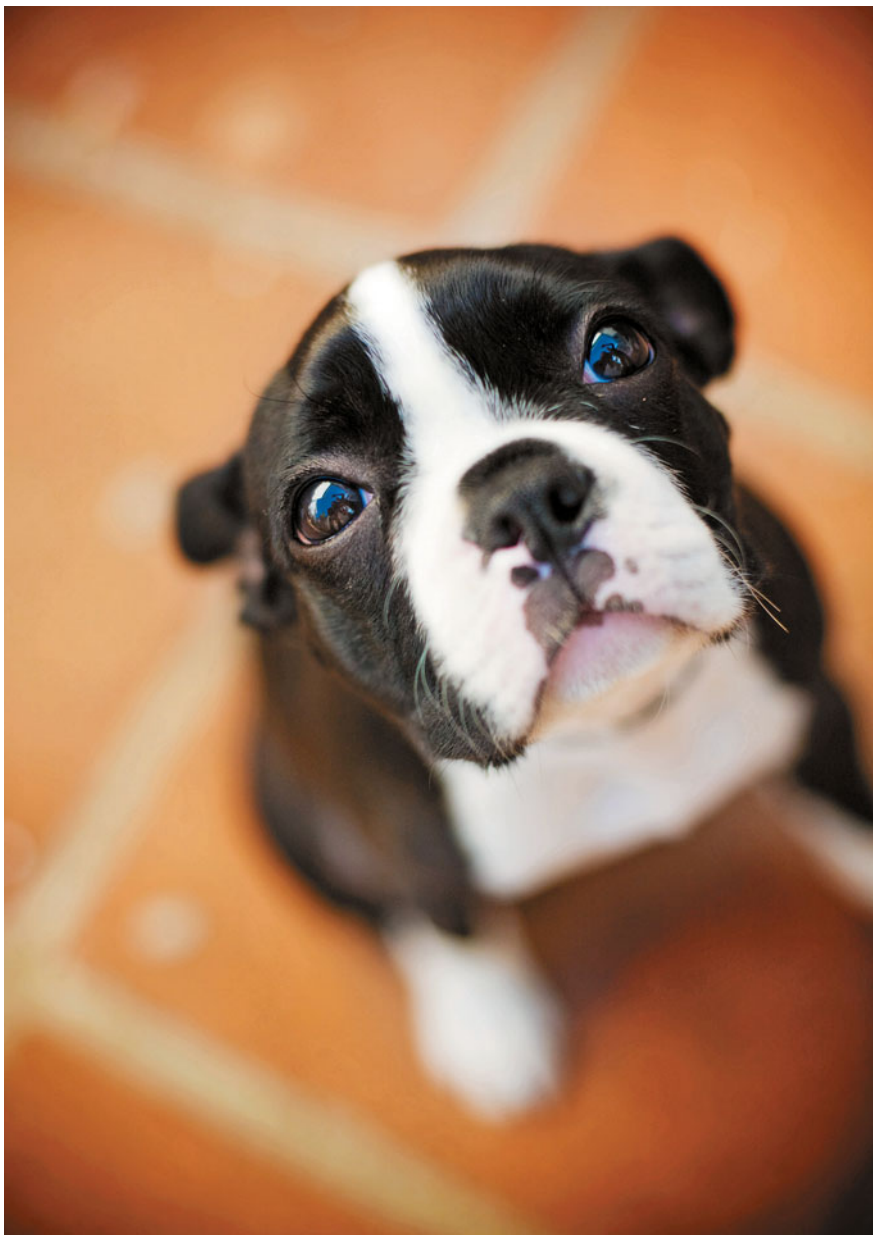
MEDICINE | Behavior

Facing fear HEAD ON

In part 2 of this series, we equip veterinary teams to assess and alleviate fear during veterinary visits to build a more behavior-centered practice—and stronger pet-owner relationships. *By Karen L. Overall, MA, VMD, PhD, DACVB, CAAB*

If you're not conducting routine evaluations for common behavior problems, you're not alone. Taking a proactive approach to behavior is almost nonexistent in most of our practices, yet research suggests that implementing a fear and anxiety assessment at each veterinary visit could go a long way toward preventing relinquishment and suffering in pet dogs and cats.

In part one of this series ("Fear factor: Is routine veterinary care contributing to lifelong patient anxiety?" September 2013 *dvm360*), we discussed dramatic research suggesting that a simple veterinary visit can greatly contribute to a lifetime of fearful behavior, starting with the first puppy or kitten wellness exam. The good news: Changing a fearful practice environment into a fun, rewarding and behavior-centered experience is easier than you think.



>>> A trip to the veterinarian doesn't have to be a painful experience for pets—or pet owners. By incorporating a fear and anxiety assessment into each patient visit, you'll create a better experience for everyone.

The fearful 10 percent

A study of 102 puppies between 8 and 16 weeks of age involved videotaping a standardized veterinary examination for each dog.[1] The exam included watching the puppy unrestrained on the floor, performing a physical exam on the table and doing a series of manipulations on the floor. The authors used the videos to define and classify the signals and behaviors.

The findings were striking: Most puppies exhibited what we think of as typical puppy exploratory and social behaviors, but about 10 percent of the pups did not exhibit exploratory behavior, did not warm to interactions or did not want to be touched and handled by the staff. A follow-up study, not yet fully published, reexamined these same dogs under the same conditions at 18 months of age, and virtually all the pups that had been fearful when younger were fearful as adults—and fearful in the same contexts.[2] Some of the dogs that were considered normal pups had developed behavioral concerns—fears among them.

So what can we do to alleviate these emerging behaviors? First, we can assess puppies for behavioral propensities in a repeatable manner (here's a hint: the exam takes the same amount of time whether or not there's video camera mounted on the wall or on a tripod). We can think of the pup's behaviors in terms of risk assessment and explain any concerns to clients. We can disabuse the clients—and our staff members—of the common notion that these dogs will "grow out of it," as they often don't. In fact, to assume they will is to potentially condemn them to a lifetime of mental suffering. Finally, we can treat these fearful pets early and often and explain that treatment is always best when brains are developing.

THINKSTOCK

Assigning a 'stress value' to dogs

Use this scale to rate pets' stress levels during each of the exam steps listed below. Any staff member can be trained to complete this task, which should be done at each visit.

STRESS VALUE	DOG'S BEHAVIOR AND APPEARANCE
0	Extremely friendly, outgoing, solicitous of attention
1	Calm, relaxed, seemingly unmoved
2	Alert but calm and cooperative
3	Tensed but cooperative, panting slowly, not very relaxed, still easily led on lead but may need encouragement
4	Obviously very tensed, anxious, shaking, whining, will not sit/lie down, panting intensely, difficult to maneuver on lead and encouragement doesn't help
5	Extremely stressed, barking/howling, tries to hide, needs to be lifted up or brutally forced (please do not do this) when pulled by lead

CLINIC ENTRY: Assess the dog's behavior upon entering the veterinary practice and in the waiting room.

0 1 2 3 4 5

WEIGH-IN: Assess the dog's behavior upon being weighed.

0 1 2 3 4 5

ENTERING EXAM ROOM: Assess the dog's behavior upon being brought into the exam room.

0 1 2 3 4 5

Fast, effective assessment

We cannot accomplish a behavior-centered practice that's fun for the patient until we recognize and measure behaviors that are occurring and re-measure them after we have attempted interventions. A study provided some simple assessment scales,[3] which I've expanded and adapted to routine veterinary practice (see the table above; a downloadable packet of these and other scales can be found in the *Manual of Clinical Behavioral Medicine for Dogs and Cats* [Elsevier, 2013] and on the accompanying DVD).

Implementing treatment

Any dog who consistently has a score of 3 or higher needs help, especially if the scores across all three situations agree. Many dogs are fearful of moving scales, but if the dog shows consistent fear in this and the other two contexts, help is warranted. Treatment here is aimed at preventing the suffering that accompanies worsening fear and requires a four-pronged approach:

1. Protection. Protect these pups from situations in which they are overtly fearful. Explain to owners that these are not the pups that should go to soccer games, busy shopping malls or even for a ride in the car if it has to be parked in a lot. Encourage clients to identify sentinel behaviors that are good and sentinel behaviors that are not so good. For example, ask, "Does your dog pull forward confidently with his head and tail up and face relaxed, or does he pull back, ducking his head and tucking his tail?"

2. Encouragement. Encourage behavioral, mental and emotional change for the better. Help owners teach the dogs to sit, relax, take a deep breath and be calm in response to a series of cues. Start in the place they are most secure and practice a series of behaviors so that more than nine times out of 10, they can do them well and happily. Then move to another room.

The rule for expanding the dog's horizons is that you must go at the dog's pace, which may be snail-like. But if you simply force a dog to comply with you despite its distress, you will have rendered the dog worse and caused suffering. An expert (preferably a diplomate of the American College of Veterinary Behaviorists; see dacvb.org) may be helpful in designing this program. Many licensed and certified dog trainers may also be helpful, but beware that operant conditioning does not require calm mental states that are desired for truly distressed pets —it just requires rewarding targeted, repeated behaviors. Help your clients find trainers who understand and act on this distinction.

3. Supplementation. Consider supplementing these dogs with poly-unsaturated fatty acids to increase DHA (docahexanoic acid) and EPA (eicosapentanoic acid). Not only are these polyunsaturated fatty acids essential for normal brain development, but if the laboratory research is correct, they might protect against the oxidative damage[4] that occurs in times of distress.[5] Aim for somewhere in the zone of 1,200 to 1,500 mg/day/dog.

4. Medical intervention. Consider early treatment with antianxiety medication. I have treated pups as young as 5 to 6 weeks of age with such medication, and the change can be dramatic. Laboratory data show that treatment with selective serotonin reuptake inhibitors and tricyclic antidepressants can normalize neuronal migration and pruning in baby mice that either have knockout genes for certain neurotransmitters or that have been selected for more reactive or aggressive behaviors.[6] This result may be due to the neurotrophic effect of continued use of such medications.

All placebo-controlled, double-blind studies of behavioral medication in dogs have shown that dogs taking medication acquire the behavior modification more quickly, which supports the concept of neurotrophic benefits. Given this finding, early combined pharmacological and behavioral treatment may be the key to engendering normal brain development and normal social behavior. And the earlier we intervene, the less suffering and damage we can expect.

We should remember that clients recognize that their animals are ill based on their behavioral changes. We are how we behave. If we use any aspect of behavioral change to inform us about somatic illness, we should also be using such changes to inform us about behavioral illness.

Yet, as so eloquently reported by Roshier and McBride,[7] most veterinarians are not sufficiently comfortable with their knowledge of veterinary behavioral medicine to deliver appropriate care. Of the six veterinarians participating in the study, only two had acquired some training in veterinary behavior or behavioral medicine while in veterinary school, and only one conducted behavioral consultations. Of the 17 areas of behavioral concern about which the veterinarians were specifically asked, *none* of the veterinarians reported *always* discussing any of these issues with clients.

Included in the areas of concern were aggression to people; aggression to animals; training, including housetraining; destruction of property; and issues attendant with geriatric pets.

These issues must be viewed as the lymph nodes of the canine mental health field; we must address them if the dog is not to die or to suffer and be relinquished. Interestingly, clients consider animals exhibiting these concerns to be manageable, treatable and adoptable, until the concerns are deemed severe.[8] "Severe" is what happens when we fail to do our due diligence early.

Assessing and changing our behavior

We must change the way that we behave during consultations to help our fearful patients. We can do this by:

> Not interrupting clients. Clients cannot evaluate our medical skills, but they can evaluate our ability to convey information, to understand their concerns and to show empathy. And our value is assessed by how well we listen. Yet the median and mean lengths of time clients talk before being interrupted by the veterinarian are 11 and 15.3 seconds, respectively.[9] The main reason clients provide incomplete information to closed-ended questions is that we are interrupting them. As a result, the primary concern or key piece of information is often delivered at the end of the appointment when it's least likely to be competently addressed.

The *Manual of Clinical Behavioral Medicine for Dogs and Cats* contains a one-page questionnaire that can be completed by all clients at all appointments and can help owners provide behavioral information in objective terms while also helping veterinarians accurately assess and treat complaints in a data-driven manner.

> Not scaring our patients. We must cease to be part of the problem. In the studies discussed above,[3,10] dogs that had had only positive experiences were less fearful than others. And dogs less than 2 years of age that saw veterinarians frequently were often more fearful than older dogs that saw veterinarians infrequently, suggesting that repeated exposure may enhance fear to a certain age. Another study noted that muzzles interfere with our behavioral and physical assessments.[11] All early fear must become a treatment priority.[1,2]

> Teaching patients to participate. Discuss with owners the importance of encouraging and practicing compliance at home, so at exam time the pet is comfortable with a tip-to-tail examination. And we need to include in every patient record the objective assessment of patient behaviors, as outlined above. We cannot fix what we cannot see, understand or quantify.

> Calling on our understanding of neuroscience. We must incorporate what we know about the neurochemistry and molecular genetics that affect fear, arousal, learning and development into any neuroscience taught in the veterinary curriculum, and here's why:

- Learning of adaptive fear at the neurochemical level in the amygdala and the hippocampus is modulated by cortisol concentrations.
- As cortisol concentrations increase, brain-derived neurotrophic factor (BDNF) increases, which allows molecular memory to be made through the creation of new proteins.
- Fear can be almost instantly encoded because the amygdala is "preadapted" to respond to perceived threats. However, behaviors associated with learning to cope with arousal cannot be encoded at the molecular level if the cortisol concentration is too high.
- An optimal range of cortisol produces an optimal range of BDNF and cytosolic response element binding (CREB) protein.
- Only when CREB and BDNF are within this range is true complex, associative and adaptive learning occurring at the molecular level.[12]

We now know that neurodevelopmental periods interact with absent or excessive stimuli to alter brain function and development. What we do not know is why this area of neuroscience is essentially missing from veterinary education and veterinary medicine when the stakes are so clear and so high. It is incumbent on us to address the single most important aspect of our patients' well-being—their behavioral and mental health needs—using the same rigor and scientific approach that we use to vaccinate patients or treat them for diabetes. It's time to fight fear. **dvm360**

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Dr. Karen L. Overall is a researcher, the editor of The Journal of Veterinary Behavior: Clinical Applications and Research, *and the author of more than 100 publications, dozens of chapters and a new book,* The Manual of Clinical Behavior Medicine for Dogs and Cats.

Part 3 of a three-part series

Questions from the dental trenches: Creating a *streamlined* exam

From creating a good digital radiography template to making sure all pathology is detected, Dr. Beckman has the answers you need.

By Brett Beckman, DVM, FAVD, DAVDC, DAAPM

This article is the conclusion of a three-part series in which I'm answering questions I commonly receive at the end of lectures on veterinary dentistry. In the first two parts, I discussed the practical side of dentistry and focused on dental FAQs about anesthesia, nerve blocks and tooth extractions. Here, I concentrate on how to efficiently obtain and interpret intraoral radiographs, clean and polish teeth and conduct a thorough oral exam, and identify problems.

Q. When taking digital radiographs, how can I get them all to appear on the screen in a consistent order?

A. Templates within the digital software need to be created to accommodate different-sized patients. You can create these templates or have the company representative create them for you under your direction. Orientation options for each spot include *landscape* or *portrait* and *right* or *left*. Portrait orientation is reserved for the incisors. All additional views use landscape orientation. Each spot represents a certain area in the patient's mouth and progresses in the order the radiographs are taken (Figure 1).

If you use a No. 2 digital sensor, small dogs and cats normally require 10 views to complete a whole mouth series that includes all teeth. Therefore, a template is created in the software to correspond to those views. A medium to large dog requires 15 to 16 views (some patients require two maxillary incisor views to get both the right and left sides). A large dog with a dolichocephalic skull conformation or a very large dog will take 19 to 20 views. If you use a size 4 phosphor plate or film, a large dog generally can be imaged with 10 views. Occasionally 15 views are required.

Q. What is the most efficient way to progress from induction to performing necessary therapy in our patients?

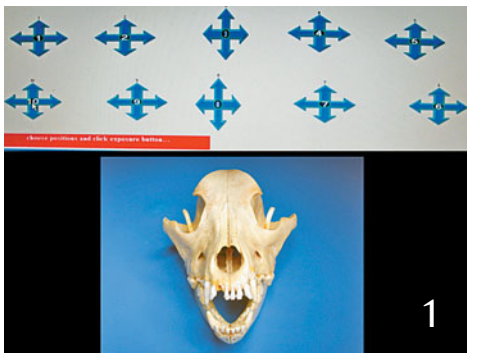
A. Efficiency is extremely important in dentistry, so make preparations accordingly to minimize time spent from induction to therapy. Developing a protocol and maintaining it with every patient is the key. The following protocol is what we recommend.

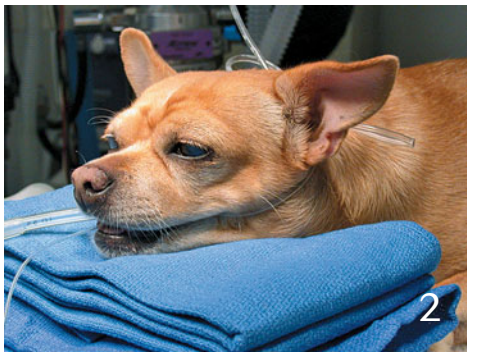
Induction takes place in sternal recumbency, an ideal position for initiation of the full mouth radiographic series. Secure the endotracheal tube behind the ears to allow the greatest access to all arcades. Make sure the cuff is inflated. Place a towel beneath the patient's head to align the palate with the horizontal plane (Figure 2). Meanwhile, the anesthesia technician should ensure the patient is at a deep enough anesthetic plane to allow for intraoral sensor placement while connecting all monitoring and warming devices. All maxillary teeth can be imaged from this position. This also standardizes positioning to allow for the use of predetermined tube head angles and positions, eliminating confusing bisecting angle calculations that have been taught in the past (Figure 3).

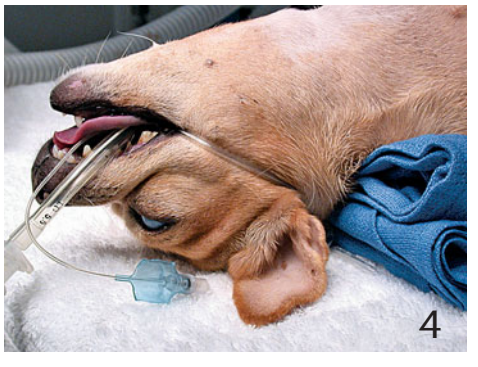
Starting at the last molar in the right maxilla, the dental technician obtains radiographs to correspond with the numbering sequence and proper position in the template in the digital imaging software as described in the answer above. The progression moves from this position to finish at the last molar on the left maxilla. Then place the patient in dorsal recumbency with a towel under its neck to orient the mandibular arcades horizontally (Figure 4). Starting with last molar of the left mandible, the technician can easily complete both mandibular arcades in this one position, using predetermined angles and tube head position.

With templates set up beforehand based on patient size and numbered in the sequence just described, the complete image set can be viewed exactly as it appears in the patient.

With a nicely organized full mouth series, begin viewing the images and recording the findings in the dental chart. Meanwhile the dental technician cleans and polishes the patient's teeth. Once you have concluded a tentative treatment plan based on the radiographs, the technician suspends cleaning and polishing temporarily so that you can perform a thorough oral examination with periodontal probing and combine the gross findings with that of the radiographs to create the treatment plan. The plan is provided to the receptionist for generation while another staff member contacts







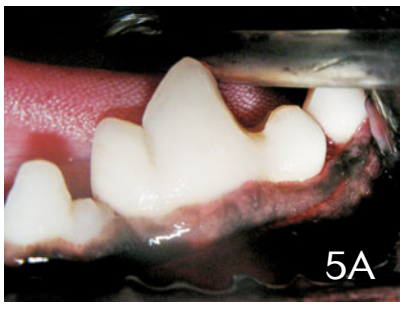
>>> **Figure 1:** An example of a digital imaging software template.

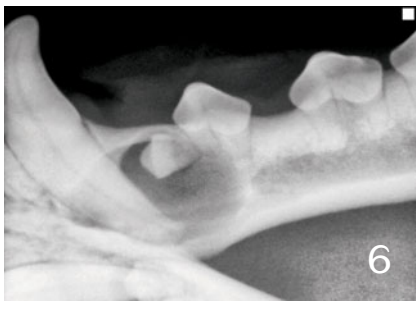
>>> **Figure 2:** Immediately after induction, the patient remains in sternal recumbency with a towel placed under its chin to orient the palate horizontally.

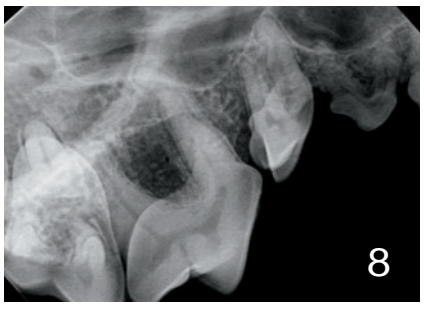
>>> **Figure 3:** The positioning guide shown here greatly simplifies the confusing bisecting angle dilemma by using predetermined angles and tube head positions to complete radiographs quickly and predictably (see http://veterinary-dentistry.net/x-ray-book/).

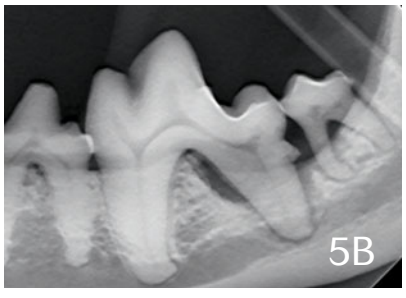
>>> **Figure 4:** A patient in dorsal recumbency, ready for imaging the mandibular arcades.

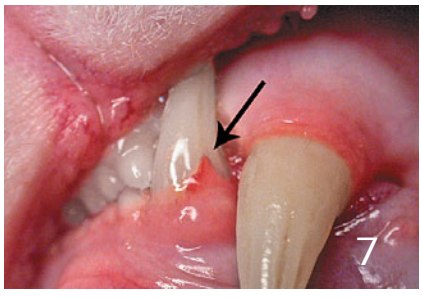
PHOTOS COURTESY OF DR. BRETT BECKMAN

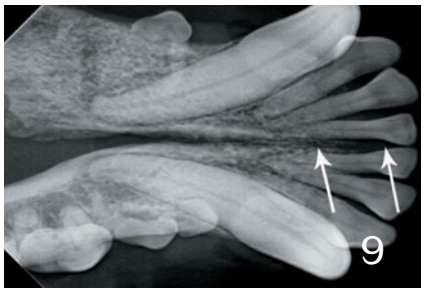












>>> **Figure 5A:** What stage of periodontal disease is represented here? Minimal changes are evident in this region in the awake examination.

>>> **Figure 5B:** The stage of periodontal disease cannot be determined until intraoral probing and particularly dental radiography are completed. This region demonstrates stage 4 periodontal disease affecting the left mandibular first and second molars.

>>> **Figure 6:** A dentigerous cyst on the left mandible of a 3-year-old mixed-breed dog.

>>> **Figure 7:** Tooth resorption on the left mandibular canine tooth (304) of a cat.

>>> **Figure 8:** The orientation of the molars and premolars in this radiograph shows that the nose would be on our right, so it's the patient's right side. (Note that the maxillary crowns will always be pointing down if correctly oriented in the template when taken, just as they appear in the patient.)

>>> **Figure 9:** When evaluating incisors, radiographs are read just as if we were looking at the patient. The side where the arrow is pointing is on our left, so it's the patient's right side. (Note that the mandibular crowns will always be pointing up if correctly oriented in the template when taken, just as they appear in the patient.)

the client. Explain the diagnosis and describe treatment to the client. Meanwhile the technician proceeds with cleaning. The receptionist then relays the estimate to the client. Once confirmation is obtained to proceed, administer nerve blocks. The technician completes cleaning and polishing, and you can then begin therapy. Your goal from induction to the beginning of treatment should be 30 minutes.

Q. Should we set our fees based on the stage of periodontal disease?

A. The stage of periodontal disease can only be determined on a tooth-by-tooth basis. Many patients have all four stages existing concurrently. Furthermore, the stage of periodontal disease for any given tooth cannot be determined without an accurate evaluation of attachment loss. This can only be determined after dental radiography and probing, which is done under general anesthesia (Figures 5A and 5B). Not only is basing fees on periodontal staging impossible, it only serves to confuse staff and clients.

An oral diagnostic evaluation estimate should be standardized for all patients with periodontal disease based on full mouth radiography, preoperative diagnostics, anesthesia, monitoring, cleaning and polishing. Educate clients with pictures and radiographs of expected pathology and advise them that they should expect that such pathology exists in their pets unless the diagnostic evaluation proves otherwise. Further instructions include the need to contact the clients once the diagnostic evaluation is completed to discuss the treatment plan and to update the estimate accordingly. The staff should stress to clients that treatment beyond cleaning is very common and should be expected. This is enforced at the initial consultation with pictures of the oral cavity of other patients that look normal or have minor pathology but have profound radiographic bone destruction (Figures 5A and 5B). These are common and easy to archive, so keep examples of these images and radiographs readily available.

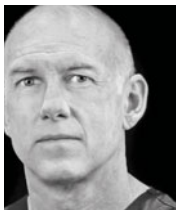
Q. Aside from periodontal disease, what other common oral conditions should we be looking for?

A. One commonly missed abnormality is missing teeth. Be sure to fully evaluate each patient and confirm that a complete arcade is present. Missing teeth may not truly be missing but rather unerupted in the mandibular or maxillary bone. Unerupted teeth have a strong tendency to develop cysts called *dentigerous cysts* that expand to destroy bone and compromise adjacent teeth (Figure 6).

Small lesions at the gingival margin in cats often indicate tooth resorption (Figure 7). Although a thorough oral exam is not possible in all cats, magnification will help detect these painful lesions while still in the early stages. The mandibular third premolar is the most commonly affected tooth and requires moving the tongue lingually to view.

Q. How can we easily determine which side of the patient we're looking at on a radiograph?

A. A radiograph that's taken intraorally will always be properly oriented and ready for evaluation if radiographs are taken in the correct order as set up in the template. The maxillary crowns point down; the mandibular crowns point up. When viewing all views except the incisor views, I ask myself this question: "Is the patient's nose to my right or to my left?" If the nose is to your right, it's the patient's right side (Figure 8). If the nose is to the left, it's the patient's left side. When viewing the incisors on an incisor view, remember it's just as if you were face to face with the patient. Your right side is the patient's left side and vice versa. So if I'm evaluating incisors on an incisor view on the left side of a radiograph it's the patient's right side (Figure 9). dvm360



Dr. Brett Beckman lectures internationally on veterinary dentistry and sees patients at Affiliated Veterinary Specialists, Orlando, Fla.; Florida Veterinary Dentistry and Oral Surgery, Punta Gorda, Fla.; and Animal Emergency Center of Sandy Springs, Atlanta. Find out more at veterinarydentistry.net.

Part 4 of a multipart series

Using urine specific gravity values to localize azotemia

See how this parameter, combined with clinical signs and other findings, can help you pinpoint where disease is occurring. *By Carl A. Osborne, DVM, PhD, DACVIM, and Eugene Nwaokorie, DVM, MS*

In previous issues of *dvm360* (see the **dvm360.com** box below left), we discussed various aspects of urine specific gravity values and their implications on patient health. Here, we discuss urine specific values and localization of azotemia.

Keep in mind that some azotemic cats with primary renal failure retain comparably greater urine concentrating capacity than dogs do. In dogs with progressive disease resulting in primary renal failure, azotemia usually follows loss of the ability to concentrate urine to a specific gravity of at least 1.030. In some cats with primary renal failure, azotemia may precede loss of the ability to concentrate urine to values of 1.040 to 1.045.

Prerenal azotemia

Causes and pathogenesis. Extraurinary diseases may cause varying degrees of alteration in glomerular filtration because of reduced renal blood flow. Inadequate perfusion of normal glomeruli with blood, regardless of cause, may cause prerenal azotemia.

Prerenal azotemia is initially associated with structurally normal kidneys that are capable of quantitatively normal renal function, provided compromised renal perfusion is corrected before the onset of ischemic nephron damage. Progression of prerenal azotemia to intrarenal (primary) renal failure due to persistent ischemia prolongs and reduces the likelihood of complete recovery.

Consider prerenal azotemia if abnormal elevations in blood urea nitrogen (BUN) and creatinine concentrations are associated with adequately concentrated urine (1.035 in dogs; 1.040 in cats) in patients with no specific evidence of generalized glomerular disease. Adequately concentrated urine in association with azotemia indicates that enough functional nephrons are present to prevent primary renal azotemia. Significantly elevated BUN or creatinine concentrations due to primary renal failure cannot be detected in dogs until about 70 to 75 percent of the nephron population is nonfunctional. Elevated urine specific gravity associated with prerenal azotemia probably reflects a compensatory response by the body to combat low perfusion pressure and blood volume by secreting antidiuretic hormone (and possibly other substances) to conserve water filtered through glomeruli. Appropriate volume replacement therapy to restore renal perfusion is typically followed by a dramatic drop in urea and creatinine concentrations to normal in about one to three days.

Another form of potentially reversible prerenal azotemia associated with primary renal disease may develop in patients with glomerulonephropathy and severe hypoalbuminemia. At the level of the glomerulus, hypoalbuminemia enhances the glomerular filtration rate because of reduced colloidal osmotic pressure. However, decreased renal blood flow and glomerular filtration that occur in association with a marked reduction in vascular volume secondary to a reduction in colloidal osmotic pressure result in a proportionate degree of retention of substances normally cleared by the kidneys (e.g., creatinine, urea). These two mechanisms have opposite effects on glomerular filtration. So carefully interpret an abnormal increase in BUN or creatinine concentration (or a reduction in creatinine clearance) in hypoproteinemic nephrotic patients. Azotemia is not indisputable evidence of severe primary glomerular lesions since a component of the azotemia may be associated with a potentially reversible decrease in renal perfusion caused by hypoalbuminemia.

Diagnosis. Diagnosis of prerenal azotemia is based on the following:

- Elevated serum BUN or creatinine concentrations
- Oliguria
- High urine specific gravity (1.035 in dogs; 1.040 in cats) or osmolality
- Detection of underlying cause
- Rapid correction of azotemia after administration of appropriate therapy to restore renal perfusion.

Prognosis. The prognosis of prerenal azotemia depends on reversibility of the primary cause. The prognosis is favorable for renal function if perfusion is rapidly restored. However, complete loss of renal perfusion in excess of two to four hours may result in generalized ischemic renal disease. With the exception of shock, this degree of reduced renal perfusion is uncommon. Thus, the onset of generalized renal disease would be expected to require a longer period of altered renal perfusion.

Postrenal azotemia

Pathogenesis. Diseases that prevent urine excretion may cause postrenal azotemia. The kidneys are structurally normal initially and capable of quantitatively normal function provided the underlying cause is corrected. However, if the underlying cause persists, death from alterations in water, electrolyte, acid-base and endocrine balance, in addition to metabolic waste product accumulation, will occur within a few days. If urine outflow is only partially obstructed, allowing the patient to survive for a longer time, varying degrees of hydronephrosis may subsequently occur.

Causes. Complete urine outflow obstruction (i.e., obstruction in urethra, bladder, or both ureters) for more than 24 hours usually results in postrenal azotemia. Unilateral ureteral occlusion (an example of renal disease) is not associated with azotemia unless generalized disease of the nonobstructed kidney is also present. Azotemia resulting from excretory pathway rupture (usually the bladder) is primarily related to urine absorption from the peritoneal cavity. Unless damaged as a result of hypovolemic shock or trauma secondary to cause of the excretory pathway rupture, the kidneys are structurally and functionally normal.

Diagnosis. A diagnosis of postrenal azotemia is based on the integration of clinical findings. Lesions causing urine outflow obstruction are commonly associated with:

- Elevated serum BUN and creatinine concentrations
- Oliguria or anuria, dysuria and tenesmus
- Obstructive lesions detected by physical examination (e.g., urethral plug, herniated bladder), radiography, ultrasonography, etc.

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The whole story

Visit **dvm360.com/Osborne** for the previous articles in this series:

- "How specific is urine specific gravity?" March 2013
- "Urine specific gravity measurement and interpretation," May 2013
- "When urine specific gravity values go awry," July 2013

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Session Break

9:30 – 10:50 AM
Debra Zoran,
DVM, PhD, DACVIM
Feline nutrition: Understanding how to feed cats for obesity prevention and weight management

10:50 – 11:00 AM
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> Variable urine specific gravity values

Rupture of the excretory pathway is commonly associated with:

> Progressively elevated serum BUN or creatinine concentrations
> Progressive depression, painful abdomen, ascites
> A history of trauma and associated physical examination findings
> Inability to palpate the urinary bladder
> Detection of a modified transudate or exudate by abdominocentesis
> Abnormalities detected by ultrasonography or retrograde contrast (positive or negative) cystography or urethrocystography.

Because of variability, the urine specific gravity of patients with postrenal azotemia is not relied on to the same degree for assessing renal function as it is in patients with primary renal and prerenal azotemia.

Prognosis associated with obstructive lesions. If the patient has total obstruction to urine outflow for three to six days, death from uremia will occur caused by alteration of fluid, acid-base, electrolyte, nutrient and endocrine balance, as well as accumulation of metabolic waste products. Death usually occurs before significant hydronephrosis has time to develop. The prognosis is favorable if the obstructive lesion or lesions are rapidly removed. The long-term prognosis depends on the reversibility of the underlying cause.

Prognosis associated with excretory pathway rupture. If a persistent rent in the excretory pathway results in progressive azotemia, the patient will likely die if the rent is not repaired. The prognosis for recovery of adequate renal function is favorable if the rent is repaired or heals. The long-term prognosis depends on the reversibility of the underlying cause.

Primary intrarenal azotemia

Pathogenesis. Intrarenal azotemic renal failure may be caused by many disease processes that destroy about three-fourths or more of the parenchyma of both kidneys. Depending on the disease's biologic behavior, primary renal failure associated with intrarenal azotemia may be reversible or irreversible and acute or chronic. Chronic irreversible azotemic renal failure is usually slowly progressive.

Diagnosis. In dogs, at least two-thirds of the nephron mass must be impaired if a dehydrated patient has impaired ability to concentrate urine. Total loss of ability to concentrate and dilute urine does not always occur as a sudden event but often develops gradually. Thus, a urine specific gravity between 1.007 to 1.029 in dogs or 1.007 to 1.039 in cats associated with clinical dehydration or azotemia is indicative of intrarenal azotemia. Total inability of the nephrons to concentrate or dilute urine (so-called *fixation of specific gravity* or *isosthenuria*) results in the formation of urine that is similar to that of glomerular filtrate (approximately 1.008 to 1.012).

If a hydrated patient has elevated BUN and creatinine concentrations and an impaired ability to concentrate or dilute urine, likely at least three-fourths of the functional capacity of the nephron mass has become impaired.

More definitive studies (e.g., ultrasonography, radiography, biopsy, exploratory surgery) are required to establish the underlying cause of primary azotemic renal failure. When formulating a prognosis and therapy, recall that the uremic signs are not directly caused by renal lesions but are related to varying degrees of fluid, acid-base, electrolyte and nutrient imbalances; vitamin and endocrine alterations; and retention of waste products of protein catabolism that develop as a result of nephron dysfunction caused by an underlying disease (Table 1).

Azotemia associated with glomerulotubular imbalance. In some patients with primary renal failure caused by generalized glomerular disease, abnormally elevated BUN or creatinine concentrations may occur in association with varying degrees of urine concentration. Be sure not to overinterpret the absolute value of the urine specific gravity in such patients, since it may be slightly elevated by the effect of protein. Adding 40 mg protein/100 ml of urine will increase the urine specific gravity by about 0.001.

The renal lesion must be characterized by glomerular damage that is sufficiently severe to impair renal clearance of urea and creatinine but that has not yet induced enough ischemic atrophy and necrosis or renal tubular cells to prevent varying degrees of urine concentration. Thus, glomerular filtrate that is formed may be concentrated to such a degree that prerenal azotemia is initially considered. However, this group of patients may be differentiated from patients with prerenal azotemia by failure of a search for one of the extrarenal causes of poor perfusion, by persistent proteinuria and by persistent azotemia despite restoration of vascular volume and perfusion with appropriate therapy.

Combinations of azotemia

Pathogenesis. Severely diseased kidneys have impaired ability to compensate for stresses imposed by disease states, dietary indiscretion and changes in environment. In patients with previously compensated primary renal disease, uremic crises are commonly precipitated or complicated by a variety of concomitant extrarenal factors.

Extrarenal mechanisms that may be associated with uremic crises include the following:

> Factors that accelerate endogenous protein catabolism increase the quantity of metabolic by-products in the body since the kidneys are incapable of excreting them. Protein by-products contribute significantly to the production of uremic signs in patients with renal failure.
> Stress states (fever, infection, change of environment) are associated with glucocorticoid release from the adrenal glands.
> Glucocorticoids stimulate conversion of proteins to carbohydrates (gluconeogenesis) and, thus, increase the quantity of protein waste products in the body.
> Abnormalities that decrease renal perfusion (i.e., decreased water consumption, vomiting, diarrhea) cause prerenal uremia.
> Nephrotoxic drugs in a patient with chronic renal failure may precipitate an acute uremic crisis by damaging nephrons.

Table 1:

Cinical findings that suggest azotemia in patients with intrarenal azotemia
Clinical dehydration
Laboratory evidence of hemoconcentration
Elevated packed cell volume
Elevated serum concentration of proteins
Decreased capillary refill time
Rapid and weak pulse
Signs of cardiovascular dysfunction
Rapid reduction in the magnitude of azotemia in response to correction of prerenal component of azotemia

Diagnosis. Combinations of causes of azotemia should be considered based on:

> A previous history of compensated primary renal failure
> Detection of primary extrarenal disease processes as well as generalized renal disease
> Detection of clinical dehydration—dehydration associated with azotemia and impaired urine concentration is reliable evidence that a portion of the azotemia is prerenal in origin.
> How the patient responds to therapy—uremic crises precipitated by reversible extrarenal disorders may rapidly respond to supportive and symptomatic therapy (rapid and significant reduction in the magnitude of azotemia). Uremic crises caused by progressive irreversible destruction of nephrons usually respond slower (a marginal reduction in the magnitude of azotemia).

Prognosis. Withhold formulating a prognosis until the magnitude of azotemia is reassessed after correcting the prerenal or postrenal components of azotemia. dvm360

Dr. Carl A. Osborne is the director of the Minnesota Urolith Center and a professor at the College of Veterinary Medicine at the University of Minnesota. Dr. Eugene Nwaokorie is pursuing a PhD at the University of Minnesota.

EQUINE | Cardiology

The *mystery* of the CALIFORNIA CLUSTER

Equine researchers try to understand a spike in sudden deaths, possibly cardiac-related, among thoroughbreds.

By Ed Kane, PhD

>>> Sudden deaths in horseracing are not uncommon, but the recent cluster of inexplicable cardiac deaths in thoroughbreds in California continues to stump researchers and key figures in the industry.

GETTY IMAGES/ANETT SOMOGYVÁRI

Earlier this year, *The Blood-Horse* and the *Daily Racing Form* both reported that California Thoroughbred racing at Hollywood Park and Santa Anita saw a spike in presumptive sudden cardiac deaths from July 1, 2011, to June 30, 2012. The fatalities occurred both during training and racing. Eleven horses died of cardiac failure during the one-year period, compared with six during the similar period in fiscal year 2011 and four in 2009, according to the California Horse Racing Board's annual reports (see "A well-documented mystery" on p. E3).

"Sudden death in a racehorse is distressing for everyone involved in racing," says Peter Physick-Sheard, BVSc, MSc, FRCVS, associate professor at the University of Guelph (Ontario), Veterinary College, who has been studying the issue in both standardbred and thoroughbred racehorses, looking at electrocardiograms and heart rhythms in horses while they're racing. "It raises animal welfare, economic and safety concerns and represents horrendous public relations for the industry."

Although sudden death in thoroughbred racehorses is fairly rare, it is of greater significance than in racing standardbreds. A study published in the *Equine Veterinary Journal* on sudden cardiac death in racing thoroughbreds found that it occurred in 9 percent of fatalities in California—96 cases in exercising horses between February 1990 and August 2008.[1] Also during that 18-year period, five cases were reported in Pennsylvania; 23 in Victoria, Australia; 16 in Sydney; four in Hong Kong; and none in Japan.

"Sudden deaths have been an issue in horseracing internationally for many years," says Rick Arthur, DVM, equine

medical director at the UC-Davis School of Veterinary Medicine, which was assigned to advise the California Horse Racing Board. "They are typically called *heart attacks*, but, in reality, cardiac failure, or even suspicious cardiac failure, accounts for less than 50 percent of all fatalities."

Some of the so-called "cardiac sudden death cases" may actually be pulmonary hemorrhage, Arthur says. "It is common for horses to bleed externally due to pulmonary hemorrhage after training, or there may be a major vessel rupture internally," he says.

Though cardiopulmonary-vascular incidents of those types are some of the most common, in California we've had a number of sudden deaths from other issues. About 10 percent of them are the result of a major bone fracture. In some of those incidents, the horse goes down and exsanguinates internally, so it is at first deemed a cardiac death, though that may not be the cause at all."

"We frequently see almost no postmortem cardiac pathology in sudden death in horses."
—Francisco Uzal, DVM, PhD, professor of clinical diagnostic pathology at UC-Davis

Starting with speculation

Francisco Uzal, DVM, PhD, professor of clinical diagnostic pathology at UC-Davis School of Veterinary Medicine and the director of the California Animal Health and Food Safety Laboratory System is trying to determine the cause of the racetrack deaths in California. As a part of looking into the recent racetrack fatalities and those occurring over the past several years regarding sudden cardiac death, he and his team have conducted pathologic and histologic examination of cardiac tissues and extensive toxicologic studies have been conducted. "But we have not been able to find the cause of some of these recent cases of sudden deaths," Uzal says.

According to the *Daily Racing Form*, traces of anticoagulant rat poison were found in two of the horses. Both horses had internal hemorrhage problems, though whether this was related to the deaths has not been confirmed.

Despite this fact, Uzal does suspect that at least some of the sudden deaths seen in the general horse population may be produced by arrhythmias. "But in many cases, we do not see morphological changes in the heart muscle or anywhere," he says. "Many times we speculate that changes in the cardiac conduction system may be responsible, but it is pure speculation. What we frequently see on postmortem is almost no cardiac pathology in sudden death in horses, making these cases somewhat of a mystery."

The cluster of sudden racetrack deaths in southern California is a different issue than atrial fibrillation (AF) ("How veterinarians can address atrial fibrillation in horses," July 2013 *dvm360*). "With exercise, AF should not cause sudden cardiac death," says Virginia Reef, DVM, DACVIM, director of large animal cardiology and diagnostic ultrasonography at the University of Pennsylvania's New Bolton Center. "You worry that if there is nothing found at postmortem, or if they find changes in the myocardium, possibly there was a fatal ventricular arrhythmia that triggered it," Reef explains. "Exercising horses have been shown to have ventricular arrhythmias that occur immediately after peak exercise, just as they are slowing down.

"Why there was a cluster of apparent sudden cardiac death in southern California is unknown and probably very difficult to determine," Reef continues. "It may be that a toxin, virus or drug interaction was involved, or it may be an adverse consequence of the maximal effort performed. If any of these horses had ventricular arrhythmias, and if the arrhythmia was more malignant, it could have triggered a cardiac death episode."

Just as with human athletes, the circumstances surrounding the episode and the postmortem findings may provide little information on underlying cause, says Physick-Sheard. Reef agrees. "In these cases the term 'sudden cardiac death' is applied," she says. "It is assumed the primary cause is a serious disturbance in heart rhythm, but evidence is lacking because affected animals' ECGs are not being monitored at the time of death."

Applying research to the problem

To try to better understand causes, a study was recently performed in standardbred racehorses in which heart rhythm was followed from harnessing until the end of the race during normal competition. "Disturbances in rhythm immediately after the race were identified that would be capable of causing a fatal outcome, but there were no deaths," says Physick-Sheard. "However, clear indications of strategies that might reduce risk of a fatal outcome were noted. Sudden cardiac death associated with racing occurs more commonly in the thoroughbred than in the standardbred, and it is possible that ventricular arrhythmias are taking place here also."

To resolve this question in racing thoroughbreds, researchers recently monitored heart rates and rhythms during normal scheduled racing at Woodbine Racetrack in Toronto, from saddling to unsaddling and into early recovery. "The objectives were to characterize the range of usual rate and rhythm variations and to provide guidance as strategies to minimize risk are developed," explains Physick-Sheard. He says the thoroughbred work was done after the standardbred work, and data are now being processed.

During the standardbred study, the research team monitored horses' heart rates and heart rhythms during normally scheduled standardbred racing.[2] "We put the monitoring gear on when the horses came into the paddock, and it stayed on until the horses came off the track at the end," Physick-Sheard says. "We were able to monitor the entire exercise response. What we identified of particular significance was that about 18 percent of horses would have significant rhythm disturbances during recovery, fairly unusual ventricular rhythm disturbances, which were not previously identified in horses."

He goes on to say that although all of the horses in the study continued to race and none died, the arrhythmias did occur at the time when there appears to be a peak in post-exercise death, as the literature shows that most horses identified as dying of sudden cardiac death die in the period immediately after racing.

"When we saw these rhythm deficits, each of them had the potential to deteriorate into a malignant or fatal arrhythmia, though none of them did," Physick-Sheard says. They all recovered and went back to normal sinus rhythm. The principal finding was that horses subjected to racing exercise will tend to show disturbances during the recovery period.

As part of the study, the team also identified factors that predisposed horses to the probability of a horse experiencing cardiac rhythm disturbances. The factors included being a trotter, getting parked at the half-mile pole and breaking in the stretch. "Our analysis of those and associated data leads us to believe that some types of physical stress, predominantly stress that is associated with psychological stress, may be predisposing these horses," Physick-Sheard explains.

They also found that the arrhythmias frequently occurred in association with what is generally thought to be a normal variation in rhythm when the heart rate is decreasing. "The heart rates do not descend smoothly," says Physick-Sheard. "They tend to come down in a stepwise fashion, and sometimes that step is quite obvious, sometimes not. But there is always a tendency for the heart rate to come down in the middle ranges in a stepwise fashion. We identified that these episodes of

sudden slowing appear to be a trigger for ventricular rhythm disturbances. That is another piece of information that we are also pursuing to indicate why sudden death may occur in all athletes during recovery from maximal effort. Some deaths occur in humans under similar circumstances."

Physick-Sheard says researchers don't know for certain whether these rhythm disturbances are just a usual variation from normal, or whether they actually represent pathology. "We are pursuing that issue with another study to try to find out whether there is pathology associated with these rhythm disturbances," he says. "It's not possible for us to be there when a horse dies because we don't want any horse to be dying, especially not while we're monitoring it. But that would be the only way to prove that these rhythm disturbances were in fact the cause of death. So we may never know for sure. The suspicion is that these disturbances on occasion deteriorate and result in death."

In human cardio stress testing, echocardiography is part of the normal routine. The difficulty is using this technology in horses. "Further studies to fully understand all the pieces to the puzzle would certainly necessitate echocardiographic studies," says Physick-Sheard. "For now, knowing that we have so much more information to gather, we are concentrating on real-world (racetrack) exercise. It's not possible to do ultrasound examinations on the racetrack at the present time."

Determining the cause of the California cluster

UC-Davis' Arthur says pathologists at California's Animal Health laboratory are conservative, so they won't categorize a sudden death as one diagnosis or another unless they have a definitive explanation.

"California has an extensive postmortem necropsy program," he says. "If you look at the nonmusculoskeletal sudden death incidents, there have been about 56 of them since July 1, 2010, but only 15 of those were from racing horses. As California has approximately 40,000 to 50,000 starts per year, that's about one out every 10,000 starts—less than 5 percent of all fatalities by starts. We also had during that same period about 40 horses die suddenly during or after training. Since a horse trains about 30 to 60 times per race start, having one of these untoward events when a horse is training is more likely."

A careful look at these cases indicates that a ventricular conduction anomaly occurring after training or racing (as per Physick-Sheard and McGurrin's work) may be at work, says Arthur. "We suspect that this represents a large portion of the sudden deaths where we do not have a definitive diagnosis, which is approximately one-third of the sudden deaths.

"One point to remember," he continues, "is that the pathologist frequently finds pulmonary hemorrhage in a lot of these horses, and myocarditis/myocardial degeneration as well, even if they were put down because of a fetlock fracture. So it is often difficult to determine the cause of death in every case due to one particular finding. A finding does not mean a cause of death." **dvm360**

A well-documented mystery

The following notations from the California Horse Racing Board annual reports detail racing fatalities due to cardiovascular events and illustrate the challenge of obtaining a definitive diagnosis for sudden death among equine athletes.

Jan. 1 to Dec. 31, 2006. Horses diagnosed with primary cardiovascular causes of death typically did not have a primary cause identified. The one exception was a horse diagnosed with purpura hemorrhagica, an immunological disease that is often a sequel to a *Streptococcus equi* infection.

Six horses total: 2—arterial rupture, 1—cardiac failure, 1—congestive heart failure, 1—myocardial edema, 1—purpura hemorrhagica

Jan. 2 to Dec. 31, 2007. There were only a small number of cases with primary cardiovascular disease identified during 2007. Horses diagnosed with primary cardiovascular causes of death typically did not have a primary cause identified. Only one case with vegetative endocarditis had an infectious etiology that was not specifically identified.

Five horses total: 1—arterial rupture, 1—myocarditis, 1—vegetative endocarditis, 2—heart failure

July 1, 2008, to June 30, 2009. There were only a small number of cases with primary cardiovascular disease identified during 2008. Horses diagnosed with primary cardiovascular causes of death typically did not have a primary cause identified. None of the diagnoses in this category were due to infectious causes.

Five horses total: 1—aortic aneurysm, 1—cardiovascular disease, 2—heart failure, 1—vascular disease

July 1, 2009, to June 30, 2010. In this period there were six cases of sudden death for which a final cause was not established but that were attributed to acute heart failure. This represents an increase from four horses with this diagnosis during 2008-2009. No horses diagnosed with confirmed primary cardiovascular causes of death were reported during this period.

Six horses total: sudden cardiac death attributed to acute heart failure, though no confirming diagnosis.

July 1, 2010, to June 30, 2011. During this period six cases of sudden death occurred for which a final cause was not established, but they were attributed to acute heart failure. This represents the same number of horses with this diagnosis during 2009-2010. Other cardiovascular system-related deaths include rupture of large arteries and myocarditis.

July 1, 2011, to June 30, 2012. During this period there were 11 cases of sudden death due to cardiac failure. This represents an increase from four horses with this diagnosis during 2008-2009 and six with the same diagnosis in 2010-2011.

Sixteen horses total: 11—cardiac failure, 2—cecal infarction, 2—major vessel rupture, 1—exsanguination.

Source: California Animal Health and Food Safety Laboratory System, J.D. Wheat Veterinary Orthopedic Research Laboratory, UC Davis School of Veterinary Medicine.

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

Botulism in horses:
Be cognizant in your diagnosis

Knowing what to look for and being diligent in gathering the patient's history will help diagnose this often overlooked condition. *By Ed Kane, PhD*

When exposed to the neurotoxin *Clostridium botulinum*, horses develop botulism, a disease of progressive flaccid paresis and cranial nerve deficits. The disease is almost always acquired in one of three ways: through the ingestion of preformed toxin with food (food-borne botulism in adults), through the ingestion of *C. botulinum* spores that subsequently germinate in the gastrointestinal tract and elaborate toxin (toxicoinfectioius botulism in foals) or through contamination of wounds with *C. botulinum* and subsequent bacterial growth with toxin release (wound botulism).[1]

According to Amy Johnson, DVM, DACVIM, assistant professor of large animal medicine and neurology at the New Bolton Center at the University of Pennsylvania School of Veterinary Medicine, botulism in horses is commonly seen in the mid-Atlantic states and Kentucky as serotype B and as type A in the western states, which include California, Washington, Oregon, Idaho, Montana, Wyoming and Nebraska. Type C is sporadically seen across the United States. Types A and B are associated with soil, and type C is associated with carrion. "Equine type B cases account for more than 85 percent of equine cases diagnosed in the U.S.," states Johnson.

Early diagnosis is key

Johnson states that because botulism can easily mimic other diseases, such as esophageal obstruction (choke) or colic, it's important to always have it on your differential diagnosis list. Practitioners should focus on the types of cases in which they should consider botulism and differentiate it from other diseases. "Many veterinarians do not commonly see botulism cases in veterinary school," says Johnson. "And if they don't recognize the signs, they might not have it on their list and, therefore, not easily diagnose it."

Early diagnosis is key to providing appropriate treatment and, hopefully, saving the horse, but the signs aren't always clear-cut in the early stages of disease, says Johnson. "By the time the horse is recumbent and clearly very weak and dysphagic, it's easy to diagnose," she says. "But the horse that presents not eating very well and looking a little bit colicky, or the horse that's a little bit dysphagic without any other signs of weakness—those are the cases that may be missed."

Botulism vs. choke

Botulism can easily be mistaken for choke because frequently the horses will have food coming out of their mouths and noses. And though often they'll have weak tongue tone, it's not necessarily obvious in the very beginning, says Johnson.

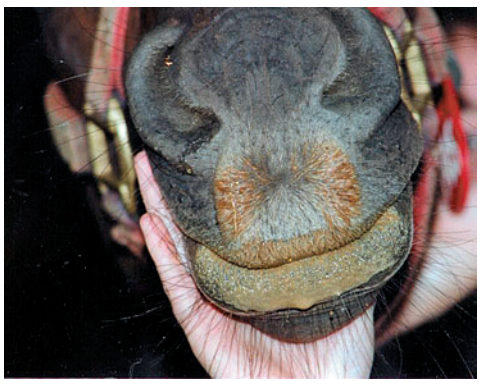
One thing that can help differentiate botulism from a choke case is if the practitioner passes a nasogastric tube and it passes easily. There are some choke cases that can be relieved on the first pass, but if it appears that there's not a very significant obstruction, the practitioner should consider whether it's actually a botulism case, Johnson advises.

If botulism is suspected, a tongue stress test and a feed test can be performed to determine if it's dysphagia and not an esophageal obstruction. The tongue tone or tongue stress test is done by gently withdrawing the tongue from the horse's mouth and assessing the horse's ability to pull it back while holding the jaw closed. With botulism, the tongue will tend to hang, not having the strength to be easily retracted.

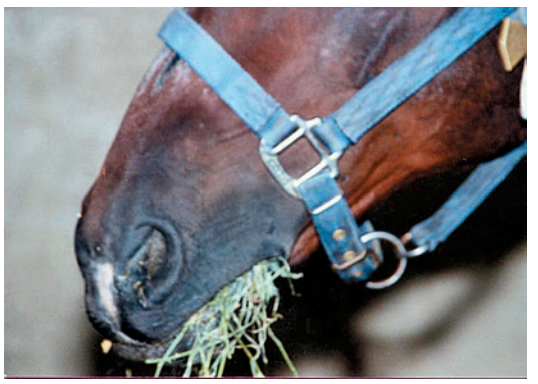
The feed or grain test involves feeding the horse eight ounces of grain in a bucket while timing how long it takes for the horse to consume the feed. Healthy horses finish their feed within two minutes, whereas horses with dysphagia do not. Not only do they not consume their feed easily, they also tend to drop their feed and release saliva from their mouth and nose as they attempt to eat, leaving a trail of saliva in the bottom of the feed tub.

"Not every botulism horse wants to eat," Johnson notes. "Some of them come in slightly depressed. They stop trying to eat, which is another reason that the disease is not so obvious when first presented."

That's when it's really important to critically evaluate the tongue, she says. Another possible clue to botulism is that the horses will often, but not always, displace their



>>> Horses with botulism tend to drop food and saliva from their mouth and nose as they attempt to eat.



>>> The clinical signs of botulism often include difficulty eating and poor hay consumption due to lack of strong tongue tone.

>>> A grain test, which involves timing a horse to see how long it takes him to consume feed, can help diagnose botulism.

PHOTOS COURTESY OF DR. SUSAN MCADAMS-GALLAGHER, NEW BOLTON CENTER AT THE UNIVERSITY OF PENNSYLVANIA

palates and display dysphagia. In a choke or colic case, that would be an unlikely finding.

Botulism vs. colic

It may be tough to differentiate botulism from colic, because horses with botulism are often lying down and not eating, and as a result, they may be designated as having colic.

"There have been several occasions, even at a place such as New Bolton Center, where a botulism case was sent to surgery [for colic]," Johnson says. "During surgery, no surgical lesions were found in the gastrointestinal tract. The practitioner then realized, after recovery, that it was botulism."

One clue to distinguish botulism from colic is that horses with botulism usually look worse standing up than lying down, Johnson explains. Additionally, they are often more agitated, have a higher heart rate when standing and have more muscle tremors. When they are lying down, horses with botulism tend to relax. They might not go into lateral recumbency, but even sternal, their muscle tremors stop and their heart rate decreases.

Also, unlike horses with colic, those with botulism don't do "flank watching" and frequently don't go back and forth between lateral and sternal recumbency as frequently as a horse with abdominal pain tends to do.

Another factor that distinguishes botulism from colic is the horse's response to an analgesic, says Johnson. "Giving a horse with abdominal pain an analgesic, such as flunixin, xylazine or detomidine, will usually lead to clinical improvement for the duration of action of the analgesic," Johnson states. "But in horses with botulism, you give them an analgesic and they don't necessarily look better. The tremors continue, and they may still lie down, as it is not affecting the muscle weakness, though it would affect the pain of the colicky horse. This exemplifies another finding to prompt putting botulism on your list."

Other distinguishing signs of botulism

Johnson also notes that once veterinarians have seen a few botulism cases, they're much better at diagnosing it again. Those familiar with the disease will notice additional cranial nerve or subtle deficits, such as weak eyelid tone, dilated pupils, slow pupillary eye reflexes, and weak tail and anal tone. It's also common to notice muscle fasciculations and tremors over the triceps, pectorals or even the hind leg muscles. And although the horse's gait is initially very normal, eventually weakness and a tendency to excessive recumbency will become apparent, says Johnson.

Diagnosing botulism

Although the PCR test, which was developed by Johnson and her colleagues at New Bolton Center, shortens the time to get a definitive diagnosis, she doesn't recommend waiting for the results before treating a symptomatic horse, as it will still be several days for the PCR results to come back. "If you have a botulism suspect case, it should be treated within that interval, rather than waiting," advises Johnson.

It also often helps to confirm the source—and the type—of the toxin. This could be important if someone has recently acquired a large quantity of hay that's possibly contaminated with carrion. "If someone is trying to decide whether to get rid of all that feed, knowing the source of the toxin can help with the decision," Johnson explains.

If a veterinarian knows that a horse has been eating a "risky" food—from a large round bale of hay or one that has been improperly stored, or from a source with known carcass or carrion contamination—it should heighten the suspicion of botulism. Feeding haylage or silage is also considered a risk factor. "Though not a common occurrence, it does happen every once in a while," Johnson says.

There is also a tendency to blame the water as a source of the botulism toxin. "When you have outbreaks with multiple horses involved, it's almost never the water," Johnson explains.

"There have been several occasions, even at a place like New Bolton, where a botulism case was sent to surgery."

—Amy Johnson, DVM, DACVIM
University of Pennsylvania
School of Veterinary Medicine

Treatment options

The antitoxin treatment—available commercially now—is essential, and the sooner the horse gets it, the better. Veterinarians who reside in endemic areas should make a plan to get plasma almost immediately for an affected horse, Johnson advises. She recommends either having a unit on hand in the freezer at the practice or being close to a clinic that has it.

"If there is no available plasma, even a shipment overnight often will not suffice," says Johnson. "It needs to be available within a few hours for the proper recommended treatment."

Prevention

Only one USDA-approved vaccine against equine botulism is available in the United States—a killed (toxoid) vaccine directed against *C. botulinum* type B (BotVax B—Neogen Corp.). The initial series consists of three doses administered at four-week intervals, with subsequent yearly boosters. Pregnant mares should receive their primary series and then be revaccinated four to six weeks before foaling.

Passively acquired maternal antibodies do not appear to interfere with the foal's serologic response, so foals may have their primary series started as early as 2 weeks of age, although it is more commonly started at 1 to 3 months of age. Unfortunately, there are no vaccines for type A or C.[1] dvm360

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Tennessee walking horse group finally accepts federal soring protocol

S.H.O.W horse industry organization carries out USDA inspections during National Celebration event. *By Julie Scheidegger*

After a yearlong lawsuit challenging the U.S. Department of Agriculture's (USDA's) minimum penalty protocol for horse soring, S.H.O.W., a horse industry organization (HIO) licensed by the USDA to enforce industry regulations, has surrendered to the court's decision. The judge ruled that the USDA protocol amending the federal Horse Protection Act last year was a valid requirement for S.H.O.W. and any horse industry organization wanting to retain certification with the USDA.

The ruling and S.H.O.W.'s subsequent compliance came just before the start of 75th annual Tennessee Walking Horse National Celebration Aug. 21-31 in Shelbyville, Tenn. Known as The Celebration, it is the premiere event for Tennessee walking horse competition, and this year S.H.O.W. carried out inspections working jointly with USDA veterinary medical officers. Tanya Espinosa, public affairs specialist with the USDA's Animal and Plant Health Inspection Service, says the officers are there to ensure that any horse that has been sored—had its forelegs blistered or irritated in order to achieve a more pronounced gait—is not shown. "We will continue to work jointly to end the inhumane practice of soring horses as well as promote fair competition within the industry," Espinosa said in an e-mail to *dvm360*.

A S.H.O.W. spokesperson who spoke to *dvm360* on condition of anonymity says there has been "unprecedented cooperation" between the organization and the USDA. "Despite what detractors claim, the inspections go smoothly with or without the USDA present," the spoksperson says. He adds that S.H.O.W. does not disagree with penalties for violations of the Horse Protection Act but filed the lawsuit because it believes the requirments will create a negative impact on the reform efforts the Tennessee walking horse community is actively working toward. "The best way to ensure safety of the horse is to have strict inspections and harsh penalties across the board, but this new protocol will reward the horse industry organizations with the least restrictive inspections," the S.H.O.W. spokesperson says.

Ron DeHaven, DVM, MBA, executive vice president of the American Veterinary Medical Association (AVMA), said last year that a system in which horse industry organizations police themselves creates an inherent conflict of interest. "We have a basic problem of the fox watching the hen house," he has said. S.H.O.W., however, claims to implement the strictest inspection process and the strongest penalties in the industry.

On Aug. 28, the USDA's Espinosa said, "As of Sunday, August 25, USDA has found 53 horses that were in violation of the Horse Protection Act. These violations include scar rule violations, foreign substance, unilateral soring, bilateral soring, high banding and illegal shoeing."

The S.H.O.W. spokesperson contends that only 26 of the 1,340 horses presented for inspection as of end of day Aug. 28 were forbidden to show at The Celebration for violations. "Those are great numbers considering the subjectivity of testing," he says, adding that a violation does not necessarily mean a horse has been sored. He says, for example, an infraction could be a violation of equipment size.

Nearly 3,000 horses compete at The Celebration, which draws more than 150,000 fans each year. Last year S.H.O.W. was mired in the USDA decertification process after it refused to adopt the new minimum penalty protocol. Since then, the PAST Act—H.R. 1518, the Prevent All Soring Tactics Act of 2013—was introduced and is currently making its way through the U.S. Legislature. The bill is listed as "top priority for passage" on the AVMA'S recently released legislative agenda. The AVMA and the American Association of Equine Practitioners (AAEP) continue to support efforts to strengthen penalties for soring and improve USDA enforcement of the Horse Protection Act. The two associations partnered to host a "lunch and learn" event in July for Capitol Hill staff in Washington, D.C., to explain what soring is and why it is important that members of Congress support the PAST Act.

AAEP President Ann Dwyer, DVM, has stated that a "culture of abuse" continues to exist in the walking horse performance show industry. "Despite more than 40 years after the Horse Protection Act, which made soring illegal in shows, sales or exhibits, the horse show industry has failed to police itself," Dwyer says. "A sored gait is still rewarded in the show ring."

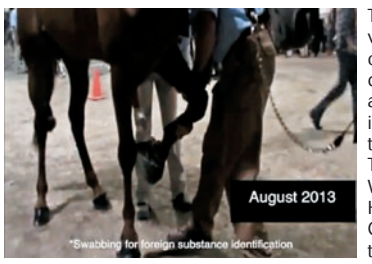
The S.H.O.W. spokesperson says the organization is making major strides in protecting the welfare of the horse. "Continuing to make the horse the top priority and making sure that no trainers who harm horses are allowed in the ring is the goal," he says. "With a close to 98 percent compliance rate, we are getting closer every day." dvm360

AVMA/USDA inspection video shows apparent footage of horse soring

The American Veterinary Medical Association (AVMA) recently obtained a U.S. Department of Agriculture (USDA) video showing footage of USDA veterinarians inspecting a horse to determine whether it had been subject to soring at the Tennessee Walking Horse National Celebration in Shelbyville, Tenn.

The video, shot Aug. 25 on the grounds of the Tennessee Walking Horse National Celebration in Shelbyville, Tenn., by an AVMA Animal Welfare Division representative who was onsite during the inspection, shows USDA officials testing for and apparently finding evidence of soring. At this year's Celebration, out of 1,952 entries, 110 violations were found (a rate of 5.6 percent), the AVMA says.

Tom McFeron, who is with the AVMA's Communications Division, told *dvm360* that the event also saw a 25.6 percent scratch rate. "Horses scratch for a variety of reasons, but a significant contributor to scratches is a concern that horses will not pass the soring inspection," he says. "A scratch rate of 25 percent combined with a violation rate of 5.6 percent suggests that soring is still a significant problem for the industry.



This video was obtained during a USDA inspection at the Tennessee Walking Horse Celebration.

"The bottom line is that soring is unethical, illegal and negatively impacts the welfare of horses," he continues. "The presence of even one sored horse at The Celebration—or any gaited horse show—is one too many."

To view the video, scan the QR code at left with your mobile device or visit **dvm360.com/soringvideo**.

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TREATMENT CONSIDERATIONS for angular limb deformities {IN FOALS

If conservative therapy fails, surgery can be a viable option for treating this common orthopedic problem in young horses.

At CVC in Kansas City this year, Robert L. Linford, DVM, PhD, DACVS, a professor of equine surgery at Mississippi State University College of Veterinary Medicine, discussed angular limb deformities and reviewed treatment options and prognoses for this common orthopedic condition.

Angular limb deformities can be categorized as either valgus (lateral deviation of the limb distal to the location of the deformity) or varus (medial deviation of the limb distal to the location of the problem) in nature. In addition, they can be further subdivided based on when they appear in the foal's life—perinatal (those that are present at birth or develop soon after) or acquired (those that develop with age).

Perinatal deformities

Perinatal deformities may be caused by incomplete ossification of the carpal or tarsal cuboidal bones, as seen in premature or dysmature foals, and can easily be identified radiographically. The key to successful treatment of this type of deformity is exercise restriction and early coaptation. Foals allowed unrestricted activity may endure irreparable crushing injuries in the affected area, so educating clients about the importance of controlled exercise is vital.

Another type of perinatal deformity results from ligamentous laxity, although this condition typically responds to exercise restriction and adequate rest alone.

Acquired deformities

Acquired deformities develop when there is a disruption of normal bone formation at the physis or epiphysis of a bone, with resulting disproportionate growth along the length of the bone. In some cases, the deformity can be corrected with exercise restriction and selective hoof trimming, if the deviation of the deformity is less than five degrees. However, if the deformity doesn't respond to this type of treatment or if the deformity is more severe (greater than five degrees of deviation), surgical intervention is appropriate.

With surgery, the intention is to either accelerate growth across the physis on the concave side of the deformity or slow growth across the physis on the convex side of the deformity. It's critical that once decided upon, a surgical procedure be performed without delay, as success depends on growth potential at the physis.

To accelerate growth across the physis, a periosteal transection can be performed. This procedure should take place before 3 months of age—although ideally between 1 and 2 months—for the distal metacarpal or metatarsal area and before 6 months of age for carpal deviations. Transphyseal bridging is used to slow growth across the physis and should be considered if more conservative methods have failed to correct greater than a four-degree fetlock deviation by 8 to 10 weeks of age. This treatment option can be performed at 2 months of age for metacarpal or metatarsal deformities, 4 months of age for tibial deformities and 6 months of age for radial deformities.

GETTY IMAGES/LIFE ON WHITE

Test your skills

Now that you've got the basics under your belt about this common orthopedic condition, put your skills to the test by identifying the flexural limb deformity in an image quiz.

To take the quiz, head over to dvm360.com/limbdeformity or scan the QR code below.

Find it all here. dvm360.com

Arkansas is doing just fine without a veterinary school, thanks!

In the August 2013 article "Aspiring veterinarians face funding shortfall in Arkansas," you missed several points. First, nobody is hiring here in Arkansas because the state doesn't have enough clients who will spend money on sophisticated veterinary care. And the large animal veterinarian "shortage" is about as valid as the "hunger in America" movement. Livestock owners simply do all of the things that veterinarians like myself used to perform. Veterinary procedures on cattle usually exceed the profit margin of that animal—it's simple economics. There will be no "shortage" in large animal veterinarians when livestock owners will pay for their services.

All in all, Arkansas is doing just fine with the normal turnover in veterinarians who retire and are replaced by younger veterinarians. The average sustaining population for a small animal practice is around 8,000 residents. If you look at two cities in Arkansas—Fort Smith and Van Buren—you'll find that the number of veterinarians far exceeds that proportion. The figure is skewed in our state because of the traditional independence and self-reliance of our pet owners, who spend very little money on their dogs or cats. You see, implying that veterinary applicants from Arkansas can't receive scholarships in sufficient amounts to go to veterinary school is only a part of the apple.

Robert Zepecki, DVM, Hot Springs Village, Ark.

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Readers wake up and respond to the crisis

I agree with Dr. Mike Paul in his August column, "Wake up and smell the crisis." Veterinarians need to contact their state and federal legislators and explain the facts of life about these grossly increasing enrollments at their local veterinary colleges. We can't expect a dean who gets his inflated paycheck from the state to lead the way. Please publish more articles like this. The Ohio State University is going from 137 students to 162 students. We should ask Dean Lonnie King, "Where do you think all of these cutting-edge grads are going to get a decent job?"

Gordon Cunningham, DVM, Salem, Ore.

I do see a crisis—too many overpriced veterinarians. I can't find any doctors to hire to my practice. We work 38-hour weeks, don't accept emergencies and aren't a full-service clinic, yet we can't find veterinarians who want to work this way. All the veterinarians I encounter want to perform testing that the client can't afford.

Our average transaction is less than $50 and with more than 11,500 clients in the past three years, we must be doing something right. We want to expand but are limited on finding veterinarians to add to our team.

All I hear is that there are too many veterinarians. In fact, there are simply too many who don't want to work.

John Gifford, DVM, Fairlawn, Ohio

Let's provide more cost-effective pet healthcare

Insistence on the highest medical standards in every case is hurting our profession.

By Brian E. Toivola, DVM

In the past two years there have been many articles in the veterinary literature addressing the factors contributing to declining veterinary visits. No doubt these factors are significant, but I believe the profession has ignored the effect of changes in the small animal practice model and its attendant standard of care issues on many small animal practitioners for more than a decade. Having sold my rural Minnesota small animal practice of 40 years and visited many rural practices in the past three years as a relief veterinarian, I've had considerable experience dealing with this matter.

I want to first acknowledge that I am not a dissatisfied, overworked and undercompensated veterinarian with 46 years of bad practice experiences "stuck in my craw." I sold my solo, profitable-and-growing, 32-hour-workweek practice for a good price in a community with an unemployment rate of 18 percent, the highest in the state at the time. Though now retired from practice ownership, I feel compelled to express my concerns about a profession I still love.

Pet owners need to be shown empathy for their financial hardships and given broad options on levels of care that might be affordable and cost-effective for them.

The past 20 years have seen many technological advances in veterinary care. And the veterinary colleges, true to their charters, have incorporated these changes into the standards of care taught to veterinary students. These standards of care have been adopted by small animal practice organizations and legally enforced by state boards of veterinary medicine. These changes have forced practices to provide higher-quality care with corresponding fee increases to all clients, regardless of their income level.

However, the money allocated to veterinary services is often a fixed item in many household budgets. As fees and standards of care have increased, those in middle- and low-income groups have had to make difficult decisions about their ability to afford veterinary care. And many have decided not to seek that care due to cost, leading to decreased visits in the profession as a whole.

In contrast, many of the few practices showing recent growth are rural clinics located in small towns 10 to 50 miles from large urban population centers. These practices are growing because they provide the more cost-effective veterinary care that many urban pet owners are begging for.

As many 30- to 40-year veterans of rural small animal practice can attest, we've been successfully performing a host of quite technical medical and surgical treatments for years without always utilizing many of the recently recommended procedures. For example, take presurgical blood tests on obviously healthy adult pets. Even in human hospitals, presurgical blood tests are not always performed on young adults—insurance companies have deemed them to be cost-ineffective and therefore do not cover them. Another example is the all-out quest for a definitive diagnosis. In some urban practices this is a major contributor to increased cost of pet care. But we all know that response to therapy is a legitimate diagnostic aid that also reduces the cost of care.

By making many procedures both optional and more cost-efficient, rural small animal practitioners have been able to satisfy their own clients in addition to visiting urban pet owners seeking more cost-effective care. Because of lower overhead, greater distances from re-

ferral centers and emergency clinics, and a less-litigious client base, they have actually handled more challenging medical and surgical cases than many of their urban colleagues. Some have achieved remarkably profitable practices, often in unlikely demographic locations.

The key to practice growth in today's economy is to treat clients fairly. They need to be shown empathy for their financial hardships and given broad options on levels of care that might be affordable for them. They need to be honestly informed of the risks associated with choosing a more moderate level of care, but they also need to be informed if the chances for a resulting negative outcome are low.

In contrast, I believe the current small animal practice model fosters exaggerated perceptions of legal liability that serve to rationalize the need for high and inflexible levels of care. If legal liabilities were a legitimate argument for defensive practice methods, then veterinary malpractice insurance rates would be significantly higher than they currently are.

The stringently high standards model also creates a situation in which the human-animal bond can be abused. That is, it can be used to garner approval for procedures that benefit average transaction fees more than patient health and cost-effective use of the client's resources. It may feel great to bask in the glow of client adulation when these clients feel everything humanly possible was done for their pet. But the way things are going, that feeling will be more difficult to experience in the future.

What's more, in poor economic times, even formerly compliant pet owners begin to decline certain elective procedures. For the most part, they observe that their pets seem to do quite well without that annual exam, heartworm test, vaccination or blood profile. They know they're taking some risks, but they're playing odds that they start to realize are much better than what they've been led to believe in the past. And they begin to question the cost-effectiveness of their veterinarian's previous recommendations when times were good. Unfortunately, this scenario has already played out for far too many pet owners.

The image of our profession has been tarnished and veterinary fees have reached a level where most pet owners cannot afford intensive pet care unless they have insurance. Though some would say fees had been too low for too long, we've unfortunately overplayed our hand. Current fees are now both impractical and cost-ineffective for an increasing percent of pet owners and we are losing our credibility and pet owner confidence.

In my practice I could have netted well over $200,000 had I implemented the experts' policies for better profitability. But my conscience would not have been clear and a lot more of my clients' pets would have been euthanized.

Our market has been fundamentally changed for the foreseeable future both by external factors and our own missteps. Doesn't the success of some rural practices mean the current model needs to be made more accommodating for pet owners? The timeless refrain of my community's native son seems appropriate: "The answer, my friend, is blowin' in the wind." **dvm360**

Brian E. Toivola, DVM, lives in Hibbing, Minn. The views expressed in this commentary do not necessarily reflect those of dvm360.

Pyometra *plus* refusal to spay { *A look at two cases*

Management, legal and ethical issues abound when veterinarians recommend 'emergency' procedures to hesitant pet owners.

>>> One pet owner didn't want to consent to an emergency spay because he was interested in breeding his show dog eventually. The veterinarian threatened to turn him over to the authorities for animal abuse.

Last week my office received a fascinating e-mail containing an account from a veterinary practitioner who is deeply involved with the ever-changing landscape of veterinary law. The story, which involved one of his clinic's show dog patients, stirred up a lively debate in the veterinary law cybersphere. I certainly found it compelling, especially since a very similar set of circumstances had unfolded at one of my own practices the previous month.

To summarize the practitioner's encounter: One of his clients, a regular participant in the dog show circuit, showed up with an ailing dog at the local after-hours emergency clinic. It appeared that the dog had developed a pyometra, which was open and draining, but the dog was otherwise normal and active.

The emergency veterinarian evaluated the dog and confirmed the pyometra. She then recommended that an immediate ovariohysterectomy be performed. The owner refused, citing his desire to obtain future litters from this dog, and did his best to fully explain his wishes to the doctor.

The emergency doctor replied that if the owner did not allow her to spay the patient by 5 p.m. that evening, she would report him to the authorities for animal abuse. The owner left with his dog and obtained medical therapy for her elsewhere. The patient recovered fully and a fresh litter was produced during her next cycle.

Real world implications

What a cornucopia of practice management issues, legal questions and ethical considerations this little tale presents. And how commonly veterinarians and their clients face this dilemma out there in the general pet owner universe.

As I mentioned, one of my associates was in a similar position just a few weeks ago. A dog presented with an open pyometra and the client refused immediate ovariohysterectomy. Our client's reasoning was simpler, however; she couldn't afford a routine spay, let alone an emergency pyometra procedure, until she sorted out her finances.

First, let's consider the two dogs' level of suffering. Both patients had wagging tails, showed good appetite and were bouncing off the walls, yet they were harboring a diseased uterus and exhibiting a substantial purulent discharge. Suffering? They were probably just uncomfortable.

The emergency doctor in the first account appears to have provided her client with only two treatment options: spay immediately or euthanize immediately. I'll leave it to you to decide whether an offer of a short period of "wait-and-see," together with antimicrobial and other nonsurgical therapies, would result in so much pain and risk to the dog that a legal threat aimed at the owner was preferable.

Second, was a threat really the best way to handle this matter? Maybe I could more comfortably accept that strategy if the patient had a "closed" pyo, was febrile or PU/PD, or at least was presenting some clear indication that a short period of medical management and observation would be detrimental.

When my associate was faced with her pyometra case, she advised the client that the need for a spaying procedure was very likely. But she added that instituting medical therapy and allowing a brief delay so the client could get her financial situation in order was

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not an unreasonable alternative.

I think my practice did a good job of keeping the lines of communication open with this client. If my associate had badgered the woman into either euthanizing her dog or grudgingly accepting the spay procedure under threat of legal consequences, all the outcomes would probably have been negative.

Chances are, the client would have never returned. She would have shared her horrible experience with anyone who would listen. Worse yet, she might have contacted the state board to report that she'd been coerced—not only into following one practitioner's advice, but into purchasing the recommended services from that one specific provider.

Legal, ethical considerations

Did the emergency veterinarian have the legal authority to insist that the pet owner concede to her recommended treatment? Was she legally entitled to demand that the procedure be performed by a certain deadline? Would she have been justified in making the threat if the owner had wanted to wait and have his own veterinarian do the spay the next day? What if the owner had said he wanted a second opinion at a competing emergency practice?

Finally, where would the emergency clinic or the emergency doctor be legally if the client had elected euthanasia instead of spay? Obviously there was no way to prove that this open pyometra would not eventually prove fatal if left untreated surgically. Nonetheless, if the client had elected euthanasia instead of spay in the face of a threat of being reported to authorities, would the emergency hospital and its employed doctor be vulnerable to a lawsuit? The pet owner would only have to Google "open pyometra" to discover that this condition sometimes resolves without emergency ovariohysterectomy.

One last thought: Would it have been a cataclysm if the emergency veterinarian had repressed the urge to threaten and followed up with a call the next morning to make sure the client was acting responsibly and following through with the matter at his regular veterinarian's office? If the ER veterinarian couldn't confirm that the dog was being cared for, okay, fine—maybe a call to the ASPCA authorities might be an appropriate next move.

As it is worked out, both pyometra dogs are now thriving. My associate's patient was spayed during regular business hours a couple of days after diagnosis, and the other practitioner's patient is proudly producing show pups.

Our client is a happy camper. I wonder how client retention stats are looking at the emergency clinic. 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 e-mail info@veterinarylaw.com.

Be an advocate for PREVENTIVE CARE

Revisit the Veterinarian's Oath and reenergize your efforts to practice preventive care for your patients.

By Michael Paul, DVM, and Jessica Goodman Lee, CVPM

Compliance with preventive veterinary care is down, and it's time for veterinarians and their teams to renew their commitment to advocating for the health and well-being of animals in their care.

If you are a diligent periodical reader and CE aficionado, perhaps this is starting to sound like a broken record. But the reality is that these two facts—low compliance and a lack of preventive care advocacy—need to be repeated over and over until we create change throughout our profession.

Perhaps the best place to start is by taking a trip down memory lane to revisit the reasons you became a veterinary practitioner. Surveys conducted at a national symposium in 2011 and 2012 confirmed that veterinarians enter the profession for a variety of reasons. But principally, we do it for love of animals and the reward of supporting the relationship between animals and people.

Maybe it's also time to reexamine what it means to be an advocate in the true sense of the word: one who supports or promotes the interests of another; one who defends a cause. If the Veterinarian's Oath states that a veterinarian's responsibility toward animals is to protect health and prevent suffering, then by definition being a veterinarian means being an advocate for patients in your care. The team members who work in your practice must be committed to the same core principle.

Preventive healthcare has been shown to be far preferable to interventional treatment. It reduces the likelihood of disease and is far less costly in terms of time, inconvenience and money to the pet owner. All major pet healthcare guidelines stress the importance of preventive measures, yet, like human healthcare, veterinary medicine has become more focused on disease treatment than prevention. The result is that millions of pets are exposed to preventable diseases. This clearly indicates that the veterinarian's role as advocate isn't what it used to be, nor what it originally aspired to be.

Vaccines

The concept of core and noncore vaccines was introduced in veterinary medicine some 20 years ago. Core vaccines are those that have been deemed necessary for all dogs and cats. Unfortunately, the role of noncore vaccines has been less clear, and as a result they've come to be seen as optional and less important rather than "situationally" core.

What's more, most veterinarians are now opting to administer core vaccines on a triennial basis. Consequently, they've gotten out of the habit of advocating for annual noncore vaccines. Because noncore vaccines are now less familiar to pet owners, client education on the part of the veterinarian is that much more critical to remove the stigma of their being optional and unnecessary.

Many pets are at significant risk of exposure to the diseases noncore vaccines protect against. Just think of feline retrovirus in cats or, in dogs, leptospirosis, respiratory disease and Lyme disease.

Perhaps veterinarians themselves have

begun to see noncore vaccines as less important to preventing disease. However, annual risk assessments show that many if not all pets are at significant risk of exposure to the diseases these noncore vaccines protect against. In fact, the risk is often greater than that of being infected by so-called core diseases. Just think of feline retrovirus in cats or, in dogs, leptospirosis, respiratory disease and Lyme disease. The goal is to stop thinking of noncore vaccines as optional and develop protocols that recognize their specific role in achieving the goals of veterinarians and pet owners alike—namely, the health and well-being of pets.

Parasites

It's impossible to even estimate how much animal suffering and zoonotic disease have been prevented since the introduction of effective broad-spectrum parasite control products. Without a doubt, year-round parasite prevention and control have done much to improve the state of pet and human health. These products are safe, effective and affordable.

Why then do internal and external parasites and the diseases they transmit continue to expand in spite of safe and effective prevention measures? If anything, the ranges and distributions of parasites have increased. The range of many ticks has expanded greatly, the prevalence of internal parasites is still high, and heartworm infection has gone from a regional disease to being reported in all states.

Why? Because, quite simply, these preventive medications are inconsistently or inappropriately prescribed and administered. These products need to be recognized and recommended as a first line of defense against parasite diseases that are frequently asymptomatic and yet have serious ramifications for both pets and people. Merely mentioning or even recommending a measure is simply not enough. Veterinarians must strongly advocate for parasite control and prevention, stressing the benefits of administration but also the potential ramifications of non-use.

Legal ramifications

If nothing else, veterinarians need to recognize the moral and potential legal ramifications of a lack of preventive care advocacy. When a cat gets heartworm disease and the client sends a complaint to the medical board stating that her veterinarian didn't recommend heartworm preventive or educate her on the risks of heartworm disease in cats, it's the practitioner's responsibility to show not only that the conversation did occur, but it took place annually.

This requires more than a check box on a template—it includes thorough documentation of the conversation and the use of "declined" codes in the practice management software. Other protective processes include having clients sign waivers if they opt to decline certain vaccinations and parasite testing.

>>> Every member of your veterinary team must communicate the importance of preventive healthcare to clients. If you don't speak up for your patients, who will?

What happens to those reminders for preventive testing, vaccines and medications that a client either chooses not to pursue or the veterinarian decides not to recommend or administer? If they remain in "red" as overdue year after year, the client no longer receives reminders for these services from the practice on an annual basis. That often means the veterinarian doesn't have the opportunity to conduct a risk assessment every year. Updating reminders, regardless of whether a preventive care service or product has been previously pursued, is an important responsibility when acting as an advocate for the patients in your care.

Advocacy tools

When an industry issue goes "global," those who serve that industry respond and help implement a fix. Improving client communication skills by utilizing free tools such as those provided by the Partners for Healthy Pets initiative (see partnersforhealthypets.org) can take you from "powering through" preventive education to enjoying the conversation with clients.

Preventive care vaccine and prescription drug manufacturers and distributors are also taking huge steps to help practices. It's no longer just about product advertising and special promotions but about educating and assisting practices. Many companies offer programs that help practices track and improve compliance, train their support teams and educate clients more effectively.

We need to stop placing blame for poor compliance on our clients and take responsibility for our level of advocacy. In many cases, the weak link in the chain of preventive health isn't the pet owner but the pet healthcare provider who, for a number of reasons, fails to accept his role as an advocate. Take a minute and rate yourself on a scale of one to 10 with one being the worst and 10 being the best advocate for the health and longevity of your patients.

Now, make a firm commitment to upping your game by getting back to the reasons you became a veterinarian in the first place—reconnecting with your role as a trusted advisor and advocate. By reigniting this passion you'll experience the ultimate professional satisfaction by watching both your patients and practice thrive. **dvm360**

Dr. Michael Paul, @mikepauldvm on Twitter, is a nationally known speaker and columnist and the principal of Magpie Veterinary Consulting. He lives in Anguilla in the British West Indies. Jessica Goodman Lee is a practice management consultant with Brakke Consulting based in Dallas.

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Stories *from the* front lines *of the* war on debt

The first of three stories of real veterinarians who are all engaged in the battle.

This month we're kicking off a series highlighting the stories of three veterinary professionals, all in very different financial circumstances and stages in their careers. I chatted with each of these doctors, and our open discussions left me with a broader perspective on the various elements that play into how we each perceive and manage our careers and debts. They also led me to reflect on a couple of situations during my own career when I had to make an important decision that would profoundly impact my financial future.

Have you been given financial advice to deal with your debt along the way? How good did that advice turn out to be? With so many opinions and experts out there, finding the best path can be daunting. During my internship year, I recall one not-so-helpful tip that I received from an associate veterinarian in the same practice. The associate suggested that my best strategy to deal with my student loans at that time was ... to shoot myself in the head. While he may not have been that far off strictly in terms of practicality (equine veterinarians tend to be very practical), I was motivated enough at the time to explore alternate approaches.

Another factor that influences a veterinarian's financial situation—and ability to pay down debt—is whether he or she chooses to pursue an internship or advanced training. Does the financial benefit of being board-certified offset the opportunity cost of compounding interest and decreased savings during those important years? My feeling is that the majority of specialty-trained veterinarians pursue their passion, not the salary.

I recall one potential "job interview" in which I was extended a fantastic opportunity. It was three years after my graduation and I was coming to realize that my dream career in equine practice just wasn't panning out. It was time for me to make the (very scary) shift to small animal practice if I was going to

survive as a practicing veterinarian. The owner of a reputable small animal referral hospital in California had a truly great offer, just for me. He said that if I wanted to work at his hospital full-time and receive no salary or benefits, then perhaps in a year or so there might just be an opportunity for me to enter a training program. After many sleepless nights of deliberating, I decided that the offer was too good to be true and politely declined.

Pursuing our career and financial goals will lead us down a bumpy, winding road. Here is the first of three stories illustrating more of the varied experiences within our socioeconomically diverse profession.

Elena Lugo: The future of veterinary medicine

Age: 22
Expected graduation year: 2017
Expected student debt: $110,000 to $130,000

Lugo is from Fontana, Calif., and is thrilled to be starting her freshman year of veterinary school this year at the University of Missouri. She has a strong interest in beef and dairy production animal medicine, but recently she has also begun to develop an interest in small animal emergency practice. In interviewing Lugo, I was reminded of the excitement and anticipation that we all experience before starting that important chapter of our lives.

Lugo is going into veterinary school as prepared as she can be, including having a rough financial plan. Since starting the application process and subsequently being admitted to veterinary school, she has been working hard at her job and saving up as much as she can. Her short-term goal is to have enough savings to cover rent and car payments for the first year. She is also considering taking on a part-time job during that first year, which would help establish residency status for in-state tuition starting her sophomore year. An in-state status change amounts to about $20,000 per year in tuition savings.

Trying not to squelch Lugo's enthusiasm *too* much, I hit her with some tough questions about her financial future and the implications her decisions will have on her life as a newly minted veterinarian. She believes that veterinary school tuition in general is too high to be accessible to middle-income families without taking on the responsibility of large loan payments. Lugo is aware that she will face debt challenges after graduation. But as most of us can relate to, that factor is not enough to stop her from pursuing her education.

"I have the passion to pursue my

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dream career," she says. "I think that if I am smart early on about managing finances, I can make this work for me."

I asked Lugo how prepared she was to take on debt to pay for school and all the considerations that go along with that. She says she would not have been prepared to develop a strategy of saving and budgeting if someone had not confronted her with the issue head-on. She is referring to the day that a pushy veterinarian (who may or may not be the author of this article) handed her a pile of white papers on the financial status of the veterinary profession. I was excited to learn of her admission to veterinary school, but I also felt compelled to help her understand the kind of burden she was about to take on.

When I asked her about her projected salary upon graduation, I wasn't surprised at the answer. Again, like so many of us, that salary figure has not been a focus for her while she's been getting ready to start veterinary school. This phenomenon should raise some concern among our profession as a whole, as it may be fueling some of the debt-to-salary disparity that seems to be compounding these days.

Lugo clarifies, "I am not money-hungry. I have not put tremendous thought into what my starting salary is or should be. I am preoccupied with determining my species preference and career path much more so than with my salary at the end of school." When I twisted her arm to give me an on-the-spot guess as to what her starting salary might be, she projected a range between $50,000 and $80,000 per year.

Lugo and other incoming veterinary students are the future of our profession. It is entirely up to those of us currently working in veterinary medicine to make sure that these energetic new minds have some basic understanding of what lies ahead. We have a tremendous responsibility to warmly welcome the best and brightest into our professional family and also to make sure they have a place to go after graduation day. Some countries outside the U.S. are so overpopulated with veterinarians that a veterinary degree is not considered a means of earning a livable wage. We all must do our part to make sure that does not become the case here. dvm360

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

> *"I have the passion to pursue my dream career. I think that if I am smart early on about managing finances, I can make this work for me."*
>
> *—Elena Lugo, student at the University of Missouri*

'But it's just a *TEENSY* postmortem procedure…'

Your cancer patient is euthanized and you want a fluid sample. Your colleague demands that you get the pet owners' OK first. Is it really necessary?

The Gatz Veterinary Center is a six-staff-member, progressive facility with an excellent reputation in the suburban community it has called home for 17 years. Although they don't hold specialty board status, several of the veterinarians have specialty interests.

For example, Dr. Leeds has developed an interest and expertise in oncology during his 14 years at the clinic. He consults regularly with the oncology department at the nearby regional veterinary college and attends continuing education in oncology whenever the possibility arises.

Dr. Leeds has been treating Alfie, a 9-year-old Labrador retriever, for lymphoma for seven months using a standard chemotherapeutic protocol and monitoring Alfie's status on a regular basis. While Dr. Leeds is off duty, Alfie develops acute respiratory distress and is brought to the hospital. The clinicians who see Alfie determine that he has a substantial amount of fluid in his chest.

These pet owners have been through a lot with their beloved retriever, and they decide that his distress, coupled with his guarded prognosis, is too much for their best friend to bear. Instead of opting to drain the chest fluid, they choose humane euthanasia.

The doctor attending to Alfie calls Dr. Leeds and informs him of the owners' decision and the euthanasia. Dr. Leeds understands and agrees with the decision. He is glad he's been able to help Alfie thrive and survive during the past seven months.

Dr. Leeds asks Dr. Ho, the clinician on duty, to take a small sample of the fluid from Alfie's chest so that he can microscopically evaluate the number and presence of neoplastic cells in the exudate. He thinks this could assist him in future management of similar oncology cases.

Dr. Ho agrees that the aspirate would be valuable but she thinks it necessary to call the pet owners and ask their permission to pursue the postmortem sample. Dr. Leeds believes that obtaining a small-needle aspirate is not invasive and does not warrant disturbing grieving pet owners. This leads to a discussion of the ethical boundaries related to obtaining postmortem information with or without a pet owner's permission.

Dr. Ho isn't comfortable taking the sample without the owners' permission and respectfully declines to do so. Dr. Leeds returns to work the following day and the two clinicians have a discussion about the deceased patient and how to pursue similar situations in the future.

Dr. Leeds reiterates his position that taking a postmortem fluid sample is not invasive or disfiguring. It isn't as if he wants to do a necropsy, which would substantially alter the dog's remains. He agrees that procedures should not be performed on patients without owner input and permission, but in this case, he maintains that Alfie is deceased and therefore no longer a patient.

Dr. Ho counters that Alfie's owners have trusted the staff at the veterinary center to treat their dog only upon full disclosure of a planned treatment protocol. In addition, she believes that upon Alfie's death, the veterinary center has been given custody of the remains to see that they are disposed of in the prescribed manner. While the hospital is in custody of the body, she says, it's an ethical breach to acquire or invade the remains without the owners' permission.

In order to facilitate matters, Dr. Leeds agrees to call Alfie's owners and request permission to take a small sample in the interest of helping future patients. The owners, however, are still distraught over the loss of their friend. They understand Dr. Leeds' interest but respectfully decline to have Alfie participate in any postmortem examination.

Dr. Leeds is disappointed and does not understand the clients' decision. After all, he has taken excellent care of Alfie and only wants some closure to his medical efforts. Dr. Ho is glad the request has been made. This way the hospital knows and can truly honor and respect the pet owners' wishes until the body leaves the confines of the veterinary center.

Rosenberg's response

In this case, medical treatment and care are not a concern for Alfie after he has been euthanized. At that point, the issues center on professionalism and honesty. Dr. Leeds has rendered compassionate veterinary care in exchange for a fee for this service. It has been understood either verbally or in writing that medical procedures are performed on the pet only with the pet owners' permission. Plus, after the dog has died, they've paid an additional fee for processing of the pet's remains.

Veterinarians have an ethical responsibility to consult with the pet owner before continuing any form of medical inquisition on the body. It's true that fluid aspiration would not have defaced the remains, and it's also true that it could have been done without anyone finding out. This is where questions of ethics and, more importantly, trust come into play.

If the pet owner cannot completely trust the veterinarian with all aspects of the care and handling of a pet, confidence in and respect for the individual doctor and for the profession as a whole will eventually break down. It's easy to respectfully request a pet owner's permission to perform a postmortem procedure.

Bottom line? I would not touch a pet or its remains without this permission. To do so would violate the trust I've worked very hard to establish.

Get in touch

Do you agree with Dr. Rosenberg? We'd like to know what you think. E-mail us at **dvmnews@advanstar.com** or post your thoughts at **dvm360.com/community** or **facebook.com/dvm360**. dvm360

Dr. Marc Rosenberg is director of the Voorhees Veterinary Center in Voorhees, N.J. He is a member of the New Jersey Board of Veterinary Medical Examiners.

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Zoetis

Equine app update

Version 2.0 of the Zoetis EQStable app is available in the Apple App Store. The update offers a new veterinary finder feature, powered by GlobalVetLINK, that provides an interactive map to search a specified area for equine veterinary clinics and gas stations for refueling on trips.

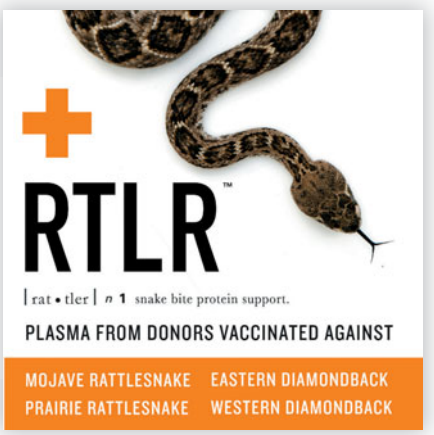
For fastest response, visit zoetisUS.com/EQStable

IDEXX Reference Laboratories

Allergen diagnostic tool and treatment

IDEXX Reference Laboratories announces two additions to the GREER Aller-g-complete system. The Aller-g-detect Allergen Preliminary Panel is a simple serum test that detects the presence of allergen-specific IgE antibodies for four common allergen groups. IDEXX also offers sublingual immunotherapy with GREER Aller-g-complete Drops to give patients and clients an alternative to injection therapy.

For fastest response, visit idexx.com



Mg Biologics

Rattlesnake bite treatment

Mg Biologics now offers RTLR, a rattlesnake bite therapy consisting of plasma from donor animals vaccinated against Mojave, prairie, eastern diamondback and western diamondback rattlesnake bites. RTLR is designed for use in equine, canine and camelid species and costs a fraction of current therapies.

For fastest response, call (877) 769-2340 or visit mgbiologics.com

Timeless Veterinary Systems

Veterinary formulary app

The Timeless Vet Drug Index is an evidence-based drug formulary app created by veterinary experts Drs. Stephen Ettinger, Etienne Cote and Wayne Schwark. It contains only the most clinically relevant drug information with full link-outs to PubMed abstracts and a visual ranking system to evaluate strength of evidence. The app is available for iPhone and iPad.

For fastest response, visit VetDrugIndex.com

Simmons

Practice purchasing website

Simmons has launched a new website with a tool for practice buyers. Veterinarians looking for purchase opportunities can now subscribe to the Simmons Practice Watch Program. The program will instantly notify subscribers when a veterinary practice becomes available in their area. Veterinarians looking for practice opportunities can now be the first to know about listings nationwide. The website also offers expanded functionality and makes finding resources even easier.

For fastest response, call (800) 333-1984 or visit simmonsinc.com

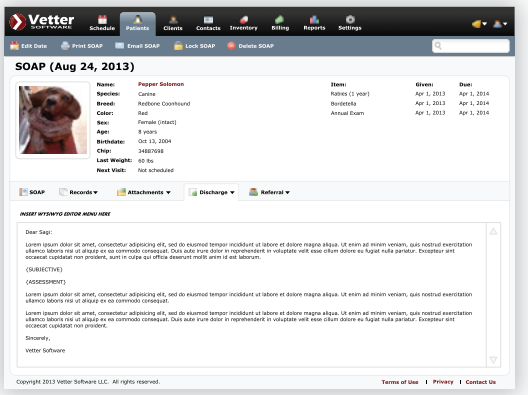
VetGirl

Continuing education podcast

VetGirl has launched a subscription-based podcast service offering RACE-approved veterinary continuing education. Founded by Justine Lee, DVM, DACVECC, DABT, and Garret Pachtinger, DVM, DACVECC, VetGirl is designed for those who want to learn via their mobile devices. VetGirl is a tech-savvy, multimedia experience with podcasts, webinars, videos and blogs. Through VetGirl, veterinary specialists provide clinical tips and reviews of the most cutting-edge veterinary literature, so you can learn on the run with three- to five-minute podcasts.

For fastest response, visit vetgirlontherun.com

Computer software, Web tools and educational materials



ImproMed

Practice management software

ImproMed has released Advantage+ version 30.375, a practice management software tool that helps animal health professionals maximize efficiency without sacrificing quality of care. The latest version of Advantage+ includes updates to the appointment book, which now displays a client's doctor preference in the "New/Edit Appointment" box, and filters and previews patient appointment reminders.

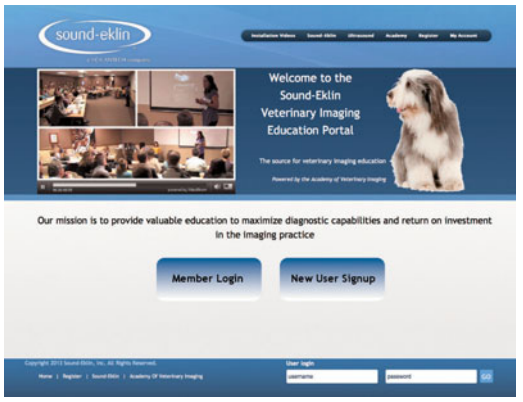
For fastest response, call (800) 925-7171 or visit impromed.com/advantage-plus

Vetter Software

Procedure templates

Vetter Software has released an update to its Web-based practice management software that includes procedure templates, which allow clinics to predefine procedure components. Once a procedure template is created, it can be used to automatically create all of the related medical records, reminders and invoice items with a single click.

For fastest response, visit vettersoftware.com

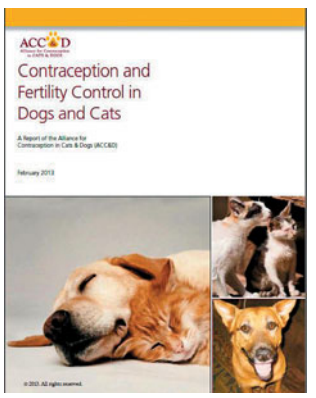


Sound-Eklin

Ultrasound education portal

Lack of education and practice is why many ultrasound machines sit unused, but Sound-Eklin's new Veterinary Ultrasound Education Portal is designed to ease the ultrasound learning curve. It features mini-courses in a "see one—do one" format, which allows users to quickly refresh skills and implement new techniques. Sound-Eklin's Education Portal is free and can be found at education.soundeklin.com.

For fastest response, call (760) 918-9626 or visit education.soundeklin.com



Alliance for Contraception in Cats and Dogs

Contraception symposium proceedings

Alliance for Contraception in Cats and Dogs is offering the proceedings from its 5th International Symposium on Non-Surgical Contraception Methods of Pet Population Control free of charge. Providing these proceedings is key to the alliance's mission of advancing nonsurgical options for humane cat and dog population control across the globe.

For fastest response, call (503) 740-5953 or visit acc-d.org/5thSymposiumProceedings

Diets

Balance IT

Natural food

Balance IT brand has launched two new natural pet foods—Grain Free Catfish and Beans and Grain Free Pork and Potato Recipe. These veterinary-exclusive foods were formulated by a board-certified veterinary nutritionist to manage multiple conditions and are available for direct home delivery if desired.

For fastest response, visit BalanceIT.com

Nutraceuticals

Kemin

Feline health chew

Kemin introduces three feline health supplements under the Resources brand. The products include Feline Urinary Tract Support, Feline Immune System Support and Protegrity GI. They are available as highly palatable chews, allowing for more convenient delivery and improved acceptability.

For fastest response, call (515) 559-5100 or visit kemin.com

Biologicals

Merck Animal Health

Porcine circovirus vaccine

Merck Animal Health has released a porcine circovirus Type 2 (PCV2) vaccine—Circumvent PCV G2—for use in pigs as early as three days after birth. The new vaccine offers convenient one- or two-dose administration options with five-month duration of immunity, which Merck says is at least 25 percent longer than any other PCV2 vaccine on the market.

For fastest response, visit merck-animal-health-usa.com

Diagnostics, laboratory, imaging equiptment and supplies

IDEXX Reference Laboratories

Cardiology test improvement

IDEXX Reference Laboratories has introduced a simplified process for veterinary practices when submitting a specimen for the feline or canine Cardiopet proBNP Test. This enhancement makes specimen preparation easier and shortens the workflow for submission by eliminating the need for the special pink-top tube, which was previously required.

For fastest response, visit idexx.com

Patterson Veterinary

Handheld ultrasound

Patterson Veterinary has entered into a partnership with Konica Minolta to exclusively distribute the new Sonimage P3 handheld ultrasound machine to veterinary practices nationwide. This portable, easy-to-use unit includes intuitive software and a 4-GB SD card that can hold more than 10,000 images. The Sonimage P3 has a high-resolution screen featuring zoom and movie clip options in addition to voice and text annotation.

For fastest response, call (651) 686-4167 or visit pattersonvet.com

Risk requirements eased for ProHeart 6 injectable heartworm control

After conducting a 4.5-year-long safety review of ProHeart 6 (moxidectin), an injectable heartworm preventive for dogs administered every six months, Zoetis has announced the lifting of several safety restrictions imposed in 2008 by the U.S. Food and Drug Administration (FDA).

The changes, which are part of the product's updated risk minimization plan (RiskMAP) with the FDA, are as follows:

> The product may be used in healthy dogs over 7 years of age.

> The product may be administered by a trained, certified veterinary technician or assistant.

> Clients are no longer required to sign a consent form before administration.

ProHeart 6 has had a rocky history since its launch to the U.S. veterinary market in the early 2000s. After thousands of adverse events, including death, were reported to the FDA in association with administration, the product was pulled from the U.S. market in 2004. The manufacturer at the time, Fort Dodge Animal Health, began conducting studies to evaluate the product's safety profile and investigate the adverse events.

According to the FDA, these studies suggested that some residual solvents used in manufacturing were allergenic, prompting Fort Dodge to change how the drug was manufactured. After these changes were made, adverse event reports declined in overseas markets and the product was relaunched in 2008 to the U.S. veterinary market.

However, a number of new rules constituting the original RiskMAP program accompanied the 2008 relaunch. Veterinarians were required to complete in-depth training, read the new label, restrict treatment to healthy dogs between the ages of 6 months and 7 years of age, provide dog owners with a client information sheet, obtain signed informed consent, record the product lot number in the medical record, and report adverse events.

Since then, Fort Dodge was acquired by Pfizer Animal Health, which was subsequently spun off as an independent, publically held company, Zoetis Inc. Also, studies of ProHeart 6 have continued, leading to today's announcement of the less-restrictive RiskMAP. "A steady and dramatic increase in ProHeart 6 use occurred during this 4½-year period, with ProHeart 6 demonstrating predictable safety and efficacy that remained consistent as use increased," reads an Aug. 28 release from Zoetis. "These data show that ProHeart 6 is a safe and effective product for the prevention of canine heartworm disease for six full months in dogs age 6 months and older."

"We are very pleased that the predictable performance of ProHeart 6 has made revisions to the RiskMAP appropriate at this time," says Zoetis's J. Michael McFarland, DVM, DABVP, group director of companion animal veterinary operations. "Although significant restrictions have been lifted, Zoetis remains committed to education on the proper use of ProHeart 6 and will continue to uphold the guidelines set forth by the FDA to help assure that veterinarians and, through them, pet owners are aware of the benefits and risks of this product."

To obtain additional information, including a copy of the product labeling or full prescribing information, visit ProHeart6dvm.com or call (888) 963-8471. **dvm360**

Zoetis accepting proposals for 2013 Horse Call grant program

Zoetis is accepting research proposals for the 2013 Horse Call grant program, which promotes excellence in veterinary economic research and education.

Zoetis will help fund one or more individuals through a grant of up to $50,000 for innovative, clinically relevant research proposals that determine the economic impact of equine encephalitic, parasitic, or respiratory disease or the impact of preventing these diseases. Another area this grant will support is determining the economic impact of practice management business practices that emphasize prevention of equine infectious or parasitic diseases or prevention of horse-related injuries to clients, technicians or veterinarians of these practices.

"We believe that the most productive way to advance veterinary research will be through an open model of discovery," says Dr. Rob Holland, director of Zoetis Outcomes Research. "There is a real economic value imposed on horse owners when their horse becomes sick and a real value when disease is prevented from occurring."

Applications must be submitted by Oct. 31. All applicants must be in good standing in their professional organization and research must be conducted in the U.S. A research committee will review the applications and will notify the selected recipient or recipients by Dec. 1. **dvm360**

Medical/surgical instruments and supplies

F.C. Sturtevant Co.

Canine antiseptic powder

F.C. Sturtevant Co. has released Columbia Canine Formula veterinary antiseptic powder. This topical skin care powder was developed specifically to treat sarcoptic canine scabies, demodectic mange, canine atopic dermatitis, *Staphyloccus intermedius* pyoderma and seborrhoeic dermatitis. Utilizing a proprietary formulation consisting of zinc oxide, phenol and other ingredients, the powder provides the proper healing environment without harmful side effects.

For fastest response, call (914) 337-5131
or visit columbiaskincares.com

Virbac expands Iverhart Plus recall to 34 lots

Product testing has revealed that 16 lots of Iverhart Plus Flavored Chewables were below ivermectin potency levels prior to the product's expiration date. As a result, Virbac Animal Health is voluntarily recalling 34 lots of the heartworm preventive—the 16 that failed testing and another 18 "out of an abundance of caution," according to a letter the company sent to veterinarians and their teams in August.

This recall is an expansion of an earlier announcement this spring in which six lots of Iverhart Plus were recalled due to potency concerns. The affected products may fail to fully protect dogs in the upper 10 percent of each designated weight range against heartworms, Virbac states. The recall does not affect Iverhart Max products.

The Iverhart Plus Flavored Chewables recalled are:

> Large, 51 to 100 lbs., with lot numbers 111394, 120091, 120127, 120207, 120256, 120289, 120300, 120305, 120306, 120363, 120377, 120379, 120434, 120464, 120651, 120658, 120678, 120824, 120831, 121110, 121150, 121283, 121386

> Medium, 26 to 50 lbs., with lot numbers 120090, 120301, 120378, 120450, 121282

> Small, up to 25 lbs., with lot numbers 120092, 120397, 120398, 120798.

Virbac is instructing veterinary clinic personnel to examine inventory and isolate all Iverhart Plus Flavored Chewables from the lots recalled to prevent dispensing any recalled product, then contact distributors regarding disposition of recalled products. Distributors will provide a voluntary recall response form for veterinarians to record requested information regarding the recall, and they will issue a credit or replacement product.

Veterinarians are encouraged to call Virbac Technical Services at (800) 338-3659, ext. 3052, to discuss testing recommendations for potentially affected pets. **dvm360**

Vets First Choice ranked 25th fastest-growing company by *Inc.* magazine

Vets First Choice has registered 500,000 pets for home delivery of pet medications and diets.

Vets First Choice, an online veterinary partner pharmacy and marketing service provider, was named the 25th fastest-growing company in the U.S by *Inc.* magazine.

The magazine's Inc. 500/5000 annual list ranks the 500 fastest-growing companies in the nation. Within the overall ranking, the company was named the nation's number one fastest-growing business services company. This is Vets First Choice's second year on the *Inc.* 500 list. Last year, it was ranked 30th.

"We attribute our accelerated growth to a strong collaboration between veterinary practices, pharmaceutical manufacturers and our team," says Benjamin Shaw, Vets First Choice CEO. "Our focus is to help veterinarians provide exceptional home delivery and compliance of pet medications and diets through our technology and we thank them for their enthusiastic support."

Vets First Choice has registered more than 10,000 veterinarian prescribers and more than 500,000 pet owners to its home delivery service across all 50 states.

"Vets First Choice enables veterinarians to offer pet owners pharmacy service with minimum impact on their clinical practice effort," says Joseph Cook, former CEO and chairman of Amylin Pharmaceuticals. "The company helps improve medication compliance, reduces physical inventory and enhances practices profits."

The private company is headquartered in Portland, Maine, and has support centers in Kansas, Maryland and Nebraska staffed with licensed pharmacists and customer support personnel. Vets First Choice contracts with all major U.S. and international animal health pharmaceutical manufacturers to provide safe and reputable medications and products.

"The Vets First Choice system gives veterinarians the ability to remain completely in control of their clients' pet medication needs while providing direct-to-home shipping of those medications which for the first time in my career can significantly increase compliance rates for preventive medications," says Michael W. Dryden, DVM, PhD, DACVIM, founding member of the Companion Animal Parasite Council. **dvm360**

Veterinary Pet Insurance surpasses 500,000 policies

More than three decades after issuing its first pet insurance policy to television's Lassie, Veterinary Pet Insurance Co. (VPI) has surpassed 500,000 pets covered by active policies.

"This milestone is a testament to our commitment of providing pet owners with peace of mind and the ability to provide their pets with optimal medical care," says Scott Liles, president of VPI.

VPI's half-million policies represent more pets protected than all other U.S. pet insurance companies combined. According to company estimates, VPI currently has 53 percent market share, followed by ASPCA with 10 percent and Trupanion with 9 percent.

In addition to traditional pet health insurance, VPI has been expanding its consumer and veterinary products and services.

"VPI is very well-positioned to expand its presence as the nation's leading pet insurance provider, as well as enter new arenas that will provide assistance to pet owners and veterinary clinics," Liles says. "We are very proud of this achievement and look forward to announcing additional milestones in the near future." **dvm360**

Zoetis commits to fight PEDv

Zoetis affirms its commitment to finding a solution to help control the recent outbreak of porcine epidemic diarrhea virus (PEDv). The virus has been positively identified in 17 states since April.

Zoetis is supporting University of Minnesota researchers to develop a rapid PEDv diagnostic test.

"Helping fund the development of the rapid diagnostic tool is just one way we are investing in and are committed to finding a solution against this virus," says Gloria Basse, vice president, U.S. pork business unit, Zoetis. "We believe that diagnostic tools and vaccines are part of the solution equation. Our research and development teams will continue to collaborate with our university and industry partners until this disease is controlled." **dvm360**

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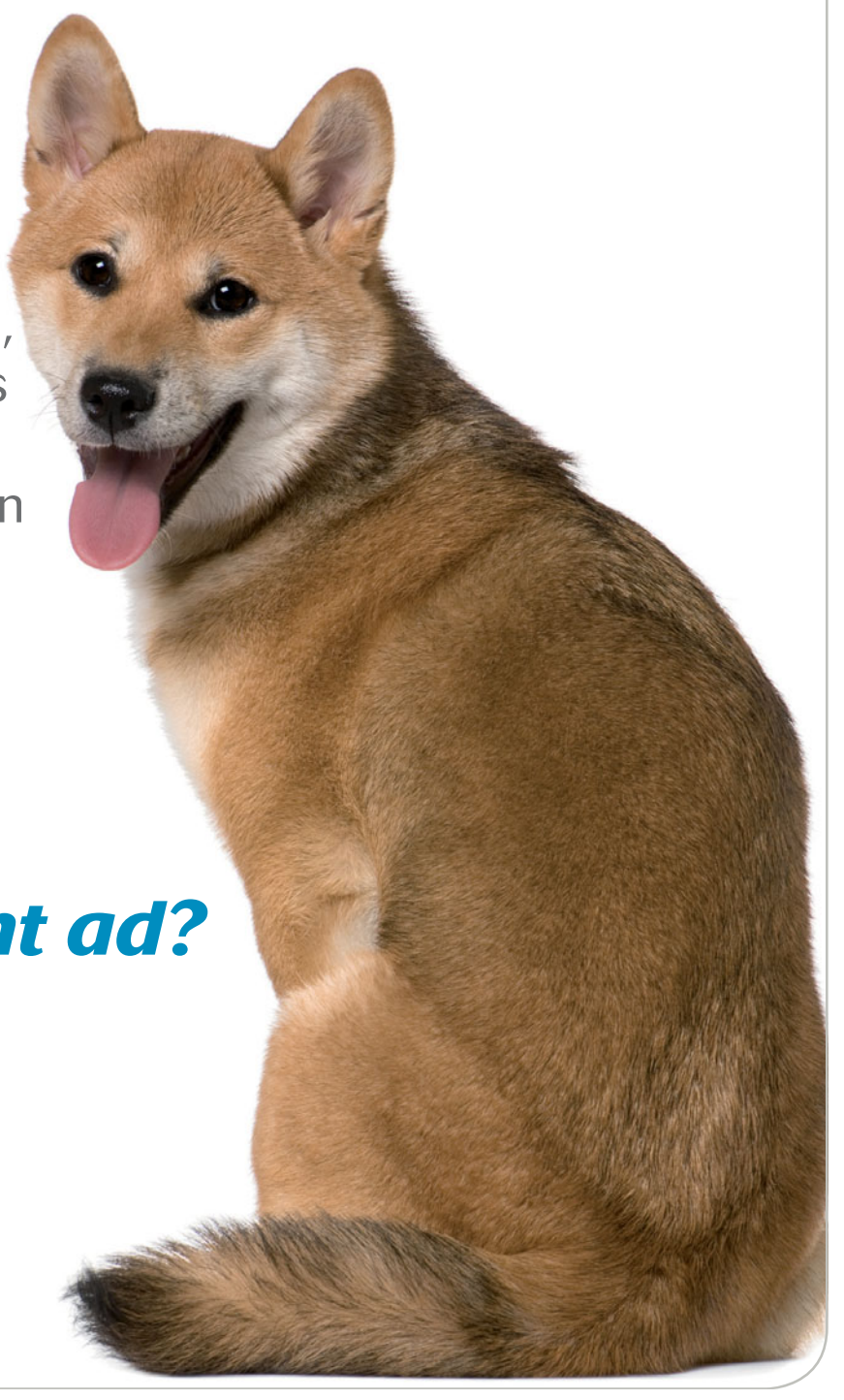

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Michigan

Join our team in Shelby Township Full and Or Part-Time. Our canine and feline clinic is open 9-6 M-F. No weekends, evenings or on call. We see a wide variety of internal medicine, surgical, and routine health care cases. We have 4 licensed techs which are utilized extensively. Our clinic has in house lab, pulse ox, BP, Tonopen and more. We have good salary and benefit package seeking a team player with good communication skills to join our collaborative environment. New grads or experienced vet welcome. The clinic is in a nice neighborhood in Northern Detroit suburbs close to local parks and Metro Detroit area entertainment and sports. Call Shirley at 586-731-9211 to arrange a visit. Send resume to Animal Clinic, 11350-22 Mile, Utica, MI 48317 or email to hsmacomb@sbcglobal.net

New York

Full or P/T veterinarian needed for a well established small animal practice in Queens, NY. Experience preferred, however new graduates are also welcomed. Competitive salary and benefits. Email cover letter and resume to 21st.ave.animalclinic@gmail.com.

Texas

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Virginia

Associate Veterinarian needed for established Small Animal Practice in Virginia Beach, VA. Seeking Full or Part-time associate with good client communication skills. Flexible schedule with no Emergency Duty required and numerous Referral Centers close by. Salary to commensurate with experience. Please send resumes to Tracy E. LVT/ office manager Phone: 757-468-1400 Email: hollandoaksvet@gmail.com
Fax: 757-468-1300.

Practice For Sale

Arkansas

AAHA Accredited Animal Hospital in Conway, AR, for sale. Long & established location, Certified practice management. Professionally designed facility with equine potential. High profitability. Real Estate available. Stable & fast growing college town, close to metro area. Retiring owner available for smooth transition. Contact Aron Tallent, DVM CVPM 1320 East Oak, Conway, AR 501-329-4466.

New Jersey

Small Animal Hospital For Sale In Affluent Central NJ Area. Grossing 720k with Single Veterinarian. Price Open For Negotiation. Please Call 732-259-6951 For Further Information.

New York

Motivated to sell turn-key, well equipped, and staffed solo small animal hospital in the Finger Lakes District. Established 35 years, has boarding, grooming, and pet shot. Large animal work is available if desired. Rural setting with city amenities. Call 607-377-6576 or email johnaaron1972@aol.com

Words to the wise

A monthly collection of quotes and citations

By Carl A. Osborne, DVM, PhD, DACVIM

Bias

» There is One (God) who has not shown partiality to princes, and has not given more consideration to the noble one than to the lowly one. (In God's eyes, there is nothing that preferentially distinguishes those with fame and power from those who are unknown and without worldly influence.)

Job 34:19

» We exercise justice when we treat others the way we want God to treat us.

Micah 6:8

» For the wisdom from above (as found in the inspired words of the Bible) does not make partial distinctions.

James 3:17

» Stop judging from the outward appearance. (The quality of a book is not necessarily reflected by its cover, and likewise the quality of a person is not necessarily reflected in outward appearance.)

John 7:24

» You must not be partial in judgement. You are not to accept a bribe, for the bribe blinds the eyes of the wise ones and distorts the words of the righteous ones.

Deuteronomy 1:17, Exodus 23:8

» Do nothing according to a biased leaning.

1 Timothy 5:21

Please send contributions to Dr. Carl A. Osborne:
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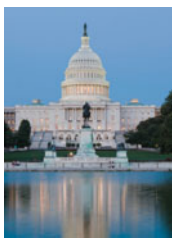
e-mail osbor002@tc.umn.edu
mail 2585 Cohansey Street
Roseville, MN 55113.

For a full listing of events in 2013, visit dvm360.com/calendar

Oct. 31-Nov. 3
CVC San Diego
(800) 255-6864, ext. 6
www.thecvc.com



May 8-12
CVC Washington, D.C.
(800) 255-6864, ext. 6
www.thecvc.com

CVC unconventional

National and international meetings

Oct. 3-4
9th Annual Equine Encore
Athens, GA
vet.uga.edu/CE
(706) 542-1451

Oct. 3-6
27th Annual Veterinary Dental Forum
New Orleans, LA
veterinarydentalforum.com
(208) 461-9045

Oct. 8-11
American College of Veterinary Radiology Annual Conference
Savannah, GA
acvr.org
(717) 558-7865

Oct. 12-13
AAHA Excellence Series
Oak Brook, IL
aahanet.org/excellence
(800) 252-2252

Oct. 17-20
Veterinary Cancer Society Annual Conference
Minneapolis, MN
vetcancersociety.org
(573) 823-8497

Oct. 24-26
American College of Veterinary Surgeons (ACVS) Symposium
San Antonio, TX
surgicalsummit.org
(301) 916-0200

Oct. 25-Nov. 1
Holistic Health for Animals
Calgary, AB Canada
deeamanda.wix.com/healthyanimals
(403) 703-7820

Oct. 31-Nov. 3
American Board of Veterinary Practitioners Symposium
Phoenix, AZ
abvp.com
(800) 697-3583

Local and regional meetings

Oct. 3
Behavior CE
Fairfax, VA
dcavm.org
(703) 733-0556

Oct. 4-6
Alaska VMA Annual Symposium
Anchorage, AK
akvma.org
(208) 922-9431

Oct. 4-6
Washington State VMA Annual Conference
Yakima, WA
wsvma.org
(425) 396-3191

Oct. 5-6
Clinician Scientist Training Workshop
Madison, WI
vetmed.wisc.edu/ce
(608) 265-5206

Oct. 10-13
Wisconsin VMA Convention
Madison, WI
wvma.org
(608) 257-3665

Oct. 10-13
NC Academy of Small Animal Medicine Great Smokies Veterinary Conference
Asheville, NC
ncasam.org
(910) 452-3899

Oct. 13
Veterinary Dentistry Radiology for the Vet and Tech
Phoenix, AZ
veterinarydentistry.net
(941) 276-9141

Oct. 13
UC Davis Veterinary Practitioners Seminar
Davis, CA
vetmed.ucdavis.edu/ce
(530) 752-3905

Oct. 18-21
Mixed Practice Acupuncture Fall Class
Reddick, FL
tcvm.com
(800) 891-1986

Oct. 18-21
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Oct. 18-21
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(800) 891-1986

Oct. 19
Canine and Feline Owners and Breeders Symposium
Madison, WI
vetmed.wisc.edu/ce
(608) 265-5206

Oct. 19
Canine and Feline Vaccination Programs
Madison, WI
vetmed.wisc.edu/ce/upcoming-courses/
(608) 265-5206

Oct. 20
UC Davis Veterinary Diagnostic Imaging Symposium
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vetmed.ucdavis.edu/ce
(530) 752-3905

Oct. 26-27
Feline Dentistry
Punta Gorda, FL
veterinarydentistry.net
(941) 276-9141

Nov. 2
Veterinary nterventional Radiology Summit
Las Vegas, NV
acvim.org
(650) 327-5000

Nov. 2-3
6th Annual 3 Rivers Veterinary Symposium
Pittsburgh, PA
pavma.org
(717) 220-1437

Nov. 3
UC Davis Veterinary The Year in Review
San Francisco, CA
vetmed.ucdavis.edu/ce
(530) 752-3905

Nov. 6
NC Academy of Small Animal Medicine
Sanford, NC
ncasam.org
(910) 452-3899

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THINKSTOCK

Acting on the *fly*

An average, everyday ostrich hunt gets sticky when low-hanging fly tape catches more than just insects.

My brother, Dr. Brandon Brock, is ten years younger than me and his brain could eat my brain for lunch and not be full. He has more letters after his name than anyone I know, is a professor of some institute of neurology, and can say more big words in one sentence than anyone I've ever met.

We are much different. I live in a tiny town in west Texas and avoid crowds at all costs. He lives in Dallas and flies all over the world giving lectures on neurology. The other day I watched him in awe as he was interviewed on a *Good Morning America*-type show. And as I watched this famous doctor who fixes people with broken brains, my mind drifted back to the years when he was growing up.

When I first moved to Lamesa, Texas, and began to build my veterinary practice, he was still in high school. He'd spend days or weeks at a time working with me and getting a taste of rural America.

On one day in particular in the early '90s, you'd have never convinced me he would grow up the be so smart. You see, we were out on an ostrich farm, of all places—back in the day when ostriches were worth $20,000 apiece. The owners of this farm were having some trouble with a few of the chicks getting crippled, so they called me out to have a look. I took Brandon with me because I knew we were going to have to do some running to catch these things, and he was a fast rascal.

The baby ostriches were in pens 30 feet long and 15 feet wide. There were little 3-foot-high fences between the pens and each pen had about 10 ostriches in it. Now, the owner of this ostrich farm was a very detail-oriented man. He wanted everything just right and kept things so neat and clean you could eat off the floor.

His left hand was stuck to the fly tape that was also stuck to his hair. Attempts to pull on either one resulted in painful hair-pulling—there was no apparent way of escape.

He gave an extensive history of the problem and then said we needed to catch one of the crippled birds so we could examine it. I sent Brandon into the pen after our patient.

He immediately went into overdrive, hopping over the short fence with nothing on his mind but catching that bird. He was so focused he didn't see the super-sticky fly tape hanging down over the pen. In fact, he didn't see the next super-sticky fly tape or even the one after that.

The first one stuck smack to the top of his head. The next one latched on the front of his shirt, and the third one stretched across his forehead.

It was the impact and adherence of that third strip that brought him to a standstill. He reached up to attempt to pull the shockingly sticky thing from his forehead, never considering that it would also stick to his hand as soon as he touched it. As he tried to pull off the tape, it slid down over his eyes and stuck to his eyebrows and eyelashes. He then strategically tried to use his other hand to release the other tape on the top of his head.

At one point the situation was like this: His right hand was stuck to the fly tape, which was also stuck to his eyes. His left hand was stuck to the fly tape that was also stuck to his hair. Attempts to pull on either one resulted in painful hair-pulling—there was no apparent way of escape. Not only that, but he couldn't see, so he ran into the wall and (surprise, surprise) stuck to it.

He hollered for help, but I was laughing so hard I couldn't even stand up. The fella who owned the place was no help either—he was chuckling just as hard as me.

I wasn't going to touch him because sticky stuff like that grosses me out. The owner must have felt the same because he just stood there too. Brandon pleaded with us to remove the stickies gently, but neither of us could do anything but laugh.

Finally we got some rags and managed to rip the tapes all loose from his body. He hollered for us to slow down while we pulled the tape with clumps of hair and eyebrows off of his body, but we assured him that ripping it off like a Band-Aid would be less painful.

By the time we finally headed home, Brandon could barely open his eyes because the residual sticky stuff had his eyes all matted together.

And look at him now, eyebrows and all, on TV saying more big words that anyone I have ever known. **dvm360**

Dr. Bo Brock owns Brock Veterinary Clinic in Lamesa, Texas.

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*Source: Among veterinary brands. Survey conducted in July 2012 of small animal veterinarians who recommended oral joint health supplements.

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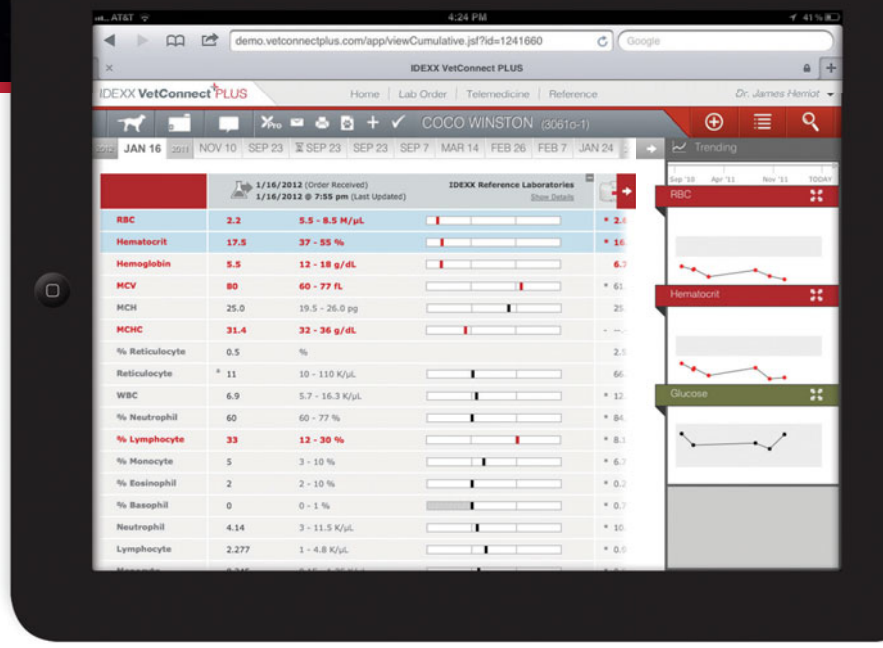
has a story.

Now you can
focus on the most
important parts.

IDEXX VetConnect PLUS

- Quickly get a comprehensive view of each patient's health.
- Review up to 10 years of IDEXX diagnostic results (in-house, reference laboratory or both).
- Spot historical trends with interactive graphing that reflects each patient's "normal".
- Increase clients' understanding and support compliance with pet owner-friendly screens and reports.



Make the best medical decisions for each patient sooner:

See VetConnect® PLUS in action at idexx.com/vetconnectplus.

IDEXX LABORATORIES