Five ways the veterinary team can help new grads succeed

Is your newest associate a brand new graduate? Every member of the veterinary team can play a role in helping these young veterinarians succeed.

By Kate Boatright, VMD

With the class of 2020 completing their schooling — albeit in a nontraditional way — several thousand newly minted veterinarians are joining the workforce. The success of these young veterinarians depends on a supportive clinic environment. While many clinics have a plan for how the current veterinarians will mentor their new colleagues, here are five ways that every team member can help these young doctors reach their full potential.

1. Understand the new graduate mindset
Most veterinary teams have experienced the changes that occur when a new doctor

Why are there so many different models for COVID-19?

Well-known British statistician George Box famously said all models are wrong, but some are useful. Here’s what he meant—and why you may find disease modeling for the novel coronavirus so confusing.

By Sonnya Dennis, DVM, DABVP (Canine and Feline), Carolyn Piché, BS (Biomedical Science), and Rachael Kreisler, VMD, MSCE, DACVPM (Epidemiology)
• Backed by the largest prospective study in diabetic cats to date, PROZINC offers predictable glycemic control and efficacy proven to improve clinical signs associated with diabetes.1-3

• Another study shows that remission rates with the use of PROZINC were comparable to glargine.2

Make PROZINC your first-line treatment for diabetic cats.4–6

For more information, contact your Boehringer Ingelheim representative.

Important Safety Information for Cats: For use in cats and dogs only. Animals presenting with severe ketoacidosis, anorexia, lethargy, and/or vomiting should be stabilized with short-acting insulin and appropriate supportive therapy until their condition is stabilized. As with all insulin products, careful patient monitoring for hypoglycemia and hyperglycemia is essential to attain and maintain adequate glycemic control and to prevent associated complications. Overdosage can result in profound hypoglycemia and death. Progestogen and glucocorticoid use should be avoided. PROZINC insulin is contraindicated in cats during episodes of hypoglycemia and in cats sensitive to protamine zinc recombinant human insulin or any other ingredients in the PROZINC product.

For more information, please see full prescribing information for cats.

A hypoglycemic event associated with stupor, lateral recumbency, hypothermia and seizures. A blood glucose value of < 50 mg/dL occurred in 71 of the cats at various times throughout the study. Two cats had diabetic ketoacidosis during the study. Two cats were euthanized due to poor response to treatment. Five other cats were euthanized during the study, one of which had hypoglycemia. Four cats had received PROZINC for less than a week and were euthanized due to worsening concurrent medical conditions. The following additional clinical observations or diagnoses were reported in cats during the effectiveness field study: vomiting, lethargy, diarrhea, cistis, hematuria, upper respiratory infection, dry coat, hair loss, occur discharge, abdominal/vestibular, black stool, and rapid breathing.

### Precautions

- Any change in insulin should be made cautiously and only under a veterinarian’s supervision. Owners should be advised to observe for signs of hypoglycemia (see Client Information Sheet for Cats for Information for Cat Owners).
- Hypoglycemic reactions on a case-by-case basis to determine if an adjustment in therapy is appropriate, or if alternative therapy should be considered.
- Effectiveness: 107 client-reported cats were enrolled in a 65-day field study with 176 resolving PROZINC. One hundred and fifty-four cats were included in the effectiveness analysis. The patients included various species and breed cats ranging in age from 3 to 19 years and in weight from 1.6 to 26 pounds. Of the clients included in the effectiveness analysis, 101 were female cats, 41 were stones females, and 1 was an intact female. Cats were started on PROZINC at a dose of 0.1-0.3 IU/lb (0.2-0.7 IU/kg) twice daily. Cats were monitored closely for signs of hypoglycemia, insulin antagonism/resistance, rapid insulin metabolism, insulin-induced hypoglycemia, ketoadiposis, hypoglycemia, and local or systemic reactions. The most common adverse reaction observed is hypoglycemia. Signs may include weakness, depression, behavioral changes, muscle twitching, and anemia. In some cases of hypoglycemia, seizures and coma can occur. Hypoglycemia can be fatal if an affected cat does not receive prompt treatment. Appropriate veterinary monitoring of blood glucose, adjustment of insulin dose and regimen as needed, and stabilization of diet and activity help minimize the risk of hypoglycemic episodes. The attending veterinarian should evaluate other adverse reactions on a case-by-case basis to determine if an adjustment in therapy is appropriate, or if alternative therapy should be considered.

### Indication:

PROZINC is indicated for the treatment of diabetes mellitus in cats.

### Package Insert for Cats

**PROZINC**

(proteamine zinc recombinant human insulin)

- **4 mL vial:**
  - Caution: Federal law restricts this drug to use by or on the order of a licensed veterinarian.
  - Description: PROZINC is a sterile, opalescent, proteamine zinc suspension of recombinant human insulin.
  - Each mL contains:
    - Recombinant human insulin 1.0-3.5 IU/mL
    - Protamine sulfate 0.466 mg
    - Zinc oxide 0.088 mg
    - Glycerin 16.00 mg
    - Water for injection (maximum)
  - pH adjusted with hydrochloric acid and/or sodium hydroxide.
  - Indications: PROZINC (proteamine zinc recombinant human insulin) is indicated for the treatment of diabetes mellitus in cats. The safety and effectiveness of PROZINC in kittens has not been evaluated.
  - Dosage and Administration: USE OF A SYRINGE OTHER THAN A U-40 SYRINGE WILL RESULT IN INCORRECT DOSES. FOR SUBCUTANEOUS INJECTION ONLY. DO NOT SHAKE OR AGITATE THE VIAL.
  - PROZINC should be mixed gently by rolling the vial prior to withdrawing each dose from the vial. Once mixed, PROZINC suspensions have a white, cloudy appearance. Clumps or visible white particles can form in insulin suspensions; do not use the product if clumps or visible white particles persist after gently rolling the vial. Using a 40 U insulin syringe, the injection should be administered subcutaneously on the back of the neck or on the side of the cat. Always provide the Client Information Sheet with each prescription.
  - The initial recommended PROZINC dose is 0.1-0.3 IU/lb (0.2-0.7 IU/kg) twice daily. The total volume of body weight 0.2 – 0.3IU/kg every 12 hours. The dose should be given concurrently with or after a meal. The veterinarian should re-evaluate the cat at appropriate intervals and adjust the dose based on both clinical signs and glucose nadirs adequate glucocorticoid control has been attained. In the effectiveness study, glucocorticoid control was considered adequate if the glucose nadir from a 2-hour blood glucose measurement on Day 3 was between 40 mg/dL and 150 mg/dL, and if the cat had no episodes of hyperglycemia such as polyuria, polydipsia, and weight loss were improved.
  - Further adjustments in the dosage may be necessary with changes in the cat’s diet, body weight, or concomitant medication, or if the cat develops concurrent infection, hyperglycemia, dehydration, neoplasia, an additional endocrine or medical disorder.
  - Contraindications: PROZINC is contraindicated in cats sensitive to recombinant human insulin or any other ingredients in PROZINC. PROZINC is contaminated during episodes of hypoglycemia.

### Warnings:

- Users: For use in cats and dogs only. Keep out of reach of children. Avoid contact with eyes or skin. Immediately flush eyes or skin with water for at least 15 minutes. In case of accidental ingestion, seek medical attention immediately. Exposure to produce may induce a local or systemic allergic reaction in sensitive individuals.

- Animal Safety: Owners should be advised to observe for signs of hypoglycemia (see Client Information Sheet). Use of this product, in addition to diet and exercise, has been associated with hypoglycemia. A cat with signs of hypoglycemia should be treated immediately. Glucose should be given orally or intravenously as directed by clinical signs. Insulin should be temporarily withheld and, if indicated, the dosage adjusted.

- Any change in insulin should be made cautiously and only under a veterinarian’s supervision. Insulin in subcutaneous fat, manufacturing types, species human, animal, or method of manufacture (DNA versus animal source insulin) may result in the need for a change in dose.

- Appropriate diagnostic tests should be performed to rule out other endocrinopathies in diabetic cats that are difficult to regulate. Precautions: Cats presenting with hypertension, hypothyroidism, anemia, lymphoma, and/or vomiting should be stabilized with short-acting insulin and appropriate supportive therapy until their condition is stabilized. As with any recombinant human insulin product, careful monitoring for hypoglycemia and hypoglycemia is essential to attain and maintain adequate glucocorticoid control and prevent associated complications. Overdose can result in profound hypoglycemia and death.

Glucocorticoids, progestogens, and certain endocrinopathies can have an antagonistic effect on insulin activity. Glucocorticoids and progestogens should be avoided. Glucocorticoids, progestogens, and certain endocrinopathies can have an antagonistic effect on insulin activity. Glucocorticoids and progestogens should be avoided. Glucocorticoids, progestogens, and certain endocrinopathies can have an antagonistic effect on insulin activity. Glucocorticoids and progestogens should be avoided.
WHY ARE THERE SO MANY DIFFERENT MODELS FOR COVID-19?

Bringing clarity to the whys and hows of all those coronavirus projections and forecasts.

By Sonnya Dennis, DVM, DABVP (Canine and Feline); Carolyn Piché, BS (Biomedical Science); and Rachael Kreisler, VMD, MSCE, DACVPM (Epidemiology)

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Bo Brock, DVM
When it comes to fast relief from allergic itch without the common side effects of steroids* IT WOULD BE A SHAME TO MAKE THEM WAIT

APOQUEL (oclacitinib tablet) gives dogs fast, effective allergic itch relief that starts working within 4 hours†

INDICATIONS
Control of pruritus associated with allergic dermatitis and control of atopic dermatitis in dogs at least 12 months of age.

IMPORTANT SAFETY INFORMATION
Do not use APOQUEL® (oclacitinib tablet) in dogs less than 12 months of age or those with serious infections. APOQUEL may increase the chances of developing serious infections, and may cause existing parasitic skin infestations or pre-existing cancers to get worse. APOQUEL has not been tested in dogs receiving some medications including some commonly used to treat skin conditions such as corticosteroids and cyclosporine. Do not use in breeding, pregnant, or lactating dogs. Most common side effects are vomiting and diarrhea. APOQUEL has been used safely with many common medications including parasiticides, antibiotics and vaccines.

For more information, please see Brief Summary of full Prescribing Information on adjacent page.


*Common side effects of steroids include polyuria, polydipsia and polyphagia. Side effects of APOQUEL reported most often are vomiting and diarrhea.
†Based on survey data from veterinarians (n=250) and pet owners (n=150).

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Brief Summary of Prescribing Information

For oral use in dogs only

Caution: Federal (USA) Law restricts this drug to use by or on the order of a licensed veterinarian.

Indications: Control of pruritus associated with allergic dermatitis and control of atopic dermatitis in dogs at least 12 months of age.

Dosage and Administration: The dose of APOQUEL (oclacitinib maleate) tablets is 0.18 to 0.27 mg oclacitinib/lb (0.4 to 0.6 mg oclacitinib/kg) body weight, administered orally, twice daily for up to 14 days, and then administered once daily for maintenance therapy. APOQUEL may be administered with or without food.

Dosing Chart

<table>
<thead>
<tr>
<th>Weight Range (in lb)</th>
<th>Weight Range (in Kg)</th>
<th>Number of Tablets to be Administered</th>
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<tr>
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<td>High</td>
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</tr>
<tr>
<td>130.0</td>
<td>175.9</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Warnings:

APOQUEL is not for use in dogs less than 12 months of age (see Animal Safety).

APOQUEL is not for use in dogs with serious infections.

APOQUEL may increase susceptibility to infection, including demodicosis, and exacerbate neoplastic conditions (see Adverse Reactions and Animal Safety).

Human Warnings:

This product is not for human use. Keep this and all drugs out of reach of children. For use in dogs only. Wash hands immediately after handling the tablets. In case of accidental eye contact, flush immediately with water or saline for at least 15 minutes and then seek medical attention. In case of accidental ingestion, seek medical attention immediately.

Precautions:

APOQUEL is not for use in breeding dogs, or pregnant or lactating bitches.

The use of APOQUEL has not been evaluated in combination with glucocorticoids, cyclosporine, or other systemic immunosuppressive agents.

Dogs receiving APOQUEL should be monitored for the development of infections, including demodicosis, and neoplasia.

Adverse Reactions:

Control of Atopic Dermatitis

In a masked field study to assess the effectiveness and safety of oclacitinib for the control of atopic dermatitis in dogs, 152 dogs treated with APOQUEL and 147 dogs treated with placebo (vehicle control) were evaluated for safety. The majority of dogs in the placebo group withdrew from the study after the 112-day study by Day 16. Adverse reactions reported (and percent of dogs affected) during Days 0-16 included diarrhea (4.6% APOQUEL, 3.4% placebo), vomiting (3.9% APOQUEL, 4.1% placebo), anorexia (2.6% APOQUEL, 0% placebo), new cutaneous or subcutaneous lump (2.6% APOQUEL, 2.7% placebo), and lethargy (2.0% APOQUEL, 1.4% placebo). In most cases, signs spontaneously resolved with continued dosing.

Dogs on APOQUEL had decreased leukocytes (neutrophil, eosinophil, and monocyte counts) and serum globulin, and increased cholesterol and lipase compared to the placebo group but group means remained within the normal range. Mean lymphocyte counts were transiently increased at Day 7, but returned to pretreatment levels by study end without a break in APOQUEL administration. Serum cholesterol increased in 25% of APOQUEL group dogs, but mean cholesterol remained within the reference range.

Continuation Study

After completing APOQUEL field studies, 239 dogs enrolled in an unmasked (no placebo control), continuation therapy study with 90% of dogs treated with APOQUEL. Of these 239 dogs, one dog developed demodicosis following 273 days of APOQUEL administration. One dog developed dermal pyogenic lesions following 266 days of APOQUEL administration. One dog developed a moderately severe bronchopneumonia after 272 days of APOQUEL administration; this infection resolved with antimicrobial treatment and temporary discontinuation of APOQUEL. One dog was euthanized after developing abdominal ascites and pleural effusion of unknown etiology after 450 days of APOQUEL administration. Six dogs were euthanized because of suspected malignant neoplasms, including thoracic metastatic, abdominal metastatic, splenic, frontal sinus, and intracranial neoplasms; and transitional cell carcinoma after 17, 30, 75, 49, 141, and 286 days of APOQUEL administration, respectively. Two dogs each developed a Grade II mast cell tumor after 52 and 91 days of APOQUEL administration, respectively. One dog developed low grade B-cell lymphoma after 392 days of APOQUEL administration. Two dogs each developed an apocrine gland adenocarcinoma (one dermal, one anal sac) after approximately 210 and 320 days of APOQUEL administration, respectively. One dog developed a low grade oral spindle cell sarcoma after 320 days of APOQUEL administration.

To report suspected adverse events, for technical assistance or to obtain a copy of the MSDS, contact Zoetis Inc. at 1-888-963-8471 or www.zoetis.com.

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

Storage Conditions:

APOQUEL should be stored at controlled room temperature between 20° to 25°C (68° to 77°F) with excursions between 15° to 40°C (59° to 104°F).

How Supplied:

APOQUEL tablets contain 3.6 mg, 5.4 mg, or 16 mg of oclacitinib as oclacitinib maleate per tablet. Each strength tablets are packaged in 20 and 100 count bottles. Each tablet is scored and marked with AQ and either an S, M, or L that correspond to the different tablet strengths on both sides. NADA #141-346, Approved by FDA

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**So Fetch! Build, engage, connect, and network ... virtually**

The Fetch dvm360 conference has gone virtual! But it's still designed to work both your mind and body.

I am sure this will be a summer to remember. The summer of social distancing, thwarted vacation plans, and entertaining our children when camps and other activities are canceled. The summer of veterinarians and team members working tirelessly, wearing masks while triaging and communicating with pet owners via telemedicine. But it is also shaping up to be the summer of innovation and adaptability.

We made the tough decision to transition all of our live conference events for the remainder of 2020 to virtual offerings. We know how important in-person veterinary experiences are, but we have quickly adapted with new ways to connect with you, the essential veterinary health care team member, in engaging ways. I cannot wait to meet you all virtually at our first virtual Fetch dvm360 conference August 26 through 31, where we will be offering well over 200 RACE-approved continuing education credit hours for all team members.

Registration also includes entrance to the Hospital Design 360 conference. After speaking with the presenters, including veterinary architects, interior designers, financial advisors, and more, this truly will be like watching HGTV for veterinarians, with valuable information even for practices that are not rebuilding. Learn how to design a veterinary hospital for social distancing. Meet the 2020 dvm360 Hospital Design Competition winners. Hear what interior designers say the "newer normal" reception area could look like. Learn how to create a Fear Free hospital.

Of course, we also have an incredible array of education for veterinarians, veterinary technicians and assistants, and hospital managers. And yes, anyone can sit in on any of the lectures. Learn the latest in clinical care, creative ways to engage with your team, soft tissue and orthopedic surgical approaches, technician critical care, and so much more. You will also be able to interact with faculty members in live Q&A sessions.

There is a silver lining to having a virtual event. Remember that one incredible talk that you couldn’t get to because another incredible talk was being offered concurrently? Now you don’t have to miss a thing. Attendees can access all 200+ sessions online for 14 days after the conference. This gives you the ability to binge-watch as much CE as your heart desires in the convenience of your home or hospital. You don’t need to worry about finding coverage for your shifts; you can go at your own pace. Relax outside with your furbaby, in your comfy clothes, and enjoy! You’ll also be able to stroll through our virtual exhibit hall! Earn points for prizes as you visit individual booths, and learn about the latest the industry has to offer.

Connect with colleagues new and old in the virtual veterinary lounge, and inspire the many veterinary students who will be attending this conference! Build, engage, connect, and network.

And finally, we know that “Zoom fatigue” is real, and we recognize how important taking care of yourself is. That’s why we’ve got you covered with entertainment and relaxation in addition to education! Be sure to submit a cute video of your furbaby(ies) via a link from your registration email. Our friends at DogTV are making a video montage celebrating all of our pets! Learn from the one and only Hilton Carter how to create and care for indoor plants while being mindful of pets. Have some belly laughs with a comedian guaranteed to relieve your stress and inject a little fun into your day! Participate in mindful meditation and yoga, and yours truly will be leading a live bootcamp class! As always, our virtual conference is designed to work both your mind and body.

To learn more and to register, visit fetchdvm360.com. We hope to see you all there. I promise you it will be fun, incredibly educational, and an experience that you owe yourself. Thank you for all you are doing.

—Adam Christman, DVM, MBA
Chief Veterinary Officer

**NEWS | Chairman’s Letter**

**A work in progress**

Our country’s founders embarked on a dream. They did not know how it would all unfold, nor did they agree on how our fledgling government should function. Nonetheless, they recognized the need for change.

As we celebrated the birth of the United States in July, we realized that our country remains a work in progress, and we still have some changes we need to make to live up to the ideals of our Founding Fathers. How do we do it? We put one foot in front of the other, always keeping our sights on those precious ideals.

In this month’s commentary (page 10), second-year veterinary student Chris Hollingsworth recounts his experience transitioning from the historically black Morehouse College in Atlanta, Georgia to Virginia–Maryland College of Veterinary Medicine on the campus of Virginia Tech, where he finds himself the only black man in a class of 123 students.

The stark contrast between those experiences has made him “more aware of the dismal lack of diversity in veterinary medicine” and propelled him “to use my platform to encourage change, so that one day I can ensure that all those who come after me do not have to navigate the same murky waters that many of us have had to cross.”

Our entire nation is talking about diversity right now, so it only makes sense that the subject has been brought to the forefront in the veterinary profession in recent months as well. Many in the profession believe it’s high time to do more than talk about diversity; it’s time to act — for the good of both veterinary professionals and the pet owners you serve.

As we all move step by step toward our ideals, our goal is that, one page at a time, dvm360 continues to provide you with the timely commentary and clinical guidance you need to reach the ideals you want in your practice.

—Mike Hennessy Sr.
Chairman and Founder
MJH Life Sciences™
Join us in August for our first virtual Fetch dvm360® Conference. We will offer a 360-degree educational experience that focuses on every facet of your life. Through our new virtual format, you’ll get the clinical updates you need to help your patients lead healthy lives. Registration includes access to HospitalDesign360™, the industry’s most comprehensive resource for information related to building or remodeling a veterinary clinic.

All sessions will be available on demand through Sept. 14, providing you with the added convenience of learning at your own pace and earning more CE credits.

Register today! fetchdvm360.com
Addressing the dismal lack of diversity in veterinary medicine

A second-year veterinary student shares his experience as the only black student in his class — and how he plans to use his unique position as a platform to encourage change throughout the profession.

By Chris Hollingsworth

The brotherhood at Morehouse College in Atlanta, Georgia can best be summed up by the phrase “Iron sharpens iron.” An all-male, historically black college/university (HBCU) founded in 1867, Morehouse has produced such leaders as Dr. Martin Luther King Jr., Dr. Benjamin Elijah Mays, Maynard Jackson, Samuel L. Jackson, and Spike Lee — the list goes on.

The HBCU experience

Morehouse enrolls roughly 2,000 students per year. Small class sizes — our biology program had about 100 students — meant that faculty members were extremely attentive and very accessible. For the first time in my education, a majority of my professors were black. They served as a daily inspiration, almost spitting images of who I wanted to become.

On the first day of new student orientation, more than 400 men who looked like me took to Brown Street and King’s Chapel (named after Dr. Martin Luther King Jr.), where we sang the sacred college hymns and learned the Morehouse history. Orientation week was focused largely on building bonds not only among the freshmen class but also with the upperclassmen, who were considered our “big brothers.” We spent the week learning the college’s core values and what’s expected of us as we go out into the world to establish ourselves as leaders. We were challenged to uphold the mantra of “the five wells”: well spoken, well dressed, well traveled, well read and well balanced.

A complete paradigm shift

Fast forward seven years, and I find myself in a space that is far from the powerful, spirit-moving environment of an HBCU. Coming from a place where for the first time in my life I wasn’t an outlier to a place where I am the only black man among 123 students in my veterinary school class has been very sobering. I went from passing people in the hallway who I considered dear friends to passing people who I feel may be asking themselves how I even got here.

Ever since starting my DVM journey at Virginia–Maryland College of Veterinary Medicine on the campus of Virginia Tech, I have felt continually defensive, like I need to prove that I do belong here. I also have a heightened awareness about what people say around me and other minority students. Although this is a professional program, we still encounter people who have become extremely comfortable in their ignorance.

In light of recent events in America, I feel empowered to hold my colleagues accountable when it comes to both covert and overt discrimination and racism. We may be the minority, but we are by no means weak. Not only do we want to increase our presence in the field of veterinary medicine, but we want to expose and rid this profession of the lingering toxic, racist ideologies that have plagued our country since its inception. There is no more room for racism, sexism or intolerance of people who don’t identify as heterosexual.

My biggest hurdle yet

My transition to a predominantly white space has made me more aware of the dismal lack of diversity in veterinary medicine and propelled me and my minority peers to demand change. Representation matters, and we are seeking to balance out the numbers within our field. We are undoubtedly grateful for our opportunity to attend these institutions and pursue our dreams of becoming veterinarians, but far too many of us have been denied that same opportunity. Many of us are not only denied veterinary school admission, but we often lack access to many resources and opportunities that can better prepare us for a career in veterinary medicine.

My time at Morehouse College prepared me to be a leader and stand firm in my beliefs. I was challenged to leave my profession better than how I found it. I have a responsibility to tear down these roadblocks that I somehow managed to leap over. Statistically, I shouldn’t be where I am right now. I am a firm believer in a higher being, and I know that I have been blessed with this opportunity and platform to help move the veterinary field into a new direction.

There are many other minority students who are well deserving of an opportunity to become a veterinarian.

Dismantling racism

Where we find ourselves today has been built by decades of unfounded hate, and it can’t be fixed overnight. I am an advocate for my people, and I refuse to let my experience remain the norm. My goal is to use my platform to encourage change, so that one day I can ensure that all those who come after me do not have to navigate the same murky waters that many of us have had to cross.

Racism is a primary disease that is at the root of many societal problems in America. As doctors and future doctors, we have always been taught to address the underlying issues. Well, it’s time for us to do just that. Black lives will always matter.

Chris Hollingsworth is a second-year veterinary student at Virginia–Maryland College of Veterinary Medicine. He was born in Guyana, South America and raised in Silver Spring, Maryland. Hollingsworth found his passion within the veterinary field through diverse experiences at a small animal practice, in a laboratory, and at the National Institutes of Health in Bethesda, Maryland. He currently serves as the vice president of his school’s student chapter of the American College of Veterinary Pathologists. He hopes to pursue a residency in anatomic veterinary pathology upon graduation in May 2023.
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Let’s Get Direct.

Clients get home delivery.

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Purina® Pro Plan® Vet Direct benefits your clinic as much as your clients. So when you recommend our diets and supplements, recommend Vet Direct.

Write the prescription.
We'll handle the rest.

*With Purina as the direct seller, participating clinics receive commission on the sale of products calculated to equal their margin, without ever taking title to or possession of the products.
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READER FEEDBACK

 Veterinarians are not obligated to perform euthanasia

Kathleen Cooney wrote an excellent article recently about dysthanasia (“Dysthanasia: a newer meaning to a relatively new word,” June 2020), and it is full of wonderful advice. The one thing she did not mention is that as professionals, we are under no obligation to perform euthanasia within our practices. We don’t all perform orthopedic surgery, or echocardiography, or many other procedures, so why do we all have to perform euthanasia, especially in light of the fact that there are experts out there who are probably going to be better at it than we could ever be?

I decided after almost 40 years in practice that I was no longer going to perform euthanasia. We did an excellent job at it, but even so there was always the risk of a bad review or a complaint by the owner either because they did not listen or understand the procedure as explained, or because (sorry millennials!) they thought that they had a better idea as to how the procedure should happen. Euthanasia visits were also one of the most stressful appointments for myself and my staff.

I have known Mary Gardner, DVM, and Sheila Robertson, DVM, for many years. Dr. Gardner is one of the founders and owners of Lap of Love, a nationwide euthanasia and hospice service, and Dr. Robertson is the company’s chief medical officer. About a year ago, when our clinic’s euthanasia drug had expired, we decided that we would refer to Lap of Love for all euthanasia services going forward. It is one of the best decisions I have ever made. The stress around euthanasia appointments disappeared and, more importantly, most — if not all — of our clients came back to thank us for the referral. This also makes good business sense; many people will not return to the clinic where their pet was euthanized. We see more return business from families we have referred to Lap of Love. I wish Lap of Love had been around 40 years ago, when I first graduated from veterinary school.

Michael Petty, DVM, CVPP, CVMA, CCRT, CAAPM
Arbor Pointe Veterinary Hospital
Canton, MI

UGA introduces online professional master’s program

By dvm360 Staff

The University of Georgia is now offering a non-thesis online master’s program in comparative biomedical sciences. The interdisciplinary program, with courses in lab animal research, clinical concepts, pathology, human and veterinary anatomy, and cell biology, among others, is intended to build a foundation for students planning to pursue careers in veterinary or human medicine, dentistry, or biomedical engineering or biomedical research.

Thirty credits earned over one to two years are required to graduate from the program. Lisa K. Nolan, Georgia Athletics Association distinguished professor and dean of the College of Veterinary Medicine, says the program could not have been developed at a better time. “Students in this program will receive a broad curriculum of knowledge that will be of great benefit to them in their pursuits—all from the safety of their homes,” she says in a press release announcing the program.

For more information about the program, visit the UGA College of Veterinary Medicine’s website (vet.uga.edu/education). dvm360
FDA OKs cell therapy clinical trial for feline gingivostomatitis

By dvm360 Staff

There may be good news for cats suffering from gingivostomatitis, a painful dental disease marked by severe, chronic inflammation of the gingiva and mucosa. VetCell Therapeutics USA has received FDA approval to begin a clinical trial with its new cell therapy, DentaHeal. Developed at the University of California, Davis School of Veterinary Medicine, DentaHeal is an allogeneic, adipose-derived, mesenchymal stem cell therapy administered intravenously that aims to correct immune abnormalities linked to feline chronic gingivostomatitis (FCGS).

The nationwide trial will include 200 cats with FCGS that have not responded to either medical therapy or full- or partial-mouth extraction. There is currently no FDA-approved cell therapy for treating FCGS.

“FCGS is a terribly debilitating, immune-mediated disease and sadly, the outlook for cats that do not respond to available treatments is bleak,” says Chad B. Maki, DVM, VetCell’s chief veterinary medical officer, in a recent press release. “Our vision is that DentaHeal will dramatically improve the quality of life for cats with FCGS by completely resolving or substantially improving their condition and provide them with long-term remission and relief.”

Because some cats with FCGS require lifelong pain management, antibiotics, and immune-suppressing drugs, this new treatment may help improve quality of life and, in some cases, save cats’ lives.

“This is a massive milestone for VetCell Therapeutics USA. Our dedicated and passionate team has worked tirelessly to advance to the clinical stage, and I believe the work being put into R&D and clinical trials will position VetCell as the catalyst for cell therapy becoming a mainstay of veterinary medicine,” said Tom C.K. Yuen, founder and chairman of PrimeGen Global, the parent company of VetCell Therapeutics.

This clinical trial, for which recruitment is now underway, will be conducted in collaboration with the UC Davis Veterinary Institute for Regenerative Cures. Visit vetcelltherapeuticsusa.com/FCGS_trial to learn more about DentaHeal and the FCGS stem cell trial.

Royal Canin announces expansion of GI diet line

By dvm360 Staff

Royal Canin has expanded its line of GI veterinary diets to include products for kittens and puppies. In June, the global pet nutrition company officially launched GI Kitten wet and dry, as well as GI Puppy — “the first and only diet formulated exclusively for the immature gastrointestinal system of growing cats and dogs,” according to a company release.

“These diets are targeted toward young cat and dog patients and feature texture options including rehydratable kibble and an ultra-soft mousse texture to help facilitate food intake,” said Catherine Lenox, DVM, DACVN, Royal Canin regulatory veterinary manager.

Also new is more user-friendly packaging, which was designed “to help consumers understand the benefits of the product their veterinarian recommends,” said Dr. Lenox.

Royal Canin has also revised the classification of its products around six core health needs: urinary, gastrointestinal, weight management, dermatology, vital support and health management.

In addition, a new packaging design is aimed to facilitate the veterinarian’s recommendation “by reinforcing the nutritional message and communicating the product benefits to the pet owner along with easy-to-read feeding guidelines,” according to the release.

Ceva Animal Health acquires ThunderWorks

By dvm360 Staff

Ceva Animal Health, maker of the pheromone products Adaptil and Feliway, has announced the acquisition of ThunderWorks, which produces a wide range of calming products for dogs and cats, most notably the ThunderShirt calming wrap.

Abbie King, senior behavior product manager at Ceva Animal Health, said in a press release about the acquisition, “We have always been fans of the ThunderShirt range and we are therefore delighted with the acquisition, which will further strengthen our extensive portfolio of behavioral products that work in synergy with one another to provide pet owners with comprehensive anxiety solutions.”

For more information, visit Thundershirt.com.
Study shows clients care what veterinarians wear

A maiden study pinpoints wardrobe styles pet owners prefer from their veterinarian, uncovering links between attire and the levels of trust, confidence, and comfort clients associate with the doctor.

By Joan Capuzzi, VMD

Studies in human medicine have demonstrated that first impressions pave the way for the doctor-patient relationship, and that a physician's clothing is a component of these important first impressions.1-3 Specifically, physician attire has been found to affect patients' trust, confidence, and comfort with their doctors. The research overwhelmingly connects the white laboratory coat with the parameters of trust and confidence.1-3

While patients’ perceptions of physician (and psychiatrist, specifically), nurse, and dentist wardrobe have been well studied, research focusing on clients’ attitudes toward veterinarians’ attire is only in its infancy.4,5

Study design

In a cross-sectional study6 investigating companion animal owners’ perceptions of, and preferences for, different types of veterinary attire, 449 pet owners were asked for their reactions to photographs depicting eight types of attire for male and female (model) veterinarians:

- Formal attire (white dress shirt/black skirt [female], white dress shirt/black pants/necktie [male])
- White dress shirt/black pants
- White casual shirt/khaki pants
- White casual shirt/jeans
- Surgical scrubs
- Surgical scrub top/khaki pants
- Surgical scrub top/jeans
- White laboratory coat/khaki pants

A single facial expression was asked, anonymously, to rate their trust, confidence, and comfort in the model veterinarian being shown based on a 7-point scale anchored at “1” (low trust, confidence, and comfort) and “7” (high trust, confidence, and comfort).

Next, participants were shown all eight photos as a set and directed to rank them according to personal preference for each style of dress. Subjects were also asked to respond to statements regarding the overall importance of veterinary attire, their preference for name tags for veterinarians, and their ratings for specific items of appearance/attire (visible tattoos, running shoes, sleeveless tops, ear and facial piercings (male/female), long hair worn down, facial hair (male), necktie (male), and skirt (female)).

The last part of the survey requested demographic data (responder gender, age, education level, annual household income) and inquired about the respondent’s pet and veterinarian (i.e., number of years affiliated with current veterinarian, frequency of veterinary visits, type of attire worn by their veterinarian).

The study, performed by researchers at the University of Guelph in 2015 and published earlier this year in the Journal of the American Veterinary Medical Association, recruited adult participants in person at various dog parks in southern Ontario as well as via snowball sampling methods through social media.

Statistical analyses of the data controlled for independent variables such as gender of participant and of randomly assigned model, participant demographics and recruitment method, and gender and usual attire of participant’s regular veterinarian.

Key findings

Most (71%) of the study participants — who were overwhelmingly female and college-plus-educated, and take their pet to the veterinarian a mean of 2.4 times a year — expressed that a veterinarian’s attire is important. When asked to rank their preference among the eight wardrobe styles, their top choice for male and female veterinarians was surgical scrubs. Least preferred was formal attire.

For trust, confidence, and comfort scores, surgical scrubs garnered the highest ratings. For trust and confidence, high scores were also given to model veterinarians clad in a white laboratory coat and khakis. Trust and confidence were lowest for model veterinarians wearing casual shirt and jeans; comfort scores were lowest for model veterinarians dressed in formal attire.

Along with attire, the gender of the model veterinarian and the education level of the participant also impacted trust in and comfort with the model veterinarian.

Among individual items of attire, running shoes were most frequently (64%) rated as appropriate, while sleeveless tops were most often (58%) rated as inappropriate. Well over half of the participants (66%) conveyed the belief that veterinarians should wear a name tag while interacting with clients and their pets.

What it all means

While this study demonstrates that a veterinarian’s work garb functions as an unspoken message to pet owners, there is variation in clients’ views on clothing selection. Studies in human medicine revealed that preferences in physician attire vary with severity of illness, time of day,7 situation, and environment.8

General practice guidelines for staff attire, the authors concluded, could enable veterinarians to better meet pet owners’ expectations and enhance the doctor-client relationship. Based on high demand expressed in this study, hospital managers might consider including staff name tags in their attire protocol. dvm360

Dr. Capuzzi is a small animal veterinarian and journalist based in the Philadelphia area.

REFERENCES
Study suggests multiple-drug resistance in canine hookworm an emerging problem

By Sarah Mouton Dowdy

Although it’s the most prevalent intestinal nematode parasite in dogs in the United States, *Ancylostoma caninum* (canine hookworm) has historically been well controlled with the anthelmintic drugs febantel, moxidectin, milbemycin oxime, fenbendazole and pyrantel. However, parasitologists from several U.S. veterinary colleges have reported an uptick in infection recurrence within the past three years — mostly in greyhounds, but in other breeds as well — which suggests the parasite may have become resistant to the drugs typically used to control it. A group of researchers led by Pablo D. Jimenez Castro, DVM, from the University of Georgia College of Veterinary Medicine, set out to study the validity of this hunch.1

What they did

Dr. Castro and his team obtained fecal samples from three dogs (a greyhound, a miniature schnauzer, and a hound mix) being treated for persistent hookworm infections, as well as from two infected dogs with no history of treatment with anthelmintics. Hookworm eggs from these samples were used to infect laboratory beagles and to perform egg hatch assays (to detect resistance to benzimidazoles) and larval development assays (to detect resistance to macrocyclic lactones). These assays were also conducted on eggs taken from the laboratory-infected research dogs.

To detect pyrantel resistance, three of the infected research dogs (representing two isolates) were treated with the anthelmintic drug and then fecal egg count reductions were measured. Finally, using DNA extracted from pools of eggs, third-stage larvae or adults, the researchers used deep amplicon sequencing assays to measure the frequency of nonsynonymous single nucleotide polymorphisms at three different codons (167, 198, and 200) of the *A. caninum* isotype β-tubulin gene.

What they found

When compared with the dogs with no history of anthelmintic treatments, the *A. caninum* isolates taken from the three dogs with suspected drug resistance had resistance ratios ranging from 6 to more than 100 for the egg hatch assay and from 5.5 to 69.8 for the larval development assay. As for the two isolates treated with pyrantel, one of the egg counts had no change and the other actually increased. Moreover, a high frequency of resistance-associated single nucleotide polymorphisms was identified at codon 167 in the three resistant isolates.

What this means (for dogs and humans)

According to the researchers, this study’s findings “conclusively demonstrate multiple anthelmintic resistance in multiple independent isolates of *A. caninum*, strongly suggesting that this is an emerging problem in the United States.” They go on to describe the findings as “important and concerning,” as the rise and spread of canine hookworms that are resistant to the three main anthelmintic classes — the only effective drug classes currently approved for the treatment of canine hookworms in the U.S. — could seriously threaten canine health.

But according to the researchers, dogs aren’t the only animals in danger. The authors note that if anthelmintic resistance can arise in canine hookworms, human medicine should take notice because *A. caninum* is phylogenetically similar to the hookworm species of humans (*A. duodenale, A. ceylanicum*, and *Necator americanus*). And as the researchers explain, “the scale-up of mass drug administration for soil-transmitted helminths is now placing similar selection pressures for benzimidazole resistance on human hookworms and reduced efficacies are widely reported.” They offer that the deep amplicon sequencing assay from the study could be used to monitor worldwide benzimidazole resistance in human hookworms.

**New study lays groundwork for heartworm vaccine development**

By Sarah Mouton Dowdy

Researchers from the University of Liverpool in the United Kingdom are working toward the development of a heartworm vaccine to combat the growing threat posed by the resistance of *Dirofilaria immitis* to macrocyclic lactones.

The American Heartworm Society (AHS) estimates that more than a million dogs in the U.S. have heartworm disease.1 And according to an analysis published in *Parasites & Vectors* in 2018,2 infection incidence is on the rise, with AHS reporting a 21.7% increase in average cases per clinic between 2013 and 2016. The analysis lists poor compliance with heartworm prevention guidelines (about two-thirds of dogs don’t receive any heartworm prevention) and emerging resistance to macrocyclic lactones as potential causes for the concerning upward trend.

Pinpointing immunosuppressive proteins

In pursuit of sustainable heartworm prevention, Ben Makepeace, PhD, the study’s principal investigator, and his team first looked at other filarial parasites similar to *D. immitis* — specifically, *Litomosoides sigmodontis* and *Onchocerca ochengi* — and were able to identify two common proteins in both parasite species that interfere with the host’s immune system, making them potential vaccine targets. One of the proteins blocks a pathway alerting the immune system to the parasites’ presence, and the other stops T cells from attacking the worms.

For the current study, which is backed by both AHS and the Morris Animal Foundation, Dr. Makepeace says they will incubate proteins from *D. immitis* that are equivalent to the ones identified above with white blood cells from healthy donor dogs to determine their effect on the immune response and to see if any of their immunosuppressive effects can be blocked. “This is an essential step before a clinical trial for a vaccine can be performed,” he adds.

An addition to your heartworm prevention toolbox

But even if Dr. Makepeace and his team reach their goal of a heartworm vaccine (a goal that’s suffered serious delays due to the coronavirus pandemic), they don’t see their work as completely cancelling out the need for preventive drugs and mosquito repellents. “It’s more about extending the life of the tools we have so we don’t reach the nightmare scenario of heartworm being unpreventable,” he explains.

**References**


Sarah Mouton Dowdy, a former associate content specialist for dvm360.com, is a freelance writer and editor in Kansas City, Missouri.
Can dogs be used to screen for COVID-19?

Several studies in the U.S. and Europe are exploring the canine nose as a potential surveillance system for the novel coronavirus.

By Amanda Carrozza

A new research initiative is underway at the University of Pennsylvania School of Veterinary Medicine (Penn Vet) to determine whether dogs can discriminate between positive and negative COVID-19 samples. Backed in part by the new Penn Vet COVID-19 Research Innovation Fund, the study is exploring the sensitivity and specificity of scent in hopes that trained dogs can detect the virus successfully, particularly among asymptomatic patients.

“Scent detection dogs can accurately detect low concentrations of volatile organic compounds (VOCs) associated with various diseases such as ovarian cancer, bacterial infections, and nasal tumors. These VOCs are present in human blood, saliva, urine, or breath,” Cynthia Otto, DVM, PhD, a Penn Vet professor and director of Penn Vet’s Working Dog Center, said in a university press release. “This study will harness the dog’s extraordinary ability to support the nation’s COVID-19 surveillance systems, with the goal of reducing community spread.”

Announced at the end of April, the study began with eight dogs over the course of three weeks. Through the process of odor imprinting, the dogs were exposed to COVID-19–positive saliva and urine samples in a laboratory setting. As the dogs continue to learn how to recognize the odor and potentially discriminate between positive and negative samples, a baseline for testing will begin to take shape. This will help determine whether the dogs can identify infected people in real-life situations.

Penn Vet’s Working Dog Center is well known for its successful canine training programs to detect explosives, drugs and various medical conditions, including cancers. To assist in its ongoing research, the university is currently seeking individuals who have been tested for SARS-CoV-2 by nasal swab or sputum test. Eligible participants will be sent a cotton T-shirt to be worn one night while sleeping. The shirt is then shipped back to the Penn Vet Working Dog Center where it will be used in training and testing the dogs to help identify a unique odor associated with COVID-19 infection.

Similar research is also being conducted throughout Europe. In a preliminary report published by bioRxiv,1 researchers at the National Veterinary School of Maisons-Alfort in France trained German shepherds to detect COVID-19 via an infected person’s sweat. The study was conducted at three locations, each following the same protocol, using 198 armpit sweat samples obtained from different hospitals. For the initial phase, eight dogs were studied in a total of 368 trials.

Overall, the dogs were able to correctly determine the presence of infection in an average of 95% of samples, with four of the eight dogs successfully identifying a positive sweat sample 100% of the time. The authors concluded that from their findings “there is very high evidence that the armpit sweat odor of COVID-19 persons is different, and that dogs can detect a person infected by the SARS-CoV-2 virus.”

Finnish researchers took a slightly different approach. Veterinary and human medical researchers at the University of Helsinki say they’ve successfully trained dogs to differentiate between positive and negative SARS-CoV-2 urine samples. “It was fantastic to see how fast the dogs took to the new smell,” said Anna Hielm-Björkman, DVM, PhD, leader of the DogRisk research group that conducted the study.

According to the university,2 preliminary tests indicate that the dogs provided more accurate results than some current COVID-19 tests based on molecular techniques. And it appears the dogs can detect the presence of the virus before patients display any symptoms. The researchers came to this conclusion after the dogs picked up on the presence of COVID-19 in samples taken from people who had previously tested negative or had not been tested at all. After researchers asked those donors to be tested again using standard testing methods, all of the tests came back positive.

For the next phase of the study, researchers will retest the dogs in a randomized double-blinded setting, introducing them to a larger number of both positive and negative patient samples to determine whether the dogs are detecting the presence of SARS-CoV-2 or another virus.

Canine COVID-19 detection studies are also taking place in Germany and England, reportedly garnering similar positive results. Using dogs to detect COVID-19 could greatly increase the speed at which people could be tested in large venues and gatherings, such as sporting events, transportation hubs, hospitals, and schools.

“The potential impact of these dogs and their capacity to detect COVID-19 could be substantial,” Dr. Otto said.3

REFERENCES
New study reveals upside of pandemic shutdown for pets

COVID-19 restrictions have afforded pet owners much more time with their furry friends, leading to big changes in their attitudes toward pet ownership and veterinary care.

By dvm360 Staff

A new survey study from Banfield Pet Hospital reveals that spending significantly more time with their pets during the COVID-19 shutdown has altered the attitude of many owners regarding veterinary care and strengthened the human-animal bond. The survey of 1,000 U.S. dog and cat owners, conducted by Wakefield Research, showed that stay-at-home orders have put the majority of owners more in touch with their pets (84%), with a significant portion (67%) planning to change how they care for their pets going forward.

“The human-animal bond now, more than ever, plays an integral role in people’s lives,” Molly McAllister, chief medical officer at Banfield Pet Hospital, said in a company press release. “At Banfield, we are firm believers that regular preventive veterinary care is key to helping our pets live happy, healthy lives. This survey shows that pets are always here for us—even, and especially, during the most difficult of times—and we’re encouraged that as a result of spending more time together, people are committed to finding new ways to better be there for their pets.”

Here are some of the survey’s key findings.

Improving pet health care

Among the respondents, 44% said they feel more responsible and attentive toward their dog or cat than ever, and 37% are paying more attention to their pet’s personal care, such as dental health:

• 41% of pet owners contacted their veterinarian during the shutdown, whether in person, via phone, or through a telehealth service.
• 20% are committed to taking their pet to the veterinarian for wellness care more often.

The ‘new normal’ for pets and their owners

With the easing of stay-at-home directives, 73% of owners are concerned about spending time away from their pets when they return to work:

• More than a third of owners say their pets appear to be happier (38%) and more playful (35%) during this time. That’s not surprising given that 65% of owners say they are showing their pets increased affection.
• 47 percent of owners say they’re talking to their pets more than before the pandemic, with cat owners (51%) being slightly chattier than dog owners (47%), and women (50%) talking to their pets a bit more than men (44%).
• 59% of owners worry that their dog or cat may suffer from separation anxiety once the owner resumes a typical work schedule.

• 47% of owners are committed to spending more quality time with their pets when they are home; 21% plan to adjust their schedules to be at home with their pets more often, and 10% intend to adopt another pet to help keep their dog or cat company.

The bond builds

Nearly half (45%) of pet owners said that their household’s happiness has increased while spending more time with their pet during quarantine:

• 39% said their pet helped lower their anxiety and uncertainty caused by the pandemic.
• 47% of millennials found increased emotional support from their pets, compared with 43% of Gen Z pet owners and 43% of Gen X owners.

By dvm360 Staff

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Vector-borne disease prevalence in dogs with proteinuria

A new study attempts to understand the potential associations between vector-borne diseases and proteinuria in a southeastern U.S. canine population.

By Michael Nappier, DVM

Proteinuria can be a significant finding, indicating nephropathy and serving as a potential marker for progression of renal disease. While some causes of renal disease and proteinuria cannot be treated, identifying those that can be treated is vitally important. Vector-borne diseases are one cause of inflammatory glomerular nephritis. Vectors include Babesia canis, Babesia gibsoni, Ehrlichia canis, spotted-fever group Rickettsia, Bartonella vinsonii spp. berkhoffii, Bartonella henselae, Bartonella koehlerae, Anaplasma spp., hemotropic Mycoplasma spp., B. burgdorferi, and Dirofilaria immitis. Understanding the prevalence of these diseases in proteinuric dogs could guide clinicians as to how important testing for these organisms might be in the clinical setting.

The authors of a new study looked retrospectively at records from the North Carolina State University Veterinary Hospital and the North Carolina State University Vector Borne Disease Diagnostic Laboratory for dogs with a submitted vector-borne disease test result and proteinuria. Demographic, clinicopathologic, and vector-borne disease test results were extracted from medical records of 209 dogs seen at the veterinary hospital between 2008 and 2015. The results were then compared with those of all 7,202 canine vector-borne disease tests submitted to the Vector Borne Disease Diagnostic Laboratory during that time period (control group).

The authors found that the incidence of vector-borne disease was higher in the proteinuric dogs than in the control population. The major differences were in Rickettsia and B. burgdorferi exposure. Overall, 34% of proteinuric dogs were seropositive for a vector-borne disease, with Rickettsia (19%), B. burgdorferi (9%), and Ehrlichia (12%) being the most common findings.

Although the authors did not prove a direct cause-and-effect relationship between vector-borne disease and proteinuria, they did prove that vector-borne disease is common in proteinuric dogs in North Carolina and should be considered as a cause of the proteinuria.1

REFERENCE

Colorado squirrel tests positive for bubonic plague

The risk for contracting this zoonotic disease, which in the United States occurs primarily in the West, is extremely low when precautions are taken.

By dvm360 Staff

A squirrel in Jefferson County, Colorado tested positive for bubonic plague on July 11, the first case of plague in the county since 2017, according to a statement released by Jefferson County Public Health. The squirrel was tested after a citizen reported seeing more than a dozen dead squirrels in the area, according to the statement.

Caused by the bacteria Yersinia pestis, bubonic plague (the most common form of the disease) infamously killed millions of Europeans during the Middle Ages. Worldwide, most cases today occur in Asia and Africa. According to the Centers for Disease Control and Prevention, an average of seven cases of plague occur in humans each year. No statistics are available for the prevalence of plague in pets.

Bubonic plague usually results from the bite of infected fleas. Lymphadenitis develops in the drainage lymph nodes, with the regional lymph nodes most commonly affected. Swelling, pain, and suppuration of the lymph nodes produces the characteristic plague buboes.

Antibiotics are effective in treating plague. Without prompt treatment, however, the disease can cause serious illness or death in both people and pets.
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An IHOP restaurant was once housed in this bright, airy, and open California veterinary hospital. Fresh colors, lots of windows with a clear view into the lobby, native plants lining the walkway, and accent lighting make a wonderful transition from restaurant to veterinary hospital.

The reception area features natural materials, providing the space with a relaxing, outdoorsy atmosphere. Natural tile floors, textured wallpaper, granite countertops, and a wood ceiling set the tone for the entire hospital.

The surgery suite makes use of multiple large windows to bring natural light in, as well as to keep staff members and doctors in constant visual connection with one another.

Skylights flood the dog wards with natural light.

The cattery, or cat ward, gives cats a view of the outdoors with large windows, helping keep them calm during their stay.

Four treatment tables and a conveniently located workstation outfit the treatment area, with the lab and pharmacy nearby. Medical lighting fixtures were relocated from the previous practice facility.
Think about the last time you walked into your doctor’s office. Did your blood pressure spike or settle? For many people and pets alike, a doctor’s office is not a relaxing environment, starting with the often cold, clinical entrance. After 45 years of practice ownership and experience at Irvine Veterinary Services in Irvine, California, Edward Cole, DVM, and his wife, Pamela Cole, set out to build a warm and welcoming, stress-relieving veterinary facility.

“We know how the environment and feeling of the interior of a practice contribute to the wellbeing of staff and the comfort of clients and pets,” says Pamela Cole. “We all know visiting and working in a veterinary hospital can be very stressful, so we wanted to create an environment with as much natural light as possible and a real interest in natural materials.”

This husband-and-wife duo set out to build a relaxing, stress-relieving hospital that simultaneously maintained their high quality of medicine and service. The resulting facility earned them a Merit Award in the 2020 dvm360 Hospital Design Competition. And this isn’t their first award for design excellence. They also won a Hospital Design Competition Merit Award for a practice they built in 1998.

Bringing the outdoors in

Biophilic design is the idea of connecting people to the outdoors through use of natural materials, natural light, and other elements of nature. Basically, it means bringing the outdoors in to create a relaxing, calming environment. At the heart of the project was Dr. and Mrs. Cole’s desire to build a stress-free environment relying on biophilic design.

“Life runs at a fast pace, so we wanted a facility that allows clients to slow down and enjoy individualized service in a calm environment,” says Pamela Cole. “We had a real focus on biophilic design principles such as daylighting, special texturing, and enhanced acoustical control measures throughout the facility. Whether clients walk in or drive by, the exterior and interior of the practice are designed to look fresh and inviting.”

You can find these elements starting from the outside in. The lobby features natural stone accents and flooring made of natural tile and stone. The canopy in the reception area is natural wood, textured wallpaper in the lobby mimics the outdoors, and the countertops in the reception area and exam rooms are granite, rather than stainless steel, to offer a warmer and more welcoming feel. Rich Raulh, of Rauhaus Freedenfeld & Associates, added his signature clerestory windows throughout, bringing the California sunshine indoors.

One detail that made the design challenge more difficult is that the Coles were renovating a 30-year-old IHOP restaurant shell. The cost of building in southern California is high, and space is limited, so they took advantage of what they could find. And looking at the practice now, with its upscale design, one would never guess the building was once used to serve up flapjacks and cups of joe.

Raulh was able to renovate the building in such a way as to bring lots of natural light in, including two skylights in the back of the building — again, aiming to reduce stress for employees and patients alike. One skylight is in the kitchen area, and another in treatment, two places that can greatly benefit from some calming sunshine.

“Working in a veterinary hospital can be a bit like working in a pressure cooker, especially in a big, busy practice, and that stress translates to the animals if we aren’t careful,” says Dr. Cole. “It’s a challenging job at any level. So, we did everything we could, design-wise, to help our staff members to decompress throughout the day.”

Leaving a legacy

Dr. Cole began his career in Irvine in 1972; 15 years later, Pamela joined him in life and in business, taking over the management side of the business in 1987. “We have a good partnership!” she says.

During the intervening years, the couple built and renovated a number of veterinary facilities, growing their businesses together. In 2017, the two started plans for the current facility across the street from the former location, simultaneously planning for their retirement. Knowing they were going to sell to a corporate owner, the Coles made plans to leave their practice in as good of shape as possible for the future generation of doctors, staff members, and clients.

“The nice thing about this project was having an opportunity to leave our staff and clients in the best of hands,” says Pamela Cole. “Our vision was not to receive accolades, but to complete our careers in veterinary medicine by giving our staff and clients a bright new future.”

The couple now spend their days in Pebble Beach, California, volunteering with local wildlife and marine mammal rescue groups as well as the Monterey Bay Aquarium. “We’ve been retired just over a year now, and are so happy to have left our staff members with our enduring legacy, setting the hospital up for health and longevity,” Dr. Cole says.

Calm California vibes make for a low-stress veterinary hospital

Natural materials and lighting, a clean flow, and a warm design set the stage for a relaxing veterinary experience in this 2020 dvm360 Hospital Design Competition merit award-winning facility.

By Sarah A. Moser

By the numbers:
Irvine Veterinary Services-University Park, Irvine, CA
Owner: Dr. Edward Cole and wife, practice manager Pamela Cole
Exam rooms: 6
Total cost: $2,410,000
Cost per square foot: $337 (building only)
Square footage: 5,615
Structure type: Renovation with new veterinary improvements
Architect: Richard Raulh, AIA, Rauhaus Freedenfeld & Associates
Photographer: Falke Photography
Disease models help us understand the behavior of infectious disease in a population by providing projections and forecasts. Projections allow us to see what might happen under different conditions — for example, how modifying our behavior through social distancing might change when and how many people get sick. It is often a good thing when observed reality is different from a model’s projection because it means that we were able to control the course of disease with an intervention.

Forecasts are different from projections in that forecasts tell us what we can anticipate will happen given current conditions, much like a weather forecast. Perhaps even more importantly, traditional epidemiologic models are highly useful for providing a framework for understanding very complex problems and prioritizing the areas that are most important to focus attention, resources, and research.

Approaches to disease modeling
There are several ways to approach disease modeling, depending on the information you have and the questions you are interested in asking. A common output of a disease model is an epidemic curve (Figure 1) that shows when and how many people get sick or die.

Compartment models
Many of the models produced for COVID-19 are based on the traditional epidemiologic compartment model of disease, which divides a population into discrete boxes ("compartments") and determines the rate of change between disease states. Many such models are also called SIR or SEIR models based on the labels of the compartments (S = susceptible, E = exposed, I = infectious, R = recovered or removed).1 The compartments are very flexible in that they can be subdivided, or new ones added, to capture important disease characteristics, such as the proportion of infectious individuals who require isolation, hospitalization or ventilation. Differential equations are then used to calculate the rates of change, typically represented by Greek letters, between compartments as a disease progresses through a population in order to generate an epidemiologic curve (Figure 2).

Compartment models are very helpful to understand which variables that affect disease behavior are of greatest importance; however, they require good input data to generate accurate projections. This can be a challenge for a novel disease such as coronavirus when many input variables are not well understood. Another potential drawback is that they use a “mass action” principle to explain disease spread. (The mass action principle can be understood basically as a bunch of balls bouncing around inside a compartment. If an “infectious” ball bounces into a “susceptible” ball, the susceptible ball becomes an infectious ball,
which can in turn infect other susceptible balls until recovered.\(^2\)

Although this type of modeling works relatively well at the population level, it may not be an accurate representation of what actually happens with infectious diseases such as COVID-19 for which social networks and super-spreader events appear to play a large role in transmission. Examples of compartment models are Youyang Gu (SEIS; \(S = \text{susceptible, } E = \text{exposed, } I = \text{infectious, } S = \text{susceptible again} \)), Columbia (SEIR), and Northeastern University (SLIR; \(S = \text{susceptible, } L = \text{latent, } I = \text{infectious, } R = \text{removed} \)).

**Curve-fitting models**

Other models attempt to compensate for the lack of knowledge about specific variables by fitting a curve to data observed from other countries further along in the disease process, and then applying this curve to the current pattern of data of a given country or state in which the disease process has not yet progressed as much. The most well-known model using this approach is the original model from the Institute for Health Metrics (IHME) and Evaluation.\(^3\) It used the starting dates of restrictions on mass gatherings, school closings, and stay-at-home orders to model projections in the U.S based on other countries such as China and South Korea (Figure 3).

A strength of this model is that it shows both model uncertainty as well as the actual data observed. It is important to note that the intervals around the estimate do not represent the best and worst case estimates as

\[
\begin{align*}
\frac{dS}{dt} &= \mu S - \beta SI - \mu S \\
\frac{dE}{dt} &= \beta IS - \mu E - \sigma E \\
\frac{dI}{dt} &= \sigma E - \mu I - \gamma I \\
\frac{dR}{dt} &= \gamma I - \mu R
\end{align*}
\]

where

\(S\) = proportion of the herd that are susceptible

\(E\) = proportion of the herd that are exposed

\(I\) = proportion of the herd that are infectious

\(R\) = proportion of the herd that are recovered

\(\mu\) = average natural lifespan of the host

\(\beta\) = effective contact rate (contact rate \times transmission probability)

\(\sigma\) = progression rate from exposed to infectious

\(\gamma\) = average duration of the infectious period

\(\frac{1}{\mu}\) = average natural lifespan of the host

\(\frac{1}{\beta}\) = effective contact rate

\(\frac{1}{\sigma}\) = average duration of the latent period

\(\frac{1}{\gamma}\) = average duration of the infectious period

\(\mu\) = birth rate = natural mortality rate

\(\beta\) = effective contact rate

\(\sigma\) = progression rate from exposed to infectious

\(\gamma\) = recovery rate

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**Figure 1.** A typical and simple epidemic curve showing number of illnesses or deaths graphed against time. The “peak” is only obvious once the epidemic is over. (Adapted from CDC)

**Figure 2.** Example of a typical SEIR model demonstrating the extensive variables as described by Bradhurst et al. in a 2015 article about foot and mouth disease outbreaks in Australia.\(^1\)

**Figure 3.** Example of an IHME forecast based on current conditions.\(^3\) (Updated July 22, 2020)
Knowing the assumptions of a model is like reading the materials and methods of a study — you cannot fully understand or trust the conclusion without it.

These models can incorporate important variables such as age, household composition, environmental changes (change in temperature and humidity in the summer), social interactions, and behavioral changes that individuals may make in response to evolving circumstances (such as staying home more often if they observe more deaths in their community, or less often if they do not). Although agents’ actions are based on simple rules, they can capture unexpected aggregate phenomena that result from their interactions with other agents and the environment around them.

ABMs are quite computationally intensive, and they require significant data on environment and behavior, such as the density of different types of workplaces. The most well-known COVID-19 ABM is from London’s Imperial College; this model investigated non-pharmaceutical interventions in COVID-19 and was used to guide early policy for the U.K. and U.S. (Figure 4).4

How do I know if I can trust a model’s output?
To understand any model, you must know the assumptions on which it is based, such as how much contact people are assumed to have with affected individuals and how likely they are to die if infected. Knowing the assumptions of a model is like reading the materials and methods of a study — you cannot fully understand or trust the conclusion without it.

The assumptions on which the model is based should be readily available. For models that use data inputs, such as compartment models, you should know what sources provided the values and what those values were. Models should provide a sensitivity analysis, which tests how the model output changes when the underlying data or assumptions are changed. If there are variables for which small changes in the input value lead to large changes in the output of the model, those variables should be examined carefully. Models should also be validated or calibrated to see if the projections match what we have seen actually happen. It is important to note that during an epidemic, accurate data collection can be challenging, and reported data against which models are validated may themselves be imperfect. For example, deaths are often undercounted in the beginning of an epidemic and are revised later to reflect the actual, higher number. Models are dynamic and are updated as knowledge and data change, and as our interventions change the course of the disease.

Which type of model is the best?
None of these approaches to modeling is a perfect representation of the real world. In other words, all models are wrong. The good news is that models do not need to be perfect to be useful.2 All approaches to modeling have strengths and weaknesses, and the “best” model typically depends on the question you are trying to answer and the quality of the available data. For forecast models, a combination of forecasts to create an ensemble or consensus model may be the best approach. This is similar to the “spaghetti” models often used to forecast the likely path of hurricanes. Models that have been more accurate in the past often are given greater weight. For example, the Centers for Disease Control and Prevention generates an ensemble model that combines nine different types of models (Figure 5), and Reich Lab has an interactive real-time model.6

So, why are there so many different models for the novel coronavirus? Because there are many questions of interest, many ways to answer those questions, and a lot of unknown data about the disease. All types of models can generate misleading results, ...
and it is critical, when considering the quality of the model, to understand the assumptions it makes and the sources and reliability of the input data. Each individual model helps us to understand the whole better. The models are not competitive with each other; rather, they are dynamic snapshots that complement one another. Models give us a range of possibilities based on our best guess of where we are now to help us prepare for the future or change our behavior where we are now to help us prepare for the future or change our behavior.

Dr. Dennis owns and practices full-time at Stratham-Newfields Veterinary Hospital in New Hampshire. She is currently working in companion animal practice while exploring her options for pursuing a graduate or professional degree.

Ms. Piché was recently graduated with a degree in biomedical science from the University of New Hampshire. She is currently working in companion animal practice while exploring her options for pursuing a graduate or professional degree.

Dr. Kreisler, current president of the Association of Veterinary Informatics, is an associate professor at Midwestern University, where she teaches shelter and community medicine, public health, epidemiology, appraisal of the veterinary literature, and practice ownership. Her work outside the classroom includes driving a 33-foot mobile veterinary clinic, providing surgical and medical services to shelter and community animals, investigating disease outbreaks, and researching questions relevant to clinical decision making.

REFERENCES

What is the Association for Veterinary Informatics?
Veterinary clinical informatics blends information technology, communications, social and behavioral science, and veterinary medicine to improve the quality and safety of patient care. Founded in 1981, the Association for Veterinary Informatics (AVI) is a nonprofit international and interdisciplinary organization comprised of individuals involved in biomedical informatics research, design, implementation, education and advocacy within the domain of veterinary medicine.

The group’s mission is to guide and transform the veterinary profession in understanding, using and extending the practice of informatics. AVI members have access to exclusive member content, including news, a member directory, past symposia details, and forums. To learn more, visit avinformatics.org.
Young veterinarians have not yet accumulated the broad experience base that allows them to fully rely on their physical examination skills and instincts.

The transition from student to doctor happens overnight. It is simultaneously exhilarating and terrifying. For many, it is the culmination of a lifelong dream. Yet, despite four years of intensive study, many young veterinarians feel under-prepared for life in clinical practice. This can lead to an intense feeling of impostor syndrome, or the feeling of being a fraud. These feelings are likely to be magnified in today’s graduates, whose clinical rotations were interrupted by COVID-19. Each student’s clinical rotation schedule is unique, so every graduate will have had different experiences. Their schooling did not fully prepare them, including dentistry, behavior, and nutrition, among others. Additionally, many felt unprepared with regard to such nonclinical skills as leadership and managing workplace conflict.

In addition to the many emotions surrounding becoming a doctor, new graduates face an immense financial burden. Their student debt may cast a shadow over many of their personal decisions, such as buying a house or starting a family, and a production-based compensation model may only compound these concerns for young vets.

Some staff members may assume that the new doctor who recommends bloodwork over symptomatic treatment on every patient presenting with vomiting or diarrhea, no matter how acute or unremarkable the examination, has no idea what to do or is trying to “pad the bill” to help alleviate some of their financial concerns.

In truth, young veterinarians have not yet accumulated the broad experience base that allows them to fully rely on their physical examination skills and instincts. Additionally, they are coming from the “ivory tower” where gold standard care is established and practiced. As a result, many young doctors may rely more heavily on diagnostic testing, where an experienced doctor may be less likely to do so.

2. Be patient

New graduates will need more time than their more experienced colleagues to complete the same tasks. Most clinics provide extended appointment times for young veterinarians, especially with sick appointments and surgical procedures. Be respectful of this need and don’t overbook their schedule or rush them, as this may lead to mistakes. There will be things your new veterinarian didn’t learn in school, many of which may seem like some of the most basic things, like how to treat an anal gland abscess or what a warble is. Young veterinarians may need to consult with their colleagues or look up treatment protocols when managing their cases. They may ask their technicians questions about how other doctors do a procedure or handle a certain type of case. Many times, they do in fact know the best way to proceed and are looking for confirmation of this from an experienced colleague. These young veterinarians are well trained; they just need time to develop into the confident young doctors they are meant to be. This lack of confidence should never be interpreted as a lack of knowledge.

3. Help them establish a client base

One of the most important things that the veterinary team can do for their new doctor is to help them gain experience working with clients and patients by filling their schedule (but don’t overbook them!). Here are some other ways for the team to help keep a new doctor well scheduled:

• The clinic can make a point to advertise the arrival of its new veterinarian in local papers or on social media prior to their arrival.
• Preferentially schedule new clients with the new doctor.
• Established doctors and team members should introduce the new associate to “frequent flyer” and longtime clients.
• Front desk staff should make a point to offer appointments with the new doctor. When a client calls in, simply stating “I have an opening with Dr. Boatright on Monday at 1 p.m.” can go a long way. Refer to them by name and as “our new graduate.”
• If asked by an existing client about your new colleague, the team should respond positively to help clients build trust in the new doctor.

Additionally, team members should share their knowledge of client and patient history and preferences. Veterinary teams often know the practice’s clients and patients better than veterinarians do. You know that Mrs. Smith doesn’t like to be in Room 1 because that’s where Fluffy was euthanized. Mr. Roberts wants all procedures to be performed in the room in front of him, and Bella Turner will only allow her nails to be trimmed if the staff sing “Twinkle Twinkle Little Star” to her. Being equipped with this knowledge will help new graduates succeed and endear clients to them.

4. Give feedback (both positive and negative)

Front desk staff or technicians are usually the final point of contact with clients during their visit. When checking out a client, make a point to ask them how their visit was and pass these responses along to your new doctor, especially if the client was particularly happy about the visit or gave a specific point of concern.

Celebrate your new graduate’s accomplishments. Hearing the excitement of your team when I completed my first C-section or made a tough diagnosis was a huge boost to my spirits. If your new doctor communicates well with clients in emotional situations or stays calm in the face of an upset client, let them know that you are impressed by their communication skills. Knowing what is going well will help new doctors continue to develop these skills and build confidence.

On the flip side, constructive criticism is important as well. Team members must be willing to give negative feedback to each other to establish and maintain a respectful working relationship. There are bound to be conflicts when any new doctor joins the team. They may not have been taught to do things the same way as the rest of the team.

If you have concerns about how a new veterinarian is managing cases, performing procedures, or working with the staff, start a respectful conversation. If you are not comfortable discussing it directly with them, bring it up to one of the other doctors. Consider following up with the doctor to make sure the issue was addressed. Do not complain behind their back to other staff members and brew a toxic attitude toward the new team member. No one can change a behavior if they aren’t
aware it is a problem, and knowing about problems in a timely manner will allow adjustments to improve the working relationships among staff members.

5. Model healthy boundaries
Anyone who works in the veterinary profession knows that mental health is a concern. Younger veterinarians were shown to have the highest levels of psychological distress among all age groups in the most recent Merck Veterinary Wellbeing Study, whose results were published in January.

Developing boundaries is an essential part of personal wellness. It can be difficult for young professionals to set strong boundaries while they work to prove themselves, establish a client base, gain experience and start a life outside of school. Modeling appropriate boundaries is an important part of training the next generation of veterinarians.

Team members should encourage young doctors to set boundaries with clients. It can be tempting as a new veterinarian not to say “no” to clients who call late in the day with a sick pet or insist on coming in as a double-booked emergency for their dog’s ear infection. While we don’t want to upset clients, learning to set and stick to boundaries early on in a career will improve long-term mental health and help keep these young veterinarians enjoying their profession for years to come.

Finally, be respectful of boundaries around personal time. Some young veterinarians may need to be reminded of how important it is to take time away from the clinic. Encourage them to do this. Do not call them on their days off. Most things can wait a day or two for them to return. If it can’t wait, speak to another colleague and advise them of the situation when they return to the office.

Doing your part
Veterinary team members play a huge role in shaping the new graduate experience. By staying positive, remaining understanding, and providing encouragement and feedback, team members can help bond a young veterinarian to the practice and help them thrive in their career from the very beginning.

Dr. Boatright, a 2013 graduate of the University of Pennsylvania, is an associate veterinarian and freelance speaker and author in western Pennsylvania. She is actively involved in the AVMA House of Delegates as well as her local and state veterinary medical associations. She is a former national officer of the Veterinary Business Management Association.

REFERENCES

Adequan® Canine brand of polysulfated glycosaminoglycan (PSGAG) INDICATIONS Adequan® Canine is recommended for intramuscular injection for the control of signs associated with non-infectious degenerative and/or traumatic arthritis of canine synovial joints. IMPORTANT SAFETY INFORMATION Adequan® Canine should not be used in dogs who are hypersensitive to PSGAG or who have a known or suspected bleeding disorder. It should be used with caution in dogs with renal or hepatic impairment. Adverse reactions in clinical studies (transient pain at injection site, transient diarrhea, and abnormal bleeding) were mild and self-limiting. In post approval experience, death has been reported in some cases; vomiting, anorexia, depression/lethargy and diarrhea have also been reported. The safe use of PSGAG in breeding, pregnant or lactating dogs has not been evaluated. Caution: Federal law restricts this drug to use by or on the order of a licensed veterinarian. For additional safety information, please see Full Prescribing Information at adequancanine.com.

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The classic definition of at-will employment

In a nutshell, at-will employment means that either the employer or the employee can end their work relationship whenever either party wants. The employer can fire the employee at any time for any reason or no reason — as long as the reason is not illegal — and the employee can quit at any time, with no meaningful legal consequences for either party. The employer must pay the employee what is owed for work completed, but the employee cannot receive unemployment insurance benefits unless their tenure and hours were sufficient.

The impact of a contract

Contracts can legally limit or impose sanctions on employers and employees. Therefore, in present-day America, no state is truly an at-will employment state. Creating an employment agreement is the point at which the edges of the at-will employment doctrine begin to fray and the rights of all parties in the workplace begin to get murky.

Employment contracts can change the at-will relationship between employers and employees in a number of ways. For example, if a professional athlete signs a contract to play a full season under any and all circumstances, that employee still gets paid even if the season is shortened because of COVID-19, regardless of whether the contract was signed in an at-will state. Without the contract, the player could simply be fired and paid only for the games they actually played in. The contract limits the at-will doctrine and, in this instance, the limitation burdens the employer.

Consider this contrary example. A veterinary associate signs a contract that claims to create an at-will employment relationship, even though it requires each side to provide 60 days’ notice to terminate the employment relationship. But it also states that if the associate fails to generate revenue for the practice that is at least five times the associate’s annual base salary, then the employer may revise the associate’s salary downward or dismiss the employee without notice “for cause.”

At-will does not mean entirely at-will

The language in that associate contract is not unusual. What it amounts to could be termed “at-will light” — the contract is basically an at-will contract, but with written limitations that change the practical impact of the agreement. Let’s look at the rights and obligations of the parties in this limited at-will situation.

Does the 60-day notice term protect the associate’s base salary for 60 days?

Probably not. The contract indicates a certain production level, which modifies the employer’s obligation to provide notice and keep a low-production associate employed at all once a production target is missed.

Is it legal to include this type of term in a contract?

Most likely. At-will contracts are generally considered to have an illegal term only if they provide for termination for certain specific reasons that are considered to violate public policy or statute (e.g., age, gender, race). Failure to be productive is not a legally protected class or category.

How can a contract be considered at-will when it contains limitations?

Describing a contract as at-will probably does not mean much. The purest form of an at-will contract is no contract at all. Some corporations have embraced this concept and require their new associate hires to sign two simple documents: a brief job description or offer letter, and a document that contains “covenants” agreed to by the employer and employee.

With this approach, employment for the associate is 100% at-will. The hired veterinarian can be fired at any time, for any legal reason, without notice requirements, severance pay, and no obligations, except — a big except — that both parties must adhere to the covenants. Covenants usually include terms for non-competition, non-solicitation, and non-disparagement.

Are notice requirements genuinely useful in otherwise at-will employment agreements?

While 30, 60, or 90 days’ notice-of-termination provisions in associate contracts appear to be practical and useful, they may not be all they are cracked up to be. These are by far the most common term-limiting at-will veterinarian employment agreements. Here are some examples of why notice requirements, rather than notice requests, are double-edged swords that may be of limited practical value:

- If the firing is contentious, does the employer really want a disgruntled veterinarian to stay on for several additional months, potentially creating a toxic workplace environment?
- If the employer mandates that the associate see through their full notice period, will the associate spend the next 3 months advising clients that they are leaving and/or relocating?
- If the associate ignores the mandated notice period and moves on to another veterinary practice, it is time-consuming and costly for the employer to obtain any genuine financial relief as a result of instituting litigation. And the lawsuit — as well as related gossip — could hamper efforts to recruit a replacement.

In present-day America, no state is truly an at-will employment state.

New associates should look closely at their employment agreements and try to determine how close they actually are to pure at-will agreements. If there are many limiting phrases and terms, it might be advisable to revisit the language at the next performance review with respect to notice terms and covenants not to compete.

Dr. Allen is president of Associates in Veterinary Law P.C., which provides legal and consulting services exclusively to veterinarians. He can be reached via email at info@veterinarylaw.com. Dr. Allen serves on dvm360’s Editorial Advisory Board.
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From research done for the AVMA’s Pet Demographic and Ownership Sourcebook,1 we know that nearly one-third of pets don’t see a veterinarian even once a year. Meanwhile, 60% of veterinary practices aren’t operating efficiently. Taken together, these data tell us that the lack of widespread effective pricing strategies is inhibiting us from being a more successful and thriving profession overall.

Economics 101
To understand why this is, let’s go back to Economics 101 for a moment. The classic formula is that total revenue equals price times quantity. Let’s use that as a lens through which to view the veterinary profession. Pet Demographic and Ownership Sourcebook data show that total veterinary expenditures across the U.S. as a whole are growing, but slowing. Meanwhile, the number of total veterinary visits is flattening or falling. The only way total revenue can increase when quantity falls is to have rising prices. Veterinary prices are rising fast, currently at a rate twice that of the U.S. Consumer Price Index.

We also know that price is a main reason why that one-third of pets — nearly 50 million animals — don’t see a veterinarian at least annually. Among those owners whose pets don’t receive regular care, 25% say they can’t afford veterinary services and more than 50% don’t see the value in regular veterinary care. That means we as a profession need to do more to help our clients understand the value of the care we provide to their pets. In fact, we must ensure that the value of our services far exceeds the price we charge, and help our clients understand why.

Cost versus value
According to the Veterinary Hospital Managers Association,2 about 40% of veterinarians set prices based on how much a service costs them to provide. Even more striking: About 80% use this approach to price the products they sell.

There is a better way
A better approach for veterinary practices is value-based pricing. Rather than basing price on the cost of a product or service, this strategy sets prices primarily according to the perceived or estimated value of that product or service to the customer. The Harvard Business Review (HBR) offers a quick guide to value-based pricing that we can easily adapt to the veterinary market. It boils down to four tactics:3

- Focus on a single market segment. This means you must identify who your clients and potential clients are. HBR uses the example of a brand that focuses only on big-screen TV buyers, not all TV buyers. The more specific you can be, the better.
- Compare your offerings with those of your main competitor. Ask yourself which veterinary practice your clients would choose if your practice wasn’t an option. Focusing on the “next best” helps you zero in on the true point of comparison.
- Understand what makes you different. Identify what makes your practice unique in your area. Those special features are what differentiate you from your competitors.
- Place a dollar amount on those differentiators. This is the most challenging part, and it may take some trial and error to hit on your sweet spot. For example, if you

Is your practice’s pricing strategy holding you back?
Your hospital’s strategy doesn’t only determine whether you recoup costs and turn a profit. It can be a critical factor in helping clients make smart decisions about their pets’ care.
Matthew Salois, PhD, is chief economist and director of the Veterinary Economics Division at the AVMA.

Ownership Sourcebook, which was recently made available to the entire profession free of charge to support practices during the COVID-19 pandemic. In addition, our upcoming AVMA Economic Summit in October (AVMA.org/EconSummit) will include a session that is devoted exclusively to pricing strategy. 6am340

Matthew Salois, PhD, is chief economist and director of the Veterinary Economics Division at the AVMA.

Bundled and preferred pricing
In addition to value-based pricing, practices also should consider experimenting with bundled and preferred pricing. Both can help enhance your perceived value among clients.

In bundled pricing, several products or services are combined and sold as a group for a reduced price, such as when wireless carriers bundle a new phone purchase with a data package. Despite the fact that the items are sold at discounted prices, bundled pricing can boost overall revenue — and pet health — by encouraging clients to expand the care you provide to their pets. One example might be to offer a reduced price on dental service with the purchase of a wellness plan.

Similarly, preferred pricing addresses the human desire to save money, which people will actually sometimes pay a premium to achieve (think Amazon Prime). With preferred pricing, the purchaser may receive a discount as a reward for previous purchases or an incentive for later ones. In the veterinary setting, practices often offer promotional deals on vaccines to existing clients.

Resources to help with pricing decisions
The AVMA offers tools and information you can use to help refine your practice’s pricing strategy. Our market share estimator, for example, provides a step-by-step process to calculate the potential size of your local market, identify current market share, and set realistic goals for growth. Having these data at your fingertips is crucial when making pricing decisions. The AVMA Direct Connect purchasing tool (AVMA.org/DirectConnect), also a free member benefit, lets you see real-time pricing at consumer pharmacies so you can know what your clients pay for medications at direct-to-consumer pharmacies.

You also can find important insights into what services pet owners value in the Pet Demographic and Ownership Sourcebook, which was recently made available to the entire profession free of charge to support practices during the COVID-19 pandemic. In addition, our upcoming AVMA Economic Summit in October (AVMA.org/EconSummit) will include a session that is devoted exclusively to pricing strategy. 6am340

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The right task at the right time

A simple process for managing an overwhelming to-do list can make you more productive—and less stressed—in no time.

Between the luxury of being retired for years and the recent months of pandemic-mandated shutdown and relative isolation, I find myself in a virtual twilight zone of unstructured time. COVID-19 and the resulting lack of demands on my time should see me scratching things off my to-do lists like a honey badger but, alas, that has not been the case. As they say, the volume of work expands to fill the time available.

When I moved to Anguilla, I brought with me a short list of commitments for self-improvement and making the best of my life experience. I have always wanted to learn to play the piano, for example. This was my chance, yet my plans remain unrealized. Then I planned to learn French. I even paid for several online courses as proof of my intention. No results there either. Finally, I planned to learn to do the great American novel, mind you, not to write a book. I’m not talking about results there either. Finally, I planned to learn the U.S. Constitution and make the best of my life experiences committed for self-improvement. The dozens of projects that have been cancelled because of COVID-19. So, for the time being, we remain in Anguilla, separated from family and friends because we cannot return to the U.S.

Not all of my days have been ill spent, of course. How could anyone complain about living in paradise? My wife and I are passionate about travel. In fact, our month-long trip to Europe was converted because of COVID-19. So, for the time being, we remain in Anguilla, separated from family and friends because we cannot return to the U.S.

During one of our near-daily phone chats, I commiserated with my son about my lack of accomplishments. On top of being an executive in an international corporation, he always seems to be finishing some project in his workshop or around his yard, so I asked, “How do you do it all?” His response intrigued me: “The key is to do less, not more. Sounds like you could use Kanban.” So, at my son's suggestion I started on a path to learning a new perspective on time management.

Kanban is a production management concept developed by Toyota in the late 1940s that subsequently led to the just-in-time model of task management. The name comes from the Japanese word for “sign.” In the kanban system, each shipment of parts used to make cars comes with a “kanban,” or sign, that is sent to suppliers when the parts are nearly exhausted. The supplier then ships new parts to the assembly line. Kanban stresses that the key to maximum output is to focus on the task at hand.

In 2011, productivity experts Jim Benson and Tonianne DeMaria Barry wrote Personal Kanban: Mapping Work | Navigating Life to show how the kanban concept can be applied in your personal life. The idea behind personal kanban is that when we simplify how we work, we can get more done while working less. We all have to-do—lists those ever-growing, never-completed, guilt-producing reminders of a myriad of tasks that need to be addressed. But where do you stand on completions? Does your list, like mine, produce more anxiety than results?

It’s easy to get lost in the jumble of tasks we need to complete every day and the many aspects of our lives that compete for our time. Often, the longer the to-do list, the more difficult it is to know which tasks to tackle first. Without proper planning, we often dedicate our time to less-important tasks instead of focusing on what really needs our attention.

As a flexible, actionable, achievable way of looking at your workload and limitations, personal kanban has two basic mandates:

• Visualize your work, so that at any time you can look at your overall workload and determine quickly what you should work on next.
• Limit your workload at any given time, and restrict demands on your time. These two simple acts help us improve the way we work and the way we make choices to balance our personal, professional, and social lives.

Focus on “less is more”

To be truly productive, we must realize there are limits to what we can do and focus our efforts on fewer projects. We can still have a list of projects and goals, but we must set realistic expectations for completing them.

A kanban board is the mechanism used to organize—and accomplish—tasks. A kanban board is a simple chart with three vertical columns: To-Do, Doing, and Done. In the “doing” column, place all of the tasks you’re either working on now or plan to work on immediately. Ideally, the tasks are further organized by priority, so you can glance at them at any time and see which ones to tackle first. In the “to-do” column, list all the tasks you aren’t working on right now but need to get to at some point. The “done” column lets you see at a glance how much work you have completed and keeps you motivated to do more.

Once your board is complete, follow these steps:

• Identify two or three important items on your to-do list. Do not add anything else to this list until a task can be marked off as completed.
• Focus your energy and complete your target projects, then move on to the next thing on your list.
• As you finish each task, move them from the doing column to the done column.

Kanban hinges on the fact that you must know not only your destination but where you are now. By limiting how much unfinished work is in process, you can also avoid problems caused by distraction, conflicts over your time, and task switching.

That’s all there is to it. Personal kanban can help you achieve your goals by helping you manage personal planning. Now, about that memoir…

Michael Paul, dvm

Dr. Paul is the former executive director of the Companion Animal Parasite Council and a former president of the American Animal Hospital Association. He is currently the principal of MAGPIE Veterinary Consulting. He is retired from practice and lives in Anguilla, British West Indies.
Can pandemic rules be broken?

In a time of ongoing uncertainty, veterinary practices are trying to get used to new rules and regulations. But are these rules really one size fits all?

Dr. Jim Geer worked very hard for 16 years to build the Geer Animal Care Center, a thriving suburban veterinary practice with a state-of-the-art facility, a highly skilled staff, and loyal clientele. Then, COVID-19 hit and all the rules changed. Some mandates were state orders, some were professional recommendations, and others were just plain common sense. In the midst of all the governmental directives, stimulus support options and outright panic, Dr. Geer tried to understand the new rules that would govern his practice of veterinary medicine for the foreseeable future.

One new rule was that veterinarians were considered essential workers, with “essential” functions limited to non-elective care. When Dr. Geer approached his state veterinary organization for a definition of non-elective care, the debate began. He had a meeting with his staff to discuss what was elective and what was not, but the distinction between the two started to become unclear. Everyone agreed that an animal in pain and distress should be cared for, but what about elective spaying of young animals? Spaying is not a life-or-death situation, but what about elective spaying after a certain age can have serious medical consequences. Next were those breeds that become pathologically matted when they are not groomed. And some nail trims are cosmetic while others are clearly medically indicated. Dr. Geer felt that client requests should be evaluated on a case-by-case basis.

As more rules were created, so were more issues. Curbside care was instituted to maintain the health and wellbeing of staff and clients. The rule was that no one except professional staff could set foot inside the clinic. At first, this rule seemed cut and dried, but then a very emotional euthanasia was presented. Participating in the euthanasia via FaceTime or Zoom was unacceptable to the owner, and Dr. Geer decided he was not going to deprive this client of her last moments with her beloved pet. During the procedure, which took place inside the hospital, Dr. Geer, his staff, and the pet owner all wore gowns, gloves, and mask.

After this experience, Dr. Geer decided he had had enough. He gathered his staff and told them that while all of the new directives were certainly well intentioned, they were not created by veterinary clinicians. Therefore, his years of practice combined with his staff’s desire to observe all safety measures while caring for patients would guide his decision-making going forward. As far as veterinary care was concerned, the new rules could not be etched in stone.

His team observed all of the core rules. Staff and client safety was the priority. All team members washed their hands frequently, wore masks, and practiced social distancing. But the state’s directives, the veterinary medical association’s directives, and the endless media expert opinions all had to defer to Dr. Geer’s best judgment. He was a hands-on clinician who knew the unique needs of his clientele, and he had the support of his staff. As long as he had the best interests of his patients and staff as a priority, he would ignore the chaos and let his experience be his guide. His state officials and other practice owners may not agree with all of his decisions but, in the end, at his hospital the buck stopped with him.

Rules certainly are not made to be broken, but in the world of veterinary medicine and COVID-19 calm assessments and good professional judgment are paramount.

Do you agree with Dr. Geer that veterinary practices should use their own judgment in the care they provide during the COVID-19 pandemic, or do you feel that in times of crisis the experts should be your guide? We would like to know. Email us your thoughts at dvm360news@mmhgroup.com.

Dr. Rosenberg’s response

Dr. Geer, like the rest of us, is in uncharted territory. Veterinarians are being pulled in all directions by well-intentioned pundits. Pandemics are like storms because they are not always predictable and often change course. Every practice has a profile, and nobody knows that profile better than the professionals who work there. If you are meeting the needs of your clients, patients, and staff, you are satisfying your professional ethical obligations. Rules are not made to be broken, but during trying times such as these they should serve only as guides. dvm360

Dr. Rosenberg is director of the Voorhees Veterinary Center in Voorhees, New Jersey. Although many of the scenarios Dr. Rosenberg describes in his column are based on real-life events, the veterinary practices, doctors and employees described are fictional.
Managing intervertebral disk disease: Do steroids have a place?

Recommendations for medical management of IVDD have changed, and corticosteroids are once again in the spotlight.

By Kate Boatright, VMD

“...I am a veterinarian, and I love steroids,” Simon Platt, BVM&S, FRCVS, DACVIM, DECVN, confessed at the opening of his lecture on management of intervertebral disk disease (IVDD) at a recent Fetch dvm360 conference. Although he acknowledged that corticosteroid use is controversial, Dr. Platt believes they have a place when used appropriately.

Diagnosing IVDD

In many cases, a presumptive diagnosis of IVDD can be made based on history and neurologic examination. For a chondrodysplastic patient presenting with acute-onset paraparesis or paraplegia and back pain, IVDD is the top differential. In other breeds with similar presentations, IVDD should still be on the list, along with trauma, inflammation, infection, and neoplasia.

Patients presenting with clinical signs of IVDD can be divided into five grades based on the results of neurologic examination:

- **Grade 1**: Back pain without motor impairment
- **Grade 2**: Ambulatory paraparesis
- **Grade 3**: Nonambulatory paraparesis
- **Grade 4**: Paraplegia with pain perception
- **Grade 5**: Paraplegia without deep pain perception

Plain radiographs are not always useful, Dr. Platt noted, as the correct disk space is identified only 60% of the time. He reminded the audience that all chondrodysplastic dogs have disk disease; it’s just a matter of whether the animal is symptomatic. Thus, plain radiographs in these patients are highly likely to indicate disk disease, but the correct space may not be identified. Radiographs are more useful in nonchondrodysplastic breeds to rule out other differentials.

Advanced imaging is needed to confirm the diagnosis and localize the lesion to make a surgical plan. Computed tomography (CT) and magnetic resonance imaging (MRI) are equally accurate in localizing the lesion, but CT scans are faster and more affordable for clients. Dr. Platt stated that some clinicians prefer MRI as it allows them to visualize edema in the spinal cord that cannot be viewed on CT, but this knowledge ultimately does not change the treatment plan.

Decision making: medical or surgical management?

Two treatment options exist for patients with IVDD, Dr. Platt said: conservative medical management and surgery. Determining what’s best for the dog “comes down to neurologic status and how much money the owners have,” he said.

Dr. Platt emphasized that successful treatment does not always mean a return to normal function. Clients must understand that treatment of IVDD is considered successful when patients are pain-free, can ambulate without assistance, and maintain urinary and fecal continence.

Neurologic grade at presentation is the most important determinant of success of both medical and surgical management:

- **Grade 1 and 2**: 90% success with both medical and surgical management
- **Grade 3**: 70% success with medical management vs. 90% with surgical management
- **Grade 4**: 50% success with medical management vs. 80% to 90% with surgical management
- **Grade 5**: Less than 5% success with medical management vs. 50% to 60% with surgical management within 24 to 48 hours of disease onset

For patients with grade 5 disease that are managed surgically, the prognosis begins to decrease 48 hours after disease onset. By seven days after disease onset, the chance of recovery is minimal.

When comparing prognosis between medical and surgical management, it’s obvious that patients presenting with grade 4 or 5 disease should undergo further workup and surgery when owner finances permit. Given the comparable success rate in low-grade disease, Dr. Platt...
acknowledged that many practitioners may wonder why surgical treatment would be considered. He recommends the following criteria for surgical therapy:
• Paralysis at presentation (grade 4 or 5 disease)
• Patients that remain painful after seven days of medical management
• Patients that worsen neurologically during medical therapy
• Patients with recurrent back pain, which may be worse than initial presentation. Fifty percent of dogs presenting with back pain will have recurrence of clinical signs.

Principles of medical management
For patients managed conservatively, rest and pain control are the core of therapy. It’s important for owners to understand the importance of rest in patient recovery. Cage rest should be continued for four to six weeks to give the disk space(s) time to heal. Dr. Platt noted that the length of time of cage rest can vary with the type of underlying disk disease.

Multimodal pain control is the other essential component of medical management. Either a nonsteroidal anti-inflammatory drug (NSAID) or low-dose corticosteroid should be used to address inflammation. Other pharmaceutical options for pain control include opioids, gabapentin, and muscle relaxants such as diazepam or methocarbamol, which Dr. Platt feels are “vastly underutilized” for treatment of back pain. Nonpharmaceutical options such as acupuncture, hydrotherapy, laser therapy, and physical rehabilitation can also be considered.

Inflammation and pain should resolve within several days of spinal injury. In patients with refractory pain after seven days of treatment or worsening disease in the face of medical management, surgical therapy is recommended.

The case for corticosteroids
“Those days, I have a bit of an issue saying we shouldn’t use steroids,” Dr. Platt said when discussing the choice of anti-inflammatory. He acknowledged the controversial history of corticosteroids in medical management of IVDD; studies in human and veterinary medicine have led to the conclusion that high-dose intravenous corticosteroids are contraindicated in acute spinal trauma in dogs, which has led to the belief that corticosteroids should never be used in spinal disease. “But that’s wrong,” Dr. Platt said, “because you have inflammation in the spinal cord, and you often are not ... in the acute stage.”

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Take-home message
Medical management is highly successful for many patients with low-grade IVDD. In these patients, a combination of rest and pain control is essential to a successful outcome. Due to their anti-inflammatory properties, the use of short-term, low-dose corticosteroids can improve patient comfort and should be considered. In patients with paralysis, recurrent back pain, uncontrolled pain, or worsening clinical signs despite medical management, surgery is the recommended course of action.
Environmental enrichment: The key to ameliorating Pandora syndrome

Successful long-term management of Pandora syndrome involves treating the cat, the environment and, last but not least, the client.

By Laurie Anne Walden, DVM, ELS

In some cats, chronic lower urinary tract signs or other persistent health problems may be secondary to a multisystemic syndrome caused by chronic anxiety. Cats with this syndrome are best treated with environmental enrichment to reduce stress. This is according to Tony Buffington, DVM, MS, PhD, DACVN, who spoke on the topic at a recent conference of the American Association of Feline Practitioners.

Dr. Buffington coined the term Pandora syndrome nearly a decade ago to describe a constellation of feline disorders that likely result from chronic anxiety. Affected cats can have clinical signs related to several organ systems. Possible manifestations of Pandora syndrome include lower urinary tract disease, picky eating, overgrooming, aggression, vomiting, diarrhea, hiding, and other medical or behavioral disorders, said the emeritus professor at The Ohio State University College of Veterinary Medicine.

Pandora syndrome results from activation of the central stress response system, Dr. Buffington said. This system, which incorporates elements of the endocrine, immune and autonomic nervous systems, responds when an animal’s perception of threat exceeds its perception of control. Individual animals respond to chronic stressors in different ways because of genetic factors and traumatic events (including those occurring prenatally) that sensitize the central stress response system to the environment.

Diagnosing Pandora syndrome

Because the chronic disorders that could potentially be attributed to Pandora syndrome have many other possible causes, Dr. Buffington advised that cats receive a complete physical examination and diagnostic workup to rule out other medical problems. Because Pandora syndrome affects more than one organ system, he recommended investigating the presenting problem last during the physical examination to reduce the chance of overlooking a comorbidity.

Dr. Buffington gives owners health history and household evaluation questionnaires to unearth adverse early experiences, stress-associated behaviors and stressful environmental conditions. These questionnaires are also a way to start a conversation with clients about a cat’s home environment, he said, adding that he “praises the client for everything they are doing right and offers coaching for areas that may benefit from modification.”

The following criteria support a diagnosis of Pandora syndrome. The diagnosis is effectively confirmed if all of a cat’s signs of illness respond to environmental enrichment, Dr. Buffington said.

• History of adverse experience (e.g. being orphaned or bottle fed, trauma, environmental instability)
• Evidence of comorbidities or additional sickness behaviors
• Clinical signs that wax and wane in response to changes in the environment
• Clinical signs that improve with multimodal environmental modification

Dr. Buffington said Pandora syndrome can be excluded if the diagnostic workup reveals another cause of illness or if the history and test results are not compatible with Pandora syndrome. He noted that cats with Pandora syndrome may also have signs of illness that are more severe than the underlying pathology would seem to suggest. Those without the syndrome are more likely to have signs of illness in proportion to the severity of the disease process.

Acute care

Medical treatment for cats with Pandora syndrome depends on the individual cat’s specific needs. Hospitalized cats benefit from modifications to the cage and clinic environment designed to reduce stress.

Signs of stress in hospitalized cats

• Resting in the litter box (a sign that a cat is cold or fearful, Dr. Buffington noted)
• “Trash[ing]” the cage or, conversely, apparently not moving around the cage at all
• Sickness behaviors: vomiting, diarrhea, inappetence, lethargy, failure to groom, eliminating outside the litter box, not eliminating at all
• Increased respiratory rate, heart rate, and blood pressure
• Licking lips, sweating from paw pads
• Increased withdrawal behaviors: hiding, freezing, attempting to escape, becoming defensively aggressive
• Decreased approach behaviors such as purring, kneading, and soliciting attention from caregivers

Cats are less stressed in top cages than in bottom cages, Dr. Buffington said. Cages should include a hiding place, a cover over the door to reduce stimulation, and bedding that completely covers the cage floor. Bedding that carries the scent of the cat or its owners may reduce the cat’s perception of threat. He recommended changing bedding only when soiled, not daily, to avoid removing the cat’s scent. Spot cleaning (rather than full cage cleaning) helps preserve the scent. Food and water should be placed in the back of the cage near the hiding place. The litter box, which is used less often than food and water bowls, should be at the front of the cage. Sometimes cats under stress rearrange items in the cage. “When you clean the cage and put it back together,” he suggested, “put everything where the cat had it.”
The clinic environment outside the cage can also be modified. Putting lights on timers (if natural light is not available) and cleaning cages at the same time every day improve the predictability of the environment. Ambient sounds and noxious odors (from dogs, perfumes, alcohol-based hand sanitizers, cleaning solutions, etc.) should be minimized. Calming music, warm ambient temperature, low-stress handling techniques, and attention from a dedicated caregiver can also help.

Staff should monitor hospitalized cats for physical and behavioral signs of stress (see *Signs of stress in hospitalized cats*). These parameters can also be used to evaluate the effectiveness of environmental modifications.

**Chronic care**

Long-term management of Pandora syndrome involves treating the client, the cat and the environment, Dr. Buffington said. Environmental enrichment benefits all indoor cats, not only those with Pandora syndrome.

**Treating the client**

Client communication is the most important component of successful treatment, Dr. Buffington said. Owners are often frustrated by their cats’ chronic problems, so he suggested empathizing with clients and listening carefully to their concerns.

“Explain to owners that Pandora syndrome is manageable — although not curable — and enlist them as partners in their cats’ treatment,” he recommended. Cat owners are responsible for implementing environmental enrichment, he pointed out, so the success of treatment depends on their commitment to the plan. Effective, empathetic communication helps decrease clients’ anxiety about their cats and can improve compliance.

**Treating the cat**

The effectiveness of dietary therapies for illnesses related to Pandora syndrome has not been studied thoroughly, Dr. Buffington said. A number of drugs have been used to treat lower urinary tract signs in cats, and anxiety drugs are also available. However, he said, these medications are either of questionable benefit for lower urinary tract disease or have not been evaluated fully for long-term use in cats. He pointed out that no behavioral drugs are currently approved in the United States for indoor cats.

Dr. Buffington offered resources that practitioners may want to consult — for environmental enrichment for indoor cats:

- AAFP feline enrichment resources: catvets.com/education/conference/feline-enrichment-resources
- Indoor Pet Initiative from Ohio State University: indoorpet.osu.edu

**Treating the environment**

The goals of environmental modification are to reduce cats’ perception of threat and increase their perception of control. Enriched environments allow animals in captivity (including indoor cats) to participate in species-appropriate activities and feel safe, Dr. Buffington said. Effective multimodal environmental modification for indoor cats has five components:

- **Space**: Cats should have a safe refuge (like a carrier to which the cat is habituated) and multiple options for scratching, climbing, and hiding.
- **Food**: Cats need to be able to eat alone and undisturbed in a quiet location. Offering new foods in separate containers rather than mixed together allows cats to choose their food. Food puzzles or toys can allow cats to simulate natural predatory behavior.
- **Litter boxes**: Litter box size, location, number, and substrate can all affect cats’ urinary behaviors.
- **Play**: Owners should provide toys for cats that enjoy them. Some cats respond well to positive-reinforcement training to do tricks; others prefer simply to be petted.
- **Conflict management**: Cats in multiple-cat households may develop conflict over resources (e.g., food, litter boxes) or threats to their status.

Follow up with owners to provide support and assess the cat’s response to treatment, Dr. Buffington advised. His goals for owners are decreased frustration and increased empathy for the cat; goals for cats are fewer clinical signs and more positive behaviors.

Dr. Walden received her doctorate in veterinary medicine from North Carolina State University. She is a practicing veterinarian and a certified editor in the life sciences (ELS). She owns Walden Medical Writing, LLC, and writes and edits materials for healthcare professionals and the general public.

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**Behavior | MEDICINE**

*Signs of stress in hospitalized cats*
I like big blocks and I cannot lie
Practical tips for improving your pain protocols and increasing veterinary patient comfort by extending local anesthetic blocks.

By Stephen Cital, RVT, SRA, RLAT, VCC, CVPP, VTS-LAM (Res. Anesthesia)

Local and regional anesthesia is the technique of applying to the skin or infiltrating tissues with a sodium channel-blocking agent. Numerous articles, videos and textbooks detail the techniques used to administer local and regional anesthetics. This article focuses on how to extend or enhance local blocks to make your patients comfortable for longer. The most commonly used blocking agents in veterinary medicine, lidocaine and bupivacaine, are the primary local anesthetics discussed in this piece.

Efficacy of local anesthetics
Local anesthetics allow an animal in severe pain (e.g., with broken ribs) to feel comfortable within minutes. Large animal practitioners often perform standing surgeries with only local anesthetics on board. Because local anesthetics are so powerful, we are able to lower the overall use of systemic analgesics (and gas anesthetics) that may otherwise cause more concern, particularly in critical patients, by not causing sedation or by causing such adverse effects as excessive panting or hyperthermia.

Emerging research has also found some local anesthetics to be anti-inflammatory and even anti-proliferative for certain cancers, suggesting more serious consideration for most, if not all, surgical cases and trauma. Depending on the type of local anesthetic used and the dose administered, the duration of action can range from 2 to 6 hours. Obviously, most patients will feel pain for longer than this length of time, leaving us to explore methods of extending the local anesthetic if possible. Acute pain, such as from surgery or trauma, and the inflammatory processes that result, are at their peak for the first 72 to 96 hours from outset. This does not mean analgesics should not be used past this 96-hour mark; rather, it should trigger us to focus on this acute pain period for better outcomes down the road.

Local infiltration is a less precise, yet still effective, means of administering a blocking agent. Basically, a local blocking agent is infiltrated into the area where the surgeon plans to incise the skin and manipulate tissues. There are many positive studies on the efficacy of using this technique for surgical patients. It is now included in the pain management guidelines provided by the American Animal Hospital Association and American Association of Feline Practitioners.

Local anesthetics allow an animal in severe pain to feel comfortable within minutes.

Regional or nerve blocking techniques are a bit more precise and require thorough knowledge of the nervous system anatomy. To administer a regional block, anatomic landmarks, palpation, or devices are used to infiltrate the blocking solution within millimeters of a nerve. It is important to note this is different than instilling the blocking agent into a body cavity or on mucous membranes. Local infiltration is a less precise, yet still effective, means of administering a blocking agent. Basically, a local blocking agent is infiltrated into the area where the surgeon plans to incise the skin and manipulate tissues. There are many positive studies on the efficacy of using this technique for surgical patients. It is now included in the pain management guidelines provided by the American Animal Hospital Association and American Association of Feline Practitioners.

With topical or surface anesthesia, sodium channel-blocking agents in creams or solutions are administered on the skin or mucous membranes to provide some relief. Unfortunately, many of the agents used in veterinary medicine are not readily absorbed through the skin and must be left on for quite some time to achieve their effect. The use of lidocaine patches over wounds or incisions has also been described but has not been found to alleviate the need for other analgesic medications. I have found the effects of lidocaine patches on myself and on patients to be lackluster.

I like big blocks and I cannot lie
Mixology
A few techniques in veterinary practice can reduce the sting of blocking agents, but is doing so necessary? Adding sodium bicarbonate to the blocking agent alkalizes the agent for a less dramatic sting in awake patients, but it also decreases the duration of the block.13 In addition, adding too much sodium bicarbonate can cause precipitation and decrease efficacy further.13 A solution containing bicarbonate can cause precipitation and adding too much sodium bicarbonate to three parts blocking agent is contraindicated in patients, but it also decreases the duration of the block.13

Adding sodium bicarbonate to the blocking agent alkalinizes the agent. By altering the pH level, it facilitates tissue distribution of the blocking agents.14 The longstanding practice of mixing two local blocking agents, one with a quicker onset (lidocaine) and one with a longer onset but longer duration (bupivacaine), has been largely disproven, with a growing body of evidence showing that this mixture can be inferior to bupivacaine alone. There are also a handful of veterinary studies and multiple human studies showing no added benefit to this technique.15–21 The bupivacaine may be washed out of the system based merely on changing concentration gradients and the manipulation of pH levels of each drug when mixed. Interestingly, bupivacaine was found in a 2015 study22 to have some effect on the N-methyl-D-aspartate (NMDA) receptor by its ability to access the sodium ion channel ubiquitously and suppress transmission currents to the dorsal horn. This receptor is critical in the complex physiology of chronic pain.3

Because local anesthetics are vasoconstrictors, some practitioners add epinephrine to their anesthetic cocktail to produce local vasoconstriction and thus allow the block to last longer. This is contraindicated in patients with cardiovascular disease,23 however, and not a technique I recommend. Instead, micro doses of dexmedetomidine can be added for this same effect, a longer duration of action, and potentially better analgesia. In a 2018 human meta-analysis study,24 the authors noted no more than a 60-minute prolongation of the local anesthetic when epinephrine was added, again suggesting the superiority of using dexmedetomidine instead.

Mixing the local anesthetic with saline better facilitates tissue distribution of the blocking agents. Using saline allows for a decrease in the total volume of the mixture, as lower volumes even with volume expansion is needed, I mix the higher-end dose (2 mg/kg) with saline in a 1:1 ratio. My preferred maximum total doses for patients that still may require larger volumes even with volume expansion or multiple site infiltrations are 4 mg/kg total for lidocaine in dogs and 2 mg/kg in cats, and a maximum dose of 2 mg/kg of bupivacaine for both species. (Doses can be increased further if necessary and referenced appropriately.)

Adjunctive medications
If there are concerns about toxicity, the addition of an adjunctive medication allows for a decrease in local anesthetic dose while still prolonging the block (Table).25–30 Use of a preservative-free solution is not necessary for peripheral nerve blocks. These blocking cocktails can be re-administered after the initial block has worn off.

With the release of Nocita (bupivacaine liposome injectable suspension — Elanco) in 2016, being a creative mixologist became a bit less ... experimental. Nocita is labeled for specific indications and not a portion of a total systemic dose to add to the local anesthetic cocktail.

### TABLE. Adjunctive medications used to enhance local anesthetic blocks25–26

<table>
<thead>
<tr>
<th>Medication</th>
<th>Dose</th>
<th>Expected duration</th>
<th>Precautions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>OPIOIDS</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morphine</td>
<td>0.075–0.1 mg/kg</td>
<td>~15–30 hours</td>
<td>Generally, these doses will not provide systemic analgesia; avoid injecting into a vein or artery.</td>
</tr>
<tr>
<td>Buprenorphine</td>
<td>0.003–0.005 mg/kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydromorphone</td>
<td>0.015 mg/kg</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ketamine</td>
<td>0.1–0.5 mg/kg</td>
<td>~7–18 hours</td>
<td>Generally, these doses will not provide systemic analgesia or effect; avoid injecting into a vein or artery.</td>
</tr>
<tr>
<td>Dexamethasone</td>
<td>0.1–0.25 mg/kg</td>
<td>~15–23 hours</td>
<td>Avoid injecting into a vein or artery; this drug is not ideal for patients with infected wounds.</td>
</tr>
<tr>
<td>Dextromethoridine</td>
<td>0.25–2 µg/kg</td>
<td>~6–22 hours</td>
<td>Higher doses have been associated with slight sedation, bradycardia, and hypotension in human studies.</td>
</tr>
<tr>
<td><strong>NSAID</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Meloxicam* (injectable)</td>
<td>0.2 mg/kg</td>
<td>Does not appear to extend local anesthesia; mixed data; a bupivacaine (extended release) and meloxicam blend known as HTX-011 is currently listed as an investigational drug with a duration of 72 hours.</td>
<td>Generally, this dose will not provide systemic analgesia; avoid injecting into a vein or artery.</td>
</tr>
</tbody>
</table>

*Other NSAIDs have been used but data are lacking.

References available at dvm360.com.

Stephen is a surgical research anesthetist through the Academy of Surgical Research and a VTS in research anesthesia through the Academy of Laboratory Animal Technicians and Nurses. He became one of the first veterinary cannabis counselors and a certified veterinary pain practitioner through the International Veterinary Academy of Pain Management. He is often found on the Veterinary Anesthesia Nerd and Veterinary Cannabinoid Academy Facebook pages when not lecturing or writing.
Modulating the immune system to fight for good

Immunotherapy — using an individual’s own immune system to fight disease — is one of the fastest-growing areas in both human and veterinary research. Here’s the latest.

By Ashley Kalinauskas, MS

The immune system is the body’s defense against pathogenic infections, but immune-mediated diseases such as cancer, diabetes, and allergic dermatitis arise from dysbiosis of the immune system. The immune system can work for you to prevent disease, go into overdrive to cause disease, or be tricked into not working like it should.

Immunotherapy, or the use of the body’s own immune system to combat disease, has truly defined the past decade of medical advancements. More than 20 million dogs and cats have immune diseases that could be ameliorated by using specific biologics to modulate the immune response.

From monoclonal antibodies (mAbs) to personalized cancer immunotherapy to viruses loaded with immune-modulating properties, the field is rapidly growing and expanding.

Monoclonal antibodies
Therapeutic mAbs are highly targeted therapies that work by blocking specific cell-to-cell interactions. The first monoclonal antibody for humans was created in 1975 to prevent kidney transplant rejection by blocking CD3, a receptor found on T lymphocytes, to suppress the immune system.1 Because T lymphocytes (commonly known as T cells) are the backbone of adaptive immunity, downregulating a T-cell response allows for a transplant to become successful — the body no longer has enough power to recognize the new organ as foreign.2 However, the major problem with the first mAb was that it was created from a mouse. Repeated administration of a mouse antibody into a human can cause an anti-mouse response within the body, leading to the potential for adverse effects.

Creating full speciated mAbs, or chimeric antibodies (the combination of mouse with the species of interest), is important to generate a specific response that will not lead to adverse events. So, “caninization,” “felinization,” and “equinization” are necessary in veterinary medicine to create safe and species-specific mAbs that will lead to an effective response. Balance here is key.

One of the most successful mAbs to date in veterinary medicine is Cytopoint (Zoetis Petcare), which was created to target interleukin-31, an inflammatory cytokine that is upregulated in allergic and atopic dermatitis.3 Cytopoint has become a game-changer for pet owners dealing with atopic dermatitis in their pets.

When it comes to cancer, mAbs for immune checkpoint inhibitors (ICIs) are moving toward becoming standard of care for human cancer treatment. From melanoma to non-small cell lung cancer, ICIs block the interaction of tumor cells that downregulate T cells within the tumor microenvironment. Specifically, when a tumor cell expresses PD-L1 (programmed death-ligand 1), it binds to PD-1 on the T cell, thus inactivating the T cell. Using an mAb against PD-L1 or PD-1 allows for the T cells to remain active within the microenvironment, which leads to tumor cell destruction.

In veterinary medicine, we are still a ways off from making ICI mAbs for cancer accessible and available. For one, there are only a subset of tumors and a subset of patients that overexpress PD-L1. Ensuring the PD-L1 expression level on these tumors requires either genomics tumor profiling or creation of specific diagnostic tests that would ensure potential efficacy for this treatment.

Second, creating a “caninized” version of an anti–PD-L1 therapy is both time-consuming and expensive. While over 4 million dogs are diagnosed with cancer each year, far fewer patients will have the expression levels of these antigens that will make commercializing ICIs a feasible business endeavor.

However, the specificity of therapeutic mAbs is truly astonishing, so as human science advances we will be sure to see more in the development pathway for cancer and osteoarthritis in veterinary medicine.

Personalized immunotherapies for cancer
Personalized cancer immunotherapies, such as autologous therapies or chimeric antigen receptor T-cell (CAR-T) approaches, are growing within the veterinary field. Several veterinary-specific companies are focused on creating personalized cancer immunotherapies for pets.

Cancer is a disease of mutations. Each tumor, even within the same patient, is unique with regard to the array of epitopes expressed on each cell’s surface.4 Effective immunotherapies must encompass the diversity of cancer, as well as the diversity of the immune response of the tumor-bearing patient.

Autologous cancer immunotherapies are created for and used to treat a single patient. These activated T-cells, or “personalized vaccines,” can be provided back to the patient to stimulate an anti-tumor response. Instead of focusing on a single antigenic epitope, both methods allow for vaccination with an array of antigens. This is intended to develop multiple T-cell clones with different specificities and ligand affinities that generate a highly specific immune response.5

While personalized cancer immunotherapies in the veterinary market are still experimental, as regulated by the U.S. Department of Agriculture, they encompass a new generation of cancer therapy research in the veterinary market that is rapidly gaining traction.

Oncolytic viruses
One of the newest areas of immunotherapy that has not yet made its way into the veterinary field is the use of oncolytic viruses as a way to modulate the immune system.

Oncolytic viruses are genetically engineered tumor-killing factories that combine the specificity of mAbs with the ability to produce cytokines.
to direct and augment an immune response against the cancer.

When an oncolytic virus is provided intratumorally, the resulting tumor necrosis creates an inflammatory response that alerts the immune system, leading to a systemic response against the cancer.

Currently, research is being conducted on genetically engineering polio, herpes, and adenoviruses. The only FDA-approved oncolytic virus in the human field is for advanced melanoma; Imlygic (talimogene laherparepvec — Amgen) is provided via intratumoral injection.

The creation of an oncolytic viral therapy that can be provided intratumorally and create a systemic anti-tumor response can be a viable opportunity within veterinary medicine.

Conclusion

While a faulty immune response can cause disease, the use of targeted immunotherapies allows for redirection and regulation of the immune system. Balance is necessary in the immune systems of our companion animals, and many biopharmaceutical companies are working to bring more immunotherapies to market.

Providing safe, effective and affordable immunotherapies to veterinary patients is an industry goal. There are many emerging therapies coming out of the human field and many emerging companies in the veterinary field working to address immune-mediated diseases in companion animals.

Can new immunotherapies commercialized in the veterinary industry lead to the next breakthrough and one day inform human research? I believe that with the support of the veterinary community, and the similarities between canine and human antigenic targets, we can.

Ashley Kalinauskas is the CEO of Torigen, a startup biotechnology company focused on providing personalized cancer immunotherapies to companion animals. Torigen is a team of veterinarians and researchers spun out of research from the University of Notre Dame focused on utilizing immunotherapy for cancer and immune-mediated diseases.

REFERENCES
Addressing acute diarrhea in the adult horse

Big colons can lead to big problems. That’s why veterinarians who treat horses should understand current diagnostic and treatment best practices for this potentially lethal condition.

By Kate L. Hepworth-Warren, DVM, DACVIM

Acute diarrhea is not an emergency in many animal species, but this is not always the case in horses. Because of the huge volume of fluid that can be lost from the horse’s gastrointestinal (GI) tract as diarrhea, horses quickly can become profoundly hypovolemic. Horses are also exquisitely sensitive to lipopolysaccharide (endotoxin), and thus inflammation within the GI tract and translocation of bacteria through tight junctions can lead to endotoxemia, systemic inflammatory response syndrome, and death.

Diarrhea can be caused by malabsorption, increased osmotically active particles in the lumen, increased secretion of water and electrolytes into the lumen, inflammation in or around the GI tract, or altered intestinal motility. It can be a primary issue or may occur secondary to disease outside the GI tract, such as endotoxemia, hypoproteinemia, or heart disease.

Most cases of acute-onset equine diarrhea are caused by an infectious agent. Infectious diseases leading to colitis and diarrhea include salmonellosis, clostridiosis, coronavirus, Potomac horse fever and larval cyathostomiasis. Non-infectious issues include right dorsal colon secondary to nonsteroidal anti-inflammatory drug (NSAID) administration, inflammatory bowel disease (can also present as chronic diarrhea), and toxins such as cantharidin, hoary alysum, and arsenic.

It is important to remember that horses with colitis do not always develop diarrhea. Therefore, many of the conditions commonly associated with diarrhea should not be ruled out simply because diarrhea is absent. For example, in a study examining the characteristics of Potomac horse fever in hospitalized horses, 34% did not have diarrhea. Horses can pool huge volumes of fluid in their colon, which may lead to signs of colic due to distention and dysmotility, and can create significant hypovolemia without the presence of diarrhea. In some instances, patients with colitis may not develop diarrhea until fluid therapy is initiated and their fluid balance is restored.

Diagnoses

Regardless of cause, the initial approach to examining and managing a horse with diarrhea is the same. Frustratingly, a definitive diagnosis for the inciting cause is rarely made, and most of the conditions that cause acute diarrhea present very similarly to one another. Taking a thorough history is critical when beginning the task of differentiating infectious from non-infectious causes. Medication history (specifically NSAIDs and antimicrobials), recent travel, exposure to animals with similar clinical signs, changes in feed or management, recent deworming, previous illness, and duration of clinical signs are crucial pieces of information.

Clinical signs, aside from the presence of diarrhea, often include signs consistent with dehydration, fever, colic, and/or endotoxemia. A complete physical examination should be performed, with extra attention paid to cardiovascular status and evidence of endotoxemia and laminitis. Initial diagnostics generally include a complete blood count and serum biochemistry panel. Useful adjuncts include measurement of blood lactate, blood gas analysis, and serum amyloid A.

Findings on complete blood counts in horses with colitis can vary drastically over as few as 6 to 12 hours. Initially, patients may have a normal total leukocyte count and a normal neutrophil count that can progress rapidly to marked neutropenia with a left shift and, often, toxic changes in the neutrophils. As patients improve, there is often a “rebound neutropenia” and, finally, the counts normalize again as the patient recovers. The rapid pace at which these shifts occur supports the need for frequent monitoring of hematologic parameters to adjust therapy. Evaluation of blood smears in cases of diarrhea and colitis allows for identification of band neutrophils and toxic changes that may not be identified by an automated analyzer.

Findings on serum biochemistry panels and blood gases generally support hypovolemia, metabolic acidosis, and loss of electrolytes and albumin through diarrhea. Assessment of biochemistry panels both before and after fluid therapy will allow the clinician to alter fluid therapy and rule out concurrent conditions (e.g., renal disease if blood

<table>
<thead>
<tr>
<th>Disease/agent</th>
<th>Recommended test (sample)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salmonella spp.</td>
<td>Culture (feces)</td>
<td>Labs will often perform PCR first and then culture positive samples. Five serial samples are recommended for culture.</td>
</tr>
<tr>
<td>Neorickettsia risticii (Potomac horse fever)</td>
<td>PCR (feces)</td>
<td>N risticii is present in blood monocytes early in the disease course and eventually infects enterocytes and is shed in feces. Testing of both blood and feces is ideal.</td>
</tr>
<tr>
<td>Clostridium difficile</td>
<td>Toxin A/B ELISA (feces)</td>
<td>Toxic A/B ELISA is considered the standard diagnostic.</td>
</tr>
<tr>
<td>Clostridium perfringens</td>
<td>Toxin ELISA (feces)</td>
<td>Enterotoxin</td>
</tr>
<tr>
<td>Coronavirus</td>
<td>Culture (feces)</td>
<td>Low yield</td>
</tr>
<tr>
<td>Right dorsal colitis</td>
<td>PCR (feces)</td>
<td>Looks for toxin</td>
</tr>
<tr>
<td>Cyathostomiasis</td>
<td>Clinical, histopathology of cecal or colonic mucosa</td>
<td>Histopathology will show eosinophilic inflammation, edema, +/- larvae. Fecal egg counts are rarely of use in diagnosis as the condition is caused by larval stages of parasites.</td>
</tr>
<tr>
<td>Inflammatory bowel disease</td>
<td>Histopathology (biopsy of affected segment of GI tract)</td>
<td></td>
</tr>
</tbody>
</table>

ELISA = enzyme-linked immunosorbent assay; PCR = polymerase chain reaction.
urea nitrogen/creatinine normalize following fluid therapy). Hypovolemia can mask hypoalbuminemia, so a one-time measurement may give an incomplete clinical picture. In addition to azotemia (typically pre-renal), patients with diarrhea may have variable changes in their electrolytes. Sodium, chloride and bicarbonate are often lost through the GI tract, whereas hyperkalemia is common secondary to metabolic acidosis. Patients with normal potassium or mild hypokalemia in the face of metabolic acidosis may, in fact, be profoundly hypokalemic.

Identifying the cause of diarrhea can be challenging as not all infectious agents are shed consistently in the feces, nor can they be identified readily in the blood. Non-infectious causes of acute diarrhea can present in the same way as infectious causes. In up to 60% of cases of acute diarrhea in adult horses, the causative agent is never identified. Results by one method of diagnostic testing (e.g., culture for *Salmonella* spp.) may be negative, while another test (e.g., polymerase chain reaction) for the same agent may be positive. Formed fecal matter is more likely to yield culture-positive results as compared with feces with high water content; culture-positive results as compared to fecal matter is more likely to yield rapid intravascular expansion followed by ischemic crystalloids. There is a significant debate in human and small animal medicine, and to a lesser degree in equine medicine, regarding the use of colloids as a resuscitative therapy, but some clinicians advocate their use in the initial fluid plan.\(^7\)

Hydroxyethyl starch solutions and plasma both provide volume expansion of approximately three times the volume administered.\(^7\) Plasma has the added benefit of also providing immunoglobulins and coagulation factors that can attenuate the effects of endotoxemia. It can, however, be cost-prohibitive for some clients, and there is the risk of anaphylaxis and disease transmission during administration.\(^7\) While hydroxyethyl starch solutions are significantly cheaper and less likely to cause immune reactions, they have been shown to affect equine platelet function negatively and increase mortality when administered to humans with sepsis; therefore, the potential benefits must be weighed against the risks when deciding whether to use these fluids.\(^7,8\)

It is imperative that patients with ongoing diarrhea be monitored closely, with fluid rates assessed frequently, to ensure that fluid losses are being replaced and daily maintenance requirements are being met. As the frequency and volume of bowel movements decrease, the volume of intravenously administered fluids can be decreased.

**Restoring fluid balance**
Fluid deficits should be addressed once a patient’s approximate percentage of dehydration is determined based on clinical indices reported elsewhere (heart rate, capillary refill time, packed cell volume, urine specific gravity). An average-sized horse (450 kg [992 lb]) with watery diarrhea can produce 90 L (nearly 24 gallons) of diarrhea in a 24-hour period and thus will need significant volumes of both replacement and maintenance fluids to achieve normal hydration status.\(^6\)

Initial resuscitative fluid therapy can be administered as a bolus of isotonic crystalloids (Normosol-R, Plasmalyte, lactated Ringer solution). Hypertonic saline can also be administered for rapid intravascular expansion followed by isotonic crystalloids. There is a significant debate in human and small animal medicine, and to a lesser degree in equine medicine, regarding the use of colloids as a resuscitative therapy, but some clinicians advocate their use in the initial fluid plan.\(^7\)

Adjunct therapies
A number of adjunct therapies have been administered in cases of diarrhea, including intestinal adsortents, anti-endotoxin therapy, probiotics, and fecal transamination. Di-tri-ocathedral smectite (Bio-Sponge — Platinum Performance) is an intestinal adsorbent that can bind *Clostridium difficile* toxins A and B, *C. perfringens* toxin A and endotoxin.\(^10\) Polyoxinyn B is a polypeptide antimicrobial agent that binds and neutralizes circulating endotoxin.\(^11\) Fluixinium meglumine can also be given to attenuate endotoxemia. Laminitis prevention with cryotherapy is also recommended in many cases of acute diarrhea.\(^1\)

Owing to their safety, ease of administration, and affordability, probiotics are often administered as adjunct therapy in horses with acute diarrhea. However, many probiotic products may not reach the target site (large colon) effectively, and it is still largely unknown which strains of bacteria may be beneficial when administered to horses.\(^12\) Recently there has been renewed interest in the use of fecal microbial transamination (FMT) to reestablish normal flora following dysbiosis and colitis. FMT involves taking a fecal sample from a healthy donor and administering the feces directly into the bowel of the recipient, most commonly via nasogastric tube.

Ideally, donors would be tested first for salmonellosis, *C. perfringens*, and equine infectious anemia virus, and should have no recent history of antimicrobial administration.\(^12\)

**Conclusion**
Acute diarrhea in the adult horse is a serious situation that requires prompt attention and therapy. It can be frustrating for veterinary clinicians and clients alike because a definitive diagnosis is often impossible to find. Luckily, however, treatment is generally the same for any case and should focus on maintaining cardiovascular status, resolving the diarrhea, and preventing endotoxemia and laminitis.

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**REFERENCES**
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evetsummitchicago.com

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avma.org
800-248-2862

August 29-September 3
ExoticsCon
Denver, CO
exoticscon.org

September 21-22
VMC’s Human Resources
Boot Camp
Philadelphia, PA
vmc-inc.com
303-674-8169

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Connectivity 2020
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aaha.org

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abvp.com/symposium
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veterinarydentalforum.org
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newyorkvet@closerstilmedia.com

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Sometimes you just can’t predict how your clients will respond.

Dealing with people is the part of veterinary medicine that many of us can never truly say we are good at. Some may profess to be comfortable with it, but most will agree that it is the hardest part of the job. Many clients simply don’t respond to certain life situations as I would, making it difficult to know what they might do next.

I was still early enough into my career that every phone call coming into the house didn’t send chills up my spine. One Tuesday night at nine o’clock found a sobbing man beckoning me from the other end of the line. He was explaining that his dog Hamburger was very sick and needed immediate attention. Every attempt on my part to find out what the dog’s clinical signs were was met with a stonewalled answer that help was needed immediately.

I met the couple at the clinic several minutes later. Here was the scene: A man about 50 years old, skinny as a rail, beard down to the navel streaked with gray and black, was clutching a small mixed-breed dog wrapped in a towel with only two legs visible. The dog/towel unit was braced firmly against the man’s upper chest extending to the chin area. The wife was a rather large woman wearing a pair of skin-tight nylon shorts on an evening with temperatures in the upper thirties. Her middle two upper teeth did not exist and her tongue seemed always to occupy the space where they used to be.

They were both sobbing and talking so fast in unison that I could not begin to comprehend what had happened. After what seemed to be 10 minutes of talking in circles, it became apparent that the dog had not eaten or moved for the past 3 days. Any question from me was met with a high-pitched wail from the man and a series of rapid tongue thrusts through the tooth void from the woman.

I was a bit worried. These people were beyond reason when it came to this dog. I asked to see the critter and was met by loud objection. He told me that I could only see the dog if I promised to fix him so he could eat hamburgers again. What do you say to that?

I realized what was happening before I ever touched the dog. The dog hadn’t eaten or moved for the past three days for a reason. The fleas were leaving the dog and migrating through the man’s beard for a reason. The legs were stiff and the dog was a sawhorse for a reason. It was dead.

Oh my, what now? How am I going to break this news? I reached over and got the stethoscope, gently placed it under the towel and over the dog’s heart and listened intently. I kept it there for a long time trying to figure out how I was going to break the news. The dog was room temperature, stiff, and obviously without a heartbeat.

I gently slid the scope out from under the towel, conjured up my most caring facial expression and tone of voice, and said, “I am sorry, but Hamburger is beyond repair. He has passed away.”

The man hit the floor like someone had shot him. He lay flat on his stomach, legs apart and arms flailing. He kept screaming over and over, “No he ain’t! No he ain’t! He can still stand up.”

He jumped back up, grabbed the dog, tucked him under his chin again, and started for the door.

“You’re just as dumb as that last vet that looked at him yesterday. I can’t believe they ain’t putting out vets from that there school that know what they are doing. Come on, Momma, let’s go to Amarillo, they got some vets there that can fix him.”

With that, they scurried out the front door and off into the night. I was left standing there, stethoscope still in hand, wondering what I should have done. People just don’t respond to things the way you might anticipate.

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