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A primer on open wound management

When a patient with an open wound comes into your practice, your first instinct is probably to close it right up. But you might want to wait a few days first, according to one veterinary surgeon.

By dvm360 Staff

Not all wounds should be closed up immediately—keeping them open is sometimes the right call. "The temptation can be to close any wound right away, but allow yourself a little time to view it as a long-term project rather than a short-term fix," Bronwyn Fullagar, BVSc, MS, DACVS, told dvm360.com in a recent interview.

Dr. Fullagar, a locum small animal surgeon at VCA Western Veterinary Specialist and Emergency Centre in Calgary, Alberta and Fetch dvm360 conference speaker, says some should be managed as open wounds, and what you want to achieve is a healthy bed of granulation tissue. "Once you’ve achieved that healthy, bleeding, pink granulation bed, you have a multitude of options for closing the wound over it," she says.

In general, any wound that isn’t an acute-onset, very clean wound shouldn’t be stitched up on day one. Wounds that veterinarians have a tendency to close but don’t heal well initially are wounds like those from dog bites because crushing trauma and infection may be present. "If you suture these on day one, they’re more likely to have issues and have a tendency to dehisc," Dr. Fullagar says.

"Leaving wounds that are very traumatic open even for just a couple of days “will let the tissue kind of declare itself,” she says, giving you the chance to determine what’s healthy and what’s not before closing it up.

“When you’re sure that the wound bed is in a healthy place, then go ahead and close it,” she advises.
Neonates can become compromised quickly. Learn how to care for these fragile animals.
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Do I need a monthly staff meeting?

My veterinary team is smart and we’re really busy, but ongoing education is vital to practicing good medicine. So, are monthly staff education meetings a necessity?

By Emily Shiver, CVPM, CCFP

Our team at dvm360.com and Firstline magazine asked practice manager Emily Shiver to answer your questions about life in practice for managers, technicians, assistants, client service representatives and more.

Q: I manage a small, very busy veterinary practice. I’d like to set up at least one all-hands educational staff meeting per month, but some doctors and team members are pushing back. Do I need this meeting?

A: For me, this is a resounding yes!

Staff meetings are your chance to reach your team, nurture culture and teamwork, provide invaluable training and include everyone in the plans and success of the practice. People will say they don’t have the time, and some staff won’t be on board, and maybe you don’t have a solid plan to lead them right now. But your team will feed off your excitement about this chance to listen, inform and inspire. Involve them!

Below are some dos and don’ts for launching monthly staff meetings in a veterinary hospital.

Dos

- Map out meeting topics for the entire year. Not too hard—you only have to come up with 12 topics! Let the staff weigh in on what they’d like to learn.
- Ask hospital leaders or other team members who may be passionate about a particular topic to present. You don’t have to be the educator at every single one! Make sure you’re there to support and give guidance.
- Assign seats for the meetings so staff members share with the entire team, not just their friends.
- Incorporate interactive table activities to encourage teamwork.
- Set staff meetings for two hours. This length has worked well worked for me.

Don’ts

- Don’t waste time with staff meetings about new products you don’t plan to carry.
- Don’t talk negatively about staff meetings.
- Don’t dismiss team members’ ideas to improve meetings without first discussing and considering them.
- Don’t make the topic of every meeting super heavy—try to balance them. Provide interactive fun activities when appropriate.

Embrace educational staff meetings in your veterinary practice, and make them events that everyone starts looking forward to. Once implemented by inspired colleagues, you could see big effects in just a couple months. Every month you don’t have a staff meeting is a growth opportunity missed.

Emily Shiver, CVPM, CCFP, is practice manager at Cleveland Heights Animal Hospital in Lakeland, Florida. Got a question for her? Email us at frontline@mmhgroup.com.
Busy times call for simpler flea and tick treatment.

ONE chew every 12 weeks*

During these hectic times, it’s more important than ever to protect pets from parasites. Prevent fleas and ticks without the hassle of a monthly treatment.

Talk to your clients about extended protection with BRAVECTO® today.

*BRAVECTO Chews for Dogs kill fleas, prevents flea infestations, and kills ticks (black-legged tick, American dog tick, and brown dog tick) for 12 weeks. BRAVECTO Chews also kills lone star ticks for 8 weeks. The most commonly reported adverse reactions include vomiting, decreased appetite, diarrhea, lethargy, polydipsia, and flatulence. BRAVECTO Chews for Dogs have not been shown to be effective for 12-weeks’ duration in puppies less than 6 months of age. BRAVECTO Chews are not effective against lone star ticks beyond 8 weeks of dosing. Fluralaner is a member of the isoxazoline class. This class has been associated with neurologic adverse reactions including tremors, ataxia, and seizures. Seizures have been reported in dogs receiving isoxazoline class drugs, even in dogs without a history of seizures. Use with caution in dogs with a history of seizures or neurologic disorders. VIEW PRESCRIBING INFORMATION

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Flavored chews for dogs.

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

Description: Each chew is formulated to provide a minimum dose of 11.4 mg/lb (25 mg/kg) body weight. The chemical name of fluralaner is cis-4-[3,5-dichlorophenyl]-5-[4-fluoromethyl]-3,4-dihydropyrazole-3-(3H)-yl]-2-methyl-N-(2-oxo-2-[2,2,4-trifluorocyclohexyl]ethyl)pyrazine.

Indications: Bravecto kills adult fleas and is indicated for the treatment and prevention of flea infestations ([Oxymet�axole (flea)] and the treatment and control of tick infestations ([Leads scapularis (black-legged tick)], Dermacentor variabilis (American dog tick), and Rhizophalus sanguineus (brown dog tick)] for 12 weeks in dogs and puppies 6 months of age and older, and weighing 4.4 pounds or greater.

Bravecto is also indicated for the treatment and control of Amblyominae amerecan (lone star tick) infestations for 8 weeks in dogs and puppies 6 months of age and older, and weighing 4.4 pounds or greater.

Dosage and Administration: Bravecto should be administered orally as a single dose every 12 weeks according to the Dosage Schedule below to provide a minimum dose of 11.4 mg/lb (25 mg/kg) body weight.

Bravecto may be administered every 8 weeks in case of potential exposure to Amblyominae americanum ticks (see Effectiveness).

Bravecto should be administered with food.

Dosage Schedule

<table>
<thead>
<tr>
<th>Body Weight Ranges (lbs)</th>
<th>Fluralaner Content (mg)</th>
<th>Chews Administered</th>
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</thead>
<tbody>
<tr>
<td>&gt; 4.4 – 9.9</td>
<td>112.5</td>
<td>One</td>
</tr>
<tr>
<td>&gt; 9.9 – 22.0</td>
<td>250</td>
<td>One</td>
</tr>
<tr>
<td>&gt; 22.0 – 44.0</td>
<td>500</td>
<td>One</td>
</tr>
<tr>
<td>&gt; 44.0 – 88.0</td>
<td>1000</td>
<td>One</td>
</tr>
<tr>
<td>&gt; 88.0 – 123.0*</td>
<td>1400</td>
<td>One</td>
</tr>
</tbody>
</table>

*Dogs over 123.0 lb should be administered the appropriate combination of chews.

Treatment with Bravecto may begin at any time of the year and can continue year round without interruption.

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

Warnings: Not for human use. Keep this and all drugs out of the reach of children. Keep the product in the original packaging until use in order to prevent children from getting direct access to the product. Do not eat, drink, or smoke while handling the product. Wash hands thoroughly with soap and water immediately after use of the product.

Keep Bravecto in a secure location out of reach of dogs, cats, and other animals to prevent accidental ingestion or overdose.

Precautions: Fluralaner is a member of the isoxazoline class. This class has been associated with neurologic adverse reactions including tremors, ataxia, and seizures. Seizures have been reported in dogs receiving isoxazoline class drugs, even in dogs without a history of seizures. Use with caution in dogs with a history of seizures or neurologic disorders. Bravecto has not been shown to be effective for 12-weeks duration in puppies less than 6 months of age. Bravecto is not effective against Amblyominae americanum ticks beyond 8 weeks after dosing (see Effectiveness).

Adverse Reactions: In a well-controlled laboratory dose confirmation study, one dog developed edema and hyperemia of the upper lips within one hour of receiving Bravecto. The edema improved progressively through the day and had resolved without medical intervention by the next morning.

In a well-controlled laboratory dose confirmation study, one dog developed edema and hyperemia of the upper lips within one hour of receiving Bravecto. The edema improved progressively through the day and had resolved without medical intervention by the next morning.

Post-Approval Experience (2019): The following adverse events are based on post-approval adverse drug experience reporting. Not all adverse events are reported to FDA/CVM. It is not always possible to reliably estimate the adverse event frequency or establish a causal relationship to product exposure using these data.

The following adverse events reported for dogs are listed in decreasing order of reporting frequency for fluralaner: vomiting, lethargy, diarrhea (with and without blood), anorexia, pruritis, polydipsia, seizure, allergic reactions (including hives, swelling, erythema), dermatitis (including crusts, pustules, rash), tremors, and ataxia.

Contact Information: For a copy of the Safety Data Sheet (SDS) or to report suspected adverse drug events, contact Merck Animal Health at 1-800-234-5318. Additional information can be found at www.bravecto.com.

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

Clinical Pharmacology: Peak fluralaner concentrations are achieved between 2 hours and 3 days following oral administration, and the elimination half-life ranges from 9.3 to 16.2 days. Quantifiable drug concentrations can be measured (lower than necessary for effectiveness) through 112 days. Due to reduced drug bioavailability in the fasted state, Bravecto should be administered with food.

Mode of Action: Fluralaner is for systemic use and belongs to the class of nonoxinol-substituted benzamide derivatives. Fluralaner is an inhibitor of the arthropod nervous system. The mode of action of fluralaner is the antagonism of the ligand-gated chloride channels (gamma-aminobutyric acid (GABA)-receptor and glutamate-receptor).

Effectiveness: Bravecto began to kill fleas within two hours after administration in a well-controlled laboratory study. In a European laboratory study, Bravecto killed fleas and leads ronina ticks and reduced the numbers of five fleas and leads ronina ticks by > 98% within 12 hours for 12 weeks. In a well-controlled laboratory study, Bravecto demonstrated 100% effectiveness against adult fleas 48 hours post-infestation for 12 weeks. In well-controlled laboratory studies, Bravecto demonstrated > 93% effectiveness against Dermacentor variabilis, Leads scapularis, and Rhizophalus sanguineus ticks 48 hours post-infestation for 12 weeks. Bravecto demonstrated > 90% effectiveness against Amblyominae americanum 72 hours post infusion for 8 weeks, but failed to demonstrate ≥90% effectiveness beyond 8 weeks.

In a well-controlled U.S. field study, a single dose of Bravecto reduced fleas by ≥ 99.9% for 12 weeks. Dogs with signs of flea allergy dermatitis showed improvement in erythema, alopecia, papules, scales, crusts, and excoriation as a direct result of eliminating flea infestations.

Palatability: In a well-controlled U.S. field study, which included 559 dogs administered to 224 dogs, 80.7% of dogs voluntarily consumed Bravecto within 5 minutes, an additional 12.5% voluntarily consumed Bravecto within 5 minutes when offered with food, and 6.8% refused the dose or required forced administration.

Animal Safety: Mogry of Safety Study: In a margin of safety study, Bravecto was administered orally to 8- to 9-week-old puppies at 1, 3, and 5X the maximum label dose of 56 mg/kg on three, 8-week intervals. The dogs in the control group (0X) were untreated.

There were no clinically-relevant, treatment-related effects on physical examinations, body weights, food consumption, clinical pathology (hematology, clinical chemistries, coagulation tests, and urinalysis), gross pathology, histopathology, or organ weights. Diarrhea, mucoid, and bloody stools were the most common observations in this study, occurring at a similar incidence in the treated and control groups.

In a reproductive safety study, Bravecto was administered orally to 60 female Beagles at a dose of up to 168 mg/kg (equivalent to 3X the maximum label dose) on three to four occasions at 8-week intervals. The dogs in the control group (0X) were untreated.

There were no clinically-relevant, treatment-related effects on body weights, food consumption, reproductive performance, semen analysis, litter data, gross necropsy (adult dogs), or histopathology findings (adult dogs and puppies). One adult 3X treated dog suffered a seizure during the course of the study (46 days after the third treatment). Abnormal salivation was observed on 17 occasions: in six treated dogs (11 occasions) after dosing and in one control dog (5 occasions) prior to dosing. The following abnormalities were noted in 7 pups from 2 of the 10 dams in only the treated group during gross necropsy examination: limb deformity (4 pups), enlarged heart (2 pups), enlarged spleen (3 pups), and deformed palate (2 pups). During veterinary examination at Week 7, two pups from the control group had inguinal testicles, and two and four pups from the treated group had inguinal and cryptorchid testicles, respectively. No undescended testicles were observed at the time of necropsy (days 50 to 71).

In a well-controlled field study Bravecto was used concurrently with other medications, such as vaccines, anthelmintics, antibiotics, and steroids. No adverse reactions were observed from the concurrent use of Bravecto with other medications.

Storage Information: Do not store above 86°F (30°C).

How Supplied: Bravecto is available in five strengths (112.5, 250, 500, 1000, and 1400 mg fluralaner per chew). Each chew is packaged individually into aluminum foil blister packs sealed with a peelable paper backed foil lid stock. Product may be packaged in 1, 2, or 4 chews per package.

Approved by FDA under NADA # 141-436

Distributed by:

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Madison, NJ 07940

Fluralaner (active ingredient) Made in Japan

Formulated in Austria

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Rev. 04/19
Probiotics: How to help your clients shop smart

A nutrition researcher offers a few nuggets to share with clients who are interested in purchasing a probiotic for their pet.

By dvm360 Staff

Probiotics for pets are a hot topic these days, and for good reason. These “beneficial bacteria” promote a healthy gut microbiome (the billions of microbes and other microorganisms that live in the intestines) and have been shown to aid digestion, regulate the immune system and hinder the growth of harmful bacteria. But there is much confusion about the available probiotic products, also for good reason.

Probiotics come in multiple forms (e.g. capsules, powders, chews) using different bacterial strains and amounts, and they are sold at widely varied prices. And like other nutritional supplements, they are not regulated by the U.S. Food and Drug Administration.

With so many variables, it can be tough to distinguish effective from ineffective products.

With so many probiotics readily available today, client education about how to select an appropriate, effective product for their animal companion is a must. That’s where the veterinary team comes in. We asked Gail Czarnecki-Maulden, PhD, a senior nutrition researcher at Purina, for her advice on selecting a probiotic. Here’s what she had to say.

First, Dr. Czarnecki-Maulden advises clients that different probiotic bacteria have different functions, so pet owners should choose a probiotic that addresses their specific concern.

Second, she says, there are a couple things to consider from a consumer awareness standpoint. One is that there are very specific requirements for labeling. “When you look at the packaging, there should be a guarantee of the number of live bacteria that are in the product,” Dr. Czarnecki-Maulden says. “If there is no guarantee, then the product is not meeting labeling requirements. So that would be a product that I personally would not buy.”

In addition, there should be an indication on the label of what bacterial species and strain are in the product. “Ideally, the label will contain some information that allows you to check whether the product is backed by associated efficacy data,” Dr. Czarnecki-Maulden says.

Dr. Czarnecki-Maulden is a senior research nutritionist at the Nestlé Research Center in St. Louis. She is a member of the National Academy of Science Board on Agriculture and Natural Resources and the Association of American Feed Control Officials (AAFCO) Dog and Cat Nutrient Profiles Subcommittee, which sets nutrient standards for dog and cat foods in the U.S. Dr. Czarnecki-Maulden has published over 60 articles and abstracts on pet nutrition based on her research related to the effect of nutrition on gastrointestinal health. She is a certified dog trainer and a licensed Family Paws parent educator, as well as a member of the board of directors of Havanese Rescue.

When a probiotic is not appropriate

“The only time you would not want to give a probiotic would be if the animal is severely ill and has a compromised immune system,” Dr. Czarnecki-Maulden says. In those cases, you’re trying to keep the animal from being exposed to any type of bacteria.

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Prefering a kitten foster care manual

Shelter medicine expert Dr. Amanda Dykstra makes a case for equipping foster parents with detailed instructions on the care and keeping of kittens.

By Sarah Mouton Dowdy

You’ve probably heard it said that kids don’t come with an instruction manual. But according to Amanda Dykstra, DVM, MPH, DABVP (Shelter Medicine Practice)—a former professor of shelter medicine at the University of Tennessee College of Veterinary Medicine who is now working as medical director for a nonprofit organization and as a shelter consultant—this adage doesn’t necessarily apply to foster kittens.

Dr. Dykstra recommends providing kitten foster parents with a manual. “A foster manual with detailed care instructions will help families give foster kittens the best start in life while saving the veterinary staff precious time and resources,” she explains.

Dr. Dykstra’s foster manual includes sections on housing, feeding, elimination and socialization. It also provides information about weight gain and milestones as well as answers to common medical concerns and what to do in case of emergency.

Housing

According to Dr. Dykstra, providing warmth is the most important housing concern for neonates and infants, because hypothermia has a negative impact on immunity, feeding and digestion.1 She sends foster kittens home with a safe source of heat, such as a heat lamp or a Snuggle Safe pad.

“Kittens don’t regulate their own body temperature well in the first four weeks of life and can only maintain a body temperature that’s about 12° higher than that of their environment,” she explains. “This is due to their large body surface area with noncornified skin and their lack of insulating fat as well as the fact that they can’t vasoconstrict their peripheral vessels. Neonates are especially susceptible because they’re unable to shiver at birth.”2

Dr. Dykstra also advises foster parents to house kittens in an area that can be disinfected easily and where visits from children and other animals are restricted. “I say limited, because it’s not like we don’t want children to be around them at all. We want kittens to be socialized, but the interactions need to be supervised by an adult for the protection of the kitten and the child,” she says.

Feeding

Nutrition can be one of the greatest challenges for foster families, says Dr. Dykstra. “Bottle feeding is done wrong all the time. It’s amazing how often people try to bottle feed kittens like they do human babies,” she says.

Give foster parents the guidance they need by including specific instructions in the foster manual on preparing and warming the formula, feeding frequency, feeding positioning (it should be done at a 45-degree angle), weight monitoring and weaning. Dr. Dykstra also spells out signs of feeding problems as well as the risks of overfeeding, using cow’s milk or mixing in too much water. “It’s not uncommon for well-meaning foster parents to cause unintentional harm in an attempt to save the shelter money,” she says. “Make sure they understand how this can affect the animals in their care.”

Dr. Dykstra notes that, when available, lactating foster queens are the best option for feeding orphaned kittens as they can provide both nutrition and maternal care. “Most lactating queens will accept the additional kittens, but it’s important to place foster kittens with similarly sized animals to avoid size discrepancy,” she says.

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On the topic of weaning, Dr. Dykstra says that kittens generally start drinking formula from a dish at around 3 or 4 weeks of age and that solid food can be introduced by mixing canned food with milk replacer in a flat dish. “Slowly decrease the amount of milk replacer until the kitten is eating primarily solid food,” she explains. “By the time the kitten is 5 to 6 weeks old—and possibly sooner if the teeth are coming in well—it can chew dry food and should be eating about one-third of its daily calories in the form of solid food.”3 Kittens should be weaned completely by the time they are 6 to 9 weeks old.

Elimination
Elimination can be a major struggle for foster parents, so be sure to give them the educational (as well as material) tools they need to be successful. In kittens younger than 3 weeks of age, urination and defecation must be stimulated, says Dr. Dykstra. “Normally, this is done by the queen when she licks the kitten’s perineum,” she explains. “To mimic this in young orphans, foster parents need to rub the kitten’s lower abdomen, genitals and rectum with a cotton ball dipped in warm water before and after each feeding.”

Explain to foster parents that kittens tend to urinate with every stimulation and defecate at least once a day, and include a poop chart in your manual so foster parents can easily keep track. “When the kitten starts eliminating on its own, it should be given a litter box with shredded paper or nonclumping litter (as kittens tend to have a taste for the clumping kind),” Dr. Dykstra says. “Stool should be placed in the litter box until the kitten learns to eliminate there.”

Socialization
The importance of the sensory phase, which begins at around 3 weeks of age and lasts until the kitten is approximately 2 months old, cannot be overstated, says Dr. Dykstra. “Opportunities to gain desirable conditioning during this time will improve the kitten’s ability to be a well-socialized companion animal in the future,” she explains. “Make sure foster parents understand that their job isn’t limited to keeping the kitten alive with food and water. Kittens really need frequent, careful handling.”

Emergency! (maybe)
If you’d rather not receive a desperate call at 2 a.m. about a foster kitten with a slight limp, you’ll want to detail in your foster manual what constitutes an emergency (and, perhaps just as importantly, what doesn’t). Dr. Dykstra recommends having the shelter veterinarian clearly outline the clinical signs that fall into the following three categories:

- Emergency
- Needs to be examined at foster parent’s convenience
- Can be watched at home

The signs that go into each category aren’t universal. “The specifics will depend on your shelter’s human and material resources,” she says.

**Make your manual count**
The above represents a small smattering of what you’ll need to include in your kitten foster care manual, but don’t get overwhelmed by the prospect of creating your own in full. Dr. Dykstra insists there’s no need to start from scratch. The University of Wisconsin-Madison School of Veterinary Medicine offers a guide that Dr. Dykstra found to be a tremendous asset in creating her own resources.4

Lastly, a manual is only useful if it’s read, so don’t just hand it to foster parents and cross your fingers that they’ll crack it open when they get home. Take the time to walk through it with them—either one-on-one or during a foster orientation session—so they know all of the answers it holds.

Sarah Mouton Dowdy is a freelance writer and editor in Kansas City, Missouri.

**REFERENCES**
A practical review of common veterinary renal toxins

The key to managing any toxicity in pets is early identification and timely treatment. Keep these common renal toxins in mind when obtaining patient histories and examining dogs and cats.

By Rebecca A. Packer, MS, DVM, DACVIM (Neurology/Neurosurgery)

Time is of the essence when diagnosing and treating patients with toxicosis. At a recent Fetch dvm360 conference, Tina Wismer, DVM, MS, DABVT, DABT, reviewed five common renal toxins: cholecalciferol, ethylene glycol, nonsteroidal anti-inflammatory drugs (NSAIDs), lilies and grapes/raisins. Identifying these cases quickly in the clinical setting will enable more rapid treatment or mitigation procedures.

Cholecalciferol (vitamin D)

Vitamin D toxicity can occur at doses as low as 0.1 mg/kg, Dr. Wismer said. The incidence of cholecalciferol toxicity in pets is increasing due to its use as an ingredient in psoriasis creams as well as increased use as an ingredient in rodenticides. Initial clinical signs typically include vomiting, depression, polyuria and polydipsia within 12 to 18 hours of ingestion. Increased phosphorus concentrations can be identified within 12 hours, and increased calcium concentrations within 24 hours. Renal failure can occur within 24 to 48 hours.

Treatment includes emesis, if ingestion occurred within the previous 30 to 60 minutes (creams) or four hours (rodenticides). It’s also recommended to administer a single dose of activated charcoal, followed by cholestyramine. When monitoring calcium, phosphorus, blood urea nitrogen (BUN) and creatinine, the addition of 0.9% NaCl is indicated for patients with increasing calcium concentrations to provide competition to calcium reabsorption in the renal tubule. For rapid calcium increases, calcitonin, pamidronate or zoledronate may be administered, as well as phosphate binders. Furosemide and corticosteroids may be used as adjuncts.
Ethylene glycol

Despite its commonality, toxic doses of ethylene glycol have not been well established, Dr. Wismer said. Clinical signs vary depending on the stage of toxicity and metabolism of the parent compound. Central nervous system (CNS) signs appear first, followed by metabolic acidosis and renal tubular necrosis. Neurologic signs, polyuria/polydipsia and hypothermia generally appear within 30 minutes of ingestion and may be brief or last up to 12 hours. Cardiopulmonary signs generally occur 12 to 24 hours after ingestion. Renal effects may be seen as early as 12 hours after ingestion but more commonly are seen within 24 to 72 hours.

Laboratory findings include hyposthenuria, glucosuria and (inconsistently) the presence of calcium oxalate crystalluria on urinalysis. In later stages (after 12 hours), azotemia may be present, but a diagnosis is typically necessary prior to this stage. An ethylene glycol test kit is a valuable tool for rapid diagnosis, and kits are available for both dogs and cats. Note that activated charcoal and some medications (e.g. diazepam) contain propylene glycol and can interfere with test results, so test kits should be used prior to their administration.

Treatment for asymptomatic animals or recent exposures (within 45 minutes of presentation) includes induction of vomiting or gastric lavage. Activated charcoal is not generally effective. High rates of intravenous crystalloids promote renal perfusion. The key to successful treatment is early administration of ethanol and fomepizole, which delay the breakdown of ethylene glycol to its toxic metabolites. Be aware that ethanol will worsen metabolic acidosis and CNS depression. Prognosis is dependent on the amount of ethylene glycol ingested, the time between ingestion and initiation of treatment, as well as the aggressiveness of treatment. The presence of oliguria/anuria is a grave prognostic indicator.

NSAIDs

NSAIDs provide analgesia and reduce inflammation by inhibiting prostaglandin synthesis; however, toxicity results in increased production of gastric acid and pepsin, decreased secretion of the protective mucus layer in the stomach and small intestine, and vasoconstriction in the gastric mucosa (which can lead to mucosal hypoxia and thrombosis). Renal effects include vasoconstriction and inhibition of renal blood flow, reduced glomerular filtration rate and hypoxic renal damage, among other biochemical effects, leading to accumulation of toxic substances in the medulla and renal papillae and resulting in papillary necrosis. Gastrointestinal upset may occur within two to six hours of ingestion, with gastric hemorrhage and ulceration occurring 12 hours to four days post ingestion. Dogs, cats, rats, mice and pigs are thought to be most sensitive to NSAID toxicity. Treatment is comprised predominantly of intravenous fluids and gastroprotectants.

Lilies

When ingested, lilies may cause acute renal failure in cats. The mechanism of this toxicosis is unknown. Emesis, often the first clinical sign, can occur within a few hours of ingestion. Oliguric/anuric renal failure develops within 24 to 72 hours, with increases in BUN and creatinine apparent within 12 hours. Within 24 hours, urinalysis may show isosthenuria, abundant casts, proteinuria and glucosuria. Additional clinical signs often include vomiting, depression, anorexia and dehydration. Toxicity may be fatal, especially if treatment is delayed beyond 18 hours. Intravenous fluids should be administered at twice maintenance rates for 48 hours in an attempt to prevent tubular necrosis and renal failure. For cases resulting in renal failure, dialysis may be used to manage renal failure until tubular regeneration occurs.

Grapes/raisins

Grapes and raisins may cause renal failure from proximal tubular necrosis in some dogs, but there is variability in susceptibility and toxic dose. When it occurs, renal failure is usually apparent within 72 hours of ingestion. Toxicity has been documented from doses as low as 0.7 oz/kg (grapes) and 0.11 oz/kg (raisins), although Dr. Wismer noted that reports exist of toxicity from just one grape. When it occurs, vomiting may begin within six hours of ingestion, and BUN and creatinine may become increased within 12 to 18 hours. Treatment of grape/raisin toxicity consists of intravenous fluid diuresis and symptomatic care. Oliguria/anuria is a poor prognostic indicator. Dialysis may be attempted with oliguric/anuric patients, with mixed results.

Dr. Packer is an associate professor of neurology/neurosurgery at Colorado State University College of Veterinary Medicine and Biomedical Sciences in Fort Collins, and is board certified in neurology by the American College of Veterinary Internal Medicine. She is active in clinical and didactic training of veterinary students and residents and has developed a comparative neuro-oncology research program at Colorado State University.
Whether you’re employed in a veterinary practice you’ve soured on, are relocating to a new town or are new to the industry, Tasha McNerney, CVT, CVPP, VTS (anesthesia/analgesia), and Tosha Zimmerman, CVT, shared advice for veterinary technicians at a recent Fetch dvm360 conference on how to "ace the interview."

Rock the resume
"Acing the interview starts with the resume," Zimmerman said. Make sure yours is succinct—one page, folks: "I’m advocating for one page," McNerney said. "That’s it."

And double-check that your formatting looks OK. Some websites give you an option to build your resume there (Indeed. com, for instance), but don’t trust the system to make it look good. Create, preview and then upload your resume on your computer, Zimmerman said; that way you can be sure it came out right.

Ax the unprofessional email address
Do you have an inappropriate name in your email address that you created when you were 15? It’s time to make a professional one. “People are going to look at that,” Zimmerman warned—and judge accordingly.

Nail the basics at the interview
• Show up early (how about at least 10 minutes?), and be on your best behavior from the time you’re in the door until you leave.
• And watch what your wear, said McNerney. No scrubs, unless you ask first if it’s OK. “And please don’t wear your yoga pants,” she deadpanned. “Definitely no workout gear.”
• Questions are a two-way street, of course. Make sure you ask enough—and observe enough in a working interview or observation—to know whether the people you meet are the kind of people with the values you want in your workplace.

“Ask to speak to the staff,” Zimmerman said, and pepper them with questions about the practice and its culture. “How late do you stay every day?” ‘Why do you like working here?’ ‘Do you do team-building?’”

“You want to enjoy the time you’re at work,” McNerney said. So, keep in mind that you’re evaluating them as much as they are evaluating you.
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For several years, I worked at a veterinary specialty hospital. Our doctors would see patients whose regular veterinarian couldn’t perform further diagnostics or surgeries. During my time there, I witnessed a range of emotions from clients—happiness, yes, but also sadness, grief and anger. Because our hospital was often a last resort for very sick pets, and death was something we dealt with daily, I saw more sadness than anything. Every day, I saw clients crying in the lobby, spoke with upset clients on the phone and gave out hugs and tissue boxes.

What’s wrong with me?
I was always taught to be strong for clients in these situations. They look to us for kind words and sincere actions, even as slight as a hand on a shoulder. Most clients were faced with making the difficult decision to euthanize when their doctor ran out of options and their beloved pet lost its fight. A small portion of clients never got the chance to say goodbye as their pet passed away during a procedure. No matter what the cause of death, it was always heartbreaking.

During my time there I noticed something about myself: I never cried. I wondered, “What is wrong with me?” I never had tears in my eyes or a lump in my throat. I repeatedly told myself that I had to be strong for the owners because the sight of me crying could make them more upset. I remember telling my mother one day after work that I thought my job was making me coldhearted because I never cried. It was like I was missing the compassion switch in my head. Little did I know, I had the switch, it just hadn’t been turned on.

Now I get it
Shortly after leaving my job at that hospital, I started working at the clinic where I lost my own lovely dog, Lylah, and my switch was flipped. Every euthanasia appointment that I experienced after that made me break down in tears. Any emergency where the pet couldn’t be resuscitated made me wonder what more I could have done to help. Losing Lylah opened my eyes to a whole new world of pet ownership—and it wasn’t a world I wanted to know. After losing her and experiencing such an emotional roller coaster, I took a few months off from working as a veterinary technician to regain my composure and focus.

My first job back in a veterinary clinic was nine months after Lylah’s death. I had finally decided to get back into the groove, motivated by my grandfather who was losing his own battle. Hesitant and scared, but knowing this is what I was meant to do, I took a leap of faith. During my first euthanasia appointment back, I cried. As much as I tried, I couldn’t hold it in. But it felt different this time.

The pet owner and I had something in common. While crying together, we chatted about our dogs and the great experiences we had with them. I had found a way of connecting with clients on a personal level, and losing Lylah helped me get there. I had never known what it felt like to lose a
pet, so I never experienced the related emotions until I lost my own pet. I now understand how the clients I had interacted with in the past had felt during such a painful moment. After a while of crying so much about it, I learned to be strong again. This time, it wasn’t just for the pet owner, but for me as well.

Fast forward a few years
I just had my first emotional breakdown in three years because of a pet’s death at the clinic. A 14-year-old Chihuahua with a liver mass the size of my fist underwent surgery at our clinic in hopes that the cancer hadn’t spread. The doctor opened her up and removed the mass from the liver, only to find that not only had the cancer spread but it was impossible to remove all of it and have the pet survive. The pet owner was called and the decision made to euthanize on the surgery table. As the doctor was administering the euthanasia solution and I watched the Chihuahua’s tongue go from pale pink to blue, memories of Lylah flashed in front of my eyes. This dog’s life had just ended, and I witnessed the entire event. I just stood there, watching her pass into oblivion, like I had with Lylah.

The first thought that ran through my mind was, “Am I even in the right career?” I texted my mom and told her that I love what I do, but it’s cases like this that make me think of Lylah and wonder if I’m in the wrong profession. My mom bluntly but so perfectly replied, “Nope ... you just have compassion. This is what Lylah would want you to do.” Of course, that just made me cry harder, but after I calmed myself down, I took to heart what my mom told me.

I won’t be able to save every animal. Death is inevitable, but I can damn sure try my best.

Grief comes in many forms

How a person experiences grief is as unique as the person who is experiencing it. Most discussion of grief center around five stages: denial, anger, bargaining, depression and acceptance. Not everyone goes through all of the stages, nor does everyone experience them in the same order.

Denial is usually the first stage. Our brain registers confusion, chaos and shock as a way of guarding us from the emotions that will follow, and it causes us to avoid the reality of the situation until we have the capacity to really feel. When I lost my first dog as a young adult, I couldn’t face the fact that I was going to have to make a decision to let her go.

Anger gives our grief structure, and makes us feel stronger and more in control. Anger is the manifestation of underlying pain, and lashing out makes us feel more powerful in a situation where we might be powerless. I’ve been on the receiving end of anger when delivering bad news to clients. I don’t take it personally, because I know anger is a necessary part of the natural grieving process.

Bargaining is the thinking that if only we’d done something different (e.g. brought the pet in earlier, paid closer attention), this wouldn’t be happening. Bargaining allows us to avoid reality, and it seems to crop up over and over again as we navigate grief. It’s what makes us question our decision to euthanize and wonder if we chose the correct time or waited too long.

Depression—profound sadness and a sense of feeling truly lost—is necessary to get to the other side. There’s no proper way to deal with this stage, but talking through our grief with a family member, friend, support group or therapist can help us navigate it. Remembering that pets are a significant part of our lives will help us progress beyond the depression and move into acceptance.

Acceptance does not mean being OK with the loss or moving on. Rather, it’s about accepting that life has changed and will be forever different going forward. I spent a year without a dog after I lost two within four months of each other. When I got to the point of acceptance and my house felt empty, I adopted again. I will never forget my other dogs, but I chose to open my heart to another.

I write about this subject not to make you feel sad but to help us all to feel supported and understood. Guilt, judgment and regret have no place in this discussion. There is no correct way to lose a pet and no correct way to grieve.

In addition to her work as a small animal and exotic pet veterinarian, Dr. Cappel is a leadership and life coach. She has owned a four-doctor veterinary practice in Warren, Michigan for more than 20 years.
Hosting events is a great way for potential new veterinary clients to find your practice. One good one way to start is by hosting an open house.

Find a reason
A local holiday or an anniversary of some sort gives meaning to the party. One-year anniversary at your new location? Twenty-five years in business? Dr. Smith’s five-year anniversary with the practice? Those are all good reasons to throw an open house. And there are plenty more.

Have fun with your stops along the way
Create a one-way traffic pattern with stations throughout the clinic. Make some or all of the stations kid-friendly. Need ideas? I’ve got some—but brainstorm with your clinic’s team and you’ll come up with even better ones!

- The first station could be an exam room with a stuffed animal patient with a fake lump inside it. Ask kids to palpate to see if they can find the (fake) puppy’s lump.
- Another station might be in the lab, where people can peer into a microscope. Provide a slide of parasite eggs and an identification chart so they can have fun figuring out what they are looking at. Of course, live ear mites would be exciting as well.
- Radiology makes a great station, with a variety of interesting pictures on display. The activity could be counting how many puppies there were inside a pregnant patient.
- The final station should be refreshments, along with a veterinary technician or veterinarian there to answer questions.

Plan well
Start preparing for your open house at least two months in advance so that you have time to advertise it and plan for every station. An open house is also a great excuse for a deep cleaning of the facility.

Tracy Sheffield, BS, LVT, CVPM, is practice administrator at Wimberley Veterinary Clinic in Wimberley, Texas, as well as co-owner of T&L Veterinary Business Consulting.
While the current focus on the human-animal bond (HAB) feels new(ish) to some, the roots for exploring the connection between healing and wellbeing in humans through relationships with pets, therapy animals and more go back in time as well as into our future.

A whirlwind tour through HAB history
The term “human-animal bond” was coined in the 1960s when Austrian zoologist and ethologist Konrad Lorenz, MD, PhD, became known for his principle of attachment, or imprinting, by which a bond is formed between a newborn animal and its caregiver. In 1969, Boris Levinson, PhD, professor of psychology at Yeshiva University, published the book *Pet-Oriented Child Psychotherapy* based on his discovery in his psychotherapy practice that when his dog Jingles was in the room, children would speak more freely. He later coined the term “pet therapy.”

In the mid-1970s other visionaries founded the Delta Foundation (which became the Delta Society) as a clearinghouse for research involving animal-assisted interventions and the HAB. In 1981, William McCulloch, DVM—brother of one of the Delta Foundation founders—helped start the AVMA’s Human-Animal Bond Task Force.

Putting this research to work resulted in the development of the Pet Partners program, the first comprehensive, standardized training in animal-assisted activities and therapy for volunteers and
health care professionals. In 2012, the Delta Society formally changed its name to Pet Partners, and the organization continues to grow across the United States.

During the 1980s and 1990s, hunches and observations moved to research and documentation. Alan Beck, ScD, and Aaron Katcher, MD—a psychiatrist at the Center for the Human-Animal Bond at Purdue’s School of Veterinary Medicine—co-wrote *Between Pets and People: The Importance of Animal Companionship*, in which they cited a 1992 study of 5,000 people that revealed that pet owners had lower blood pressure and blood fat levels than non-pet owners.1

Another of the recent contributors to the field is Philip Tedeschi, who serves as executive director of the Institute for Human-Animal Connection at the University of Denver within the Graduate School of Social Work. He launched the school’s Animal-Assisted Social Work Certificate program for master’s of social work students as well as the Animals and Human Health online professional development certificate program. Inspiration for the program began when Tedeschi was a veterinary student at the University of Wisconsin, where he moonlighted teaching horseback riding to adults with schizophrenia. As he recognized positive changes in the riders, he became fascinated with human-animal interactions.

In describing the Institute for Human-Animal Connection, he writes on the university’s website, “The well-being of humans, other animals and the environment are deeply interconnected, and optimum human health and resilience [require] mutually healthy living systems—from thoughtful petkeeping to global biodiversity.”

**Where HAB research stands today**
The burgeoning field of psychoneuroendocrinology has brought into focus understanding of the presence of important hormones like serotonin, oxytocin, dopamine and endorphins. Of particular interest to those researching the human-animal bond is the presence of oxytocin. This has long been advertised as a “love hormone,” made in the hypothalamus, stored and released by the posterior pituitary gland in the brain.

In 1992, documentary producer Meg Daley Olmert joined a team studying the neurobiology of social bonding headed by Carol Sue Carter, PhD, of the University of Maryland. This inspired Daley Olmert to write the 2009 book *Made for Each Other: The Biology of the Human-Animal Bond*, in which she chronicles the study of oxytocin.

Daley Olmert points out that oxytocin was first identified in 1902 as the hormone that acts on the muscles of the uterus to produce labor contractions. Some 50 years later it was discovered that this hormone produces the spasms that release breast milk. In the 1980s, scientists realized there was even more to the oxytocin story. When released, the hormone produces a feeling of love and satisfaction and is the primary hormone released during an orgasm. Not only does it cause new mothers to form a loving bond with their newborn babies, but it’s related to sexual arousal, trust and more general bonding.

This plays out in the benefits of the human-animal bond that Pet Partners shares online:

- **A therapy dog has a positive effect on patients’ pain level and satisfaction with their hospital stay following total joint arthroplasty.**
- **Fibromyalgia patients spending time with a therapy dog instead of in an outpatient waiting area at a pain management facility showed significant improvements in pain, mood and other measures of distress.**
- **A walking program that matched sedentary adults with therapy animals resulted in an increase in walking over a 52-week graduated intervention, with participants saying they stuck with the program because “the dogs need us to walk them.”**
- **The presence of an animal can significantly increase positive social behaviors among children with autism spectrum disorder.**
- **Children made fewer errors in match-to-sample categorization tasks in the presence of a dog compared with a stuffed dog or human. Similar studies may indicate that the presence of a dog serves as both a source of motivation and a highly salient stimulus for children, allowing them to better restrict their attention to the demands of the task.**
- **Therapy animals in pediatric cancer studies improved motivation to participate in treatment protocol, to maintain motivation over time and to want to “get better” or stay optimistic.**
- **Pet ownership, perhaps by providing social support, lowers the blood pressure response to mental stress.**
- **Pet owners have higher one-year survival rates following heart attacks than do non-pet owners.**
• Recognizing and nurturing the connection between animals and humans has potential implications for individual stability and health, improved economic outputs and healthcare cost savings.
• Pet ownership, particularly dog ownership, may lower the risk of cardiovascular disease.
• Pet ownership was associated with a reduced risk for non-Hodgkin lymphoma and diffuse large B-cell lymphoma.
• Human health savings of $3.86 billion over 10 years have been linked to pet ownership as related to a decrease in doctor visits in studies in Austria and Germany.

What HAB means for veterinary practice
Pet owners intuitively know that living with a pet comes with many benefits, like constant companionship, love and affection. Not only are people happier in the presence of animals, they’re also healthier. In a 2016 survey of pet owners conducted by the Human-Animal Bond Research Institute (HABRI), 74% of pet owners reported mental health improvements from pet ownership, and 75% reported that a friend’s or family member’s mental health had improved from pet ownership.

It is widely accepted by pet owners that veterinarians are a trusted resource for the health of their pets. Now these clients are also coming to their veterinarian for information on the human health benefits of caring for a pet. To support the launch of a veterinary professional certification program, HABRI surveyed 2,000 pet owners after educating them on the health benefits of pet ownership. They found that:
• 92% said they were more likely to maintain a pet’s health, including keeping up with vaccines and preventive medicine.
• 89% said they were more likely to schedule regular checkups with a veterinarian.
• 88% said they were more likely to provide a pet with higher-quality nutrition.
• 62% said they were less likely to skip visits to the veterinarian.
• 51% said they were more likely to purchase pet health insurance.

And about that certification program: the North American Veterinary Community (NAVC) launched the Human Animal Bond Certification program with HABRI and contributions from the AVMA as a founding educational partner and premier sponsors Zoetis, Petco and PetSmart Charities.

If learning about the human-animal bond inspires you in veterinary practice, the resources are out there right now to share with your own clients to inspire and inform them about the human health benefits of a close relationship with pets. The time has come for veterinary practices to embrace the human-animal bond.

Dr. Shadle earned her PhD in interpersonal and organizational communication from the State University of New York at Buffalo. Dr. Meyer earned his PhD in communication studies and speech arts from the University of Minnesota. They write and have trained veterinary professionals at numerous national and international conferences through Interpersonal Communication Services.

REFERENCES
Every member of your veterinary team should be able to advocate confidently for pet dental health. Not sure where to start? Consider these suggestions for making actionable recommendations in the examination room and promoting ongoing oral care at home.

Address dental care during every well visit
Vow to not skip the conversation
During wellness visits, be diligent about making dental health discussions as routine as taking a patient’s vital signs. When technicians and nurses initiate a conversation about a pet’s dental needs, it adds substantial weight when the veterinarian repeats the same points later in the visit.

Present the facts
Make sure clients are aware of how common dental issues are in companion animals. Although dental issues are not always apparent to pet owners, 80% to 89% of dogs¹ and about 70% cats² have some level of periodontal disease by age 3.

Help clients understand that dental disease can cause discomfort and infection that, left untreated, will cause pain and thus decrease their pet’s quality of life. Take it a step further by providing real-life examples, such as photos or radiographs comparing healthy and diseased teeth. Make sure clients know that dental disease in pets is irreversible, as with people, but treatments are available to locate and rectify problems. The intent is not to instill fear, but rather to help clients understand the full scope of the situation.

Make concrete recommendations
Too often clients perceive discussions about their pet’s oral health as “friendly suggestions” instead of medical recommendations. Consider how you approach the conversation and what small, impactful changes you can make to improve compliance. For example, rather than simply saying, “You should consider scheduling a dental appointment for Fido soon,” reiterate specific concerns (e.g. gingival recession, tooth fracture) from the exam and explain that you would like to schedule a full dental exam under anesthesia so the veterinarian can make a proper diagnosis.

Share experiences among staff
Put “conversations with clients about dental care” on the agenda for your next staff meeting, and

By Amanda Carrozza
take the opportunity to share real-life experiences with one another. Discuss what tactics work best with clients and how to move beyond the common push-backs. Evaluate the feedback and, as a group, come up with brief yet compelling recommendations that staff can make to clients about dental care.

**Stress the importance of home dental care**
Maintaining proper pet oral health cannot be done solely during annual visits at the veterinary hospital. Regular toothbrushing is the best way to prevent periodontal disease in pets. It’s imperative that clients take the lead on cleaning their pets’ teeth and recognizing signs of pain or dental disease. The key to increasing compliance is keeping it simple. Here are several ways to keep your clients informed in and out of the hospital:

- Explain in detail how to start the toothbrushing process and what products to use to ensure a pleasant experience for both pet and owner.
- Maintain and distribute client handouts based on individual patients, such as young pets, cats, dogs with gingivitis, etc. (Hint: For a plethora of handouts on a wide range of topics, including pet dental health, visit dvm360.com/business/client-handouts.)
- Keep the conversation going online by using your hospital’s social media platforms to educate clients about the need for preventive care. Aim to share at least one post a week.
- Provide specific recommendations for oral health products, including those with the Veterinary Oral Health Council Seal of Acceptance.
- Include links to dental health articles in any post-appointment notes that are sent to clients.
- Follow up after a dental procedure to see if the client has any questions about postoperative care or long-term maintenance.

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Amanda Carrozza is a freelance writer and editor in New Jersey.

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**Laser pointers can cause behavior disorders in cats**

But you can educate your well-meaning veterinary clients on how to use them in the most rewarding way.

By Sarah Mouton Dowdy

Cats and laser pointers. Name a more iconic duo. Unfortunately for our feline friends, many cat owners are using laser pointers in potentially harmful ways.

According to John Ciribassi, DVM, DACVB, founder of Chicagoland Veterinary Behavior Consultants (now retired) and co-editor of *Decoding Your Dog*, the problem with laser pointers is that they lack an endpoint. Nothing is ever physically caught. Even if the cat is “successful,” there’s no reward. Such pointless play, says Dr. Ciribassi, can cause some cats to develop a compulsive disorder. Instead of engaging in normal activities like playing with their owners or even eating, these cats will spend a large portion of their day chasing things that are similar to the laser pointer light, such as shadows or reflections. “It’s a quality of life issue,” he explains.

But that doesn’t mean you need to instruct clients to surrender their laser pointers. Dr. Ciribassi still thinks they’re great for getting cats the exercise and predatory stimulation they need. “We don’t want to throw the baby out with the bathwater,” he says. “We’ve got a tool that works. Let’s just use it in a way that’s more effective.”

In Dr. Ciribassi’s opinion, this can best be achieved by turning the iconic duo into a trio by adding a clicker. Here’s how it works: The cat is trained to associate the sound of the clicker with pleasing its owner and with the promise of a tangible reward. Once it’s clicker trained, the cat is periodically allowed to “catch” the laser light, at which point the owner delivers a click followed by a tasty treat. In this way, the cat knows that it’s won and that something good is coming. “Now,” says Dr. Ciribassi, “there’s a concrete, tangible result of catching the laser light.”

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Amanda Carrozza is a freelance writer and editor in New Jersey.
High-risk puppies and kittens are those that become severely dehydrated or systemically ill, or are falling behind in weight gain. A variety of factors can contribute to these circumstances, of which husbandry is the most common. Failure of passive immunity and/or infectious disease can also contribute.

Caring for high-risk neonates requires knowledge of normal newborn parameters. Healthy newborns should be gathered in a loose pile within their enclosure (Figure 1), should have good mucous membrane coloring and should be noted to be “twitching” while asleep; they should not be extremely vocal.

A healthy puppy or kitten will twitch noticeably, almost continuously, while sleeping. This can even startle them awake or cause them to readjust their sleeping position. In my experience, evaluating for this twitching has been the most important factor when monitoring neonates. A significant decrease or lack of twitching could signify that the animal is not doing well and requires professional evaluation.

Several other factors should be monitored as well when caring for high-risk neonates, including environment, hydration, nutrition, excrement, weight and immunity.

**Environment**
In the first week of life, puppies and kittens rely solely on their external environment for warmth; they are unable to maintain their own body temperature. Environmental temperatures ranging from 75°F to 80°F will support maintaining an optimal neonatal rectal temperature of 98°F to 99°F. Only when a puppy or kitten is maintained at an appropriate temperature is it able to digest milk and thus ready to be fed.

High-risk neonates are typically solitary individuals; an entire litter of high-risk neonates is rare. Those at high risk prefer to snuggle against something warm. IV fluid bags warmed in the microwave (make sure the bag is neither too hot nor too cold) and covered with a tube sock can provide a nice substitute for littermates. A sock will be more inviting to the neonate and, because they can be changed and laundered easily, socks also help keep the area clean.

**Hydration**
A well-hydrated puppy or kitten will have adequate skin turgor and good pigment color. Light-colored animals should have bright pink

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**Neonatal nursing care for high-risk puppies and kittens**

Newborn puppies and kittens can become compromised quickly. Here’s what you need to know when caring for these fragile animals.

*By Lauren Simermeyer, DVM*
mucous membranes (Figure 2). As for adults, it can be challenging to assess mucous membranes in darkly pigmented animals. However, there should be areas where assessment is possible, such as the belly.

Any fluids administered to a neonate, regardless of route, should be warmed. For mildly dehydrated newborns, subcutaneous fluid administration is appropriate. Crystalloid fluids should be administered at a dose of 1 ml/30 g. In cases of severe dehydration, an intravenous or intraosseous catheter is greatly preferred. Jugular intravenous catheters may be the easiest to obtain, and the femur is an excellent bone for intraosseous placement using a hypodermic 22- or 20-gauge needle. Both routes can be used to administer fluids, blood products, diluted dextrose and antibiotics. Severely hypovolemic neonates can receive a total of about 60 ml/kg of crystalloid fluid total during one resuscitation event. In cases of dehydration, the rehydration process should be more gradual.

Dehydration deficits in neonatal puppies and kittens are calculated in the same way as for adults:

Percent dehydration multiplied by body weight in kilograms will provide the total fluid deficit in liters. \(^1\) The neonate's maintenance fluid is about 60 to 100 ml/lb/day. Colloids can be used in urgent circumstances and are dosed the same as in adults.

**Nutrition**

Any species-specific milk replacer or goat’s milk can be used to feed neonatal puppies and kittens. Newborns need to be fed every two hours until they are gaining weight steadily and becoming more glossy in appearance. They can be bottle fed only if they are vigorous enough to perform the task adequately. Bottle feeding should not be attempted until the neonate's Apgar score is between 7 and 10 (Table). \(^2\) Neonates with Apgar scores between 4 and 7 should be tube fed via a red rubber catheter (size 8-10 Fr for puppies and 5 Fr for kittens.)

Correct tube length is imperative when tube feeding. The tube should be aligned from the mouth and extended down to the last rib. When placing the tube in the stomach, you will feel resistance as the tube passes the lower esophageal sphincter. Place the animal in sternal recumbency and insert the tube toward the back of the throat on the left side, advancing rather swiftly. A puppy or kitten that is alert enough to be fed will also fight you to some degree during tube placement. Holding the mouth of the puppy or kitten closed and the neck extended while milk is instilled will help keep the tube in place.

It is very common for neonates to grunt and vocalize while being fed. Hearing this is a sign that the tube has been placed correctly. An animal that is too lethargic to swallow the tube and provide some resistance is not quite ready for enteral nutrition. While feeding, palpate the area below the lower rib on the left side of the body to ensure you are not overfeeding. A good guideline for feeding volume is approximately 4 to 5 ml/100 g. If the puppy or kitten shows signs of discomfort during feeding, work up to the full volume incrementally. To prevent residual milk from dripping into the pharynx, risking aspiration, kink the tube before removing it.

**Excrement**

Because neonates cannot urinate or defecate without assistance, they should be stimulated both before and after feedings. To stimulate urination, rub the puppy’s ventral caudal abdomen/inguinal area. Urine should be almost clear in a well-hydrated neonate (urine specific gravity < 1.017). A neonate with darker urine will need a more aggressive fluid therapy plan.

Some neonates may urinate and defecate simultaneously, while others need separate stimulation to produce feces. Do not rub directly on the anus repeatedly to stimulate defecation; this can result in ulceration of the anal tissue and

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**Table. Apgar scoring in neonatal puppies and kittens**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0</td>
</tr>
<tr>
<td>Heart rate</td>
<td>&lt;18 bpm</td>
</tr>
<tr>
<td>Respiratory rate and effort</td>
<td>&lt;6 breaths/min; no crying</td>
</tr>
<tr>
<td>Reflex irritability</td>
<td>Absent</td>
</tr>
<tr>
<td>Motility</td>
<td>Flaccid</td>
</tr>
<tr>
<td>Mucous membrane color</td>
<td>Cyanotic</td>
</tr>
</tbody>
</table>

A total score of 7 to 10 indicates no distress; 4 to 6 moderate distress; 0 to 3 severe distress. Adapted from Veronesi MC, et al. \(^2\)
make defecation uncomfortable. Instead, wipe a damp, warm cloth or gauge bilaterally on either the ischium or the pelvis (or both). If ulcerations do occur, use vitamin A & D ointment between stimulation events. Neonal feces should resemble varieties of mustard. It can be bright yellow or darker yellow, with or without “seed” material in it. The seeds are fatty excrement. The feces can be very wet in appearance but should not be completely liquid. The meconium is much darker and gelatinous. At-risk neonates that have not had adequate nutrition may pass meconium much later after birth.

Weight
Healthy puppies and kittens will gain about 10% of their body weight daily. High-risk neonates should be weighed twice daily using a gram scale. This will allow minor weight losses and gains to be observed more closely to allow for any necessary intervention sooner rather than later.

Immunity
Neonates that have failed to nurse on their dam or queen within 18 hours of birth will not have had the opportunity to ingest colostrum. In these cases, plasma or serum can be used as a substitute. If administered within the first 18 to 24 hours of life, the plasma or serum can be given orally to the neonatal puppy. Puppies should receive 0.1 ml/g of adult dog serum.1

In kittens, care should be made to ensure the serum blood type matches that of the kitten. Dosing for kittens is 15 ml non-hemolyzed adult serum/100 g of body weight. This serum should be divided into three total injections given every eight hours for the first 24 hours of life.1

Conclusion
Newborn puppies and kittens can become compromised quickly, particularly in the first week of life. Their owners may miss early warning signs of compromise, only noticing that something is amiss when the neonate has entered a high-risk state. 

REFERENCE

Dr. Simermeyer is an emergency practitioner at Mount Laurel Animal Hospital in Mount Laurel, NJ. Her professional interests include emergency and critical care, and canine reproduction. She has been breeding Cardigan Welsh Corgies for the past 23 years.

REFERENCES
Rodeo: When patient fear makes a veterinary exam nearly impossible

By Gina Singleton, DVM

Many veterinary professionals have untold hobbies and talents that let them escape veterinary practice for a while. Maine practitioner Gina Singleton, DVM, sheds her everyday job frustrations through poetry. Here, she shares an amusing poem about something that every veterinary professional can relate to—the petrified patient.

Rodeo

You enter the room and instantly know just how this appointment is going to go.

With tail held down and eyes to the side, Fido looks desperately for somewhere to hide.

His owner is coaxing him, trying to soothe.
The tech’s tossing treats, but the dog won’t improve.

You try to be patient, you give them a smile, but you say to yourself, “Looks like we’ll be here a while.”

How best to proceed from this point here? Simply go “old school” and ignore the dog’s fear?

Let the owner hold him, to whom he is glued and say to yourself, “Please, don’t let me get sued?”

You decide just to do it—get the muzzle and lead. But now he is slipping in the puddle he’s peed.
The owner is shocked: “This is totally new!” with a look that really says, “He’s scared of YOU.”

The poor dog is thinking he’s going to die.
The owner’s embarrassed and starting to cry.
Your tech is exhausted and covered in poo.
And you laugh to yourself, “What is this job that we do?”
Some things change.
Their heartworm prevention shouldn’t.

From puppy to senior, you’re there for your patients.*
And for 32 years, we’ve been there with you.

HEARTGARD® Plus (ivermectin/pyrantel) prevents heartworm disease, and treats and controls roundworms and hookworms, in the only monthly real-beef chew dogs and puppies love.¹

Trusted at six weeks, trusted for 32 years.
Recommend it for a lifetime.

¹Freedom of Information: NADA 140-971 (January 15, 1993)
*For puppies 6 weeks of age or older.

IMPORTANT SAFETY INFORMATION: HEARTGARD Plus (ivermectin/pyrantel) is well tolerated. All dogs should be tested for heartworm infection before starting a preventive program. Following the use of HEARTGARD Plus, digestive and neurological side effects have rarely been reported. For more information, please see full prescribing information or visit www.HEARTGARD.com.