SHOULD I (AND HOW TO) INDUCE EMESIS? A CASE SERIES
Marc Seitz, DVM, DABVP (Canine and Feline Practice)
Assistant Clinical Professor of Emergency Medicine
Mississippi State University College of Veterinary Medicine
Email: marc.seitz@msstate.edu

Introduction
Inducing emesis can be a versatile diagnostic and therapeutic tool in small animal private practice. When a dog or cat ingests a toxin, inducing vomiting forms the cornerstone of appropriate decontamination. Similarly, this technique is an inexpensive and relatively safe means of retrieving select foreign bodies following acute ingestion. The clinician must always weigh the pros and cons when considering inducing emesis. This session will use a case-based approach to discuss how and when to induce vomiting in dogs and cats. For simplicity, the word “toxin” in these proceedings will refer to any xenobiotic (drug or toxin) that can elicit a harmful effect.

USING EMESIS AFTER TOXIN INGESTION
Case #1: Who ate the rat poison?
A client presents two young healthy Labrador retrievers (shocking I know) 30 minutes after an entire bucket of brodifacoum-based rat poison is found missing. The owner is uncertain which pet is the guilty party. Should I induce emesis? Yes! But which one? Both of them!

This introductory case underscores two very important points about inducing emesis in small animal patients. First, it is a handy screening test that can rule in exposure to a toxin. For our first case example, the author prefers to induce vomiting in all animals potentially exposed to a toxin rather than depend on the owner’s gut intuition. If the toxin is seen, further treatment can follow. Unfortunately, absence of the toxin in the vomitus does not rule out exposure since gastric retrieval rates are highly variable, ranging between 9 and 75% with a mean of 49%. Additionally, successful emesis does not guarantee that toxicosis will not occur since some of the toxin may have already exited the stomach or absorbed into the bloodstream. Factors that logically increase retrieval include the timing of emesis (the sooner the better), the nature of the toxin, and the volume of contents in the stomach (larger quantities are more likely to come back up). With respect to the final factor, feeding a small meal to patients who have not eaten recently or who fail to vomit the first time can improve yield. If no toxin is retrieved, the clinician must rely on other decontamination strategies or supportive therapies in light of the theoretical exposure.

Second, emesis is the cornerstone of appropriate decontamination for most toxins. Since toxins are subject to the toxicokinetic principles of absorption, distribution, metabolism, and elimination, induction of emesis (and usually activated charcoal afterwards) dramatically decreases absorption in an attempt to reduce potential toxicosis. Emesis is most effective if it is induced within the first 30-60 minutes after ingestion of a toxin.

Inducing emesis in dogs
Agents used to induce emesis act either centrally on the chemoreceptor trigger zone (CRTZ) in the brain or peripherally via gastric irritation that triggers afferent nerves which stimulate the
emetic center. In dogs, safe options include apomorphine, hydrogen peroxide, and full mu agonist opioids (e.g. morphine or hydromorphone). Although it sounds like an opioid, apomorphine is actually a dopamine agonist, which stimulates dopamine receptors in the CRTZ. Apomorphine is very effective; however, it is most effective (and quicker) if given intravenously (Khan 2012). The IV form must be compounded. Alternatively, the author’s current institution has a protocol for dissolving powder from a capsule in sterile water and administering the solution safely IV via a 0.22 micron sterilizing syringe filter (protocol available upon request). The author recommends a dose of 0.04mg/kg IV which can be safely repeated two more times as long as the animal does not become significantly sedated. The dose for conjunctival administration is 0.25mg/kg. The powder can be placed directly into the conjunctiva or dissolved in saline first. Once emesis is achieved, the remaining powder may be rinsed away because it is irritating and can perpetuate vomiting or nausea.

Hydrogen peroxide (3%) stimulates afferent nerves via gastric irritation. Efficacy is comparable to conjunctival apomorphine (both ~90%), but inferior to intravenous apomorphine (100%) in both the veterinary literature (Khan 2012) and the author’s clinical experience. Still, it is a valuable sole agent (or back up) in any small animal practice. Of note, hydrogen peroxide (and conjunctival apomorphine) can take up to 10 minutes to elicit their effect, so be patient. Hydrogen peroxide is the only means through which owners can safely induce emesis at home. The dose is 1ml/pound of body weight up to a maximum dose of 60mL. It is ideal to instruct owners to use either a teaspoon (5mL), a tablespoon (15mL), or a ¼ cup (60mL) to measure the appropriate dose. Two factors that reduce the efficacy of hydrogen peroxide are the animal’s willingness (or lack thereof) to consume the appropriate dose and the age of the product. Opened hydrogen peroxide degrades over time into water. Thus if it appears ineffective, ensure the bottle is fresh. The author only recommends instructing clients to induce emesis over the phone if a valid veterinary-client-patient relationship exists or if the owner lives far enough away that delaying emesis to seek veterinary care would possibly negatively influence the patient’s outcome. Inducing vomiting at home oftentimes delays an inevitable veterinary visit that provides more appropriate medical intervention. The recommendation to induce emesis at home should be done on a case-by-case basis.

If apomorphine or hydrogen peroxide are not available, a low dose of morphine (0.5mg/kg) or hydromorphone (0.1mg/kg) can be administered intramuscularly (IM) or subcutaneously (SQ). Opioids stimulate mu receptors in the CRTZ. Unfortunately, emesis appears to be much less consistent as compared to apomorphine or hydrogen peroxide.

Although adverse events are possible for all agents, they are typically limited to mild sedation and/or retractable vomiting. Anti-emetics are always recommended as feeling nauseated is horrible (author’s opinion) and activated charcoal is commonly administered afterwards. Most anti-emetics (maropitant, metoclopramide, ondansetron, and/or dolestron) are effective at standard doses. Although maropitant has become widely popular due to its label and efficacy, metoclopramide should not be forgotten when using apomorphine since metoclopramide blocks dopamine receptors in the CRTZ. The author frequently uses metoclopramide in place of maropitant in large dogs and administers the standard dose of 0.2-0.4 mg/kg dose as half IV and half SQ. Although rarely needed, naloxone can be given (0.04mg/kg) to reverse sedation.
associated with apomorphine or opioids. It is important to note that naloxone does not reverse the emetic effects of apomorphine.

The following methods of inducing emesis are no longer recommended due to safety concerns and/or the increased risk for complications: rapid intravenous bolus of cefazolin, syrup of ipecac, salt, soap, dry mustard powders, or inducing gag with your finger (why do so many clients love to try this last one?).

**Case #2: Lily ingestion in a cat**
A client presents a young healthy cat immediately after it ingests one lily leaf. Should I induce emesis? Yes!

One notable species difference is that cats appear less prone to vomiting as compared to dogs no matter which agent is chosen. The author finds it important to educate owners on this fact when a cat is presented following toxin ingestion as decontamination can be challenging. When selecting an emetic in cats, it is important to recognize that they lack dopamine receptors in their CRTZ – thus apomorphine is minimally effective (~10%). Fortunately, cats have an abundance of alpha receptors in their CRTZ which makes alpha-2 adrenergic agonists like dexmedetomidine and xylazine the best options. Traditionally, xylazine has only demonstrated a moderately successful retrieval rate ranging between 43-57%. Dexmedetomidine may be superior with reported rates of 58% and 81% (Thawley 2015 and Willey 2016); however, prospective controlled studies are needed. Xylazine may be administered at 0.44-1mg/kg IM and dexmedetomidine at 7mcg/kg IM. Although hydrogen peroxide is reported as an effective emetic in cats, it has the potential to cause severe to life threatening esophageal and gastric hemorrhagic ulcers. As a result, the author strongly discourages its use unless the need to retrieve the toxin far outweighs the risk and other methods have failed. Anecdotally, the author has heard of clinicians using (and tried unsuccessfully) IM hydromorphone (0.05mg/kg) with or without midazolam (0.2mg/kg). Although safe, no data is available on the efficacy of this combination as compared to alpha-2 agonists. Similar to dogs, other options are no longer considered effective or safe for routine use in cats. All anti-emetics mentioned above can be utilized as well. Reversals (atipamezole or yohimibine) can be administered if sedation occurs.

**Case #3: Gum ingestion in a bulldog with clinical signs**
A young previously healthy bulldog presents for lethargy, depression, and intermittent seizures following ingestion of xylitol containing gum six hours ago. Should I induce emesis? No!

This case underscores the importance that inducing emesis has several contraindications. If too much time has elapsed and the toxin has absorbed, emesis is likely to be ineffective. Furthermore, emesis should never be induced in an animal that is symptomatic (i.e. abnormal mentation or neurologic status) due to the risk for aspiration. Exercise caution in animals predisposed to aspiration, such as brachycephalic breeds or animals with diseases such as laryngeal paralysis or megaesophagus. Hydrocarbons and petroleum distillates (i.e. gasoline or furniture polish) also carry an increased risk of aspiration when vomited. Finally, emesis should not be induced if the toxin is caustic and could damage tissues during transit.

**Case #4: Chocolate ingestion with delayed presentation**
A young healthy Schnauzer presents six hours after ingesting an entire bag of dark chocolate candy with wrappers. The owner reports the patient vomited once an hour ago. The vomitus contained only a small amount of chocolate and wrappers. The patient is otherwise normal on physical exam. Should I induce emesis? Most of the time, yes!

Although indications and contraindications exist, the art of veterinary medicine lies in knowing when to bend the rules. Although emesis is best used 30-60 minutes after ingestion, common exceptions include the ingestion of sticky foods (e.g. chocolate or gum), large quantities of food (e.g. raisins/grapes), extended release medications, or toxins that decrease gastrointestinal motility (e.g. opioids or tricyclic anti-depressants). Chocolate is a common toxin for which the author will still attempt emesis hours after ingestion, especially if the quantity is large and the patient is asymptomatic. Although some texts list vomiting as a reason not to induce emesis, the author sees no harm if the patient is otherwise normal. Oftentimes, the vomiting achieved with drugs is markedly more forceful than natural vomiting and hence improves retrieval.

**Case #5: Mole bait (containing zinc phosphide) ingestion in a dog**

A client presents a young healthy dog one hour after ingesting an entire package of mole bait containing zinc phosphide. Should I induce emesis? Probably, but very cautiously!

One of the tenants of toxicology is to “avoid contamination of the decontaminators.” Zinc phosphide clearly illustrates this principle. Although a detailed explanation of the management of zinc phosphide toxicity is beyond the scope of this presentation, clinicians should be aware that decontamination of patients with this toxicosis poses a significant health hazard to veterinary staff. Unfortunately, this concern is not theoretical as the CDC has documented numerous incidences of affected veterinary staff. When zinc phosphide combines with stomach acid, it releases phosphine gas which is both topically corrosive and cytotoxic. Although decontamination is usually an important part of case management, phosphine gas released into the environment during vomiting can cause toxicosis in humans. If zinc phosphide ingestion is suspected, it is safest to consult your pet poison helpline of choice for guidance. However, general precautions include decontaminating patients outside in a well ventilated area and standing up-wind of the patient. After the animal has moved away, the vomitus should be rinsed away with copious amounts of water. Finally, smell should not be depended on to evaluate risk of exposure as human detection usually doesn’t occur until twice the EPA’s established safety limit.

**Case #6: Wood glue ingestion (e.g. Gorilla glue)**

A young, otherwise healthy dog presents 15 minutes after ingesting a quarter bottle of gorilla glue. Should I induce emesis? No!

Although the active ingredient found in many woods glues (polymeric diphenylmethane diisocynate) is non-toxic, it has the incredible capacity to rapidly expand, foam, and cure, forming a “cyano-bezoar.” The formed bezoar is surprisingly bigger than the amount ingested and often forms a perfect mold of the stomach and attaching portions of the esophagus and intestines. Emesis is completely contraindicated due to the speed at which formation occurs and the resulting size. Radiographs should always be obtained first and typically surgery is required.
to remove the dried glue. Prognosis is usually good with surgery but gastric irritation and ulceration is a possible co-morbidity.

**USING EMESIS AFTER FOREIGN BODY INGESTION**

**Case #7: Penny (zinc containing) ingestion in a dog**

A young, otherwise healthy dog presents immediately after ingestion of a penny. Radiographs confirm a radiopaque circular object in the stomach. Should I induce emesis? Yes!

This case underscores the value of emesis to provide a safe, non-invasive, and inexpensive means to retrieve gastric foreign bodies. As mentioned above, it can also serve as a diagnostic tool for radiolucent foreign bodies if ingestion is acute and the object contained within the stomach. Again, a negative result does not rule out the presence of a foreign object due to limited gastric retrieval or gastric emptying. Potential contraindications are similar to those mentioned in the toxin section and include the timing of emesis, the type of foreign body ingested, the presence of clinical signs, and/or underlying diseases that predispose the animal to aspiration.

**Case #8: String foreign body in a cat**

A young, otherwise healthy cat presents for acute vomiting and abdominal pain. A string is found under the tongue during physical exam and radiographs confirm plication of the small intestine. Should I induce emesis? No!

This cat missed its chance. Once clinical signs are present and/or the foreign body is anchored somewhere in the body, emesis is completely contraindicated. However, emesis is a wonderful consideration if the string is acutely ingested (and witnessed) and the cat is asymptomatic.

**Case #9: Safety razor blade ingestion in a dog**

A young, otherwise healthy dog presents shortly after ingesting a safety razor blade. Radiographs confirm the presence of the foreign body in the stomach and the razor appears intact. The owner has limited financial resources ($300). Should I induce vomiting? It all depends on clinician preference and informed consent.

This is a case that typically divides the room – and that is perfectly acceptable. Ideally, this patient would receive endoscopy. Gastrotomy is also a consideration. However, finances (or equipment availability) can limit ideal care. Cases like this earned the author the reputation of “give that case to Seitz – he’ll make anything throw up” in private practice. Although many veterinarians would not advocate emesis, the author firmly believes each case must be reviewed on an individual basis in the context of client capabilities and informed consent. Also, each clinician should work within his or her comfort zone. If emesis occurs in a situations like this, feeding a small meal can help provide a vehicle for the object, possibly protecting the esophagus. Also, an appropriate conversation with the owner regarding the pros and cons of the procedure is absolutely imperative. An alternative course of action with similar pros and cons would be a “watch and wait” approach with small, frequent meals of a high fiber diet.

**Case #10: Carpet tack ingestion in a bulldog**
A young, otherwise “healthy” bulldog with untreated brachycephalic syndrome presents shortly after ingesting 12 carpet tacks. Radiographs confirm all 12 tacks in the stomach. Should I induce emesis? Probably not.

Similar to toxins, foreign body retrieval should not be attempted if there is significant potential for damage to the esophagus as the object returns. Multiple pointed objects fall into this category. Furthermore, this patient is a bulldog with an increased risk for aspiration. Although the author supports emesis in clinical situations where others would be hesitant, one must not be reckless. In this situation, endoscopy or gastrostomy are likely the safest options. Although much less ideal, a “wait and see” approach could be considered over emesis if a client had limited financial resources.

In conclusion, emesis is an invaluable tool in small animal medicine for the management of toxin and foreign body ingestion. Pros and cons always exist and cases must be evaluated on an individual basis within the context of the toxin/object ingested, timing, pre-existing conditions, clinical signs, clinician comfort, and informed client consent. Although inducing emesis is versatile and typically safe, absolute contraindications do exist.

References (alphabetical order)
**LIPID THERAPY: A NEW ANTIDOTE FOR COMMON SMALL ANIMAL TOXINS**

Marc Seitz, DVM, DABVP (Canine and Feline Practice)
Assistant Clinical Professor of Emergency Medicine
Mississippi State University College of Veterinary Medicine
Email: marc.seitz@msstate.edu

**Introduction**

Intravenous lipid therapy (IVLT) is the clinical application of intravenous lipid emulsions (ILEs) to hasten recovery from toxicosis. Commonly used synonyms include lipid therapy, lipid resuscitation therapy, and Lipid Rescue™. Lipid therapy is easy to administer, inexpensive, and relatively safe. As a result, it should be in every practitioner’s “tool box” when traditional therapies have failed or a patient’s clinical condition is life threatening. Although uncommon, adverse effects are possible but can often be avoided with appropriate understanding of administration best practices and dosing guidelines.

**The fat of the land**

Simply put, intravenous lipid emulsions (ILEs) are fat solutions. They comprise the fat portion of total parenteral nutrition and provide the body with fatty acids via medium to long-chained triglycerides. They are also used to dissolve certain drugs like propofol. The fat is typically derived from plant-based oils such as soybean, safflower, or olive oil. ILEs are metabolized by numerous tissues in the body similar to endogenous triglycerides. Breakdown of triglycerides forms free fatty acids which can either be used for energy or converted back to triglycerides for storage. The most commonly available product in the United States is **Intralipid® 20%**. It delivers mostly long chain triglycerides via 100% soybean oil.

**The history of lipid therapy**

Intravenous lipid emulsions became available for medicinal use in the early 1960’s. Their high caloric density filled a need with total parenteral nutrition, which until that time, had been solely dependent on high concentration dextrose infusions. Ironically, the ability of ILEs to bind drugs and alter their pharmacokinetics was also realized at this time; however, research diminished until a seminal study by Weinberg and colleagues in 1998 rekindled interest. In that study, increasing amounts of lipids were found to increase the amount of bupivacaine needed to induce asystole in rats. Weinberg proposed that ILEs may have clinical utility for local anesthetic systemic toxicity (LAST), giving birth to the idea of lipid therapy. Weinberg provided further evidence for this theory in 2006 with another key study comparing resuscitation success from bupivacaine-induced asystole with and without ILEs in dogs. Amazingly, no dogs in the control group (saline bolus and CPR) survived while 100% of dogs in the treatment group (ILE bolus and CPR) survived. Three years later, the first human case report demonstrated the true potential of lipid therapy when a patient was brought back to life after 20 minutes of bupivacaine/mepivicaine-induced asystole that failed to respond to CPR and advanced life support. As case reports continue to demonstrate success, research has shifted to explain the exact mechanism of action of lipid therapy.

**How do they work?**

Over the past two decades, large amounts of research have proposed numerous possible mechanisms to explain the therapeutic effect of lipid therapy. At this time, all theories can be
categorized into two main physiologic concepts: 1) sequestration and redistribution or 2) improved cardiovascular performance.

1) Sequestration and redistribution
Lipid therapy uses a rapid bolus of ILEs to create iatrogenic lipidemia. Numerous studies have confirmed that dramatically increasing the lipid form of plasma creates a concentration gradient that favors the trapping of lipophilic drugs or toxins (commonly referred to as a “lipid sink”). Bound xenobiotics are inactive and unable to reach their target tissues. The fate of each xenobiotic is not yet defined, but likely involves redistribution to the liver for metabolism, the kidneys for excretion, or other tissues for storage and breakdown. In the case of the latter, free fatty acids are used for energy while xenobiotics are gobbled up and destroyed by lysosomes.

The sequestration and redistribution theory is further supported by the fact that lipid therapy works with so many different toxins, most of which happen to be lipophilic. The degree of lipophilicity is defined by how a chemical partitions between two solvents – octanol (lipophilic) and water (hydrophilic). The degree of partitioning is expressed as a coefficient (Log P or $K_{ow}$) where lipophilicity is any value greater than 1.0. Conveniently, the Log P of almost any chemical can be found on websites such as https://pubchem.ncbi.nlm.nih.gov and www.Drugbank.ca. A Log P >1.0 supports the use of lipid therapy (especially if a particular xenobiotic is not reported in the literature). Unfortunately, comorbidities such as hypothermia, acidemia, and hypoxemia decrease the efficacy of sequestration. This underscores the adjunct nature of lipid therapy and the need for traditional supportive therapies if a patient is hemodynamically unstable. Although sequestration and redistribution is the most inclusive mechanism of action, lipid therapy has been proven effective with several hydrophilic xenobiotics. To explain this effect, ILEs also appear to have direct effects on the heart and vasculature.

2) Improved cardiovascular performance
Although the cardiotonic effects of lipids are well established, the exact mechanism is still debated and largely unknown. Although cardiomyocytes use free fatty acids as their primary energy substrate, research has failed to support this as a definitive mechanism in dogs, cats, and humans. In addition, newer evidence suggests that ILEs may be cytoprotective by reducing cardiac ischemic reperfusion injury. Finally, evidence also supports that ILEs support vascular tone.

Indications:
Currently, lipid therapy is only considered a first line, standard of care with LAST. For all other toxicoses, lipid therapy should be considered an adjunct tool and NOT replace standard supportive therapies or antidotes. If a patient’s clinical syndrome is mild and/or controlled with standard therapies, lipid therapy should not be used. However, lipid therapy should be considered if:

a) The patient’s clinical signs are life threatening
b) The patient has failed to respond to standard antidotes or supportive therapies
c) Cost prohibits standard or prolonged supportive therapies
Theoretically, lipid therapy can be considered for any xenobiotic that is lipophilic or directly effects the cardiovascular system. In order of decreasing evidence, lipid therapy may be beneficial for the following xenobiotics or xenobiotic classes:

- Randomized controlled study: pyrethrins (cats)
- Veterinary case reports: pyrethrins (cats), moxidectin (dogs), ivermectin (dogs and cats), lidocaine (cats), naproxen (dogs), baclofen (dogs), diltiazem (dogs), and marijuana (dogs). It is worth mentioning that a recent case series (Wright, 2011) reported that lipid therapy may not be effective for ivermectin toxicosis if the animal carries a homozygous mutation for the ABCD1-1Δ (formerly MDR1) gene.
- Human case reports (listed by drug class with possible veterinary applications that are not already mentioned above listed in brackets): local anesthetics [cocaine], anti-depressants [amitriptyline, doxepin], anti-psychotics [acepromazine, trazadone] blood pressure/cardiovascular [diltiazem, propranolol, atenolol, amlodipine], muscle relaxants, and miscellaneous [diphenhydramine, pentobarbital, phenobarbital, aminta (mushrooms), and amphetamines].
- Anecdotal: Phenobarbitol, bromethalin, and CCNU

Despite the vast amounts of case reports, do not forget the value of poison control centers when deciding the ideal approach to a poisoned patient. They are likely to have the most up-to-date information on this rapidly evolving therapy.

In summary, if you are new to using lipid therapy, the following xenobiotics are the most supported in the veterinary literature: pyrethrins (cats only), macrocyclic lactones (e.g. ivermectin and moxidectin), and local anesthetics.

Possible complications

Although relatively safe, lipid therapy carries the risk of numerous complications that can be sorted into the following four categories:

1) Complications from sequestration and redistribution

Lipid therapy inactivates xenobiotics through sequestration because they cannot reach their target receptors. Unfortunately, the same is true for supportive therapies that may be lipophilic. If the lipid is metabolized away before the xenobiotic has been completely cleared, the clinical syndrome may return uninhibited. As a result, patients should remain hospitalized until grossly lipemic serum is no longer visible. ILEs’ ability to redistribute xenobiotics has also raised concerns regarding oral routes of exposure. Animal models have demonstrated that lipid therapy increases the rate of absorption from the intestines and hence could accelerate toxicosis. Further research and clinical observation are needed to elucidate these concerns, but caution is advised.

2) Reactions to the ILE product itself

In numerous publications, complications related to the product itself are always discussed, such as allergic/anaphylactic reactions, sepsis, phlebitis, and local irritation if extravasation occurs. However, the author feels this category is uncommon given our target species (dogs and cats) and the short duration of lipid administration. Unlike in humans, no soybean or egg allergies have been reported in veterinary species receiving Intralipid 20%. However, it is wise to follow transfusion best practices and monitor patients closely in a manner similar to those receiving blood products. Given the fact that lipids are administered over shorter periods of time, aseptic technique should reduce any concerns of sepsis, especially compared to total parenteral nutrition.
Although theoretically possible, phlebitis is rare because lipids are isotonic and again, only administered for a short period of time. Finally, it is obvious that the body would not respond well to pro-inflammatory substances outside of the vein – proper catheter placement and maintenance should avoid this complication.

3) **Complications from iatrogenic hyperlipidemia.**
In the author’s opinion, these are the complications we need to be mindful of since we are inducing a state of iatrogenic hyperlipidemia. Theoretical complications in this category include pancreatitis, hepatic problems (hepatomegaly, icterus, liver insult, or liver failure), pulmonary emboli and acute lung injury, hyperviscosity, and annoyingly, interference with colorimetric laboratory tests. Although only reported in humans, fat overload syndrome is also a theoretical concern characterized by hepatomegaly/jaundice, splenomegaly, headaches, fever, hemolysis, thrombocytopenia, increased clotting times, leukopenia, respiratory distress, and/or seizures. It is also important to remember that most formulations of ILEs contain predominately omega 6 fatty acids and are thus pro-inflammatory.

With the theoretical framework laid down, let’s take a look at what has actually been reported in the lipid therapy literature. For this, we’ll pull from a few lab animal studies, human case reports, and veterinary case reports. In a study (Hiller et al, 2010) that approximated the LD50 (67ml/kg, SE 10.7) of lipids in rats, histopathologic changes were seen in the liver and lungs at dosages exceeding 60ml/kg. Fortunately, this is 3-6 times the dose that should be used in clinical practice. Furthermore, the pancreas, brain, heart, and kidneys all appeared normal. This study reflects the wide safety margin that has been observed in clinical practice when using lipids in otherwise healthy patients. Curiously, pigs appear to be allergic to lipids and exhibit mottled red skin and pallor characterized as a complement activation related pseudoallergy.

In a recent review of 94 human case reports (Cao et al, 2015), minimal (5.3%) adverse effects were seen. Four patients developed acute respiratory distress syndrome. Three instances of pancreatitis were documented. Two patients developed asystole immediately following lipid administration; however, both of these patients had hypotension and bradycardia that was refractory to traditional therapies secondary to oral overdosing of metoprolol/bupropion and diltiazem/propranolol, respectively. It is uncertain if this relationship was temporal or cause and effect. Finally, one patient demonstrated persistent lipemia that eventually resolved.

Fortunately, the veterinary literature has reported minimal adverse effects as well. One review article (Gwaltney-Brant et al, 2012) indicated a non-peer reviewed report by the ASPCA of hemolysis in a dog. Bates et al (2013) observed pain and swelling following extravasation. Peacock et al (2015) noted one incidence of facial pruritus in pyrethrin toxicosis; however, this finding is also noted with pyrethrins if cats transfer the chemical to their face while grooming. Finally, a single occurrence of persistent gross lipemia and corneal lipidosis has also been documented (Seitz 2016) in a cat treated for pyrethrin toxicosis.

4) **Relapse of toxicosis.**
Finally, it is worth mentioning that toxicosis and hence clinical signs can relapse if the lipid is metabolized and cleared faster than the toxin itself. One human case report (Marwick, 2009) described the recurrence of LAST in a human that was treated with lipid therapy. This
complication is likely avoided by monitoring patients in the hospital until gross lipemia has cleared.

Based on the above information, lipid therapy appears safe and well-tolerated as long as appropriate clinical decisions are made and dosing guidelines are followed. However, the author recommends that lipid therapy be used cautiously or avoided in patients with the following: elevated triglycerides, pancreatitis, severe liver disease or failure, acute lung injury, cats in severe shock, known uveitis, or any critical, pro-inflammatory state characterized by systemic inflammatory response syndrome and/or multi-organ dysfunction.

Administration and dosing:
Administering lipid therapy is technically easy and safe through a peripheral catheter because Intralipid 20% is both isotonic and neutral. The unopened bag has a shelf life of two years. Once opened, unused product can be refrigerated and used again within 24 hours. Strict aseptic technique should be used when removing product from the bag to minimize the risk for sepsis and so the rest of the contents can be saved for later. For large infusion volumes, the bag can be spiked with a standard extension set and delivered via an infusion pump or free dripped. For smaller infusion volumes, the author prefers 35-60mL syringes delivered manually or via a syringe pump. Finally, hematocrit tubes and a centrifuge are needed to evaluate the patient for gross lipemia post administration.

Similar to other drugs, veterinary dosing guidelines are extrapolated from human medicine. All doses are listed in ml/kg which makes use of a 20% product imperative. Based on all available evidence, the author recommends the following dosing guidelines:

- Administer 1.5ml/kg bolus over one minute (for cardiovascularly unstable pets), then/or
- Administer a constant rate infusion of 0.25ml/kg/min for 30-60 minutes

The above protocol delivers 9ml/kg for the 30 minute CRI and 16.5ml/kg for the 60 minute CRI (includes one initial 1.5mL bolus). To date, no maximum daily dose has been established for lipid therapy. However, several points should be kept in mind. First, the FDA recommends a maximum daily dose of lipids for TPN in humans of 12.5ml/kg/day (2.5g/kg/day). Second, the reported maximum elimination rate of lipids in humans is 19ml/kg/day (3.8g/kg/day). Third, the LD50 in rats is 67ml/kg but rats started dying at 60ml/kg. Finally, adverse effects are affected by the total daily dose as well as the rate and length of time for which they are administered.

What if my patient isn't improving?!?
The aforementioned standard protocol can be altered if a patient is not responding. If a patient remains in cardiopulmonary arrest, the initial 1.5ml/kg bolus may be repeated two more times (3 boluses total) before the 30 minute CRI is started. If a patient is stable but no initial improvement is seen, three options may be considered:

a) **Wait it out**. The author has observed numerous situations with a delayed response to lipid therapy (e.g. pyrethrin toxicosis taking 4-6 hours to dramatically improve). Anecdotally, the longer the time between appearance of clinical signs and therapy, the slower and less likely lipid therapy is to work. However, evidence to support this claim is lacking. If the serum is grossly lipemic, lipid therapy should be working.
b) **Repeat the initial protocol if serum lipemia has cleared.** The entire protocol can be repeated once the serum is no longer lipemic. Spun down hematocrit tubes may be checked every 4-6 hours to monitor for gross lipemia. However, caution is advised because it is very easy to administer excessive cumulative daily doses if the protocol is repeated more than once. The author recommends staying below a total cumulative daily dose of 20-30ml/kg.

c) **Stop the initial 0.25ml/kg/min CRI after 30 minutes and then decrease to a maintenance CRI of 0.5ml/kg/hr for 24 hours.** The idea behind the low dose maintenance CRI is to prolong lipemia without accumulating large daily doses. Combined with the initial 30 minute protocol, this low dose CRI will deliver approximately 19ml/kg – the aforementioned maximum rate of lipid clearance in humans.

No matter what, be mindful of your total daily dose. Lipids are not the time to practice the adage “if some is good, more is better.” Based on all available evidence, the authors tries to stay below a maximum daily dose of 20ml/kg while occasionally administering up to 30ml/kg in select patients. Unfortunately, some patients do not appear to respond to lipid therapy even when they “should.”

**Conclusion**

It is easy to see why Weinberg coined the phrase “gift from the glob” when discussing lipid therapy in its early years. Although much research is still needed, the role of lipids with toxicosis is now well-established.

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FLUID THERAPY MADE EASY
Marc Seitz, DVM, DABVP (Canine and Feline Practice)
Assistant Clinical Professor of Emergency Medicine
Mississippi State University College of Veterinary Medicine
Email: marc.seitz@msstate.edu

Introduction
Fluid therapy is used every day in private practice to manage both healthy and sick patients. Although our understanding of fluid dynamics within the body continues to evolve, most of the fundamental rules of fluid therapy remain the same. A fluid therapy plan may be as simple or as complex as the veterinarian wishes; however, it is fair for the plan to reflect the simplicity or complexity of the patient’s underlying disease process. Most patients treated in private practice benefit from simple but fundamentally sound fluid therapy plans. The purpose of this lecture is to use an anatomical fluid compartment approach to simplify fluid therapy decisions. Some key fluid therapy updates will be discussed within the context of making fluid therapy easier.

Does the patient require fluid therapy?
If there is one point that is commonly forgotten with fluid therapy decision making, it is that fluids are drugs! Like all drugs, fluids have indications, contraindications, benefits, risks, and unplanned adverse effects. As a result, fluid therapy should only be given when clinically necessary. In the past, many clinicians have taken the mindset of “if they don’t need the fluid, they will just pee it out.” However, even in healthy patients, unnecessary fluids have negative consequences. This is best illustrated through our changing paradigm of fluid therapy during anesthesia.

In the past, pre-anesthetic fluid loading and/or high intra-operative fluid rates (10ml/kg/hr) were administered in a theoretical attempt to prevent hypotension. Not only do these practices NOT prevent hypotension as compared to lower anesthetic fluid rates, but they actually increase the risk for hypervolemia post-op. Post-operative hypervolemia has been associated with increased rate of complications such as surgical site infections, decreased wound healing, gastrointestinal ileus, pneumonia, and pulmonary edema (Barter 2015 and Bundgaard-Nielsen 2009). As a result, current recommendations are to administer lower anesthetic fluid rates of 3-5ml/kg/hr and bolus fluids only as needed for hypotension if it occurs (Barter 2015).

Answering the question “does this patient require fluid therapy” is simplified within the context of a fluid compartment approach. Fluid therapy is absolutely indicated if there is a fluid deficit in any one of the three physiologic fluid compartments. Although beyond the scope of this presentation, fluid therapy can be indicated for reasons not related to compartmental deficits such as diuresis and electrolyte supplementation. Compartment-driven fluid therapy simplifies initial treatment decisions because it eliminates the need to memorize fluid therapy plans for numerous diseases and conditions. With this understanding in mind, let us review the three fluid therapy compartments and how they are clinically evaluated.

Where is the fluid deficit? Understanding physiologic fluid compartments.
The total water content of dogs and cats is estimated to be approximately 60% of body weight and is affected by factors such as age and body condition. For example, neonates and lean
animals tend to have a higher percent weight of total body water (TBW). Water is distributed and free to move about three main compartments – intracellular, interstitial, and intravascular - as illustrated in Figure 1.

**Figure 1**: Fluid compartments and their percent distribution of total body water.

<table>
<thead>
<tr>
<th>Compartment</th>
<th>Syndrome</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intravascular</td>
<td>Hypovolemic Shock</td>
<td>Blood loss from trauma</td>
</tr>
<tr>
<td>Interstitial</td>
<td>Dehydration</td>
<td>Gastroenteritis</td>
</tr>
<tr>
<td>Intracellular</td>
<td>Hypernatremia</td>
<td>Free water deficit</td>
</tr>
</tbody>
</table>

**Identifying an intravascular fluid deficit, or hypovolemic shock**
A deficit in the intravascular fluid compartment causes hypovolemic shock due to decreased perfusion and hence decreased oxygen delivery to tissues. It is imperative to recognize an intravascular fluid deficit as soon as possible as prognosis worsens the longer hypovolemic shock persists. Physical exam perfusion parameters used to evaluate the intravascular compartment include mucous membrane color, capillary refill time, heart rate, pulse quality, mentation, and temperature. Although not evaluated on the physical exam, urine output also reflects perfusion and can be monitored during hospitalization. Two additional perfusion parameters that augment the physical exam include blood pressure and lactate concentration.
Hypovolemic shock is a continuum that begins with an inciting cause and ends with death if left untreated. In-between the inciting cause and death, the body progresses through a compensated (i.e. hyperdynamic or occult) phase and a decompensated (i.e. hypodynamic) phase depending on how the body is able to physiologically respond to the insult. Recognizing these phases is important because both their clinical presentation (summarized in Table 2) and prognosis drastically differ. Cats tend to only display clinical signs associated with hypodynamic shock.

Compensated shock is a state of physiologic adaptation through which hyperdynamic changes in the cardiovascular system maintains perfusion to key organs in the body despite an overall accumulation of oxygen debt. Physical exam parameters tend to be normal or elevated which can mimic stress or pain, making compensated shock challenging to identify. Measuring the lactate concentration in the blood can be a valuable tool for differentiating patients in shock from those that are stressed or in pain. Most of the time, lactate reflects perfusion in the body with elevations indicating poor perfusion and shock (Di Mauro 2016). Lactate monitors are inexpensive and only require one drop of blood, ideally from the jugular vein. If an elevated lactate is found, a fluid bolus should be administered. Uncommonly, lactate elevations can occur with mitochondrial dysfunction, drugs and toxins, or rare metabolic disorders.

Decompensated shock occurs when the body’s compensatory mechanisms can no longer maintain perfusion. Hypodynamic changes to the cardiovascular system ensue, creating abnormalities in perfusion parameters that are easily detected on physical exam. Blood pressure decreases and lactate levels become even more elevated.

<table>
<thead>
<tr>
<th>Perfusion Parameter</th>
<th>Hyperdynamic</th>
<th>Hypodynamic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mucous Membranes</td>
<td>Dark pink to red</td>
<td>Pale</td>
</tr>
<tr>
<td>CRT</td>
<td>Brisk, &lt; 1 sec</td>
<td>Delayed</td>
</tr>
<tr>
<td>Heart rate</td>
<td>Normal to increased</td>
<td>Increased, then decreased</td>
</tr>
<tr>
<td>Pulse quality</td>
<td>Strong/bounding</td>
<td>Weak to absent</td>
</tr>
<tr>
<td>Temperature</td>
<td>Normal to elevated</td>
<td>Normal to low</td>
</tr>
<tr>
<td>Mentation</td>
<td>Normal</td>
<td>Depressed to obtundund</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>Normal to elevated</td>
<td>Normal to low</td>
</tr>
<tr>
<td>Lactate</td>
<td>Elevated</td>
<td>More elevated</td>
</tr>
</tbody>
</table>

Although other forms of shock create the exact same clinical signs as hypovolemia, most do benefit from some form of fluid resuscitation. The exception is cardiogenic shock – fluids should never be administered to a patient in heart failure unless pericardial effusion is the only inciting cause.
**Identifying an interstitial fluid deficit, or dehydration**

Dehydration reflects a fluid deficit in the interstitial compartment. Dehydration can influence the other two compartments based on its severity and the type of fluid loss. If dehydration reaches 10% of the patient’s body weight, hypovolemia will occur. Although less common, if fluid losses are severely hypertonic or hypotonic, fluctuations in sodium concentration, which shift fluid into or out of the intracellular space, can occur. Typically, dehydration is isotonic (or close to it), making changes to the intracellular compartment clinically irrelevant.

Dehydration can be evaluated with mucous membrane moisture, skin turgor, and body weight. Unfortunately, all three parameters can be influenced by factors that are not related to the interstitial compartment. Thus, all three should be used when determining the hydration status of a patient. Mucous membrane moisture can be evaluated with the gingiva, the conjunctiva, and the colonic mucosa during rectal exam. Panting can artificially dry the rostral half of the oral mucosa whereas nausea can cause moisture via ptyalism. As a result, other mucous membranes (e.g. the conjunctiva) should be evaluated before making a determination of hydration status. Skin turgor typically decreases with dehydration, causing skin tenting. However, body condition score and age can influence results. For example, a geriatric cat with a body condition of 2/9 will commonly have skin tenting despite being adequately hydrated. Finally, body weight can loosely be used to evaluate hydration status. Factors that influence body weight independent of hydration status include natural weight loss or gain as well as translocation of fluids into body cavities (aka “third spacing”).

**Table 3: Estimating dehydration using physical exam findings**

<table>
<thead>
<tr>
<th>% Dehydration</th>
<th>Physical Exam Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5%</td>
<td>Not detectable</td>
</tr>
<tr>
<td>5%</td>
<td>Tacky mucous membranes</td>
</tr>
<tr>
<td>8%</td>
<td>Dry mucous membranes</td>
</tr>
<tr>
<td></td>
<td>Decreased skin turgor</td>
</tr>
<tr>
<td>10%</td>
<td>Retracted globes, persistent skin tent, hypovolemia present</td>
</tr>
<tr>
<td>12-15%</td>
<td>Hypovolemic shock and eventual death</td>
</tr>
</tbody>
</table>

**Identifying an intracellular fluid deficit**

Intracellular fluid deficits are the most challenging to recognize because they cannot be detected on physical exam. Blood sodium concentration can sometimes reflect the intracellular compartment where hypernatremia indicates intracellular dehydration and vice versa. Because sodium concentration is affected by both solute and solvent, changes can indicate a problem with either sodium (loss or gain) or free water (loss or gain). A thorough discussion of hypernatremia is beyond the scope of this lecture; however, a few key clinical points will be reviewed later.
Identifying the appropriate fluid deficit is arguably the most important step as it directs all other aspects of fluid therapy. Some of the most common fluid therapy mistakes come from misdiagnosing the affected fluid compartment. Once this information is mastered, treating each compartment becomes easy due to fundamental rules that apply to most clinical situations.

**Properties of fluids**

All fluids can be categorized by two main properties: particle size and tonicity. Crystalloids are solutions composed of small particles such as electrolytes, buffers, and sometimes dextrose. In contrast, colloids are solutions that contain large molecules such as hydroxyethyl starch. Crystalloids depend on osmosis to shift fluid in the body whereas colloids exert oncotic pressure to do the same. The degree of fluid shifting also depends on the tonicity of the fluid. Tonicity describes the concentration of osmotically active particles in a solution relative to the body’s innate osmolality. Fluids of a similar tonicity to the body are termed “isotonic.” Hypertonic and hypotonic fluids are those with a tonicity greater than or lesser than the body, respectively. Practically speaking, the tonicity of a fluid is usually labeled by how it behaves in the body. For example, although 5% dextrose in water enters the vein isotonic, the dextrose is rapidly metabolized *in vivo* leaving free water, which is hypotonic.

**Treating the intravascular compartment**

Treating shock calls for rapid intravascular fluid expansion. As a result, intravenous (IV) and intraosseous are the only acceptable administration routes. Although convenient, subcutaneous and intraperitoneal fluids are inappropriate routes with shock. When selecting a catheter, place the shortest, largest bore catheter to minimize the resistance of fluid flow and hence maximize fluid delivery rates. Do not forget that the size of T-ports, extension sets, and IV tubing also influences flow rate so never use “micro” versions of these products if they can be avoided. All fluids are given as a rapid bolus over 10-15 minutes. Fluid pumps are convenient for smaller volumes but can sometimes limit the rate of large volume boluses. As a result, pressure bags are inexpensive and handy. For small volumes of fluids, syringes that are manually pushed are ideal for rapid and precise administration.

Balanced isotonic crystalloids such as Lactated Ringer’s, Plasmalyte, and Normosol-R are the initial fluid of choice for hypovolemic shock. All balanced crystalloids are virtually interchangeable in most resuscitation situations. Although 0.9% saline can be used, it is now considered inferior to balanced crystalloids. Its supra-physiologic chloride content and lack of a buffer contribute to a metabolic acidosis, while its supra-physiologic sodium content contributes to hypervolemia post-resuscitation. Large, randomized human studies have confirmed increased morbidity and mortality in critical patients resuscitated with saline as compared to balanced isotonic crystalloids (Cazzolli 2015). Although any fluid is better than no fluid with shock, balanced crystalloids are the treatment of choice if available. Furthermore, hyperkalemia is no longer a contraindication to administering a balanced crystalloid as demonstrated by two well designed veterinary studies (Cunha 2010 and Drobatz 2008).

Although “shock doses” for the dog (90ml/kg) and cat (60ml/kg) are based on the total blood volume, they are not administered anymore. Instead, 1/4 to 1/3 of a shock dose is administered and the patient re-evaluated. A useful rule of thumb to rapidly determine the fluid bolus amount (mL) for a patient in shock is to add a “0” to their weight in pounds. This delivers a 22ml/kg
bolus which equates to a 1/4 shock dose in dogs and a 1/3 shock dose in cats. For example, a 70 pound dog would receive a 700mL bolus. Boluses are repeated until perfusion parameters are normalized. If 2-3 boluses do not correct perfusion parameters, then hypertonic saline and/or synthetic colloids may be considered. Large dosages of crystalloids (i.e. greater than a blood volume) during resuscitation are associated with numerous side effects such as hypothermia, hypoproteinemia, dilutional coagulopathy, gastrointestinal ileus, and loss of mucosal barrier function (Balakrishnan 2015).

Hypertonic saline rapidly and transiently increases intravascular volume by pulling fluid from the interstitial space via osmosis. Because sodium rapidly equilibrates, the volume expansion only lasts around 30 minutes. However, the net clinical effect is usually faster stabilization with less total volume administered when combined with a crystalloid or synthetic colloid. Hypertonic saline is commonly available as a 3% or 7.2% solution. The 23% solution is a stock solution that should never be used for boluses. The dose for either the 3% or 7.2% solution is 3-5ml/kg, which can be repeated once. The total volume should be administered over 5-10 minutes, not to exceed 1ml/kg/min as hypotension and arrhythmias can be seen. Side effects are minimal and usually limited to a transient increase in sodium concentration that is approximately 1mEq for every 1ml/kg of 3% solution used. If hypertonic saline is given too fast (~1ml/kg/min), arrhythmias and hypotension can occur.

Synthetic colloids such as Hetastarch and Vetstarch help retain fluid in the intravascular space via an increase in oncotic pressure. As long as vascular permeability is not increased, intravascular volume expansion lasts longer than that of crystalloids or hypertonic saline. This makes colloids a very attractive option when total resuscitation volume needs to be limited, such as with acute hemorrhage. The typical dose is 5-10ml/kg for dogs (not to exceed 20ml/kg) and 3-5ml/kg for cats (not to exceed 10ml/kg). Unfortunately, of all of the fluids, synthetic colloids carry the largest potential for side effects. All colloids exhibit a dose dependent coagulopathy above a total dose of 20-30ml/kg. Furthermore, fluid extravasation can occur if vessels are leaky from systemic inflammation and the colloid molecule enters the interstitium. Finally, there is growing concern over a dose-dependent link between colloid administration in critical patients and acute kidney injury (Adamik 2015). It is for these reasons that colloids should be used judiciously. However, they are still very clinically valuable.

Resuscitation fluid therapy should continue until all perfusion parameters are normalized. Traditionally, this was limited to physical exam parameters and blood pressure. Unfortunately, human studies have found that up to 80% of patients resuscitated with physical exam parameters and blood pressure alone still have occult shock defined by other perfusion parameters such as lactate. As a result, serial lactate measurements are recommended to guide fluid resuscitation efforts (Di Mauro 2016). Numerous studies have confirmed that normalizing or reducing lactate concentrations by 50% within the first 6 hours of presentation is associated with significantly improved outcomes. It is important to note that prognostic decisions should NEVER be made based on a single lactate measurement, no matter how high the severity. Finally, Lactated Ringer’s solution is perfectly safe to administer to patients with elevated lactate levels.

To clinically summarize, the author tends to use balanced isotonic crystalloids (22ml/kg) as an initial fluid for all forms of resuscitation. If the patient cannot be stabilized with 2-3 boluses,
hypertonic saline (3ml/kg) is used next. If the patient still cannot be stabilized, colloids are used (10ml/kg for a dog, 5ml/kg for a cat) thereafter.

Acute hemorrhage is a unique form of hypovolemic shock that benefits from limited volume resuscitation (Hammond 2014). Limited volume resuscitation is the idea of using the least amount of fluids to achieve low normal perfusion parameters such as a mean arterial pressure of 60 mmHg. Fluid volume is minimized during resuscitation by giving hypertonic saline and/or synthetic colloids along with or in place of traditional crystalloid boluses. If shock cannot be corrected with judicious fluid use, blood products such as whole blood or a combination of packed red cells and plasma should be considered.

Table 4: Summary of shock resuscitation dosages for various fluids

<table>
<thead>
<tr>
<th>Product</th>
<th>Dog</th>
<th>Cat</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isotonic Crystalloids</td>
<td>20-30ml/kg</td>
<td>10-20ml/kg</td>
</tr>
<tr>
<td>(preferably balanced)</td>
<td>Up to 90ml/kg</td>
<td>Up to 60ml/kg</td>
</tr>
<tr>
<td>Synthetic Colloids</td>
<td>10ml/kg</td>
<td>5ml/kg</td>
</tr>
<tr>
<td></td>
<td>Up to 20-30ml/kg</td>
<td>Up to 10ml/kg</td>
</tr>
<tr>
<td>Hypertonic Saline</td>
<td>3-5ml/kg</td>
<td>3-5ml/kg</td>
</tr>
<tr>
<td></td>
<td>Up to 8ml/kg</td>
<td>Up to 8ml/kg</td>
</tr>
<tr>
<td>Whole Blood and Plasma</td>
<td>10ml/kg</td>
<td>10ml/kg</td>
</tr>
</tbody>
</table>

Treating the interstitial compartment
The goal of treating the interstitial compartment is to replace fluids lost through processes such as dehydration; however, the determined fluid rate must also take into account provision of maintenance fluid requirements as well as on-going losses. Typically, fluids are delivered as a constant rate infusion - boluses are typically unnecessary. Higher rates are used initially to replace the deficit over 12-24 hours, after which the fluid rate may be decreased. Fluids may be administered via the intravenous, intraosseous, or subcutaneous routes. Although fluid can be administered into the intraperitoneal cavity, this is generally not routinely recommended given the increased risk for complications and the availability of other routes. Catheter size is less important if fluid boluses are not anticipated. Fluid pumps are ideal due to their accuracy and reduced need for close monitoring; however, free dripping is reasonable if tight control is not needed and technical staff can monitor the fluid delivery closely.

Balanced crystalloids are considered the fluid of choice for rehydration and maintenance. Since this is a “fluid therapy made easy” lecture, the author will admit that under most clinical situations, the specific choice among balanced crystalloids does not matter. Although subtle differences in balanced crystalloid fluid type become important in the critical care setting, most clinicians will not see a significant enough difference in a general medicine population to justify stocking all fluid types. As mentioned in the previous section, 0.9% saline is no longer recommended for routine use due to its increased risk for complications. However, saline still has specific indications where it is the ideal fluid of choice, such as with hypochloremic
metabolic alkalosis (caused by bilious vomiting or pyloric obstruction), diuresis for hypercalcemia, and compatibility with blood products and drug dilutions.

Traditionally, determining an appropriate fluid therapy rate involves the three tiered process of calculating maintenance fluid needs, calculating the dehydration deficit, and estimating on-going losses. Numerous maintenance fluid therapy calculations exist. Ideally, the author recommends calculating maintenance fluid rates based on the AAHA-recommended body surface area calculations for the dog and cat (Davis 2013):

- **Dog**: $BW^{0.75} \times 134 = \text{daily maintenance requirement}$
- **Cat**: $BW^{0.75} \times 80 = \text{daily maintenance requirement}$

These calculations ensure accuracy among all body weights as other methods tend to underestimate maintenance requirements in small patients and overestimate them in large patients. Although less precise, a reasonable approximation for dogs is to set the patient’s hourly rate to their weight in pounds. For example, a patient weighing 45 pounds would receive 45ml/hr. If a patient weighs less than 10 pounds, this rate should be doubled. For cats, the maintenance requirement for an average sized cat (~4.5kg) is always around 10ml/hr. These cheats are only recommended for healthy to mildly sick patients that are anticipated to be on fluid therapy for only 24-48 hours. They can also be a good starting point for the busy practitioner until fluid therapy calculations can be performed.

Dehydration is calculated by multiplying the estimated deficit by the body weight in kilograms. An hourly rate is determined by dividing the dehydration deficit by the number of hours over which the clinician wishes to correct it, typically 12-24 hours. If fluid boluses are given, these are typically subtracted from the initial dehydration deficit as most of that fluid will eventually end up in the interstitium. To simplify the math, doubling the calculated maintenance fluid therapy rate will correct 5% dehydration over 24 hours. Tripling the rate will correct 5% dehydration over 12 hours or 10% dehydration over 24 hours.

Ongoing losses are usually an estimate unless cage paper is weighed before and after soiling or a urinary catheter is in place. When losses cannot be precisely tracked, the author recommends re-examining the patient every 6-8 hours while monitoring parameters such as body weight, packed cell volume, total solids, and urine specific gravity. When fluids are administered appropriately, physical exam abnormalities rapidly improve, weight increases (recall 1mL of fluid equals approximately 1g of body weight), and the urine becomes dilute with an increase in output.

For stable outpatient cases with mild dehydration (~5%), fluids may be administered via the subcutaneous route. A dose of 22ml/kg, calculated by adding a zero to the patient’s body weight in pounds is rapid and usually comfortable for the patient. It will also replace approximately half of the fluid deficit while the remainder is made up by the animal via oral intake. Subcutaneous fluid are usually reserved for patients whose ongoing losses can be rapidly controlled with symptomatic therapy such as an antiemetic or an antidiarrheal. The author strongly discourages the practice of trying to administer the entire dehydration deficit via the subcutaneous route in one dose. This practice is usually not medically necessary, is uncomfortable, and carries the small risk of pressure necrosis if the skin is stretched to the point of damaging its blood supply.
Dehydration is not life threatening, and, if symptoms are controlled, the patient should be able to orally re-hydrate over the next 24 hours.

**Treating the intracellular compartment**

Unfortunately, there is no way to make fluid therapy associated with dysnatremias easy. A complete discussion is beyond the scope of this lecture and well-reviewed elsewhere (Burkitt Creedon 2015). However, a few key points are worth mentioning. Severe dysnatremias, defined as a sodium concentration < 120 mEq/L or > 170 mEq/L, are always serious and warrant therapy due to the potential for neurologic sequelae caused by fluid shifts into and out of the brain. The sodium should be corrected slowly (0.5-1mEq/hr) to avoid neurologic complications that occur with sudden changes in osmolality. Dropping a hypernatremia too quickly will result in cerebral edema whereas raising a hyponatremia too quickly causes delayed myelniolysis. Either can be life-threatening. Correcting severe hyponatremia usually benefits from starting with Lactated Ringer’s since it contains the lowest concentration of sodium (130mEq/L), which will limit the rate of sodium increase in the body. On the contrary, hypernatremias are corrected with free water sources such as half strength saline or 5% dextrose in water. A precise and carefully monitored fluid therapy plan is absolutely necessary to reduce the risk of morbidity and mortality.

**When should fluid therapy be stopped?**

Fluid therapy may be stopped when the underlying disease has been controlled, all deficits have been replaced, electrolyte abnormalities have normalized, on-going losses have stopped, and the patient can maintain hydration through oral consumption. Continuing fluids just because the patient is hospitalized or to maintain catheter patency in a patient that can drink and eat on its own is ill advised due to the increased risk of hypervolemia and its complications.

**Summary of fluid therapy tips and tricks**

Today’s presentation is best summarized by applying the aforementioned information to a commonly seen case in private practice. A 3-year-old female spayed dog weighing 15kg (33 pounds) presents for a 48 hour history of acute vomiting and bloody diarrhea. Physical exam reveals tachycardia, tachypnea, brick red gums with a CRT <1 second, and a lactate of 5.5 mmol/L. A blood pressure is not available. The gums are tacky, the skin tents, and the globes are retracted. What is your initial fluid therapy plan?

Based on our compartmental approach, we know this patient has a deficit in the intravascular compartment (likely from severe dehydration and/or sepsis) that requires a fluid bolus.

- Since balanced crystalloids are ideal and specific choice usually doesn’t matter, you reach for a bag of whatever was cheapest through the distributer that week.
- Using the body weight trick, you add a 0 to the weight in pounds and administer an initial crystalloid bolus of 330mL over 15 minutes through a 20G cephalic catheter.
- After re-evaluating the patient, you determine a second bolus is indicated.
- After two boluses, the patient appears more stable and the lactate is now 2.0 mmol/L so you move on to a rehydration plan.

Since the two boluses replaced 4% of the dehydration deficit, you now only have to replace an additional 6%.
- Using our maintenance fluid therapy trick, we estimate the hourly maintenance fluid therapy rate to be equal to the body weight in pounds = 33ml/hr.
- Since the patient is now only 6% dehydrated after two boluses and 6% is close to 5%, you double the maintenance fluid rate to correct the remaining dehydration over 24 hours as long as no further losses occur = 66ml/hr.

Now wasn’t that easy?

References (alphabetical order).
DON’T LET THEM BLEED TO DEATH: AUTOTRANSFUSION IS CHEAP AND EASY
Marc Seitz, DVM, DABVP (Canine and Feline Practice)
Assistant Clinical Professor of Emergency Medicine
Mississippi State University College of Veterinary Medicine
Email: marc.seitz@msstate.edu

Definitions
1. Autologous transfusion: transfusion of a patient’s own blood
2. Allogenic transfusion: transfusion of a blood product between two individuals of the same species
3. Xenotransfusion: transfusion of a blood product from one species to another

Historical Perspective: transfusion medicine has come a long way
The first published account of a successful allogenic blood transfusion occurred in 1666 when Dr. Richard Lower successfully transfused blood from one dog to another using quills. The next year, the first successful xenotransfusions (animal to human) took place in France and England, only a few months apart. Both Jean Baptiste Denis (France) and Dr. Lower (England) transfused blood from a sheep to a human in an attempt to cure psychoses. During that time period, mental faculties were believed to be carried in the blood. Curiously, Denis’s patient died of a presumed hemolytic reaction whereas Lower’s patient lived. Although Denis was acquitted of criminal charges, his failure led to the prohibition of blood transfusion in Europe, abolishing the practice for over 150 years.

The first attempted human allogenic blood transfusion did not occur until 1829, and the first successful transfusion occurred only a year later in a women dying of post-partum hemorrhage. Both transfusions were performed by William Blundell. The discovery of citrated anti-coagulants and blood groups at the turn of the nineteenth century paved the way for rapid advances in transfusion medicine. Today, more than 9 million blood transfusions are performed annually in humans. Although allogenic blood transfusions are also standard of care in veterinary medicine, cost and limited availability frequently restrict their use. Fortunately, autotransfusion is a remarkably simple, inexpensive, and effective technique, especially in a private practice setting, where blood products may be of limited quantity or unavailable.

Introduction
Perhaps the most important role of blood is the delivery of oxygen to tissues. The acute loss of red blood cells (RBCs) via hemorrhage can quickly lead to hypovolemic shock and death. Mild to moderate acute blood loss (< 30% blood volume) can usually be stabilized with fluid resuscitation alone. Studies have demonstrated that even severe anemia can be tolerated as long as blood volume is held constant to maintain adequate perfusion of the remaining red cell mass (Prittie 2010).

Currently, limited volume resuscitation (LVR) is considered the best approach to managing acute hemorrhage (Hammond 2014). The goal with LVR is to restore the blood pressure to low normal values (mean arterial pressure of 60mmHg, systolic of 90mmHg) with the least amount
of volume possible. The goal is to reduce the risk of complications that have been associated with the administration of large volumes of fluid, such as continued bleeding from increased hydrostatic pressure, hypothermia, dilutional coagulopathy, and post-resuscitation hypervolemia. Typically, LVR is achieved by combining a balanced isotonic crystalloid with hypertonic saline and/or a synthetic colloid. In fact, a recent veterinary study of spontaneous hemoperitoneum (Hammond 2014) found a combination of hypertonic saline and a synthetic colloid alone were significantly superior to a balanced crystalloid at achieving faster hemodynamic stability with less volume. If hemodynamic stability cannot be achieved with fluids, then blood products should be considered.

More severe blood loss (> 30-40% blood volume) almost always necessitates a blood transfusion. Currently, component therapy is considered the safest approach to transfusion medicine. Component therapy dictates that only the deficient portion of the blood be replaced. For example, the ideal blood product with immune mediated hemolytic anemia is packed RBCs, because the animal does not need volume or clotting factors. With acute blood loss, the ideal replacement product is fresh whole blood. If fresh whole blood is not available, equal portions (1:1) of packed RBCs and fresh frozen plasma can be given. Alternatively, a 2:1 ratio can also be used.

Unfortunately, larger human clinical trials as well as smaller veterinary studies have shown an association between the risk for morbidity and mortality and the administration of allogenic blood transfusions (Prittie 2010). Furthermore, risk seems to increase as the number of transfusions increases. Although blood transfusions provide red cells that are essential for oxygen delivery, they also carry the risk of immunologic and non-immunologic reactions. These studies have led to the concept of restrictive transfusion practices in order to minimize the need for and quantity of allogenic blood products used in patients. Autologous transfusion is an often forgotten strategy for limiting the need for or quantity of allogenic blood products.

**Indications for Autologous Transfusion**

Autologous transfusions are indicated with acute blood loss anytime traditional blood products are not available, cannot be prepared fast enough, or are of a limited quantity. Autologous transfusion may also be used to intentionally limit the total quantity of allogenic blood products used when replacing severe blood loss. With these indications in mind, autologous transfusions can take on three main forms based on the timing of the procedure in relation to blood loss.

1. **Pre-operative blood donation**: If an elective surgical procedure carries the high potential for significant blood loss, blood may be collected from the patient 2-4 weeks prior to the procedure. This time period will allow re-generation of most of the donated RBC mass and all of the volume. Although this technique is described in the veterinary literature and apparently safe, it does not appear to be clinically utilized very often (Fusco 2000). Further guidelines for this technique are well described elsewhere (Fusco 2000 and Jutkowitz 2004)

2. **Acute euvolemic hemodilution**: Although not commonly performed in veterinary medicine either, this form of autologous transfusion involves the collection of blood from the patient immediately before the surgical procedure. The donated volume is replaced with crystalloids to maintain volume and hence perfusion. The collected blood volume is kept low enough so as not to affect critical RBC mass and oxygen delivery. The blood is
then kept at room temperature in the operating room, “at the ready.” Furthermore, if hemorrhage occurs, less RBC mass is lost per unit of volume since the patient is now hemodiluted. Although this procedure does not usually prevent the need for allotransfusion, it does reduce the overall number of units needed, which could help reduce adverse effects associated with repeated allogenic transfusions.

3. **Autotransfusion**: Typically, the word “autotransfusion” refers to the collection and transfusion of blood lost within cavities such as the pleural or peritoneal space. Blood may be lost from naturally occurring pathology or during surgery. Common clinical situations include bleeding secondary to vitamin K antagonist rodenticide ingestion, trauma, and surgical blood loss. Controversial clinical situations include blood contaminated with neoplastic cells or bacteria.

Of these three clinical applications, autotransfusion is the most commonly used type of autologous transfusion in veterinary medicine and will be the focus for the remainder of the presentation.

**Benefits and Risks of Autotransfusion**

Although allogenic transfusion is relatively safe, injecting a foreign substance into a body carries with it certain risks that are both immunologic and non-immunologic in nature. It is for this reason that autotransfusion has several obvious advantages. First, the blood is compatible with the recipient and carries no risk for outside infection. This reduces the need for blood typing and cross matching if no other blood is to be given. Second, the blood is readily available, at room temperature, and usually fairly safe if collected within 24 hours (or less) of bleeding. Third, the blood cells contain higher levels of 2,3-diphosphoglycerate relative to stored blood, making them more efficient at oxygen transport and delivery. Fourth, autotransfused blood lacks storage lesions. Finally, the cost of an autotransfusion is almost always cheaper than the cost of an allogenic transfusion. At this time, no evidence exists to suggest differences in RBC lifespan or significant morphologic differences regarding autotransfusion versus allogenic transfusion.

Despite the aforementioned advantages, autotransfusion does have certain drawbacks and risks. The red cells are prone to hemolysis or decreased life span the longer they contact serosal surfaces or if they are damaged during collection or administration. Second, collected blood may contain large amounts of cell fragments, inflammatory mediators, fibrin-degradation products, or other physiologic debris that can initiate coagulation (e.g. DIC) or potentiate systemic inflammation (e.g. SIRS) and hence organ dysfunction (e.g. MODS). Specifically, acute lung injury can occur from microembolization of the pulmonary vasculature with cellular debris. Similar to allogenic transfusions, autotransfusions can cause problems such as dilutional coagulaopathy and citrate toxicity if enough volume is used. Finally, collected blood that is contaminated with bacteria or neoplastic cells theoretically has the potential to cause sepsis or metastasis if reinfused. Similarly, blood contaminated with urine or bile are systemically problematic.

Despite these potential disadvantages, autotransfusion appears to be relatively safe with minimal complications reported in the veterinary literature, which mirrors the author’s clinical experience. In one retrospective study (Higgs 2015) of 25 dogs with acute hemorrhage managed with autotransfusion, the only reported complications were hypocalcemia, hemolyzed serum, and mildly prolonged coagulation times. All of these complications were deemed clinically
insignificant, and many of these dogs received numerous other therapies including allogenic blood transfusion, making it hard to draw conclusions. In a smaller case series (Robinson 2016) of four dogs receiving auto-transfusion following post-operative bleeding, no complications were noted. Finally, in a study of 15 cats undergoing pre-operative blood donation, no complications were noted other than three instances of mild iatrogenic anemia (Fusco 2000).

**Technique**

Blood may be collected from a body cavity via centesis or suctioning during surgical procedures. Either way, blood should only be collected for autotransfusion if it is less than 24 hours old. The longer blood is in contact with serosal surfaces, the larger the risk for accumulation of pro-inflammatory mediators, cellular aggregates, and cell lysis that could all increase the risk for complications. Most of the time, an anti-coagulant is not necessary because blood that is in contact with serosal surfaces becomes defibrinated after about an hour. However, if blood is collected during periods of active hemorrhage or if the status is unknown, a citrate based anticoagulant such as citrate-phosphate-dextrose-adenine (CPD-A) should be used. Typically, 7mL of CPD-A is used per 50mL of blood (~1:7 ratio). Equally, commercially prepared blood donation bags that are preloaded with an anticoagulant can be used. Blood loss associated with vitamin K antagonist rodenticide toxicity typically does not need an additional anticoagulant.

The actual blood collection is relatively straightforward. Blood collected via centesis is performed similar to any other aspiration procedure. The site is clipped and aseptically prepped. Sterile gloves are worn and a 60mL syringe is used to aspirate blood through a needle or catheter. If a large volume of blood is anticipated, a 3-way stop cock can be used to immediately transfer blood into a sterile 1-liter bag or a commercially prepared blood donation bag. During surgery, blood may be aspirated via 60mL syringes and handed off for immediate administration. Alternatively, blood may be collected via mechanical suctioning using a Poole suction tip, tubing, and a sterile container. This technique increases the risk for red cell lysis if aggressive suction pressures are used or significant amounts of air are allowed to mix with the blood. The vacuum pressure should be held between 40-60mmHg and should never exceed 100mmHg. The suction tip should be kept below the surface of the blood as much as possible so only liquid is pulled into the tube. Once the blood is collected, the canister contents may be emptied into a sterile 1-liter bag with a hole cut into the top, or the blood may be aspirated into individual 60mL syringes.

Once collected, blood is delivered to the patient through any peripheral venous catheter. A blood filter should always be used to reduce the amount of cellular aggregates contained within the blood. Acceptable filter sizes range between 18 to 270 microns. Filters should always be changed according to the manufacturer’s recommendation or whenever the flow of blood is impeded. For example, 18-micron aggregate filters (e.g. Hemo-Nate®) must be changed with at least every 60mL syringe. The effect of filter type and/or the use of a pump on RBC survival is still unclear. One study in dogs (McDevitt 2011) compared autologous transfusion using three different methods: gravity drip, volumetric pump, or a syringe pump. The former two used an in-line filter (170 microns) and the latter used an 18-micron aggregate filter. In dogs, significant reduction in red cell survival was seen just overnight using the volumetric pump and the syringe pump. The exact reasons were not identified but shear stress from the volumetric pump or the
smaller filter size were considered. Data from a pilot study at our institution suggests that administration method may not influence RBC survival. Further studies are currently underway. One study (Heikes) of cats demonstrated that their RBCs may not be affected by delivery method or filter due to their smaller RBC size. Until more studies become available, gravity drip may be considered. However, the other methods can be used if speed is necessary or the autotransfusion is merely a stop-gap until other blood products can be administered. For example, the author commonly uses 60mL syringes, aggregate filters, and manual pushing.

Finally, it is worth mentioning that human medicine commonly employs cell salvage devices during autotransfusion, and recently their use has been reported in the veterinary literature (Kellett-Gregory 2013). Cell salvage devices utilize centrifugation to separate out blood cells from plasma and other cells. The packed RBCs are then washed and reinfused into the patient, allowing for a blood product that contains less volume, less anti-coagulant, and fewer cellular contaminants. Furthermore, when combined with a leukoreduction filter, cell salvage techniques can eliminate virtually all bacteria and neoplastic cells that may contaminate blood in certain clinical situations. Unfortunately, lack of availability, cost, and technical expertise will likely limit their widespread use in veterinary medicine.

Clinical Application of Autotransfusion
Appropriate case selection is an important aspect of achieving success with autotransfusion. Universally agreed upon applications in veterinary medicine include significant cavitary blood loss associated with vitamin K rodenticide (or warfarin) toxicity, perioperative hemorrhage, or trauma. For all of these cases, treatment should always begin with limited volume fluid resuscitation, as oftentimes blood products are not needed. However, if the patient cannot be stabilized and the delay in obtaining or using allogenic blood products would be detrimental to the patient, autotransfusion should be used. If bleeding can be stopped and the patient is hemodynamically stable, further blood products may not be needed. Oftentimes though, allogenic blood products are necessary. This may be limited to the use of fresh frozen plasma if the autotransfusion provided enough RBC mass. However, it may also include whole blood or packed RBCs.

One controversial application of autotransfusion is the use of blood associated with the rupture of visceral neoplasia. The theoretical concern is that using this blood will potentiate neoplastic dissemination and metastasis. To date, no human or veterinary studies have substantiated this claim. In fact, human studies have demonstrated that cell salvage devices and leukoreduction effectively eliminate tumor cells and are safe in cancer patients (Esper 2011). Additionally, some studies have shown worsened outcomes and metastatic rates in patients with increasing numbers of allogenic transfusions, likely from immunomodulation (Esper 2011). For all of these reasons, it is reasonable to consider autotransfusion if the benefits outweigh the risks. For example, the author would rather have a patient survive surgery with a theoretical (but not proven) risk for metastasis than die from severe hemorrhagic shock when allogenic blood products are not available or are of limited quantity.

A second controversial application of autotransfusion is the use of blood contaminated with bacteria. Anecdotally, it has been recommended that contaminated blood should not be used for fear of increasing the risk of sepsis. Curiously, this concern has been tested with numerous
studies and has yet to be validated (Esper 2011). Cell salvage devices with leukoreduction are capable of removing approximately 99% of the bacterial load present in blood. Additionally, there is clinical evidence to suggest that allogenic blood transfusions are associated with an increased risk for infection (Esper 2011). Since cell salvage devices are not readily available in veterinary medicine, it is probably best to avoid blood obviously contaminated with a bacterial source (i.e. ruptured bowel, prostatic abscess, biliary mucocele, etc).

It is possible that occultly contaminated blood could be accidently used in certain clinical situations. For this reason, it is worth mentioning an experimental study from the Journal of Trauma (Smith 1978) that looked at the use of fecal-contaminated blood for auto-transfusion in a hemorrhage model of dogs. Dogs were hemorrhaged at 20%, 30%, or 40% of their estimated blood volume and then reinfused with either their blood alone or their blood contaminated with feces. No differences in mortality were seen in the 20% and 30% groups. Although mortality significantly increased in the 40% blood loss group, this risk was eliminated when antibiotics were co-administered. This study, combined with others that demonstrate marked improvement in sepsis with the early administration of antibiotics, suggests that the accidental use of contaminated blood for auto-transfusion may not impact outcome if antibiotics are appropriately administered at the time of diagnosis. At this time, it is probably best to avoid the use of blood known to be contaminated unless it is absolutely life-threatening and no other options exist. However, if contaminated blood is used, immediate four-quadrant intravenous antibiotic therapy should be started.

At this time, auto-transfusion is not recommended if blood is contaminated with bile contents or urine due to the obvious risk of severe metabolic compromise following administration.

Conclusion
Acute hemorrhage is potentially life-threatening if severe or fast enough. Although allogenic blood products are relatively safe, their cost or availability present limitations in certain clinical situations. Don’t let patients bleed to death! Auto-transfusion is an inexpensive and technically simple procedure that can provide veterinarians with more option for stabilizing patients in hemorrhagic shock.

References (alphabetical order).
- McDevitt RI, Ruaux CG, Baltzer WI. Influence of transfusion technique on survival of autologous red blood cells in the dog 2011;21(3):209-216.
Introduction
In emergency medicine, focused ultrasound exams have gained popularity and are a valuable adjunct diagnostic tool. Dissimilar to full diagnostic ultrasound exams, focused techniques are designed to answer a specific clinical question in a yes or no format. For example, focused assessment with sonography for trauma, or FAST, was originally designed to identify abnormal free fluid in trauma patients. Since its inception, the idea and application of numerous other focused exams have increased. With this spirit in mind, there are several focused exams that can benefit the general practitioner regardless of his or her scanning ability. It goes without saying that focused exams are not intended to replace full diagnostic exams. However, focused exams are rapid, easy to learn, and improve quality of medicine by enhancing other diagnostic tools. The purpose of this session is to review focused exams that can be used in a general practice setting.

General Information and Technique
Ultrasonography uses sound waves to produce images on a screen. The black and white image reflects tissue density where fluid is usually black (anechoic) and tissues are various shades of grey (hypo- to hyperechoic). Bone density or air will display white at their surface but block visualization of tissues deeper to their location, a phenomenon termed “shadowing.” Fluid will sometimes not appear completely anechoic if blood clots, protein, sediment, or other gross debris are present. Examples include septic peritonitis fluid or the urine of a cat with feline lower urinary tract disease. Image artifacts can occur, but are beyond the scope of this presentation and well-reviewed elsewhere (Fulton 2014, Mattoon 2014, and Mauragis 2015).

A quality image is highly dependent on good probe-skin contact. Although clipping the fur is ideal, most focused exams can be achieved without clipping by parting the fur and applying acoustic coupling gel to the exposed skin. The use of 70% isopropyl alcohol or hand sanitizer is also convenient but carries the risk of damaging the probe with long term use. In an emergency setting, alcohol based products should be avoided if defibrillation is anticipated.

The ultrasound probe is typically held in a longitudinal fashion by keeping the probe marker pointed toward the patient’s head. The image on the screen will be similar to a lateral radiograph in that the image’s left is cranial to the patient, and right is caudal. The top of the screen is always nearest the probe and the bottom of the screen farthest away. Most focused scans are only performed in the longitudinal plane; however, the transverse plane may also be used. It is worth mentioning that most beginners identify structures and fluid easier in the longitudinal plane.

Every focused exam has a specific region of the body or target organ that is used for orientation. Once a region or target organ is localized, it is scanned in all directions by fanning the probe. If necessary, the probe may also be moved across the skin a few centimeters in all directions.
Although machine settings are beyond the scope of this presentation, depth and focal point deserve mentioning. The depth should be adjusted so the entire object is kept in frame. The focal point (usually an arrow on the side of the screen) should be placed at the level of the organ of interest. Finally, probe pressure is a variable that can be used to manipulate image quality.

Patient positioning depends on the type of focused exam performed. Generally, abdominal focused exams are performed in lateral recumbency while thoracic exams are performed in either lateral or sternal. Dorsal recumbency is usually avoided due to patient discomfort and the risk for worsening cardiovascular instability if underlying shock or respiratory distress are present.

**Focused Examine #1: Ultrasound-Guided Cystocentesis**

Ultrasound-guided cystocentesis is one of the most useful and underutilized focused exams in general practice. If the ultrasound is kept accessible and turned on in the general treatment area, its use will improve primary evaluation of lower urinary tract problems while also obtaining a sterile urine sample. For example, urolithiasis comprises up to 15-21% of cases of feline lower urinary tract disease (Forrester 2007). Relative to survey radiographs, focal ultrasound is more sensitive (Weichselbaum, 1999), cheaper, and safer when evaluating the bladder for stones. It is for these reasons that the speaker uses ultrasound-guided cystocentesis as a screening tool for any patient presenting with lower urinary signs.

Prior to obtaining urine, the bladder is fully scanned for any obvious abnormalities of the wall or lumen. In a stable patient, scanning the bladder can be performed in either lateral or dorsal recumbency. The probe is placed on the caudal aspect of the abdomen in a longitudinal orientation until the bladder is visualized. Small bladders may reside quite caudally. The bladder is best examined when it is moderately distended with urine. The normal bladder wall appears as a thin hyperechoic curved sac that measures 1-3mm thick depending on fullness and body weight. The lumen is typically anechoic when filled with urine. Although uncommon, a completely voided bladder may not have an appreciable lumen on ultrasound. The trigone is the area that tapers to a “V” at the caudal aspect of the bladder and a subtle thickening is possible if the ureter papilla are visualized. The entire scan usually takes no more than 30-60 seconds. As ultrasound experience increases, the prostate of males can be scanned as well.

Once the scan is finished, the ultrasound may be used to aspirate urine from even the tiniest of bladders on the first try, improving efficiency and patient comfort. Sterile collection practices also allows for urine culture testing. Focused bladder exams should NOT be limited to the veterinarian. This is one skill where technicians can and should be empowered. If an abnormality is found, the veterinarian can always step in and further evaluate.

The purpose of the focused exam is to identify obvious abnormalities that would represent a clinical “game changer” – mainly marked thickening of the bladder wall (e.g. polyploidal cystitis or masses) or hyperechoic contents within the lumen (e.g. stones, blood clots, or sediment). If abnormalities are found, they can be used to justify further imaging studies that day rather than the typical “watch and wait” approach based on response to medications and urinalysis results alone. For example, finding numerous small, round, hyperechoic densities in the lumen of a young patient with hematuria could trigger the use of a radiographs sooner in the clinical course to confirm stones. Equally, finding a large, irregular wall thickening in the trigone of a 12-year-
old patient with hematuria could uncover a bladder mass more quickly. Again, keep things simple and treat the focused examine for what it is – a rapid screening test. If an obvious disease can be ruled in, great. If more imaging is needed, that is fine as well. However, as experience increases, the ultrasound may be all that is needed to confirm the diagnosis. For example, the speaker finds focused exams as a useful middle ground for cost-confined clients who may not be able to afford abdominal radiographs.

It is important to note that not all bladder wall thickening is neoplasia. Stones and chronic infections can cause severe, irregular bladder wall thickenings, termed “polyploidal cystitis,” which often forms at the apex of the bladder. Although biopsy is the only way to distinguish this form of cystitis from neoplasia, it is reasonable to treat the underlying disease (e.g. antibiotics and/or stone removal) and recheck the abnormality in 2-4 weeks. Polyploidal cystitis will improve with treatment of the inciting cause whereas neoplasia will worsen. Recheck exams can be performed to monitor the lesion. Also of clinical relevance, polyploidal cystitis of bacterial origin often takes prolonged antibiotic therapy (4-8 weeks or longer) and benefits from culture and sensitivity testing.

Unfortunately, ultrasound of the bladder does have some limitations. First, the bladder is difficult to evaluate when small and devoid of urine. Second, the colon and several artifacts can mimic abnormalities within the bladder. Finally, stones can easily be missed if they are in the kidneys, ureters, or urethra. This reinforces the point that focused exams complement, but do not replace, other diagnostics.

**Focused Exam #2: Abdominal FAST**

Abdominal FAST (AFAST) was the first focused exam put into clinical practice with the sole purpose of detecting abnormal fluid formation in body cavities associated with trauma. Today, most veterinarians utilize AFAST for non-trauma triage as well. For example, a recent FAST scan study of 100 dogs and cats presented to an emergency department without trauma found free fluid in one third of patients (McMurray, 2016). Of particular importance, three fourths of patients evaluated as “not-stable” (i.e. in shock or respiratory distress) had abnormal free fluid. The primary goals of AFAST are to identify fluid, aspirate a sample of that fluid for diagnostic testing, and note any obvious pathology that is visualized. As we will discuss, AFAST utilizes the five major organs in the abdomen (liver, spleen, both kidneys, and bladder) as landmarks so it builds mental maps and psychomotor skills applicable to learning diagnostic ultrasound.

An AFAST is indicated in any patient with the following: trauma, shock, unexplained lethargy or collapse, anemia, or respiratory distress. The speaker often jokes that any golden retriever over the age of five presenting for “ADR” should probably receive a FAST scan to rule out free abdominal fluid or pericardial effusion. Although AFAST is the most sensitive technique for detecting abnormal fluid (~4ml/kg), ultrasound is unable to distinguish fluid types. Appropriate fluid analysis is always recommended, such as gross examination, cytology, PCV/TS, glucose, lactate, creatinine, potassium, and/or total bilirubin.

Right lateral is the preferred patient positioning for AFAST but left lateral is also acceptable. Four standard views are used: 1) Diaphragmaticohepatic (i.e. DH or subxyphoid), 2) Splenorenal (SR or left flank), 3) Cystocolic (CC or bladder), and the 4) Hepatorenal (HR or
right flank). Although the scanning order does not matter, most practitioners start at the DH location and complete the scan in a clockwise rotation.

**Figure 1: AFAST Locations**

The DH view (#1 in Figure 1) is visualized by placing the probe directly behind the xyphoid, pressing inward, and directing the beam cranial. The classic starting view is the entire cranial aspect of the liver where the gall bladder contacts the diaphragm. It is important that the machine’s depth setting be maximized such that the deepest portion of the liver and diaphragm are seen in the far field. Once all structures are in view, the liver is examined by slowly fanning up and down toward each body wall until the liver margins disappear. Fluid is typically anechoic and will cause the liver margins to separate. Small amounts of fluid will appear as small anechoic triangles. As a general rule of thumb for all views, fluid usually forms on the cranial aspect of the target organ first. For the DH view, that means paying close attention to the diaphragm/liver margins, especially near the gall bladder. In addition to searching for fluid, note any obvious masses or parenchymal changes. Finally, always look on the other side of the diaphragm as both pleural and pericardial effusion can sometimes be visualized from this view. The scanner should be aware that the mirror image artifact can cause an exact replica of the liver and gall bladder to appear on the other side of the diaphragm. False positives are possible with other hypoechoic to anechoic structures including the gall bladder, the caudal vena cava, hepatic veins, portal veins, and a fluid filled stomach.

**Figure 2: DH view – normal and abnormal**
The SR view (#2 in Figure 1) is obtained by placing the probe on the inside corner of where the floating ribs meet the epaxial muscles. FAST is intended to be performed all at one depth setting to maximize speed. However, adjusting the depth more shallow for all views after the DH view allows for easier visualization of small pockets of fluids. Whereas large amounts of probe pressure are used for the DH view, light probe pressure should be used for the remaining three. The goal is to visualize the kidney on the caudal aspect of the screen with or without the spleen on the cranial aspect. This may be very difficult if the patient is in left lateral since the right kidney is located more cranial and often under the ribs. Once the target organs are located, scan through the entire area by scanning both toward and away from the spine. Evaluate for fluid as well as gross abnormalities of the left kidney and spleen. Structures that create false positives for fluid include the aorta, vena cava, kidney, and small intestines.

Figure 3: SR view – normal and abnormal

The CC view (#3 in Figure 1) is obtained by placing the probe on top of the body wall just cranial to the hind leg. It is important that the probe be kept perpendicular to the table and not placed on midline. The former visualizes fluid in the gravity dependent area whereas the latter will create an image that looks over small amounts of fluid. Ideally, the apex of the bladder should be placed in the center of the screen to evaluate for fluid. The area is fanned similar to the SR view. Afterward, the entire bladder and trigone should be evaluated as described in the ultrasound-guided cystocentesis section. Structures that create false positives for fluid include small intestines, the great vessels, and occasionally lymph nodes.

Figure 4: CC view – normal and abnormal
The HR (#4 in Figure 1) view is now considered misnamed because neither the liver nor the right kidney is visualized. Instead, the probe is placed just under the umbilicus over the most gravity dependent portion of the abdomen. Typically, small intestines and/or the spleen will be visualized. The area is evaluated for fluid by scanning completely toward and away from the table. Obvious pathology should be noted if present and false positives are possible due to vessels and intestines. Although fluid may be obtained from any site, the HR can be the easiest location to aspirate from when large amounts of fluid are present. However, the ultrasound may be used to guide aspiration at any site fluid is found as long as other anatomy can be avoided.

**Figure 5: HR view – normal and abnormal**

The entire scan should take approximately 3-6 minutes to complete. Again, the intent is not to perform a full diagnostic scan. Maintain a “get in and get out” mentality regardless of ultrasound training and only look for fluid and obvious pathology. If a full scan is required, it should be performed at a later time after stabilization and other diagnostics have been considered.

**Abdominal FAST and Trauma**

Trauma comes in two major forms – blunt force (e.g. vehicular) and penetrating (e.g. bite wounds). AFAST is highly sensitive and specific for detecting free fluid with blunt force trauma. Unfortunately, it is less sensitive and specific for detecting free fluid with penetrating trauma due to the fact that these injuries are usually associated with smaller volumes of fluid.
Serial exams can help but caution is still advised. No matter which type of trauma is present, FAST is not accurate at localizing the source of the free fluid and hence the underlying injury.

**Abdominal Fluid Score (AFS)**

An abdominal fluid scoring system has been developed and reported in the dog (Lisciandro, 2009) that aids monitoring and clinical decision making. The AFS is achieved by assigning a point to each AFAST location where fluid is seen. This creates a scale of 0-4. Although exact volumes have not been correlated to each score, the higher the score the larger the volume of fluid in the abdomen. Paradoxically, the order of fluid formation is typically as follows: DH → CC → HR → SR. Regardless of the fluid type, the AFS can be used to monitor worsening or improving. Serial fast scans every 4-6 hours are recommended if fluid is initially found as AFS status often changes in response to therapy, for better or for worse. For example, bleeding can stop and blood can be reabsorbed with traumatic hemoperitoneum. On the contrary, scant fluid can markedly worsen once a patient with septic peritonitis is rehydrated.

The AFS is particularly useful with blunt force trauma in dogs. If fluid is found with blunt force trauma, hemorrhage is most likely (~97%) with urine being possible but uncommon (~3%). Rarely, bowel contents or bile can be seen. If hemoperitoneum is confirmed, AFS can be used to guide clinical decision making. Patients can be divided by score into “minor bleeders” (AFS 1 and 2) and “major bleeders” (AFS 3 and 4). In one study (Lisciandro, 2009), dogs with an AFS score of 3 or 4 were likely to develop anemia with 25% of those becoming severely anemic, often requiring a blood transfusion. As a result, the author uses the initial FAST scan to help set owner expectations as to what therapies may or may not be required. It is worth mentioning that most dogs with traumatic hemoperitoneum can be stabilized with blood products and do not need surgery. Whole blood (or packed cells combined with plasma) is ideal because trauma can induce numerous coagulation abnormalities that potentiate bleeding. Finally, if AFAST is not initially performed, the following have been correlated to an increased risk for internal hemorrhage and should prompt the clinician to reach for the ultrasound probe or perform blind centesis: lactate > 4.0 mmol/L, ALT >1000, pneumothorax, and pelvic fractures.

**The Gall Bladder Halo Sign**

The normal gall bladder (GB) visualizes as an anechoic structure with a thin, hyperechoic wall. Sometimes, pathology will cause thickening of the GB wall creating a thick hypoechoic layer surrounded by a thin hyperechoic rim on either side (Figure 6, inset picture below). This change is termed a “GB halo sign.” Curiously, the GB halo sign can manifest from non-gall bladder diseases such as primary hepatic disease, other local inflammatory diseases, free abdominal fluid, pericardial effusion, right sided heart failure, volume overload, and more recently, anaphylactic shock. The latter has received a lot of attention due to a study (Quants, 2009) that found elevated ALT and GB abnormalities were excellent biomarkers for diagnosing anaphylactic shock in dogs. Furthermore, a small subset of dogs with anaphylactic shock can
present with mild to marked hemoperitoneum with or without coagulation abnormalities (Lisciandro, 2016). The speaker has found AFAST helpful in diagnosing anaphylactic shock in dogs that present with ambiguous signs such as lethargy, collapse, vomiting, and/or diarrhea, but normalize their blood pressure (and/or other signs) upon presentation to the hospital. However, it is imperative to recognize that the GB halo is not pathognomonic for anaphylactic shock and the aforementioned differentials must always be considered. The cause of a GB halo sign can usually be narrowed down with a good history, physical exam, and thoracic FAST.

**Focused Exam #3: Thoracic FAST**

Thoracic FAST (TFAST) is used to evaluate the pleural and pericardial spaces for abnormal free fluid. The physiologic fluid normally found in these spaces is not routinely visualized on ultrasound. The primary indication for TFAST is respiratory distress; however, other indications include trauma, shock, unexplained lethargy or collapse, and anemia. With TFAST, no cat with pleural effusion should ever have to die on the radiology table again. All cats with respiratory distress should be given oxygen and immediately FAST scanned to determine if thoracentesis is indicated prior to further diagnostics.

Sternal recumbency or standing are preferred as these positions maximize oxygen exchange in the dyspneic patient. Flow by oxygen can be administered during the exam. For the more stable patient, lateral recumbency is acceptable but the patient must be flipped to examine both sides. The two primary sites that compose a standard TFAST are the chest tube site (CTS) and the pericardial site (PCS) as marked by tape in Figure 7. The CTS is visualized over the dorsal third of the chest anywhere between rib spaces 7 – 9. The PCS is visualized near the sternum anywhere between rib spaces 3-5. The probe is kept perpendicular in a longitudinal fashion with only enough probe pressure to maintain good image quality. Excessive probe pressure is painful to the patient! Both sites are examined on each side of the patient. Finally, many consider the DH site an essential part of the TFAST. Pleural effusion is visible at any of the sites whereas pericardial effusion is best visualized at the PCS or DH sites. Fluid can be aspirated at any site it is visualized except for the DH site.

**Figure 7: TFAST Locations**
Focused Exam #4: Lung ultrasound or VetBLUE

The final focused exam worth mentioning is a lung exam, termed, “veterinary bedside lung ultrasound exam, or VetBLUE.” Although much information can be gained from this exam, the most useful aspect for the general practitioner is the ability to differentiate a normal dry lung from an abnormal wet lung. Normally, the lung visualizes as a very hyperechoic line at the lung/pleural interface that glides back and forth with respiration. Due to the presence of air in the lung, a reverberation artifact creates horizontal lines (termed A-lines) under the lung/pleural interface that descend into the far field. When certain pathologies cause the lung parenchyma to become edematous, or wet, B-lines or lung rockets form. B lines visualize as echogenic bands that originate from the lung-pleura interface and extend into the far field, obliterating the normally visualized A-lines. In summary, dry lungs will display A-lines and wet lungs will display lung rockets (B-lines). A small percentage of animals can normally have a few sparse lung rockets at one site, on each side. However, the vast majority of patients will have completely dry lungs with no lung rockets visualized.

The VetBLUE is performed by examining the lung at 4 sites on both sides of the chest as marked by tape in Figure 8. Alternatively, a four quadrant approach can be used. The four sites are named for their regional approximations: the caudodorsal lung lobe, the perihilar lung lobe, the middle lung lobe, and the cranial lung lobe. Visually, these form a check mark or hockey stick when looking at the dog’s chest. The probe is held in the same longitudinal fashion and the region is evaluated by fanning the probe in all directions. The goal is to evaluate the lung parenchyma in that region for dryness or wetness. The number of lung rockets is recorded at each site as follows: 0, 1, 2, 3, 3+ or infinite if the entire field appears wet.

Figure 8: VetBLUE Locations

Common conditions causing lung rockets include pulmonary edema, non-cardiogenic pulmonary edema, pneumonia, contusions, hemorrhage, atelectasis, fluid overload, pleuritis, and acute respiratory distress syndrome. Causes of dyspnea such as upper airway problems, inflammatory lung disease, and non-respiratory look-a-likes typically do not cause lung rockets. It is important to recognize that pathology MUST reach the lung surface in order to be detected by ultrasound. As a result, focal, centrally located lung disease is a common reason for false negative results.
with VetBLUE. Although VetBLUE cannot and should not replace traditional thoracic radiographs, it can be a valuable adjunct that narrows the differential list when its findings are combined with a signalment, history, and physical exam. VetBLUE can provide information that helps directs supportive therapies either prior to obtaining thoracic radiographs or when thoracic radiographs are non-discriminatory.

Conclusion
With the discovery and clinical application of numerous focal exams, there is no excuse to not utilize the ultrasound on a daily basis. Veterinarians should avoid the thinking that ultrasound is reserved for full diagnostic exams only. Given ultrasound’s capabilities, it is easy to see why human physicians have described focal exams as “the stethoscope of the future” (Filly 1998) and an “extension of the physical exam” (Rozycki 2001). In conclusion, focused exams can increase utilization of a currently owned ultrasound or justify the purchase of a new machine for any private practitioner.

References (alphabetical order)


FELINE URETHRAL OBSTRUCTION: UPDATES AND CONTROVERSIES
Marc Seitz, DVM, DABVP (Canine and Feline Practice)
Assistant Clinical Professor of Emergency Medicine
Mississippi State University College of Veterinary Medicine
Email: marc.seitz@msstate.edu

Introduction
Feline urethral obstruction (UO) is a common complication of feline lower urinary tract disease (FLUTD) in male cats. Much of what is considered standard of care remains unchanged. Goals of therapy include patient stabilization, a diagnostic work-up to identify the underlying cause, restoration of urethral patency, supportive care, and long term management of the underlying disease. This session will address clinically applicable updates and controversies regarding care of feline UO. A complete review of UO is beyond the scope of this session.

EMERGENCY STABILIZATION
Feline UO has the potential to cause severe morbidity and even mortality due to the resultant hyperkalemia, metabolic acidosis, cardiovascular compromise, arrhythmias, uremia, and acute kidney injury. Once obstruction occurs, these metabolic derangements occur within 24 hours and, if untreated, death ensues within 3-6 days. Despite this, evidence (Lee 2003) and clinical experience demonstrates that only a small percentage (~12%) of patients present severely metabolically affected. Still, most patients do benefit from some form of stabilization.

Fluid choice:
Fluid therapy in the form of isotonic crystalloids is the cornerstone of stabilization. Traditionally, normal saline (0.9% NaCl) was considered the fluid of choice over concerns of exacerbating hyperkalemia through the administration of potassium containing fluids. However, evidence now supports that balanced isotonic crystalloids such as Lactated Ringer’s and Plasmalyte are not only safe, but probably more ideal. Two separate studies (Cunha 2010 and Drobatz 2008) demonstrated that balanced crystalloids corrected metabolic acidosis faster in cats with UO and did not delay time to normalization of potassium as compared to normal saline. These findings make sense within the context of fluid physiology. First, the amount of potassium in these solutions (4-5mEq/L) is proportionally negligible compared to total body potassium stores and plasma concentrations. Considering boluses in cats rarely exceed a blood volume (~250mL), clinicians are effectively giving a cat a single mEq of potassium during stabilization. Second, balanced isotonic solutions contain a buffer that combats metabolic acidosis whereas saline is acidifying due to its lack of a buffer, low strong ion difference, and supraphysiologic chloride content. Finally, inorganic acidosis potentiates hyperkalemia so correcting it helps lower the potassium concentration. Key point: reach for your balanced crystalloid of choice when treating blocked cats!

Fluid resuscitation and rate:
Anecdotally, the author has witnessed that clinicians tend to under-resuscitate blocked cats due to their fear of “fluid overload.” Concern over fluid overload stems from the fact that the cat’s shock organ is the lung and severe UO can cause acute kidney injury/failure. Although possible, fluid overload appears to be uncommon among blocked cats and is typically not fatal. In one published abstract (Ostroski 2013), a teaching hospital with a high annual case load of blocked cats (~80-100) only reported fluid overload in 17 cats over a 10 year period. Sixteen cats
survived to discharge and one was euthanized due to reobstruction. Curiously, 7 cats were diagnosed with underlying heart disease. Thus, it is important to consider occult hypertrophic cardiomyopathy if fluid overload does occur. This aforementioned study matches the author’s clinical experience in that fluid overload in blocked cats is uncommon and most cats with urethral obstruction need and can handle aggressive fluid therapy.

Consider titrated boluses (10-20ml/kg) of balanced crystalloids for patients with cardiovascular compromise and/or a higher initial rate (40-60ml/hour per cat) for the first 4-6 hours. Be cautious of diagnosing acute renal failure in an under-resuscitated cat, especially in the context of a concentrated urine specific gravity. Once the urine output increases (>0.5ml/kg/hr), fluid therapy may be tailored to the individual patient taking into account diuresis, replacement of dehydration, and ongoing losses from post-obstructive diuresis. It is important to remember that fluid therapy is dynamic and the patient’s needs can rapidly change. For example, although rates of 20-30ml/hour are appropriate for most cats following stabilization, patients that develop post-obstructive diuresis can require rates of 50-100ml/hour for a short period of time to maintain euvoemla. For this reason, urine output monitoring every 2-4 hours via a closed collection system is recommended, especially in the face of severe metabolic compromise. Studies (Francis 2010 and Frohlich 2015) suggest that the presence of a metabolic acidosis is significantly correlated with the development of a post-obstructive diuresis. Unfortunately, the duration of significant diuresis is highly variable but usually relatively short lived (6-12 hours). The author recommends slowly tapering the fluid rate every 2-4 hours while closely monitoring perfusion parameters to prevent iatrogenically perpetuating significant polyuria. Key point: Don’t under-resuscitate blocked cats in fear of fluid overload.

Hyperkalemia – ECG findings
Traditionally, studies on ECG changes associated with experimentally induced hyperkalemia in otherwise healthy animals produce predictable changes at escalating potassium concentrations that we all memorized early in our veterinary careers. Changes (in order of progression) include tall, spiked T waves, prolonged QRS complexes and P-R intervals, depressed P waves, atrial standstill, and eventual asystole or other terminal arrhythmias. One would logically assume that a tachycardia on physical exam could be used to rule out life threatening hyperkalemia among block cats. Unfortunately, this is not the case. In one study of cats with naturally occurring hyperkalemia, ECG abnormalities correlated with experimentally reported reference ranges less than half the time (Tag 2008). Furthermore, wide-complex tachyarrythmia has been reported in cats with naturally occurring UO (Norman 2006). Key point: tachycardia and ECG findings do not rule out metabolic compromise – obtaining a potassium concentration is imperative.

Hyperkalemia – emergency management
The emergency management of hyperkalemia involves numerous strategies, all of which contribute small changes that add up significantly. First, calcium gluconate (1ml/kg of 10% solution) is immediately administered to restore the resting membrane potential of cardiomyocytes. Due to the short lived (10-15 minutes) mechanism of action, therapies that lower the potassium must quickly follow. It is imperative to recognize that fluids and restoration of urethral patency are the single most important part of managing hyperkalemia. Together, they dilute the potassium concentration, resolve metabolic acidosis (which shifts potassium intracellularly), and promote renal excretion of hydrogen ions. Fluids should be started
immediately – not after unblocking occurs. Since organizing supplies and technical help to perform the unblocking can take time, drugs are often given to temporarily shift potassium back into the cell, effectively lowering the intravenous potassium concentration. The co-administration of dextrose (1mL/kg of 50% solution) and insulin (0.25U/kg) intravenously is well established in the literature and together are capable of decreasing the potassium concentration by 0.5-1 mEq/L. In the author’s experience, rapid intervention with fluids, calcium gluconate, dextrose, and insulin have been sufficient to stabilize even the most severe hyperkalemias in a short amount of time. Some sources advocate the use of sodium bicarbonate intravenously at 1-2mEq/kg IV over 10-15 minutes. However, clinical studies have found it to be weak and inconsistent in reducing hyperkalemia (0-0.4mEq/L) relative to other therapies. Additionally, it takes 10-15 minutes to administer during which time other therapies and fluids cannot be administered. Finally, sodium bicarbonate has the potential for complications such as worsened ionized hypocalcemia (already a problem among blocked cats), hypotension, hypernatremia, and/or paradoxical acidosis in the central nervous system. For these reasons, the author rarely administers this drug. Curiously, evidence exists for the potential role of beta-2 agonists such as albuterol or terbutaline in lower potassium concentrations by up to 0.5-1.0mEq/L. For hyperkalemia refractory to standard therapies (fluids, insulin, and glucose), clinicians may want to consider these drugs prior to the administration of sodium bicarbonate due to their ease of administration and safety. Albuterol may be administered via an inhaler with spacer and mask (e.g. AeroKat) at standard dosages while terbutaline can be given subcutaneously or intramuscularly at 0.01mg/kg. Key points: Fluid therapy, calcium gluconate, insulin, and dextrose will appropriately manage most cases of hyperkalemia. For refractory hyperkalemia, perhaps beta-2 agonists are a better choice than sodium bicarbonate.

Ultrasound findings
With the increasing availability of ultrasound, more and more clinicians are using this diagnostic technique on patients with UO, either as a focal/emergency scan or a complete diagnostic exam. Given the medical adage, “look and you will find,” it is prudent to consider commonly observed pathologies and their clinical significance (or lack thereof). A very recent retrospective study (Nevins 2015) described the following common ultrasonographic findings among 87 cats with naturally occurring urethral obstruction (and without cystocentesis): echogenic urine sediment, bladder wall thickening, pericystic effusion, hyperechoic pericystic fat, and increased urinary echoes. Specific to the kidneys, mild pylectasia, renomegaly, perirenal effusion, hyperechoic perirenal fat, and ureteral dilation were observed. The authors found no association among any findings and the risk for recurrent UO. Most of the findings make sense within the current paradigm of UO pathophysiology; mainly an underlying inflammatory bladder disease that forms gross urinary constituents that causes mechanical obstruction and resultant ascending genitourinary pressure. One finding that is surprising and previously unreported is the presence of pericystic fluid. Although the exact nature of fluid and its cause (e.g. transmural leakage of urine vs inflammatory/modified transudate) has not been studied, bladder rupture appears to be uncommon and similar findings have been reported elsewhere (Cooper 2013 and Hall 2015). Key points: Don’t let ultrasound findings change your prognosis. Don’t assume bladder rupture if free fluid is found during an ultrasound exam.

Anecdotally, three other points are worth mentioning regarding ultrasound. First, the author has seen a limited number of cases where urinary sediment was so severe or a blood clot so large that
medical management failed and surgery was needed to clean out the bladder. Ultrasound may have a role in identifying these cats sooner. Second, the author has found ultrasound to be a highly valuable tool to screen for uroliths in cases where cost precludes abdominal radiographs. Finally, ultrasound can be used in place of radiographs to confirm proper indwelling urinary catheter placement.

Cystocentesis
Cystocentesis carries numerous theoretical advantages and disadvantages. Arguments for its use include obtaining a sterile sample for urinalysis and culture as well as decreasing pressure, which restores glomerular filtration and may make unblocking easier. Critics cite numerous risks such as the extravasation of urine through the needle track, bladder laceration, and aortic puncture or tear. Despite these concerns, clinical experience and studies (Cooper 2013 and Hall 2015) suggest that a single cystocentesis (by experienced personal) appears to be safe [key point]. Anecdotally, bladders that rupture tend to appear very diseased (purple to black) on gross inspection.

SUPPORTIVE THERAPIES (POST-STABILIZATION PERIOD)

Does standard of care matter?
Oftentimes, clients (and sometimes veterinarians) wonder if hospitalization for standard of care for feline UO really matters. “Isn’t there a cheaper option?” they ask. Although evidence is limited, standard of care does appear to improve outcomes and lower the risk of recurrent UO. One published study (Cooper 2010) of cats with naturally occurring UO described a protocol without urethral catheterization consisting of sedation, reduced environmental stress, and intermittent cystocentesis. Curiously 73.3% (11/15) cats cleared their obstruction and had a similar 30 day reobstruction rate as reported in the veterinary literature. Limitations of the study include a small study population (n=15) and the exclusion of cats that were severely sick on admission. Notably, those that did not clear their obstruction had severe consequences (uroabdomen or hemoabdomen) that led to euthanasia in three cats. Data by the author (Seitz 2016) demonstrates that standard of care (indwelling catheterization and hospitalization for supportive therapy) significantly reduces the incidence of recurrent UO within 30 days as compared to single catheterization and outpatient supportive care (10.9% vs 31.1%, respectively). Cats treated with outpatient care were 3.7 times (p = 0.0175, 95% CI 1.2 – 11.4) more likely to experience recurrent UO than cats treated with standard of care. Survival in this study was comparable to the current veterinary literature. Key Points: Standard of care is superior to alternative therapies regarding risk for recurrence and survival to discharge. However, alternative therapies appear reasonable if cost prohibits standard of care.

Catheter size:
In humans, consensus guidelines by the CDC (Gould 2009, pp12) recommend “the smallest bore catheter possible, consistent with good drainage, to minimize bladder neck and urethral trauma.” In male cats, a size 3.5 Fr catheter fulfills these criteria most of the time. A recent veterinary study (Hetrick 2013) supported this recommendation by documenting a two-fold increased risk for re-obstruction within the first 30 days of discharge from hospitalization whenever a size 5 Fr indwelling catheter was used compared to a size 3.5 Fr. However, a different study (Eisenberg 2013) did not find catheter size influenced risk for recurrence. A larger catheter size (e.g., 5Fr) may be beneficial in patients with large amounts of urinary constituents that result in obstruction
of urine flow of smaller catheters. Further studies are needed to better determine the advantages and risks of indwelling catheter size in patients with FUO. **Key Point:** It is reasonable to start with the smallest catheter size possible; however, if it becomes obstructed with urinary constituents, a larger size may be considered.

Although not considered new information, it should be noted that catheter material choice is established in the literature (Lees 1980 and Gould 2009). Although rigid catheters made of polypropylene (e.g. “Tomcat” catheters) are appropriate for the initial unblocking, they contribute to worsening hematuria and severe histologic lesions relative to softer materials such as polyvinyl, silicone, or latex. **Key point:** More appropriate indwelling catheters include red rubber and Slippery Sam catheters.

**Catheterization duration:**
Evidence is greatly conflicted regarding the ideal duration of catheterization. Two studies are in conflict as to whether duration of catheterization influences risk for urethral obstruction (Hetrick 2013 and Eisenberg 2013). CDC guidelines (Gould 2009) and veterinary evidence (Hugonnard 2015) support the use of shortened indwelling times in an effort to reduce the risk of bacteriuria and catheter-associated infections. **Key point:** At this time, catheterization duration should reflect individual patient needs with respect to monitoring urine output, clearing gross urinary debris, minimizing iatrogenic trauma, and minimizing infection.

**Antibiotics:**
The discussion of antibiotic use in cats with FLUTD and UO can get heated really quickly. Like many treatments in veterinary medicine, the author prefers an evidence-based approach. Rather than applying a rigid position to all patients, consider the risk factors unique to each patient and elucidate those factors with appropriate diagnostics. For example, it is well established that the incidence of bacterial infection is incredibly low (<2%) in otherwise healthy male cats with UO. In contrast, the incidence of infection dramatically increases if you are a cat that is over the age of 10 or living in Norway. Unfortunately, the primary treatment for urethral obstruction (i.e. urethral catheterization) increases the risk for infection as well. However, the risk for infection is still relatively low if appropriate sterile technique and catheter care is used and the catheter is pulled when medically appropriate. Finally, it is well established that antibiotics do NOT prevent catheter-associated infection, and, if it is to occur, the bug is more likely to be resistant.

As a result, consider the following practical points when deciding on the use of antibiotics:
- The routine use of empirical antibiotics in young, otherwise healthy male cats living in the United States is not necessary – even after catheterization.
- Perform appropriate diagnostics. Perform a urinalysis at admission and ideally a urine culture (obtained via cystocentesis) after catheter removal to help detect the small percentage of cats that naturally have or iatrogenically develop bacterial cystitis.
- Identify risk factors that increase the potential for an infection, mainly being female, inappropriate catheter technique, or prolonged catheterization time. If a risk factor is present, urine culture becomes even more important.
- If empirical use of antibiotics are to be used due to the client declining standard of care (which includes appropriate diagnostics), do not start the antibiotic while the catheter is indwelling.
If infection is suspected or confirmed while the catheter is indwelling, the antibiotic may be started.

**Urethral relaxant drugs**

Drugs that relax the urethra are commonly used in the management of UO. Drugs can be divided based on their ability to relax the smooth-muscle containing proximal urethra (e.g. prazosin, phenoxybenzamine, and acepromazine) or the skeletal-muscle containing distal portion (benzodiazepines). Although these drugs have a strong theoretical role, evidence that they affect outcomes by reducing the risk for obstruction is lacking. One double-blinded, placebo controlled study (Thomas 2012) presented in abstract form failed to show a reduction in the recurrence rate of UO in cats treated with prazosin one month after initial obstruction. However, the study appeared underpowered given its treatment group size (20 and 16) and its relatively low incidence for obstruction (5-8%) relative to other studies. No other peer reviewed clinical evidence exists. One retrospective study did demonstrate that prazosin may be superior to phenoxybenzamine in preventing recurrent UO (Hetrick 2013). However, the study design does not allow one to conclude that urethral relaxants in general preventing recurrent UO due to the retrospective nature and lack of a control. Although efficacy is lacking, these drugs due appear safe. At this time, the author commonly uses a benzodiazepine (with pain medications and other drugs) for sedation during the initial unblocking. Acepromazine can be considered in hemodynamically stable cats during hospitalization, as well. At this time, the author does discharge all patients with prazosin and a pain medication (e.g. buprenorphine) but recognizes evidence is lacking for the former.

**Intravesicular drugs**

Current standard of care involves instillation of isotonic fluids into the bladder to flush gross urinary constituents. However, intravesicular drugs have fallen out of favor over time due to their lack of efficacy or theoretical concern over increased permeability when the bladder wall is inflamed. Evidence still does not support the instillation of antibiotics, antiseptics, pain medications, or anti-inflammatories. However, one randomized, blinded, placebo-controlled pilot study (Bradley 2014) recently documented a reduction in incidence of recurrent UO that approached significance (P = 0.06) seven days after instillation of an intravesicular glycosaminoglycan (GAG). On the contrary, a larger randomized, blinded, controlled study using a different GAG product did not find a reduction of clinical signs or incidence of recurrence (Dellile 2015). Given the possible role of a defective GAG layer of the uroepithelium in cats with idiopathic cystitis, further research is indicated. However, at this time, research does not support the widespread application of this practice.

**References (alphabetical order).**

Introduction
MacGyver is the main character of the popular 1980’s television series of the same name. The central premise of the show was that MacGyver could solve complex problems using simple, everyday objects. Like MacGyver, veterinarians are sometimes forced into situations in which creative problem-solving is necessary. Although veterinarians invest in at least four years of graduate level training augmented by countless hours of clinical experience and continuing education to learn the ideal way to treat diseases, clients are sometimes unable (or unwilling) to pursue standard of care for their pets. This is especially true when the condition occurs suddenly and unexpectedly. When a disease is severe enough, this can create a potentially life-threatening predicament for both the pet owner and the veterinarian. At that time, diagnostic and treatment plans become dependent on clinical prowess, probabilities, and informed consent. In short, we are forced to practice “MacGyver medicine,” a phrase the author uses for deviations from standard of care that are potentially less effective but humanely reasonable given the client’s circumstances. This session will review alternative diagnostic and treatment strategies for common emergencies when standard of care is not possible. Recent literature will be reviewed where applicable. Blonde mullets and brown leather jackets are optional.

MacGyver medicine should not replace standard of care
If there was ever a time for a disclosure, it is now. First, although the author both enjoys and strongly advocates for MacGyver medicine, it should NEVER replace standard of care. Most of the time, owners can and are willing to do what is in the best interest of their pets. This does not mean we should practice defensive or excessive medicine; however, we should always provide medicine that advocates for the pet’s best outcome. When standard of care has been discussed and declined, MacGyver medicine is appropriate, especially in the face of alternatives such as no treatment whatsoever or euthanasia. In short, continue to practice the medicine you were trained to do, but enjoy these clinical pearls when the situation necessitates them.

Secondly, MacGyver medicine is best applied to the stable patient who is mildly or moderately affected by their disease process. Severely debilitated patients are poor candidates for MacGyver medicine, because prognosis for a favorable outcome significantly drops and prolonged suffering is possible. Disease severity and prognosis should always be discussed with the client. There are times when treatment alternatives are best left off the table.

MacGyver Medicine Strategies
When considering MacGyver medicine, the following three strategies will help to maximize outcomes:

1. **Differentiate stable from unstable pets**: One of the most essential clinical skills is the ability to differentiate sick but stable pets from hemodynamically unstable pets. Fundamentally, this means looking for shock or diseases process that rapidly lead to...
shock. In addition to a thorough physical exam, inexpensive triage tools that help evaluate patients include a lactate meter, benchtop venous blood gas, blood pressure, pulse oximetry, and focused ultrasound techniques.

2. **Maximize diagnostic yield:** As students, we are taught to throw a minimum database (i.e. a complete blood count, chemistry panel, and urinalysis) and imaging studies at almost every sick pet. MacGyver medicine diagnostic plans take on two strategies. The first is to use diagnostics that rule out diseases or processes that would inflict severe harm if undiagnosed or that would significantly change the treatment plan. The second is to choose diagnostics in order of the most probable differential to the least rather than casting a wide diagnostic net to see what shows up.

3. **Choose the biggest treatment bang for your buck:** Veterinarians (and physicians) love to prescribe drugs. We also love the latest and greatest. Both of these have the potential to increase the cost of treatment. MacGyver medicine is the time to avoid polypharmacy as well as to utilize drugs or therapies that are oldies but goodies.

With these strategies in mind, let’s take a look at how MacGyver medicine can be used to manage feline urethral obstruction, canine parvovirus, vomiting and diarrhea, and left sided congestive heart failure. The author has chosen these conditions as suitable candidates for MacGyver medicine because they are frequently seen in practice and have the potential to respond fairly well to deviations from standards of care.

**Feline Urethral Obstruction**

Feline urethral obstruction (UO) carries the potential for severe morbidity and mortality. Approximately 24 hours after obstruction occurs, sequelae such as hyperkalemia, azotemia, metabolic acidosis, cardiovascular compromise, arrhythmias, uremia, and acute kidney injury begin and worsen with time. If untreated, death ensues within 3-6 days. Despite the potential for these severe pathophysiologic consequences, the majority of patients (~90%) with UO present relatively stable, with only mild metabolic derangements. As a result, the short-term prognosis, as defined by survival to discharge, is considered very good (91.1% - 93.6%) with appropriate treatment. In contrast, the long-term prognosis, as defined by recurrence of urethral obstruction, is guarded (15% - 36%). The week after initial treatment appears to be the most likely time period for reobstruction to occur.

The standard therapeutic approach for feline UO is well described in the veterinary literature (Balakrishnan 2013), and includes immediate stabilization of life-threatening sequelae, restoration of urethral patency, and hospitalization for further diagnostics and supportive care. A standard diagnostic workup includes a complete blood count (CBC), chemistry profile, urinalysis, abdominal radiographs (and/or ultrasound), and a urine culture. Indwelling urethral catheterization is used to maintain urethral patency and monitor urine output during hospitalization. The urethral catheter is typically removed once the urine output has normalized, metabolic derangements have improved, and any gross urinary constituents have resolved. Depending on the region of the country, standard of care for routine cases can range between ~$1,000 and $2,500. Less expensive alternatives exist and carry a lower but fair chance at success.

As mentioned above, one of the keys to success with MacGyver medicine is appropriate case selection. Since ~90% of patients present stable (i.e. potassium concentration < 8.0 mmol/L and
a pH < 7.10), outpatient therapy is reasonable, as metabolic derangements become self-limiting once the obstruction is cleared. The key is differentiating stable cats from unstable ones to reduce the potential for harm with this plan. The physical exam is a reasonable place to start but carries some limitations. Obvious signs that a cat is unstable include abnormalities of standard perfusion parameters that indicate shock: bradycardia, pale gums, prolonged capillary refill time, dull mentation, and hypothermia. For example, one study (Lee 2003) showed that bradycardia (< 120 bpm) and hypothermia (<95-96.6 °F) were accurate predictors of hyperkalemia. Unfortunately, a normal to elevated heart rate can never rule out severe hyperkalemia (Tag 2008 and Norman 2006). An ECG can be used to evaluate for hyperkalemia associated arrhythmias; however, the potassium concentration only correlates with predicted textbook ECG findings approximately half the time in vivo (Tag 2008). Furthermore, placing ECG leads on a painful or fractious cat can prove challenging. Perhaps the most ideal means of evaluating a cat with urethral obstruction for hyperkalemia is with venous blood gas analysis. For approximately $40-75 (cost to the client), the clinician can rapidly (< 5 minutes) measure electrolytes, pH and other useful parameters. The author thoroughly enjoys the Abaxis iStat for its speed and ease of use; however, other bench top analyzers are appropriate. If standard of care is not possible, outpatient therapy is reasonable for cats with only mild to moderate metabolic derangements. Let us now consider two main options for MacGyver medicine that have been reported in the veterinary literature.

**MacGyver medicine option #1:** The first option is to manage cats with a single urethral catheterization and outpatient supportive therapy. Some variation of this first option is probably what most veterinarians have tried at some point in their career. Once a cat is deemed “stable,” it is sedated with any number of protocols. The author frequently uses dexmedetomidine (5-10mcg/kg), butorphanol (0.2-0.4mg/kg), and midazolam (0.2mg/mg) because they are effective and the dexmedetomidine is rapidly reversed. If further sedation or an alternative is needed, propofol can be titrated to effect with or without intubation and general anesthesia. Although ketamine and Telazol are equally appropriate choices, the author avoids these drugs due to the need for a prolonged recovery. Once heavy sedation is achieved, a routine sterile unblocking procedure is performed at the clinician’s preference. The bladder should be lavaged with sterile saline until grossly clear to reduce the concentration of gross urinary constituents. The patient is then recovered, and additional supportive therapies, such as stronger pain medications (e.g. buprenorphine) and subcutaneous fluids, are administered. Patients are sent home with pain medications (e.g. buprenorphine) and drugs for urethral spasm (e.g. prazosin, phenoxybenzamine, or acepromazine). Increasing water intake, making a dietary change, and modifying the environment are essential long term management strategies.

In addition to performing a venous blood gas, the author prefers to perform at a minimum a urinalysis and focal ultrasound of the bladder. These diagnostics help screen for active sediment, crystals, and stones, all of which change the long term treatment plan and prognosis. Other diagnostics (full bloodwork, radiographs, and a urine culture) can be performed according to the owner’s budget or saved for a follow-up visit at a later date.

Until recently, literature has been lacking on how deviations from standard of care affect long term prognosis. Recent data (Seitz 2016) indicate that cats treated with this outpatient protocol are 3.7 times more likely to reobstruct as compared to more traditional standard care (31%
recurrence rate versus 11%). However, that means 69% of cats recover with a treatment plan that is only a third of the cost of standard of care treatment. If reobstruction occurs, sometimes the outpatient protocol can be a stopgap that provides owners the needed time to secure funds for more ideal treatment. In the Seitz et al. (2016) study, only one cat out of forty-six in the outpatient group died after discharge.

**MacGyver medicine option #2:** Although the speaker does not personally advocate or practice the following plan as an initial approach, a second option has been described in the veterinary literature (Cooper et 2010). With this protocol, stable cats without urolithiasis were managed in the hospital without a urinary catheter. At presentation, cats were sedated so penile massage and cystocentesis could be performed. Cats were then placed in a low stress environment and received supportive therapies such as pain medications, urethral relaxants, and subcutaneous fluids the remainder of hospitalization. Intermittent cystocentesis was repeated as needed. Curiously, 11/15 (73%) cats in this study cleared their obstruction and had a 30-day reobstruction rate (22%) that was similar to the rate reported in the veterinary literature for standard care (15-36%). However, those that did not clear their obstruction had severe consequences (uroabdomen or hemoabdomen) that led to euthanasia in three cats. It is for these reasons that the author prefers an outpatient catheterization protocol. That being said, the author has used the plan for patients already hospitalized for standard care that appear to functionally re-obstruct (i.e. due to urethral spasms) following indwelling catheter removal.

**Canine Parvoviral Enteritis**

A second routine condition with evidence supporting outpatient management is canine parvovirus. Canine parvovirus infects rapidly dividing cells to cause syndromes that range from mild gastroenteritis to severe sepsis, depending on the viral load and the host’s immune response. Although the majority of patients (~90%) die if parvovirus is left untreated, with treatment, the majority of patients survive (~90%). Reasons for death usually relate to sequelae such as dehydration, electrolyte abnormalities, hypoglycemia, aspiration pneumonia, intussusception, organ failure, and sepsis. The standard therapeutic approach is well established (Vier 2014) and involves a complete diagnostic workup and hospitalization for supportive care while the patient clears the virus. Typical diagnostics include an ELISA exam for parvo, a complete blood count, serum chemistry, urinalysis, fecal exam, and sometimes abdominal imaging. Therapies include intravenous fluids, anti-emetics, gastroprotectants, antibiotics, early enteral feeding, and good nursing care. Depending on the length of hospital stay and complications, care for typical cases can average between $1,000 and $2,500. Because canine parvovirus can occur shortly after an owner purchases or adopts a dog, the expense associated with treatment is often unexpected, and some owners are limited in the care they can provide.

Managing parvoviral enteritis on an outpatient basis is not a novel concept; however, little is known about how it compares to standard of care – until recently. A recent study out of Colorado State University (Venn 2016) evaluated inpatient versus outpatient care for parvovirus. All dogs received intravenous fluids at admission to stabilize cardiovascular parameters and then were randomized into one of two groups. The inpatient group received intravenous fluids, enteral nutrition, maropitant, and cefoxitin. The outpatient group also received enteral nutrition and maropitant, but fluids were given subcutaneously and cefovicin was used instead. Additionally, uncontrolled nausea was treated with ondansetron and uncontrolled visceral pain.
was treated with buprenorphine. For the outpatient group, hypoglycemia and hypokalemia were managed with corn syrup and Tumil-K respectively. A detailed copy of the protocol with drug dosages is available at the following address: http://csu-cvmbs.colostate.edu/documents/parvo-outpatient-protocol-faq-companion-animal-studies.pdf

In the Venn study, the outpatient protocol was successful in 80% of dogs (16/20) as compared to 90% success in the inpatient protocol (18/20). While the study found no statistical difference between the two groups, a Type II error is probable based on the small sample size and unexpected similarity in rates. Of the four dogs who failed therapy, two died, one was euthanized, and the fourth was converted to inpatient care due to a worsening clinical condition. When considering the high success rate of the outpatient protocol, one important detail is worth mentioning – the outpatient group was actually hospitalized, too, for the purposes of the study. This allowed close monitoring, nursing care, and daily bloodwork that permitted adjustments to therapy. In a real world setting, hospitalization and intensive monitoring would likely not be possible. Even daily recheck exams and bloodwork are usually cost prohibitive. As a result, success rates may be lower, as reflected by the speaker’s anecdotal experience (~60-70%) and an unpublished study out of the University of Pennsylvania (~67%). Similar to the treatment of blocked cats, inpatient care should still remain the gold standard, but outpatient care is a reasonable alternative in stable patients, as long as clients understand the risks.

A few other updates related to managing parvoviral enteritis on an outpatient basis are worth mentioning. First, early enteral nutrition is considered ideal for diseases such as parvoviral enteritis and pancreatitis. Early feeding prevents enterocyte atrophy, which helps maintain mucosal integrity and repair. In one study (Mohr 2003), feeding dogs with parvovirus within 12 hours of hospitalization was associated with improved weight gain and clinical signs as compared to fasting until 12 hours after vomiting has stopped. Second, oral recuperation fluids (ORFs) are now available and may have a role in treating parvovirus. One product that contains a proprietary blend of vitamins, minerals, fatty acids, and amino acids was recently studied. Tenne et al (2016) demonstrated that some dogs recovering from parvovirus would voluntarily consume an ORF. Dogs that consumed the ORF started eating more quickly and consumed more calories compared to dogs who drank only water or dogs who did not consume any oral liquid. ORFs may provide a way to hasten recovery with outpatient protocols as well. Third, the jury is still out regarding the role of antivirals with parvovirus. Although one study (Savigny 2010) found that oseltamivir (Tamiflu) significantly improved body weight and white blood cell counts as compared to a control, the drug did not influence hospitalization time, clinical scores, treatments needed, morbidity, or mortality. Although the speaker has used oseltamivir quite often, its role in outpatient care is questionable given its high cost relative to its unclear therapeutic benefit. Finally, a recent prospective, randomized, double-blinded controlled study (Bragg 2012) found that canine-parvoviral immune plasma did not reduce clinical signs, viremia, or CBC changes as compared to a saline control. When choosing any adjunct therapy, it is important to consider the cost-benefit ratio. For example, food is expensive with good literature that it may contribute to clinical outcomes. To the contrary, Tamiflu is $~150 (1/3 the cost of an entire outpatient treatment protocol) with no evidence that it improves outcomes.
**Vomiting and diarrhea**

The pet with vomiting and diarrhea is one of the more common appointments in private practice. MacGyver medicine in a patient with acute vomiting and diarrhea is nothing new – it involves symptomatic treatment with your anti-emetic and anti-diarrheal of choice, with or without subcutaneous fluids. However, patient selection becomes vitally important so as not to miss a severe underlying disease. Informed consent for the MacGyver approach must be present and the owner must understand the risks. When an owner presents a patient with vomiting and diarrhea and expresses concerns about cost, focus shifts from identifying the exact etiology to differentiating stable from unstable patients. In these situations, the author uses key physical exam findings and inexpensive triage tools to make certain that patients are good candidates for outpatient therapy.

On physical exam, the patient must have normal perfusion parameters and lack abdominal pain. A lactate is an inexpensive blood test to rule out occult perfusion abnormalities and hence shock. If bloody diarrhea is present, a PCV/TS is a valuable tool to screen for hemoconcentration associated with hemorrhagic gastroenteritis. Although not always available, a venous blood gas is a great way to rule out severe metabolic and electrolyte abnormalities. A normal venous blood gas also makes conditions like severe renal disease, diabetic ketoacidosis, and ethylene glycol intoxicosis unlikely. Normal electrolytes make an Addisonian crisis less likely as well. Focused abdominal ultrasound can be used to screen for free fluid associated with more severe causes of acute abdomen like severe pancreatitis, septic peritonitis, or hemoperitoneum. Finally, age can be used to direct a limited diagnostic work up. The author will choose abdominal radiographs over full bloodwork in a young animal and vice versa. The number and exact tests chosen is situation dependent. If no significant abnormalities are found, administer outpatient supportive care with confidence, but always discuss with the owner an appropriate timeline for follow up and next steps if the pet is not improving. As mentioned above, sometimes outpatient therapy provides a stopgap in the stable patient to allow time for owners to secure funds for more extensive diagnostics and treatments.

**Left-sided congestive heart failure**

One final condition that is common and scary for both the owner and veterinarian is congestive heart failure (CHF). The scope of this final section will be limited to dogs with suspected myxomatous mitral valve disease (MMVD) and left sided CHF. However, the fundamentals may be applied to other causes of heart failure such as dilated cardiomyopathy in dogs and hypertrophic cardiomyopathy in cats. Left-sided CHF in dogs is the clinical consequence of excessive fluid accumulation in the pulmonary parenchyma secondary to reduced cardiac output and neurohormonal compensatory mechanisms. The complete diagnosis and management of MMVD and heart failure is well described elsewhere (Atkins 2009). Routine diagnostics may include assessment of oxygenation, thoracic radiographs, a minimum database (CBC, chemistry, and urinalysis), electrocardiography, blood pressure, and echocardiography once stable to confirm the underlying etiology. Emergency treatments include oxygen therapy (if hypoxemia is present), sedatives, furosemide, and pimobendan. If a textbook approach is taken, initial diagnostics and emergency treatment can range from $1,000-$3,000 depending on the length of hospitalization. Unfortunately, the speaker is unaware of any clinical studies evaluating reduced-cost inpatient care or outpatient alternatives to managing congestive heart failure. As a result, what follows is mostly anecdotal.
Similar to before, diagnostics can be limited to those absolutely essential for making the correct diagnosis and following response to therapy. Because different causes of respiratory distress can look identical, the history and physical exam can be used to increase or decrease the odds of CHF and thus augment information gained during further diagnostics. After all, many dogs will present with clinical signs of heart disease (i.e. a heart murmur) but not be in heart failure. Unfortunately, no history or physical exam findings are pathognomonic for heart failure. First, because CHF is a sympathetic nervous system-driven response to severe heart disease, the presence of a sinus arrhythmia or a normal sleeping respiratory rate virtually rules out CHF. Second, because heart murmurs are typically loud when failure occurs, a soft murmur makes CHF less likely. Exceptions to this rule include a ruptured chordae tendineae or CHF sequelae such as pulmonary hypertension or pulmonary thromboembolism. Next, although coughing can occur with CHF, it more often occurs with airway diseases. Because CHF is always rapidly progressive, a coughing history greater than 4-6 weeks reduces the likelihood of heart failure.

When owners are on a budget, diagnostics may be limited to pulse oximetry (or arterial blood gas), thoracic radiographs, Veterinary Bedside Lung Ultrasound Exam (Vet-BLUE), and possibly an electrolyte or renal panel:

- **Pulse oximetry**: Evaluating oxygenation is an important aspect of MacGyver medicine because it helps determine which patients do not need hospitalization for oxygen support, an expensive part of therapy. Although pulse oximeters are prone to numerous artifacts, a consistent number with a strong pulse signal and matching heart rate increases the likelihood the number is accurate. Pulse oximetry loosely correlates to the partial pressure of oxygen content in arterial blood when the animal is breathing room air. Since hemoglobin fully saturates around a PaO2 of 100-105mmHg, pulse oximetry is clinically useless for triage when supplemental oxygen is provided. As a result, obtain your measurement immediately at presentation or after supplemental oxygen has been discontinued for ten minutes. Hypoxemia (PaO2 of 80mmHg) begins at an SPO2 of 95%. Supplemental oxygen is considered necessary at 93% (PaO2 of 70mmHg). Severe, life-threatening hypoxemia that requires immediate oxygen therapy occurs at 90% (PaO2 = 60mmHg). Of note, cyanosis does not occur until the SPO2 is in the 70’s (PaO2 = 37mmHg), so pink gums do not rule out hypoxemia and the need for oxygen therapy. Even if a patient has an increase in respiratory rate and effort, outpatient therapy may still be considered if the SPO2 is greater than 93%. Anything below that requires supplemental oxygen.

- **Thoracic radiographs**: Thoracic radiographs are the single most important test for dogs who are suspected to be in CHF, because they allow simultaneous evaluation of the pulmonary pattern, pulmonary vessels, and cardiac size. In the dog, the left lateral and dorso-ventral (DV) views are ideal for cardiac evaluation, as pulmonary vessels are more clearly seen. The heart will appear slightly more ovoid in the lateral and DV views. On the DV view, the apex will shift to the left. If the author is limited to only one view due to severe cost constraints, the DV is preferred. Radiographic changes consistent with congestive heart failure include an alveolar to interstitial pulmonary pattern (especially in the caudal lung fields), enlarged pulmonary vessels, and left atrial enlargement with MMVD. Unfortunately, early to mild CHF can often appear similar to pulmonary
patterns created by the lungs during expiration and in old age. When the pulmonary pattern is mild, lung ultrasound may aid in interpretation.

- **Lung ultrasound**: VetBLUE is a rapid and inexpensive test for further evaluating dogs and cats for pulmonary edema. The normal lung visualizes as a very hyperechoic line at the lung/pleural interface that glides back and forth with respiration. Due to the presence of air in the lung, a reverberation artifact creates horizontal lines (termed “A-lines”) under the lung/pleural interface that descend into the far field. When certain pathologies cause the lung parenchyma to become edematous, or wet, B-lines or lung rockets form. B lines visualize as echogenic bands that originate from the lung-pleura interface and extend into the far field, obliterating the normally visualized A-lines. In summary, dry lungs will display A-lines and wet lungs will display lung rockets (B-lines). A small percentage of animals can normally have a few sparse lung rockets at one site, on each side. However, the vast majority of patients will have completely dry lungs with no lung rockets visualized. In a recent pilot study (Rademacher 2014), it was demonstrated that dogs with CHF had significantly more lung rockets (6 +/- 3.8 SD) than dogs without CHF, who typically have only 0-1 per side. Lung rockets increased as the severity of CHF worsened and seemed to correlate with the anatomic location of edema on the radiographs. Unfortunately, lung rockets are not pathognomonic for pulmonary edema. Other causes include non-cardiogenic pulmonary edema, pneumonia, contusions, hemorrhage, atelectasis, fluid overload, pleuritis, and acute respiratory distress syndrome. The presence of a “wet” lung must always be interpreted in light of a thorough history, physical exam, and thoracic radiographs. Therefore, the author uses lung ultrasound to complement thoracic radiographs, not replace them. Curiously, VetBLUE can also be used to rule out left-sided CHF. One study (Lisciandro 2016) found the absence of B-lines in all lung fields had a negative predictive value of 87% in dogs and 93% in cats for ruling out CHF. In other words, the presence of dry lungs makes CHF less likely. False negatives are typically caused by mild, centrally located edema that has not reach the lung periphery. One other use of vet ultrasound is to monitor response to therapy after a radiographic diagnosis has been established.

- **Prior to starting diuretic therapy**, a limited chemistry panel that includes electrolytes and renal values is ideal. A urine specific gravity can also be helpful. If in-house bloodwork machines are not available or too expensive, the Abaxis i-Stat has a Chem 8 cartridge that measures the following: sodium, potassium, chloride, BUN, creatinine, glucose, hematocrit, and a few other parameters. In the author’s hospital, this test typically costs $~50 and provides a rapid, less costly alternative to full bloodwork.

For the cost-restricted clients, no diagnostics other than those reviewed above are needed during the emergency management of congestive heart failure. Echocardiography is not needed to diagnose or treat heart failure unless the patient is not responding to therapy as predicted.

Once the diagnosis is made, therapy can be instituted. Furosemide (2mg/kg IV PRN and then PO q8-12h) and pimobendan (0.3mg/kg PO q12h) are the cornerstone of therapy. Although expensive relative to furosemide, pimobendan has been show to significantly improve outcomes over those achieved with furosemide. Additionally, Butorphanol (0.2-0.4mg/kg IV PRN) can be used for anxiety associated with respiratory distress. Finally, once the pet is stabilized, an ACE-inhibitor may be started (e.g. enalapril at 0.5 mg/kg q12h).
If a patient is determined to be hypoxemic at initial evaluation, hospitalization for oxygen therapy is needed. Although convenient with several other advantages, oxygen cages are very expensive which passes along cost to the client. Fortunately, several low cost alternatives exist (or can be made) to deliver oxygen to pets with hypoxemia. First, flow-by oxygen can be delivered via a mask to patients who will remain still. Second, oxygen hoods can be purchased or made from an E-collar and plastic wrap. Third, large plastic containers can be turned into an oxygen cage for smaller patients. Fourth, a regular cage can be sealed off with plastic wrap and tape. Finally, for larger patients, nasal oxygen can be administered through cannulas, a red rubber catheter, or nasal oxygen tubes. For options with an enclosed environment, the air must be briefly but frequently vented to prevent carbon dioxide from accumulating. Oxygen sensors can be purchased to monitor the fraction of inspired oxygen (FiO₂), but most methods achieve a FiO₂ of 40-60%. The oxygen source can be from a wall unit but any anesthetic unit or canister will do. The oxygen flow rate is usually 5-15 L/min for environmental chambers and 50-100ml/kg/min for nasal tubes. Oxygen therapy that lasts longer than a few hours should be humidified to avoid drying out respiratory tract. Bubble humidifiers are inexpensive and reusable, connecting directly to many oxygen flow meters. Alternatively, a nebulizer can be used to intermittently provide moisture to the patient. Ideally, oxygen is discontinued when the patient can demonstrate an SPO₂ > 93% on room air with a reasonable respiratory rate and effort.

Although patients with congestive heart failure can present with severe signs and require intense critical care, many patients with MVDD first present with mild to moderate signs that can be treated with outpatient therapy or short-term inpatient therapy. Hopefully these tips will expand how CHF is managed in your hospital.

Conclusion
MacGyver medicine may be uncomfortable for some veterinarians, but it provides us with the opportunity to alleviate suffering and facilitate healing in patients that may not otherwise receive care. Clients should always be offered standard of care. However, if cost precludes ideal medicine, MacGyver medicine is reasonable. It is used most effectively to provide outpatient therapy to stable patients. If inpatient care is needed, prioritize diagnostics and treatments so as to provide the biggest clinical bang for the client’s buck. In the end, always work within your comfort zone, and, above all else, do no harm. Please feel free to share some of your MacGyver medicine tricks after the lecture or via email.

References (alphabetical order)
Here is what you may already know about compassion fatigue:

**Compassion Fatigue**

Compassion fatigue is often coined “the cost of caring” (Figley). It is the physical, emotional, psychological and spiritual depletion or exhaustion that can result when we are repeatedly exposed to another’s pain and suffering. In veterinary medicine this pain and suffering can refer to that of both the patient and the client.

According to *Merriam-Webster Dictionary* **empathy** is defined as:

1. *the imaginative projection of a subjective state into an object so that the object appears to be infused with it*
2. *the action of understanding, being aware of, being sensitive to, and vicariously experiencing the feelings, thoughts, and experience of another of either the past or present without having the feelings, thoughts, and experience fully communicated in an objectively explicit manner; also: the capacity for this*

Charles Figley PhD, a pioneer in the field of compassion fatigue states in “*Compassion Fatigue in the Animal Care Community*” that empathy is a response and a process.

**Compassion** according to *Merriam-Webster Dictionary* is:

*sympathetic consciousness of others’ distress together with a desire to alleviate it*

Figley points out that compassion while related to empathy is really “a focused empathy, one that is action oriented”. This is an important distinction to make as many thought leaders in the area of compassion fatigue are suggesting we should really call compassion fatigue, empathy fatigue because as with compassion, our desire to alleviate another’s pain and suffering may actually be somewhat protective.

**Professional Quality of Life**

Dr. Beth Hudnall-Stamm and Dr. Charles Figley developed a self-test called the ProQol (Professional Quality of Life) that can be accessed from [www.proqol.org](http://www.proqol.org). This test assesses one’s own levels of secondary trauma, burnout and compassion fatigue.

**Burnout**
We must now define burnout and how it differs from compassion fatigue. Burnout is physical or emotional collapse caused by overwork or stress. It is a work-related issue whereby compassion fatigue is a personal issue. Said another way, it is when the work exceeds the resources. The work we all understand (patient load, appointments, surgeries, etc) but the resources can be anything from time, money, staff, appointment slots, etc.

Burnout results from the work environment itself. If we were to leave that environment and did not go to another with the same lack of resources, we would not be burned out. In contrast, if we are suffering from compassion fatigue and leave a practice to go to another, we will still be suffering from compassion fatigue because it is about who we are, the emotions we are absorbing and how we are perceiving the work and it’s effects.

Secondary Trauma

When we become traumatized by witnessing or hearing about another’s trauma is called secondary trauma.

Secondary trauma is also called vicarious trauma and refers to the cumulative transformative effect of working with traumatized individuals. Our view of the world changes. Take animal shelter workers for example. The nature of their work exposes them to some of the worst in humanity as they witness the results of neglect, abuse and disposal of animals. They start to develop a strong disdain for humans and a general hatred toward people. This is the result of vicarious trauma.

Signs and Symptoms

Regardless of what terms are used to describe compassion fatigue, the signs and symptoms are very real. While the symptoms can vary among individuals, many include: depression, hopelessness, physical and emotional exhaustion, diminished sense of career enjoyment, bottled-up emotions, irritability, substance abuse, increases in mistakes, anxiety, problems in personal relationships, isolation, physical ailments, suicide. 

Compassion fatigue is an occupational hazard inherent in veterinary medicine. While it may not be avoidable, it certainly can be managed. We want to provide authentic caring and compassion for our patients and clients but we don’t want to lose ourselves in the process.

How healthy is your practice? Only as healthy as it’s doctors and staff. If they are struggling with compassion fatigue, the organization can suffer in the following ways:

- substandard level of care
- absenteeism
- high turnover
- lack of teamwork
- team conflict
- low morale
- increased cynicism, complaining
- erosion of customer loyalty
- reduced customer satisfaction
- reputation at risk
- poor quality control
- deterioration of the org’s mission
These are costly issues to any organization but especially to veterinary practices. How can we expect our clients to have an exceptional experience at our practice when everyone they interacted with would give their job satisfaction a 2 out of a scale of 10 (10 being the highest)?

**Moral Stress**

Moral distress or simply moral stress is when our own beliefs and morals conflict with what we are asked to do. For instance the euthanasia due to lack of finances, or the reluctance from a client to continue treatment when the you believe it is what is best for the patient or the euthanasia despite a treatable condition. When we fundamentally disagree with what is being asked of us, yet policies and routines dictate.

According to Dr. Elizabeth Strand, Founding Director of Veterinary Social Work at the University of Tennessee College of Veterinary Medicine, moral distress is the biggest contributor to compassion fatigue among veterinarians. For example when one believes the best course of treatment is the one prescribed and yet the client can not afford the treatment or chooses not to do it, moral stress ensues.

**Contributing Factors**

What contributes to compassion fatigue is both plentiful and individual and may include some of the following:

- lack of awareness
- lack of training
- inexperience
- non-compliant clients
- stress of practice
- not being able to forgive oneself for mistakes
- debt
- perfectionistic personality
- lack of healthy coping mechanisms/stress management techniques
- unreasonable expectations by others and of ourselves

**Who is Vulnerable**

Anyone whose work or caregiving puts them in an environment that is emotionally taxing is susceptible to compassion fatigue. When we foster empathy, we are at risk. In addition to veterinary medicine, healthcare workers, mental health providers, eldercare workers, child care advocates, lawyers, jurors, hospice workers and teachers are all vulnerable.
What No One Has Told You

What you don't know about compassion fatigue is that it’s not about your relationship with your clients, patients or colleagues. It’s about your relationship with yourself.

Compassion fatigue results when we are repeatedly exposed to another’s pain and suffering and we ignore our own needs. We ignore our need for rest, replenishment, rejuvenation, etc. We believe our needs should come last or we just don’t feel worthy enough of even attending to our own needs.

Many veterinarians are struggling with feelings of inadequacy, of not doing/being enough, resentment, fearing failure, guilt, anger, anxiety, self-doubt and not wanting to let others down. These are all thought problems and we choose our thoughts. Of all the thoughts you could choose, why choose ones of fear, inadequacy and self-doubt?

Here’s the thing, feeling confident is just as much of a choice as feeling inadequate. You’ve just gotten really good at thinking thoughts that make you feel inadequate and then you look for evidence to substantiate that belief.

Compassion fatigue is a thought problem. How could you think about it differently? This is where you need to put your energy, not in wishing the clients, patients, co-workers, hospital director, spouse or your mother were different.
Boundaries are the ultimate act of self-love and without them we become ineffective at caring for others. Self-love and self-care are one and the same and without boundaries we can’t effectively take care of ourselves so how can we expect to effectively care for others? Boundaries are a way of not only respecting ourselves but protecting ourselves.

From a physical standpoint our skin is a boundary. Without it our insides would spill all over and we couldn’t function. The same applies to non-physical boundaries. If you know what I will accept and what I won’t accept it changes our entire relationship for the better and improves it’s functionality.

Why We Lack Boundaries

**We are people pleasers**
- We want everyone to like us and we don’t want to “hurt anyone’s feelings”. Please know that no one has the power to make us feel a certain way. Our feelings come from our thoughts and not the circumstance.
- Ask yourself how is this working being a people pleaser? My bet is that it is not working for you because you end up feeling angry and resentful and asking why no one is thinking about you since you are thinking about everyone else and their needs. Again, it’s your job to meet your own needs, no one else’s.

**We lack an understanding of boundaries**
- Typically we learn about boundaries from our parents. What did you learn from your mother about boundaries? How about from Dad? When we don’t have an understanding of their importance, we don’t know why we need them.
- You will also find that those that have very poor boundaries will constantly infringe on ours and test ours.

**Worthiness**
- Many of us come with a “not enough” or “not worthy” tape playing on continuous. Some version of not being good enough or not worthy of having our needs met. We think “who am I to ask people to not text me from work unless it’s a true emergency?”. Who are you NOT to?
- Others of us don’t feel comfortable standing up for ourselves but if we don’t others will see how far they can infiltrate our space. Boundaries prevent this.

**Self-esteem and confidence**
- Enforcing boundaries is not easy and requires patience, diligence and practice but consider the possibility that it’s these exact boundaries that will help build both your self-esteem and confidence.

Where Do We Begin?

Boundaries are about US, not the other person. What’s ok with you and what’s not ok with you. Boundaries are not about trying to manipulate other people and getting them to do or not do certain things.

Instead a boundary is, if you do THIS, then I will do THAT.

“If you yell at me, I will leave the room.”
“If you ask for my cell phone number, I will not give it to you.”
“If you text me pictures of your dog, I will not respond.”
“If you show up at my house unannounced, I will not open the door.”

1. Start small
- Find little things to start with such as telling friends you turn your phone on do-not-disturb at 9pm and that you won’t be answering texts after that time. Sure you will likely have to remind them, that’s what it means to enforce boundaries. Once you get good at setting and enforcing small boundaries, then you can move to larger ones like setting boundaries with co-workers, clients and family, etc.

2. Use a mantra
- Brené Brown, a research professor at University of Houston Graduate College of Social Work and author of the two #1 New York Times bestselling books *The Gifts of Imperfection* and *Daring Greatly*, uses the mantra “Choose discomfort over resentment” to remind herself to not be pulled into saying Yes when she really wants to say No.

3. Practice, practice, practice
- Start saying aloud (alone or to others) what it is you want to say. The more you become comfortable setting and enforcing your boundaries, the easier it will be.

“That sounds interesting but I cannot make it”
“No I’m not available.”
“I wish I could go but I can’t. Thanks for asking though.”
“No, my plate is already full.”
“Thanks for the invite. My weekend plans are to be with my family so I won’t be able to attend.”
“No I cannot work on that day, I already made plans.”


A key takeaway from the video is when she states, “Empathy minus boundaries is not empathy. Compassion minus boundaries is not genuine…”. She goes against the current belief that empathy can lead to burnout. Instead she feels that “empathy is not about feeling for someone but feeling with someone”. And in this way empathy actually can give back, tenfold.

Compassion fatigue has also been called empathy fatigue but I believe it is when we get lost in feeling for others (rather than with them) combined with not having clear boundaries that we make ourselves vulnerable and drastically increase our chances for compassion fatigue.

The most compassionate people are also the most boundaried.

Look for where in your life you are feeling angry, resentful, overwhelmed and/or frustrated. Chances are those are the areas you need to create and enforce some boundaries.
In order to provide care to another being in a sustainable way, we have to take care of ourselves first. This is not intuitive to anyone in a caregiving role.

When we put ourselves last on the list why are we surprised when we are stressed, anxious, depressed, depleted or feeling exhausted? It is our job to meet our needs, no one else’s. We can’t wait for others in our life to tell us to take a day for ourselves or go for a walk, that responsibility falls in our hands. We need to ask for what we need, unapologetically.

Human beings have 9 universal needs:
Sustenance/Health
Safety/Security
Rest
Autonomy/Authenticity
Creativity/Play
Meaning/Contribution
Love/Caring
Empathy/Understanding
Community/Belonging

Can you identify needs that are not being met in your life? Most of us can and that is ok. The question is what can you do to fulfill those needs?

What is required is that we realize the extent to which the work is traumatizing is the extent to which we need to balance it with self-initiated action aimed at meeting our needs. This is not something we can ignore or hope will go away.

If you live with others, what do you need to ask for in order to take care of yourself?
If you live alone, what is one thing you can start doing daily for yourself?
None of this has to be very time-consuming, finding 10-20 mins/day to gift yourself is often enough.

What Get’s in the Way
The most common reason for not attending to ourselves is that we believe it is selfish. Being selfish is when we care only for and about ourselves. That is not at all what self-care is.

Self-care is any self-initiated activity or behavior that results in balancing our emotional and physical stressors. It is not to be confused with consumerism or self-indulgence. Self-care

How You Start Your Day Matters

Many of the personal development thought leaders of our time have one consistency and that is they all have a very intentional morning routine in order to set their day up for success.
So What Does Self-Care Really Mean and Why Is It Essential to Your Career?
Julie Squires, CCFS

For me it involves excellent coffee, real food, meditation and exercise. Sometimes my exercise even becomes my meditation but it’s a non-negotiable. I. Do. It. Every. Morning. Sustenance and health are enormous needs of mine that I honor every day.

So this means sometimes I have to wake up earlier depending on my travel schedule or what I’m doing that particular day. I do it anyway. Because I know that it will dramatically improve the quality of my mind, body and soul for that day. I’ll be better able to serve those I care for and feel better about myself.

When the start of your day is consistently filled with chaos, and then we go to work in the often unpredictable world of veterinary medicine, you can easily see how we can set ourselves up for failure. Failure in our well-being and emotional state.

Be a Rebel

I’m asking you to break out of the traditional box of caregivers and practice giving to yourself. Be rebellious and stare down martyrdom. Don’t be surprised when the mind chatter comes up because it inevitably will. There will always be something else you should be doing other than gifting to yourself. Do it anyway.

A veterinarian who had attended one of my workshops recently told me that she had starting honoring her need for creativity/play by taking a weekly painting class, something that she once really enjoyed and had decided to give to herself once again. She told of how she fights with herself every week about it. Her mind will say things like, You shouldn’t go, you have so much laundry to do. But instead of giving in to the non-truth spouting monkey mind, she pushes back and decides “No, this is something I’m doing for myself that I really enjoy and that makes me feel good when I do it. The laundry isn’t going anywhere.”

We all have that mind chatter and the best thing you can do with it is:
1. Anticipate it
Expect that the mind will try to derail you from your efforts. Anticipate it ahead of time and think about what you will tell yourself when your mind tries to talk you out of going for that walk, doing yoga, enjoying a cup of tea outside or reading a book for pleasure.

2. Acknowledge it
I literally say “Oh I see you!” or “Oh you again!” to my mind chatter. I know I am not my mind so when I recognize my mind trying to talking me out of what is in my best interest I just smile and acknowledge it. I don’t attach to it or believe it but let it know I see it.

3. Answer it (in a way that best serves you)
This is where we can decide to think differently. Many just believe the initial mind chatter and never dream of answering it from the heart. No, I need to and deserve to have some time to
myself. This will become much easier the more you do so don’t give in to your old way of thinking.
You’ve been given the rare gift of being able to aid in the healing of others, animals and people. You’ve made a difference in more lives than you will ever know. If you too believe you have a gift, then please honor, cherish, nurture and feed it.

**Self-Care Ideas**

- going for a photo walk
- going to the forest
- a bath at the end of the day
- going for bike rides
- finding overgrown grass and putting my bare feet in it
- lying in the grass on the hill and staring up at the sky
- cooking a meal for myself and being really present
- getting up early and reading inspirational books
- journaling
- walking with my dogs
- nature
- going places–getting a change of scenery
- trying new things in general
- guided meditation
- listening to books and music
- face-to-face conversations with people
- gratitude journal
- better diet
- trying to live more authentically
- paying attention to my breathing
- gathering flowers from my garden
- planting flowers in my garden for later gathering
- art journaling
- stealing a few moments to lie on my bed when the afternoon sun is streaming in through the window
- coffee at coffee shops
- centering prayer
- mindfulness
- forgiveness of others so I don’t carry that stuff around
- simplifying
- a glass of wine at the end of the day
- fresh air
- eclectic playlists
- live music
- bookclub
- support groups
- creating a comfortable house that truly is my home
- lunch dates with good friends
So What Does Self-Care Really Mean and Why Is It Essential to Your Career?
Julie Squires, CCFS

• not skipping sleep to get things done
• trying to multitask less
• scheduling time to myself every day
• reading blogs from people who are honest
• reading for pleasure
• resting with my cat a few feet away
• yoga
• running
• getting my hair done
• getting a manicure
• baking
• knitting
• spinning
• online classes
• just for fun novels
• crafting
• being able to set limits for myself
• asking for what I need
• taking time for slow contemplative morning coffee
• cuddling with my cats
• taking my vitamins
• burning candles
• waking up naturally—no alarm clock
• green smoothies
• take painkillers when I need to instead of holding out and suffering
• earn to be with and accept my feelings
• have adventures and drive to new places
• spend less time on the Internet
• read the newspaper on Sundays at a café
• read poetry or inspiring quotes
• volunteering
• attending church
• good movies
• working with a life coach
• prayer
• taking the long way
• not being in a rush
• saying no
• turning my phone off
• listening to the birds sing
• eating a fresh bagel at a local shop while doing a crossword puzzle
• chocolate
• daily stretching
• eating when I feel like it—not by the clock
So What Does Self-Care Really Mean and Why Is It Essential to Your Career?
Julie Squires, CCFS

Source: www.theselfcompassionproject.com
Compassion Fatigue Strategies: Mind Management

Our thinking can create a lot of self-induced suffering. Veterinarians have been identified as embodying perfectionistic tendencies and being very hard on themselves, especially in regard to mistakes. While no one intends to make a mistake, it is inevitable as we are human beings after all and not perfect.

How easily can we forgive ourselves? Do we beat ourselves up when things don’t go the way we want them to? Can we let ultimately let go of the unrealistic expectations we have for ourselves? Can we let go of the sadness and pain when the outcome is not what we desire?

Managing our minds is a skill that provides us freedom from suffering. Our emotions can become overwhelming, damaging and breed rumination.

The Self-Coaching Model

This self-coaching model can offer relief. Based on cognitive psychology and the work of Master Life Coach Brooke Castillo, this model gives us the ability to identify thoughts that are creating negative emotions and then, and only then, we can change those thoughts to ones that make us feel better.

This model is based on the following truths:

• We cannot control the world
• Nothing outside of us has the power to make us feel good or bad
• It is not the circumstances, but our thoughts about the circumstances that create our experience
• We attract what we think about
• Emotions are vibrations that lead to action
• We can’t permanently change our results without changing our thoughts
• We don’t have to get anything to feel better; we can feel better right now

Here are reasons to use this model:

• To feel better

<table>
<thead>
<tr>
<th>Circumstances</th>
<th>can trigger</th>
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<tbody>
<tr>
<td>Thoughts</td>
<td>cause</td>
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<td>Feelings</td>
<td>cause</td>
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<tr>
<td>Actions</td>
<td>cause</td>
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<td>Results</td>
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Evidence

Actions: Behavior—what we do in the world. Caused by feelings, determined by thought.

Results: What we see in the world (our lives) as a result of our actions. The result will always be evidence for the original thought.

Here are reasons to use this model:

• To feel better
Putting the Model to Use to Solve Any Problem

1. Identify the problem. Even those things that seem petty, if it is bothering you it’s worthy of your attention.

   *My client won’t do what I ask.*

   *I have no work/life balance.*

   *I’m overwhelmed with the stress of the practice.*

   *My student debt is bearing down on me.*

   *I made a mistake and my patient is now very sick and fighting to live.*

2. Plug it into the model in the appropriate category.

   **Circumstance**  
   *I made a mistake and my patient is now very sick and fighting to live.*

   **Thought**

   **Feeling**

   **Action**

   **Result**

3. Fill in the rest of the model based on the problem.

   **Circumstance**  
   *I made a mistake and my patient is now very sick and fighting to live.*

   **Thought**  
   I’m not a good vet

   **Feeling**  
   Doubt

   **Action**  
   I shut down

   **Result**  
   I’ve lost confidence in myself.

Use this template to see a problem in your life and how it is manifesting. At first most models start with the Circumstance or Thought but you can start anywhere and work backwards.
4. Since THOUGHTS create our FEELINGS we have to find an alternate thought but it must be one we believe otherwise this won’t work. The thought “I’m not a good vet” is creating doubt and that doubt is then causing one to shut down and ultimately lose confidence.

In order to feel better we have to find a THOUGHT that we can believe and that makes us FEEL better when we think it. How else could we think about this situation?

Circumstance: I made a mistake and my patient is now very sick and fighting to live.

Thought: It was an unfortunate oversight that I will never let happen again.

Feeling: Acceptance, forgiveness

Action: Self-compassion

Result: I keep working to save lives and help animals.

You must remember that it is not the circumstance or situation that is causing your feelings but your thought(s) about the situation.

Following the steps outlined above, use this template to find relief from the problem or issue that you did a model for above. This is where you will change the THOUGHT to one you can believe and that feels better when you think it.

Circumstance _______________________________________________________________

Thought _________________________________________________________________

Feeling _________________________________________________________________

Action _________________________________________________________________

Result _________________________________________________________________

Page 3 of 4
You can plug something into the model at any point. For instance you can start with the Feeling or the Action or even the Result. In this example I start with the Result and work backwards.

Circumstance  Life

Thought  I can’t do it all.

Feeling  Inadequate

Action  I overeat and overdrink.

Result  Compassion fatigue

You have to acknowledge your first model before you can re-work it, before you can change the thought.

Mindfulness is said to have originated in Buddhist thinking and meditation practice two and a half thousand years ago. Its original purpose was to address and relieve self-induced suffering caused by the dysfunctional ways people habitually tend to respond to their experience. Over the last 30 years, mindfulness has become secularized and simplified to suit a Western context.

In the 1970s anecdotal and research findings about the ability of meditation to reduce unhealthy psychological symptoms triggered interest in mindfulness as a healthcare intervention. Jon Kabat-Zinn at the Medical Center at the University of Massachusetts introduced the first eight week structured mindfulness skills training program which gave considerable psychological, and some physical, relief, to patients experiencing intractable severe pain and distress from a wide range of chronic physical health conditions. This came to be known as MBSR (Mindfulness-Based Stress Reduction). (www.mindfulnessinschools.org)

Researchers recently turned their attention to the interaction between MBSR and compassion fatigue to see whether MBSR would help reduce compassion fatigue symptoms among helpers. One study of clinical nurses found that MBSR helped significantly reduce symptoms of compassion fatigue, as well as helping the subjects be calmer and more grounded during their rounds and interactions with patients and colleagues. (Cohen-Katz et al, 2005) Another study investigated the effect of teaching mindfulness-based stress reduction to graduate students in counseling psychology. The study found that participants in the MBSR program “reported significant declines in stress, negative affect, rumination, state and trait anxiety, and significant increases in positive affect and self-compassion.” (Shapiro, 2007).

Mindfulness is a sustained nonreactive attention to one’s ongoing mental contents and processes (physical sensations, perceptions, affective states, thoughts and imagery) (Grossman, Niemann, Schmidt & Walach 2004; Kabat-Zinn 2005; Miller, Fletcher & Kabat-Zinn 1995).

Said another way Jon Kabat-Zinn PhD describes mindfulness as being in the present moment, on purpose and without judgement. The practice is one of non-doing which in today’s world is very counter to our quick pace, multi-tasking and enticing digital devices.

Throughout our lives we tend to drift away from the peace that resides within us as we respond to external conditioning. Perhaps our upbringing, our career training, trauma and life experiences have caused us to separate from that peace of self.

By cultivating mindfulness, we can learn to identify the negative thoughts that keep us trapped in feelings of self-doubt and shame, and learn instead to embrace the peacefulness that stems from living in the present moment.

If not conscious, we spend the majority of our lives living in the past or future, very rarely in the present moment. Anxiety and worry stem from past or future-thinking. Most of what we fear and are worried about never happens yet we spent an exorbitant amount of time doing so and it creates S.T.R.E.S.S.

To meditate is to stop the war with the way things are.
When we become aware of our thoughts and see them as just thoughts and not facts or truth, we are able to find freedom from suffering. Man is the only being that can separate self from thinking. Meaning if I can be aware of my thoughts than I can’t be my thoughts.

While the foundation of mindfulness resides in a sitting meditation, there are many other ways to practice mindfulness such as mindful eating, yoga and walking meditations.

Regardless of the practice, the goal is only to be present. We do this by noticing. Noticing the here and now, inhale and the exhale, the sounds around us, the texture and taste of food, etc.

Breathing

*Sometimes my mind acts so confused with thoughts and feelings that I don’t know which way to turn But then I remember my breath and I am one with my treasure again.*

The breath becomes our anchor because by paying attention to it, we automatically become present. As we bring full attention to the inhalation and exhalation we let go of the past and don’t travel to the future. By practicing we learn how to rest in the present moment and be with what is, breath by breath.

Taking some time each day for mindfulness meditation is a simple yet powerful way to develop concentration, regain stability and balance, become responsive versus reactive, and enjoy an ease of being if just for this moment, if just for this breath. With a willingness to bring our attention to the breath, to be fully present for each inhalation and exhalation, we let go of the past (the previous breath) and do not travel into the future (the next breath). With this intention and attention we gain the ability to rest in the present moment, to be with what is, breath by breath, moment by moment.

PRACTICES

**Return to the Body**

Arrive and rest in the present moment by bringing your attention to your body when are sitting, standing or reclining. Notice sensations felt at the points of contact your body is making with the chair, the floor, the earth of the bed.

**Arriving**

When transitioning from one activity to another, take a moment to arrive. Focus your attention on the your body as it is in the present moment. By taking a moment to stop and pause throughout the day, we can be fully present for this moment, this person, this meal.

**Eating Meditation**

“When you eat, just eat!” Be present, aware and awake while eating and drinking throughout the day. Sipping and savoring your morning tea or coffee is a fantastic way to bring mindfulness into your life and to rest in the present moment.

**Solitary Activities**
Each moment is an opportunity to practice mindfulness. Bring mindfulness to your daily solitary activities such as washing your hands, brushing your teeth, taking a shower, cooking, stopping at a red light, doing the dishes, etc.

**Awareness of Breath Meditation**

This guided meditation on the breath will help you learn to simply be and to look within yourself with mindfulness and equanimity. Allow yourself to switch from the usual mode of doing to a mode of non-doing. Of simply being. Sitting in an erect posture, either on a straight back chair or on a cushion. As you allow your body to become still, bring your attention to the fact that you are breathing. And become aware of the movement of your breath as it comes into your body and as it leaves your body. Not manipulating the breath in any way or trying to change it. Simply being aware of it and of the feelings associated with breathing. And observing the breath deep down in your belly. Feeling the abdomen as it expands gently on the inbreath, and as it falls back towards your spine on the outbreath. Being totally here in each moment with each breath. Not trying to do anything, not trying to get any place, simply being with your breath. Giving full care and attention to each inbreath and to each outbreath. As they follow one after the other in a never ending cycle and flow.

You will find that from time to time your mind will wander off into thoughts. When you notice that your attention is no longer here and no longer with your breathing, and without judging yourself, bring your attention back to your breathing and ride the waves of your breathing, fully conscious of the duration of each breath from moment to moment. Every time you find your mind wandering off the breath, gently bringing it back to the present, back to the moment-to-moment observing of the flow of your breathing. Using your breath as an anchor to focus your attention, to bring you back to the present whenever you notice that your mind is becoming absorbed or reactive. Using your breath to help you tune into a state of relaxed awareness and stillness.

Now as you observe your breathing, you may find from time to time that you are becoming aware of sensations in your body. As you maintain awareness of your breathing, see if it is possible to expand the field of your awareness so that it includes a sense of your body as a whole as you sit here. Feeling your body, from head to toe, and becoming aware of all the sensations in your body. So that now you are observing not only the flow of breathing, but the sense of your body as a whole.

Being here with whatever feelings and sensations come up in any moment without judging them, without reacting to them, just being fully here, fully aware. Totally present with whatever your feelings are and with your breath and a sense of your body as a whole. And again whenever you notice that your mind wandering off, just bringing it back to your breathing and your body as you sit here not going anywhere, not doing anything just simply being, simply sitting. Moment to moment, being fully present, fully with yourself.

Reestablising your awareness on the body as a whole and on the breath as it moves in and out of your body. Coming back to a sense of fullness of each inbreath, and the fullness of each outbreath. If you find yourself at any point drawn into a stream of thinking and you notice that you are no longer observing the breath, just using your breathing and the sense of your body to anchor you and stabilize you in the present.
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Julie Squires, CCFS

Just being with your breathing from moment to moment, just sitting in stillness, looking for nothing and being present to all. Just as it is, just as it unfolds. Just being right here, right now. Complete. Human. Whole.

As the practice comes to an end, you might give yourself credit for having spent this time nourishing yourself in a deep way by dwelling in this state of non-doing, in this state of being. For having intentionally made time for yourself to simply be who you are. And as you move back into the world, allow the benefits of this practice to expand into every aspect of your life.

Guided Mountain Meditation

Sit with a straight back, your head held erect on your neck and shoulders, allow the shoulders to fully relax. And place your hands on your knees.

Close your eyes and bring your attention to the flow of your breathing. Feeling each inbreath and each outbreath. Just observing your breathing without trying to change it or regulate it in any way. Allowing the body to be still. And sitting with a sense of dignity, a sense of resolve, a sense of being complete, whole, in this very moment, with your posture reflecting this sense of wholeness.

And as you sit here, picturing in your mind’s eye as best you can the most beautiful mountain that you know or have seen or can imagine. Just holding the image and feeling of this mountain in your mind’s eye, letting it gradually come into greater focus. Observing its overall shape, its lofty peak high in the sky, the large base rooted in the rock of the earth’s crust, its steep or gently sloping sides. Noticing how massive it is, how solid, how unmoving, how beautiful both from afar and up close.

Perhaps your mountain has snow at the top and trees on the lower slopes. Perhaps it has one prominent peak, perhaps a series of peaks or a high plateau. Whatever its shape or appearance, just sitting and breathing with the image of this mountain. Observing it, noticing its qualities and when you feel ready, seeing if you can bring the mountain into your own body so that the body sitting here and the mountain in your mind’s eye become one. So that as you sit here you share in the massiveness and the stillness and majesty of the mountain. You become the mountain rooted in the sitting posture, your head becomes the lofty peak, supported by the rest of the body. Your shoulders and arms the sides of the mountain. Your buttocks and legs the solid base rooted to your chair. Experiencing in your body a sense of uplift from deep within your pelvis and spine, with each breath as you continue sitting, becoming a little more a breathing mountain, unwavering in your stillness, completely what you are, beyond words and thought. A centered, rooted, unmoving presence.

Now as you sit here becoming aware of the fact that as the sun travels across the sky, the light and shadows and colors are changing virtually moment by moment. Night follows day and day follows night. A canopy of stars, the moon, then the sun. Through it all, the mountain just sits, experiencing change in each moment. Constantly changing, yet always just being itself. It remains still as the seasons flow into one another and as the weather changes, moment by moment, and day by day. Calmness abiding all change.

In summer, there’s no snow on the mountain except perhaps for the very peaks. In fall, the mountain may wear a coat of brilliant fire colors. In winter, a blanket of snow and ice. In any
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season, it may find itself at times enshrouded in clouds or fog or pelted by freezing rain. People may come to see the mountain and comment on how beautiful it is or on how it's not a good day to see the mountain. None of this matters to the mountain which remains at all times its essential self. Clouds may come, and clouds may go. The mountain's magnificence and beauty are not changed one bit by the way people see it or not or by the weather. Seen or unseen, in sun or clouds, broiling or frigid, day or night, it just sits, being itself. At times, visited by violent storms, buffeted by snow and rain and winds of unthinkable magnitude. Through it all, the mountain continues to sit unmoved by the weather, by what happens on the surface, by the world of appearances.

And in the same way, as we sit in meditation, we can learn to experience the mountain. We can embody the same unwavering stillness and rootedness in the face of everything that changes in our own lives over seconds, over hours, over years. In our lives and in our meditation practice, we constantly experience the changing nature of mind and body and of the outer world. We have our own periods of light and darkness, our moments of color and our moments of drabness. Certainly, we experience storms of varying intensity and violence in the outer world and in our own minds and bodies. We endure periods of darkness and pain, as well as the moments of joy. Even our appearance changes constantly, experiencing a weather of its own.

By becoming the mountain in our meditation practice, we can link up with its strength and stability and adopt it for our own. We can use its energies to support our energy to encounter each moment with mindfulness and equanimity and clarity. It may help us to see that our thoughts and feelings, our preoccupations, our emotional storms and crises, even the things that happen to us, are very much like the weather on the mountain. We tend to take it all personally but its strongest characteristic is impersonal. The weather of our own lives is not to be ignored or denied. It is to be encountered, honored, felt, known for what it is and held in awareness. And in holding it in this way, we come to know a deeper silence, and stillness, and wisdom. Mountains have this to teach us and much more if we can come to listen.

Loving Kindness Meditation

The practice of loving kindness meditation brings to life our innate capacity for connecting to ourselves and others. It is the feelings of judgment and indifference that keeps us feeling separate. Separation creates pain and suffering.

As helpers, we often feel as though we have to get lost in another’s pain to truly serve and help them. When in fact all we need to do is be present with them. There is no greater gift you can give another than your presence.

Loving kindness meditation is simple yet powerful. Sit comfortably with your eyes closed. You are going to silently repeat certain phrases while sending your heart’s intention to yourself and others.

Begin by noticing the breath…the inhale…the exhale. After a few breaths bring to your awareness someone who is easy to love, this could be a child, a spouse a pet. As you hold them in your awareness, begin to send loving kindness to them and silently say:

May you be safe
May you be happy
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Julie Squires, CCFS

May you be healthy
May you be free from suffering

Return back to your breath for a few moments and then bring yourself to your awareness. Whether or not you are feeling loving kindness towards yourself in this moment, that's OK. You can hold the intention of loving kindness towards yourself while you silently say:

May I be safe
May I be happy
May I be healthy
May I be free from suffering

Return back to your breath and then bring your awareness to a stranger. Someone you don't know well but may see often like a cashier, someone at the dog park or someone at work you don't often talk to. While holding them in your awareness begin sending loving kindness by silently saying:

May you be safe
May you be happy
May you be healthy
May you be free from suffering

Returning back to your breath for a few moments before bringing into your awareness someone you have or are having a difficult relationship with. Not the most difficult relationship you have or one that was traumatic but someone you are having a hard time with right now. With them in your awareness, silently send loving kindness by saying:

May you be safe
May you be happy
May you be healthy
May you be free from suffering

And returning to the breath, bring to your heart and awareness all beings everywhere in the universe. With love and intention in your heart begin sending loving kindness while silently saying:

May you be safe
May you be happy
May you be healthy
May you be free from suffering

Bring your focus back to your breath and notice the sensations you feel in your body and in your heart. Breathe. Nothing to judge. Just be with yourself in this moment. And when you feel ready, begin to open your eyes.

Note: You can also do parts of this meditation, for instance maybe for just yourself if you are having a difficult day or for a patient or client that is having a hard time. You can also use other similar phrases if these don't resonate with you.

Reference:
Mindfulness Meditation, CD Series, Jon Kabat-Zinn

Resources:

University of Massachusetts Medical School, Center for Mindfulness
http://www.umassmed.edu/cfm/

Mind and Life Institute, www.mindandlife.org

Center for Investigating Healthy Minds www.investigatinghealthyminds.org


WHAT MATTERS MOST IN THE END – PRACTICAL CARE FOR GERIATRIC AND HOSPICE PATIENTS

Mary Gardner, DVM

Veterinarians have a variety of tools to keep puppies and kittens healthy as they grow, and we are well prepared to help our aging patients as they reach their senior years. The care and management of a geriatric pet, however, is very different for both the patient and the owners alike. As pets reach advanced ages and enter into this last life stage, owners are faced with a myriad of physical and emotional concerns (for both the pet and themselves). There is so much more that can be done within the veterinary profession to properly recognize this geriatric stage, keep the patient comfortable, and help owners deal with their delicate, aging family members.

Veterinary hospice is rapidly gaining traction and typically focuses on the terminal or chronically ill pet. Before and during this last stage, there is much we can do to help pets live a comfortable life as a geriatric. Our abilities to recognize and manage pain, anxiety, hygiene, and other symptoms that may limit quality of life has advanced in recent years and our profession is seeking ways to identify these unique client and patient needs, communicate effectively, set realistic expectations, and help guide pet parents with the care and management of their aging geriatric companion animal.

The goal of proper and effective geriatric pet care is to enhance the quality of life for the pet and the owners, empower them to properly care for their pet during this delicate life phase, and maintain the strength of human-animal bond. The goal of this presentation is to offer the methodology, tools, and soft skills that are essential to properly caring for this age group.

It will empower veterinarians to embrace the geriatric pet, know how to handle the symptoms that plague them as well as assist owners with the care and management.

Aging is the inevitable decline in the body's resiliency both mental and physical. Over time, cell production decreases, leaving fewer cells which are less capable of repairing wear and tear on the body. The immune system is compromised and therefore more susceptible to infections, less proficient at seeking out and destroying mutant cells, many older pets succumb to conditions they could have resisted in their youth.

The aging process is incredibly complicated and it can be difficult to distinguish between changes that are the result of 'age' and those that come with common medical conditions.

Below are the top 6 symptoms that we will cover in the presentation – plus more!

**Eyes:**
Lenticular/Nuclear Sclerosis: All geriatric dogs (starting at about 6-7 years old) develop a hardening of the lens. However, it does not become noticeable until about 10. The lens is added onto throughout life, gaining layers of protein. As the new layers of protein are added, inner layers are compacted together and become harder. The hardening of the lens fibers makes it difficult for the lens to change shape – needed for focusing. Near vision is therefore reduces –
just like in middle-ages people who need reading glasses. Pets become hesitant going down stairs and more difficulty when catching small treats or toys.

**Ears**
Presbycusis, also known as age related hearing loss. Mid to high frequencies are affected first followed by progressive loss at all frequencies. Onset is typically in the last third of a breed’s typical lifespan and will eventually progress to complete deafness.

Four types of presbycusis are described in humans and in dogs but the most common seen is the sensory presbycusis which is characterized by loss of hair cells and degeneration of the organ of Corti.

Although the loss is progressive, owners usually report an acute onset because of the ability of the animal to compensate for hearing loss until nearly complete deafness occurs. Age related hearing loss most often occurs in both ears, affecting them equally.

**Skin:**
Dull Skin and Coat: An older animal’s skin and hair may look dull and lusterless due to the decreased production of natural oils by the sebaceous glands. This can also cause the skin to appear dry and flaky. Continued brushing will help stimulate the skin to produce the oily secretion and an excessively dry coat may benefit from implementing a fatty-acid supplement. The skin also loses elasticity as pet’s age and is more susceptible to infections. The worst side effect of a skin infection is that the pet smells and therefore is shunned out of the bedroom or living area.

**Muscles – Can’t get up or down easily:**
Sarcopenia is defined as the progressive loss of lean body mass in aging animals in the absence of disease. As muscle tissue mass decreases so does muscle strength which is why older people are less steady or have difficulty catching their balance. Our pets may exhibit similar signs such as changes in their movements reflected in difficulty getting up or reluctance to jump up.

**Lungs:**
The elastic fibers in a dog’s lungs allow them to expand and contract with each breath. As a dog grows older, some of these fibers are replaced with fibrous scar tissue diminishing the ability to breathe as efficiently as possible. Pet owners should recognize that an older animal can’t exercise in extreme temperatures as well as they did when they were younger. Jogs or walks with your pet may need to become slower or shorter as they progress through their older years.

**Trouble at Night – Panting and Pacing**
Some older dogs may become restless at night and stay awake pacing throughout the house or panting. There are many reasons an older dog may have difficulty sleeping at night including both medical and anxiety or behavioral related causes. Dogs do get cognitive dysfunction which is similar to dementia in people. Cognitive dysfunction is also referred to as sundowner syndrome and is categorized as a slow, degenerative and progressive disorder in our aging pets.

Sundowning is a syndrome in Alzheimer’s patients of recurring confusion and increased agitation in the late afternoon or early evening. The hallmarks of this syndrome in dogs are
progressive confusion, reversal of day-night wake-sleep patterns and poor adaptability to new situations. The exact reason for this change in our geriatric pets is unknown.

This is just the tip of the iceberg when it comes to the ailments and common symptoms our pets face when they age. Telling an owner ‘Old age is not a disease’ is not the right thing to do during this time. Instead taking the time to listen to the problems the pet and care giver are facing, going over the causes and possible treatment options are key to helping manage the aging pet.

Providing in home evaluations can also provide you with insight to how the pet manages in their home and also how the owner is managing the pet. Both are very important. In-home evaluation: Provide suggestions for reorganizing the household for senior pet mobility/safety, such as barricading stairs, moving food bowls, using nonslip surfaces, improving traction by shaving hair between pads or using traction booties.

Many pets have sanitation issues. Diapers or Chux pads (“puppy pads”), waterproof bedding (baby mattresses are an alternative to expensive dog beds as they are waterproof), baby powder, waterless shampoo, and shaving hair around the perianal area help keep pets clean and comfortable. Keeping the pet’s mind active and alert can make a huge difference in quality of life. Owners can simply change typical pet games: Instead of tossing the ball in the back yard, roll the ball to the dog while he is in bed. Long walks can be replaced with an inside activity, such as “hide and seek,” a game many dogs enjoy, or simply short frequent walks around the house to maintain core muscle. Pets with a high food-drive may love a Kong toy (kongcompany.com) filled with their favorite treats or unique bowls (aikiou.com) that encourage them to seek out food in compartments.

Assessing Quality of Life

When dealing with an aging pet – the topic of ‘when is time’ is bound to come up. Giving your clients ways to evaluate quality of life will be key in helping them deal with that questions.

When evaluating quality of life, personalized patient and client information is needed to reach an educated, informed, and supported choice that fits not only their pet’s medical condition but also the family’s wishes. In short, quality of life applies not only to the pet; it also applies to the family!

Many Quality of Life tools are discussed at Lapoflove.com

Geriatric Wellness Plan

Similar to wellness plans for younger patients, clinics can create Geriatric Wellness plans to encourage owners to consistently bring their pets in for exams. Bundling services and avoiding services that may not be necessary at this life stage is the foundation. An example of bundling
services is offering 4 visits per year for a discounted rate (i.e., if your typical office visit cost is $45– offer 4 visits for a discounted rate of $135 instead). At the geriatric stage, diseases and symptoms progress fast; thus, warranting the need for multiple visits a year. Bundled service discounts are a great way to maximize compliance for pets in need by incentivizing for a visit every quarter.

Offering unique services is another component of a Geriatric Wellness Plan. For instance, geriatric pet sitting, monthly “sanitary shaves”, Fear-Free nail trims, laser therapy, physical therapy, and geriatric boarding/day care are a few ideas that can be incorporated into the plan.

At this stage in life, many pets will also need specialized accessories or products to help manage their daily activities. This can be done by offering a retail space within the clinic, or if that is unfeasible, simply by providing information sheets to clients on useful items and where to order them.

In Summary:

As a profession we have been well educated and equipped for marketing and caring for the senior pet. For those fragile, advanced aged geriatric pets there is an opportunity to provide better care as they enter their golden years, and support the families as they struggle alongside their pet. Marketing specifically to this group helps to highlight the symptoms the pet will encounter while also focusing on the challenges the caregiver may face. Overall, this confirms to the caregiver that you empathize with their plight, gains their trust, and encourages them to reach out for assistance with their pet when needed.
ASSESSING QUALITY OF LIFE WHILE INTEGRATING PATIENT CAREGIVER GOALS

Mary Gardner, DVM

Learning Objective:
Knowing when is “time” is not an easy thing to do unless a pet is in the active stage of suffering – at that point, it is usually clear to all involved. But most pet owners do not want to have their pet get to the point of extreme suffering. But when do you make that decision? This presentation will give attendees tools and tips to help guide owners through the decision process and to provide them with guidelines to do what is best for the pet and the family.

Proceedings:
Melinda’s phone call to me started off as most of our calls do, with lots of heartfelt tears. It was clear Melinda needed support and additional education through this tough time. Chance, her 4 year old male Staffordshire Terrier, greeted me at the door for our in-home hospice consultation, clearly unconcerned that he has both severe mitral and tricuspid valve insufficiency, along with atrial fibrillation. Melinda understood the gravity of his condition and was well-coached by the cardiologist. Her most pressing issue however, as with most of our clients, is knowing When to make that final decision. It’s the most important question we are asked as doctors and although our clients want a specific timeline, more personalized patient and client information is needed to most comprehensively evaluate quality of life (QOL) and reach an educated, informed, and supported choice that fits not only their pet’s medical condition but also the family’s wishes. “Quality of Life” applies not only to the pet; it applies just as much to the family!

The most commonly used objective measurements for quality of life by veterinarians are mobility, appetite, pain, and proper voiding. I certainly do not disagree with any of these but the presence of quality of life based on these items should not be answered with a “yes or no,” but rather “if… then”.

There are numerous objective QOL scales available that do a wonderful job addressing these, and other, clinical signs of the pet but, in my opinion, leave out the other 50% of the equation; the family’s time, emotional, physical and financial budgets. This is why I always start hospice consultations with open-ended questions. I need to get an idea of what the family values most in their pet’s daily life, where their “stop point” is in relation to the pet’s disease condition, and what their idea of a “good death” is for their pet.

The goal is not to evaluate the QOL for the family (although I feel owners want and deserve my opinion) but rather to help them uncover their own thoughts, feelings, and boundaries for their pet surrounding end of life decisions. These questions help me gauge the family’s time, emotional, physical and (when appropriate, financial) budgets:

1. Have you ever been through the loss of a pet before? If so, what was your experience (good or bad, and why)? (Side bar: ”Have you ever been through this before?” is usually the first thing I ask. I find that families experiencing quality of life evaluation for the first time generally need more hand-holding and more direct language about the process
They tend to wait for that hand-written letter from their pet saying “I’m ready now, Mom.” This is not just my observation, it is what I hear from these pet owners time and again after the loss of their pet; “I can’t believe I waited that long.”

2. What do you hope the life expectancy of your pet will be? What do you think it will be?

3. What is the ideal situation you wish for your pet’s end of life experience? (at home, pass away in her sleep, etc.)

4. Do you hold any stress or anxiety about any of these issues? (This section is meant to help identify the main concerns the family has.)
   - Pet suffering
   - Desire to perform nursing care for pet
   - Ability to perform nursing care for pet
   - Pet dying alone
   - Not knowing the right time to euthanize
   - Coping with loss
   - Concern for other household animals
   - Concern for other members of the family (i.e., children)

After some discussion, it was clear Melinda most valued the physical companionship Chance brought her. He followed her everywhere, even when it was clear his breathing was labored. She was aware that his condition could deteriorate rapidly at any time, leading to death in minutes to hours at best (a condition I categorize as “imminent”). Knowing the significant anxiety that accompanies dyspnea and the happiness her presence brings him, Melinda placed great value on the quality of death for Chance. Her worst fear was coming home after work to find that he passed away on his own, not knowing if he was in pain or stress during that death phase. Melinda’s stop-point came a couple weeks later when Chance no longer followed her to the next room; she knew it was time. She wanted to be with him and to lean on the support of family at that crucial moment, which is why we met at Chance’s favorite spot on the beach at sunset the next day to peacefully say good-bye.

Ideally, every family’s budgets and boundaries align with the disease process at hand. For Melinda it did, but this is not always the case. The family that places greatest weight on both the happiness of the pet in addition to avoiding an emergency situation at all costs needs to understand the significant risk they run by waiting too long with imminent conditions…. This determines what clinical signs should be weighted most heavily to evaluate quality of life. We have to start moving away from the standard “call me when he stops eating”! Appetite truly does not concern me for the 85 lb Labrador that has severe osteoarthritis. This dog may never stop eating and the family must not rely on this clinical sign to ever manifest itself. The little Yorkie with congestive heart failure that suddenly refuses food, however, definitely concerns me. Each disease process has it’s own set of clinical signs that should be weighted most heavily.

If the pet is declining in health and there are no additional diagnostics or treatments the family is either willing or able to explore, then quality of life is either an imminent concern or will be some point soon. If the family’s emotional, time, physical or financial budgets are being drained there is a subjective time period in which euthanasia is an appropriate decision to make. This
period could be hours, days, weeks, or even months. Before this specific period, I will refuse to euthanize since there is clearly a good quality of life. After this period, however, I will insist on euthanizing due to suffering of the pet. During this larger subjective time however, it is truly dependent on the family to make whatever decision is best for them under the guidance of a supportive medical team. Some owners need time to come to terms with the decline of their pet while others want to prevent any unnecessary suffering at all. Everyone is different. After all, owners know their pet’s personality better than anyone, even the vet!

Chance was clearly a happy boy that loved his mom dearly, watching her every move and following her to the kitchen, just 15 feet from where I was sitting. Melinda, a 25 year old professional, found Chance in the Florida Everglades as a puppy during a college field trip. He grew up with Melinda during her first years as an adult and now helps her feel secure while living alone. She has given Chance the very best quality of life thus far but with such a life-limiting and condition, is facing the difficult and inevitable loss of her boy. Although tired and breathing more rapidly than normal, Chance is happy. He has no perception of what “heart failure” means and no emotional reaction to his physical condition. He is living in the moment (isn’t that what we love about our pets anyway!?). The drawback is that once in pain, animals cannot sense an ending to their hurt. As humans, we can take a pill knowing that the headache will eventually subside but animals have no perception of their suffering ending. This key point is at the heart of quality of life evaluation; how do we measure happiness and prolong it as long as possible.

Pain and Anxiety

Pain in animals is another important topic that all pet owners should be well versed on. It’s the main topic I discuss during my in-home hospice consultations. Myself, and many other professionals, believe that carnivorous animals, such as cats and dogs, do not “hide” their pain, rather pain simply doesn’t bother them the same way it bothers humans. Animals do not have an emotional attachment to their pain like we do. Humans react to the diagnosis of cancer much differently than Fluffy does! Fluffy doesn’t know she has a terminal illness, it bothers us more than it bothers her. This is vastly different than prey animals like rabbits or guinea pigs, who must hide their pain to prevent carnivorous attacks. If you’re interested in learning more about
pain and suffering in pets, grab Temple Grandin’s book “Animals in Translation” and read chapter 5.

When discussing the decision to euthanize, we should be just as concerned about anxiety in our pet as we are about pain. Personally, I feel that anxiety is worse than pain in animals. Think about the last time your dog went to the vet. How was his behavior? Was he nervous in the exam room? Did he give you that look that said “this is terrible!”? Now think back to when he last hurt himself. Perhaps scraping his paw or straining a muscle after running too hard. My dog rarely looks as distraught when she’s in pain as she does when she’s anxious. It’s the same for animals that are dying. End stage arthritis patients begin panting, pacing, whining, and crying, especially at night time. Due to hormonal fluctuations and other factors, symptoms can usually appear worse at night. The body is telling the carnivorous dog that he is no longer at the top of the food chain; he has been demoted and if he lies down, he will become someone else’s dinner. Anti-anxiety medications can sometimes work for a time but for pets that are at this stage, the end is certainly near.

Waiting Too Long
An interesting trend that I did not expect when starting my hospice practice is that the more times families experience the loss of a pet, the sooner they make the decision to euthanize. Owners experiencing the decline or terminal illness of a pet for the first time will generally wait until the very end to make that difficult decision. They are fearful of doing it too soon and giving up without a good fight. Afterwards, however, most of these owners regret waiting too long. They reflect back on the past days, weeks, or months, and feel guilty for putting their pet through those numerous trips to the vet or uncomfortable medical procedures that did not improve their pet’s quality of life. The next time they witness the decline of a pet, they are much more likely to make the decision at the beginning of the decline instead of the end.

What about a natural death?
Yes, there are those pets that peacefully fall asleep and pass naturally on their own, but just as in humans, this is rare. Many owners fear their pet “passing alone” while others do not. Occasionally I am asked to help families through the natural dying process with their pet. For different reasons, these families are against euthanasia. I explain everything I possibly can, from how a natural death may look, how long it may take, what their pet may experience, etc. Inevitably, almost all of these families regret doing this. Most of them comment afterwards “I wish I would not have done that, I wish she didn’t have to suffer.” A natural death can be difficult to watch, especially for non-medically oriented people. Most people can watch a human family member in pain much more easily than they can their pet. To an extent, we can talk other humans through physical pain or discomfort. Humans can perceive an ending to their pain (via medication or even death) but there is little emotional comfort we can offer a pet that is suffering, they simply cannot perceive an ending to that pain. Families take this guilt difficultly and I do my very best to not only readily suggest euthanasia when appropriate, but prepare families for a “worst-case” scenario should they chose to wait.

Weigh Your Options Carefully
If the most important thing to you is waiting until the last possible minute to say goodbye to your baby, you will most likely be facing an emergency, stress-filled, sufferable condition for your pet. It may not be peaceful and you may regret waiting too long. If a peaceful, calm, loving, family-oriented, in-home end of life experience is what you wish for your pet, then you will
probably have to make the decision a little sooner than you want. Making that decision should not be about ceasing any suffering that has already occurred, but about preventing suffering from occurring in the first place. Above all, our pet do not deserve to hurt.

I’ve heard from countless pet owners that the death of their pet was worse than the death of their own parents. This might sound blasphemous to some, but to others it’s the cold truth. Making the decision to euthanize a pet can feel gut-wrenching, murderous, and immoral. Yes, those are strong words, but that is what our pet families experience. They feel they are letting their pet down or that they are the cause of their friend’s death. They forget that euthanasia is a gift, something that, when used appropriately and timely, prevents further physical suffering for the pet and emotional suffering of the family. Making the actual decision is the hardest part of the experience and I’m asked on a daily basis, “Doc, how will I know when it’s time?” Let me shed some light on this difficult discussion.

Quality of Life Scale

When evaluating quality of life, personalized patient and client information is needed to reach an educated, informed, and supported choice that fits not only their pet’s medical condition but also the family’s wishes. In short, quality of life applies not only to the pet; it also applies to the family!

Pet’s Quality of Life

Score each subsection on a scale of 0-2:

- 0 = agree with statement (describes my pet)
- 1 = some changes seen
- 2 = disagree with statement (does not describe my pet)

1. Social Functions
   a. Desire to be with the family has not changed.
   b. Interacts normally with family or other pets (i.e., no increased aggression or other changes).

2. Natural Functions
   a. Appetite has stayed the same.
   b. Drinking has stayed the same.
   c. Normal urination habits.
   d. Normal bowel movement habits.
   e. Ability to ambulate (walk around) has stayed the same.

3. Mental Health
   a. Enjoys normal play activities.
   b. Still dislikes the same things. (i.e., still hates the mailman = 0, or doesn’t bark at the mailman anymore = 2)
   c. No outward signs of stress or anxiety.
d. Does not seem confused or apathetic.
e. Nighttime activity is normal, no changes seen.

4. Physical Health
   a. No changes in breathing or panting patterns.
   b. No outward signs of pain. (See Resources Below)
   c. No pacing around the house.
   d. My pet’s overall condition has not changed recently.

Results:

1. 0 - 8 = Quality of life is most likely adequate. No medical intervention required yet, but
guidance from your veterinarian may help you identify signs to look for in the future.
2. 9 – 16 = Quality of life is questionable and medical intervention is suggested. Your pet
would certainly benefit from veterinary oversight and guidance to evaluate the disease
process he/she is experiencing.
3. 17 - 36 = Quality of life is a definite concern. Changes will likely become more
progressive and more severe in the near future. Veterinary guidance will help you better
understand the end stages of your pet’s disease process in order to make a more informed
decision of whether to continue hospice care or elect peaceful euthanasia.

Resources:

1. AAHA/AAFP Pain Management Guidelines for Dogs and Cats,
www.aahanet.org/Library/PainMgmt.aspx

Family’s Concerns

Score each section on a scale of 0-2:

- 0 = I am not concerned at this time.
- 1 = There is some concern.
- 2 = I am concerned about this.

I am concerned about the following things:

1. Pet suffering
2. Desire to perform nursing care for your pet
3. Ability to perform nursing care for your pet
4. Pet dying alone
5. Not knowing the right time to euthanize
6. Coping with loss
7. Concern for other household animals
8. Concern for other members of the family (i.e., children)

Results:
1. 0 - 4 = Your concerns are minimal at this time. You have either accepted the inevitable loss of your pet and understand what lies ahead, or have not yet given it much thought. If you have not considered these things, now is the time to begin evaluating your own concerns and limitations.

2. 5 - 9 = Your concerns are mounting. Begin your search for information by educating yourself on your pet’s condition; it’s the best way to ensure you are prepared for the emotional changes ahead.

3. 10 - 16 = Although you may not place much value on your own quality of life, your concerns about the changes in your pet are valid. Now is the time to prepare yourself and to build a support system around you. Veterinary guidance will help you prepare for the medical changes in your pet while counselors and other health professionals can begin helping you with anticipatory grief.

### Basic Quality of Life Assessments

Let’s face it – some people just need an easy way to evaluate a pet’s quality of life. I’m not saying I agree with this method, but for some, this is all they can mentally handle during these delicate days.

The most traditional method is when you ask a family to record the top 5 favorite things of the pet and when they stop doing 3 or more of them, it is ‘time’. My apprehension to this method is that it does not take into consideration the pet’s ailment.

One twist I like to add to this is adding something that the pet hates to that list. There are certain things that just ‘bug’ our pets – and when they stop caring for those things, it can be a sign that they are simply tired and do not have the energy to ‘care’. My own dog hated the Goodyear blimp that flew over our house. The week he passed – he didn’t make a peep at it coming into his air space.

Another uncomplicated way to track quality of life is to get two jars – one labeled ‘good day’ and the other ‘bad day’. Have the owner put a penny in the appropriate day jar based on the pet’s behavior, habits, daily functions, etc. Then after a few weeks – you can see if the pet is having more bad days than good and it is probably appropriate to recommend euthanasia.

A much better quality of life scale was created by Alice Villalobos, DVM and is called The HHHHHMM Scale. This takes into consideration hurt, hunger, hydration, hygiene, happiness, mobility, and more good days than bad. It can be downloaded by following this link: [http://www.pawspice.com/downloads/QualityofLifeScale.pdf](http://www.pawspice.com/downloads/QualityofLifeScale.pdf)

### Advanced Quality of Life Assessments

After helping thousands of families with determining when is ‘time’ – I have realized that much of that assessment is ruled by the pet’s ailment. As mentioned above – the pet in heart failure is very different than a pet with arthritis. The questions that you evaluate are very different.
Appetite in arthritis is not as important as it is in heart failure. Respiratory effort is vital in heart failure while not so much (except for painting due to pain) in arthritis.

Due to this – the questions I have owners ask everyday is based on the ailment. Lap of Love has created an online interactive tool that owners can use to evaluate their pet’s quality of life. They create their pet’s profile and choose from a variety of ailments. Based on the ailment selection, the questions and parameters they evaluate are different.

This tool is free for vets and the public at large and can be found at www.pethospicejournal.com

Using this scale in conjunction with the family’s quality of life has helped many owners feel empowered over their decisions – whether to continue or euthanize their pets.

Suggestions on using any quality of life scale:

1. Complete the scale at different times of the day, note circadian fluctuations in well-being. (We find most pets tend to do worse at night and better during the day.)
2. Request multiple members of the family complete the scale; compare observations.
3. Take periodic photos of your pet to help you remember their physical appearance.

Summary

How I wish the answer to the question ‘when is time’ was simple and clear cut – however, it is not. It is our duty to assist owners with end of life decisions and to help end and prevent suffering of animals. There are many ways to help families explore quality of life questions but the one way that is an injustice to our profession is if you simply say, ‘Call me when it’s time’. Owners need more than this and animals deserve more.
Learning Objectives:
All general practitioners and their staff will help families navigate through a loss of a pet. We are not trained by default to handle the emotional rollercoaster people will go through during this time. This lecture will educate the attendees on different types of grief and give tips to help families deal with owners facing these challenges – within boundaries as we are not mental health counselors.

Proceedings:

Anticipatory Grief:
The death of a pet is, for many, the worst personal loss they have ever experienced. Complicate the event with the possibility of euthanasia and the emotions can be too much for some pet parents to bare. How, when, and why veterinary professionals can make a difference at such an important time is essential to maintaining not only the human-animal bond, but the doctor-client bond as well. There is no better time to show your clients you care than by helping through the difficult journey of pet loss.

Many people experience what is referred to as ‘Anticipatory Grief’. This is when emotions such as grief, despair, anger occur before the impending loss of a pet. Once an owner learns of a terminal illness or sees the long term decline of their geriatric pet, their grief emotions can start to manifest and can even make some physically sick. The 5 stages of grief, as described below, can also be present in anticipatory grief. However, this period can also allow pet owners time to do things with their pet that they may have put off in the past and for some, it prompts a conscious closure before the loss.

With the lack of social acceptance of grief over a pet that has passed, it is even more compounded when someone is facing anticipatory grief. They feel that no one understands them or they may even feel ‘silly’ that they are getting so emotional over ‘just an animal’. But most pet owners that love their pets do understand and it is important that this period of grief is recognized, and us as pet professionals assist our clients during this difficult time.

This period of anticipatory grief doesn't usually take the place of post-loss grief. There will typically still be a degree of grief after the pet has passed.

Regardless if the pet is old or young, if death is sudden or expected, grief is a natural reaction to the loss of that pet. Similar to when a person passes away, many people can experience what is commonly called the five states of grief – although not everyone experiences all of these emotions and there is no set pattern that people follow when grieving.

1. Denial
2. Anger
3. Bargaining (i.e., trying to find an activity or action that either could have helped avoid the loss or that will take it away)
4. Depression
5. Acceptance

Pet Lover’s Code:
Dr. Alan Wolfelt, Pet Loss expert, has created the ‘Pet Lover’s Code’ which helps owners with the loss of a pet:

1. **You have the right to grieve the death of a pet.** You loved your pet. Your pet loved you. You had a strong and profound relationship. You have every right to grieve this death. You need to grieve this death. You also need to mourn this death (express your grief outside of yourself).

2. **You have the right to talk about your grief.** Talking about your grief will help you heal. Seek out others who will allow you to talk about your grief. Other pet lovers who have experienced the death of a pet often make good listeners at this time. If at times you don’t feel like talking, you also have the right to be silent.

3. **You have the right to feel a variety of emotions.** Confusion, anger, guilt, and relief are just a few of the emotions you might feel as part of your grief journey after the death of a pet. Feelings aren’t right or wrong: they just are.

4. **You have the right to be tolerant of your physical and emotional limits.** After the death of a pet, your feelings of loss and sadness will probably leave you feeling fatigued. Respect what your body and mind are telling you. Get daily rest. Eat balanced meals. And don’t allow others to push you into doing things you don’t feel like doing.

5. **You have the right to experience “griefbursts.”** Sometimes, out of nowhere, a powerful surge of grief may overcome you. This can be frightening, but it is normal and natural.

6. **You have the right to make use of ritual.** After a pet dies, you can harness the power of ritual to help you heal. Plan a ceremony that includes everyone who loved your pet.

7. **You have the right to embrace your spirituality.** At times of loss, it is natural to turn to your faith or spirituality. Engaging your spirituality by attending church or other place of worship, praying, or spending time alone in nature may help you better understand and reconcile your loss.

8. **You have the right to search for meaning.** You may find yourself asking, “Why did my pet die? Why this way? Why now?” Some of your questions may have answers, but some may not. Ask them anyway.

9. **You have the right to treasure your memories.** Memories are one of the best legacies that exist after the death of a special companion animal. Instead of ignoring your memories, find ways to capture them and treasure them always.

10. **You have the right to move toward your grief and heal.** Reconciling your grief after the death of a pet may not happen quickly. Remember, grief is best experienced in “doses.” Be patient and tolerant with yourself and avoid people who are impatient and intolerant with you. Neither you nor those around you must forget that the death of a beloved pet changes your life forever.
CANINE/FELINE GRIEF:
The loss of a pet can be quite traumatic not only on the family as a whole, but also specifically on the other pets left behind. Many of these signs are based on the pet’s natural personality. For example, a subordinate dog may become introverted, hiding and not wanting to interact with the family with the loss of a more dominant companion. Conversely, some dominant dogs may become very clingy or appear abnormally nervous (panting, pacing, searching for their friend, etc) if their “pack” seems to have been lost. These behaviors are general, however, and be seen in any pet. Based on these outward signs that pets cannot voice to us, it certainly appears that they can experience grief when a companion dies.

The American Society for the Prevention of Cruelty to Animals conducted a Companion Animal Mourning Project in 1996. The study found that 36% of dogs ate less than usual after the death of another canine companion. About 11% actually stopped eating completely. About 63% of dogs vocalized more than normal or became more quiet. Study respondents indicated that surviving dogs changed the quantity and location of sleep. More than half the surviving pets became more affectionate and clingy with their caregivers.

It is normal for behavior changes to be seen in the first 10-14 days after the loss of a companion. Pet owners may try to take their mind off of it by providing them with more attention and affection. Long walks, playing, and engaging in favorite activities, (especially those done with the companion that passed) can help build confidence and stimulate mental enjoyment. Use environmental enrichment techniques such as toys, (especially those that allow you to hide a treat inside like Kongs), to help keep them busy during the day. If the dog is too depressed, they may not respond right away.

Surviving cats may search, cry out or even pine for their lost companion. Other changes include sleep pattern irregularities, loss of interest in favorite activities, and eating pattern changes.

Remember, time heals all wounds. One may also consider a DAP (dog appeasing pheromone) diffuser, available at most pet stores. Give it few days then start encouraging the dog to do more using their favorite rewards that are not used at any other time. If symptoms do not subside after two weeks, the pet should be seen by their veterinarian. There are medical and even holistic approaches to canine grief that can be particularly helpful including antidepressants, acupuncture, and herbal remedies.

Some more severe cases may also include stress colitis (diarrhea) and may necessitate a visit to the veterinarian sooner. If the grieving dog is now an “only child,” some owners ask if they should get a new companion to prevent loneliness. While this may work for the more sociable and extroverted breeds, it doesn’t work for all, especially highly dominant dogs. It is best to allow the dog time to heal. Most experts recommend waiting at least 2-4 weeks (sometimes longer) before introducing a new pet into the household.

Remember, the pet may miss the lost companion just as much as the owner does.

MEMORIALIZING PETS

When we lose a loved one, our lives are forever changed. Those pets become a part of our life story and will leave an impression on everyone they touched. Our society honors many events
such as birth, graduation, marriage as well as death and many of the ways we honor our loved ones (furry or skin) is steeped in tradition. Creating a memorial has a positive effect on many people dealing with loss and allows them to appreciate the life and memory of the lost one.

There are so many ways that people can memorialize their pet and this can help us celebrate what was and to start mourning that loss. It also diverts some negative emotions and turns them into a positive goal – to tell their pet’s story and show people how much they loved them.

HONORING THEIR MEMORY

Honoring a lost pet is an important part of both the grieving and healing process. Below are some ideas we can provide owners to help them to honor their pet once their time together has come to an end:

- Start a scrapbook with photos, drawings and/or stories.
- Plant a tree in your backyard - you may even want to choose one as a family that ‘reminds’ you of the pet. For example, a snowball bush for a white, fluffy dog/cat or a big, oak tree for a working breed dog.
- Plant flowers yearly in a flower bed and take that time to reminisce and remember the pet. Each family member can pick their own flower and prepare one story about the pet to share with the others.
- Make a tribute table with items that remind you of your pet; pictures, toys, a collar or leash, favorite stick or mementos from various trips together. This can be a particularly useful when small children are involved in the grieving process.
- Have all family members wear something that reminds them of the pet. For example, get all shirts to match the same color as the pet’s favorite collar, get a picture of your pet on a nightshirt, a ring with the pet’s birthstone or engrave the pet’s name in a locket.
- Make each family member a small pillow out of the pet’s favorite blanket or bandana.
- Hold a memorial service - let your child take part in the planning as much as possible (older children can do the planning/inviting independently).
- Make a donation in the pet’s name and let your child choose the charity.
- Write a letter or a ‘will’ from the pet - this will serve as a nice family activity to share and a forum for memories and stories.
- Have all family members write (or if they are too young, you can do it for them) a letter to the pet to express their feelings or perhaps things they wish they could say to the pet.
- Keep a list of all the things your pet did that made you smile or laugh. Your family can experience the joy your pet brought to their lives now and for years to come.
- Keepsakes: There are many companies that specialize in creating personalized treasures like stone markers, sculptures, paintings, jewelry, even diamonds that can all incorporate the cremains of your pet.
- Lap of Love offers a special memorial page online where families can share the memory of their companion.

RESOURCES FOR COPING WITH PET LOSS
Good resources for pet loss help can be found through the “Association for Death Education and Counseling” and the “Association for Pet Loss and Bereavement”.

**Pet Loss Books for Children**
- When a Pet Dies ~ F. Rogers
- Dog Heaven ~ C. Rylant
- Cat Heaven ~ C. Rylant

**Pet Loss Books for Adults**
- Grieving The Death of a Pet ~ Betty Carmack
- Sorrow on the Loss of Your Pet ~ M. Anderson
- Pet Loss and Human Bereavement ~ W. Kay
- Animals as Teachers and Healers ~ S. McElroy
- A Final Act of Caring: Ending the Life of an Animal Friend ~ M. Montgomery
- It's Okay To Cry ~ M.L. Quintana

Pet loss grief is a real and sometimes crippling emotion. As pet professionals we need to recognize, embrace and help our clients through this time. Your clinic should have available information on local pet loss groups and even counselors to clients not only dealing with pet loss but also the upcoming loss of their pet to help with anticipatory grief.
THE ART OF EUTHANASIA AND SCIENCE OF DEATH
Mary Gardner, DVM

Learning Objectives:

The euthanasia appointment is one of the most emotionally challenging appointments for the entire staff (and owner). This lecture will go over all aspects of the appointment including how to handle the initial phone call, discussing the processing, handling payment, technical aspects of euthanasia and body care.

Being Good at Death:

We are not taught to be good at death. No one taught me how to walk into an exam room for a euthanasia, what to say to a crying teenager, or whether or not to hug the old man that just lost the last piece of his late wife. I received no direct guidance about the proper verbal and non-verbal techniques that make this “most difficult appointment” just a bit easier on everyone, including myself. And from our numerous discussions with new grads, it’s a common theme; about 75% of veterinarians graduate without ever administering the life-ending medication. It’s no wonder why our lectures are packed at conferences and why our hospice practice has more requests for externs than we can handle. We simply weren’t taught the intricacies of death, and as the only medical profession licensed to euthanize, we have an incredible privilege and responsibility to handle this procedure properly.

Euthanasia:

If there is one thing to think about when approaching the euthanasia appointment, it’s “What would I do for my own family’s pet?” This involves not only you, but your immediate non-veterinary family as well. What could you do to help the ones you love through the process? Now make sure that is the minimum standard of service and care you give each of your patients and their caregivers! Here are some tips to put this into practice:

The entire euthanasia process can be broken down into 4 stages:

1) Setting up the Euthanasia Appointment

   a. Be the first to say the “E” word. Clients hate to be the first ones to bring up “euthanasia.” They think you will judge them for not caring about their pet or that you will be mad at them for giving up too early. Be the first to say it. And even if they’re upset at you for the suggestion, at 2:00 am when they’re stressed because their dog is pacing all night or their spouse is yelling at them because their elderly cat has peed outside the litter box for the third time that day, they will know that you gave them permission to think about the next step.

   b. Making the appointment: How your support team handles this initial contact with the client is crucial. It took the owner a lot of nerve and emotion to call; many feel that they are making the appointment to kill their best friend. Guilt,
worry, anxiety, sorrow are just a few of the ingredients in their emotional cocktail. The receptionist should have nothing else on their mind but assisting that client. They should not be put on hold, the receptionist should not be checking out another client at the same time, and if at all possible, background noise should be kept to a minimum. Most importantly, empathy must be conveyed; I’m so sorry you’re facing this. Do not be scared to show them some emotion, they want to know that you care.

2) During the Appointment

a. **The Arrival:** When the time for the appointment comes, everyone in the clinic should be prepared. The paperwork should be ready, dated, and IN the room. The room itself should be set up properly and one person should be prepared to assist the client. Meet the family at their car prepared to help them into the clinic. Even holding the door open while the owner manages the cat carrier is a huge help to the client. And of course, shuttle them to the room immediately. Paperwork is best completed at this time before reality sets in with the family. Again, emotions will only get deeper from here, not lighter!

b. **The Space.** The room itself is very important. Regardless if it’s a separate comfort room or a regular exam room, you must do your best to make it as warm and comfortable as possible (it should not be the ‘cold sterile’ environment owner’s dread).

c. The veterinarian should go into the room and preferably not leave again until the pet has passed unless the owner requests time alone. Go in with sedation and euthanasia already pulled up in syringes in your pocket, or given to your technician. Speak to the client and make a visual assessment of the pet. Do not pass judgement or appear to be uncomfortable with the decision unless you are certain you will not euthanize. Your discomfort will leave a family with guilt for years.

d. When explaining the euthanasia process, it is important to give the owner peace of mind that it is a gentle process. Explain that euthanasia means “good death” and that the medication is an overdose of anesthesia, in which they go to sleep and don’t wake back up

e. Offer them some time alone with their pet. If they want time alone, hand them the 'ringer' portion of a wireless doorbell. Have the 'bell' portion in the treatment room or give it to the technician assigned to the case. That way the owner does not have to leave the pet to find someone when they’re ready. The human animal bond should never be broken. Generally people do request a few minutes alone, but it’s usually a very short amount of time.

f. **The Procedure:** Intra-muscular or subcutaneous sedation is crucial for the client’s experience and we are always discouraged to learn how many do not sedate pets before euthanasia, or provide only IV sedation (in which their pet rapidly goes from consciousness to unconsciousness, appearing dead). Having 5
minutes for the pet to slowly relax gives the owner time to watch their pet get comfortable. Many times I hear “I haven’t seen him this calm and relaxed in months!” We call this “secondary sedation of the owner.”

g. When it comes time for the final medication, ask the owner “Max is ready, are you?” Never proceed without them fully knowing what is about to happen. They should also know that their pet will pass in 30-60 seconds. All too often owners do not realize it occurs as fast as it does. Whether you use an indwelling catheter, butterfly catheter, or straight needle, do your best to stay out of the way of the owner. Let them hold their pet and instruct them to “keep talking to her, she can hear you.” Giving them something to do keeps their focus off you and this surreal moment for them.

h. After administration, listen for the heart and remain silent unless the owner speaks. This is an important moment and must be honored.

i. Stay present in the room for a few minutes as you gather the syringe and supplies. Watch for agonal breath(s), twitching, or any other movements, which generally happens within 1-5 minutes post mortem. Since we do not recommend warning about all these side-effects before, this is the time to explain them if/when they occur.

3) Memorial Items

a. The paw print is the most traditional and cherished memorial item, even more than cremains sometimes! Every pet owner should be given one at the time of the appointment and given to the owner to take home that day (at no charge!). With air dry clay like Crayola Model Magic, this is inexpensive and takes very little time. Many clinics make the paw print after the clients leave but you are missing a huge opportunity to make the owners feel a little bit of joy at such a devastating moment.

4) Body Care

a. Never allow the owner leave their deceased pet alone. If they need time alone after the euthanasia, allow them that time and hand them the wireless doorbell again. This way, a technician can come back into the room as they leave.

b. Know your crematory well. Understand how they do things and be confident they are providing the level of service your client’s deserve.

If there’s one thing we can tell you to improve your end of life care for pets and their families, it’s to provide the best from the get-go. Provide the kind of care that exceeds the expectations of 95% of the population out there. Do not cater to the 5% of people that are irregular.

The euthanasia appointment should not be the end of the client relationship, it should be the beginning of the next relationship you have with them! And remember, if it were your own pet, what would you do?
A veterinary clinic’s curb appeal does not stop at the clinic door. It extends all the way into exam room and, most importantly, to the entire team! Every person our clients interact with will receive a “snap judgement” from their first impression. How long does this take? For years the general rule has been 7 seconds, but a few years ago a group of psychologists found that it takes about one tenth of a second to form an impression of a stranger, simply from their face (1). They also found that longer exposure to the stranger does not significantly alter the impression, it only boosts confidence in the initial judgment.

What does this mean to a veterinary team? It means that we have a very, very small amount of time to make a positive impression on our clients. This positive impression is not only essential from a business standpoint (you want them to come back!), but also from a medical one. Our clients need to trust us; they need to believe that we care about their pet the same way they do. Without the belief and trust that the client and the doctor have the same desired outcome, trust and rapport will not be established and the client may not accept the treatment plan that the veterinary professional team has offered. Which is, after all, the reason we are in business; to care for, treat, heal, and support animals.

Of course, the importance of body language or non-verbal communication is not a new concept. The “7-38-55 Rule” was first developed in 1971 by UCLA psychology professor Albert Mehrabian (2): 55% of what we convey when we speak comes from our body language, 38% from our tone of voice, and a mere 7% from the words we choose. This study has been widely misinterpreted by stating “97% of what we convey is non-verbal” instead of garnering a greater understanding of vocal (tone, cadence, etc.) and body language cues, which are inappropriately combined to come up with the “97%”.

Mehrabian more clearly states the following on his website:

Total Liking = 7% Verbal Liking + 38% Vocal Liking + 55% Facial Liking. Please note that this and other equations regarding relative importance of verbal and nonverbal messages were derived from experiments dealing with communications of feelings and attitudes (i.e., like–dislike). Unless a communicator is talking about their feelings or attitudes, these equations are not applicable.

Although this landmark study is riddled with criticism and misinterpretation, it remains an important and highly cited illustration of the value of nonverbal communication. Many other studies have arisen since, each with a new methodology, and with the continued conclusion that non verbal cues are 3 to 4 times more influential than verbals cues.
Before we dive into the real content of this talk, it’s important to understand that reading body language is not the same as mind-reading. This is the difference between “observation” and “evaluation.” Reading someone’s non-verbal cues is about observation; we want to find natural tendencies in someone’s physical behavior (called their “baseline”), then look for deviations from their baseline, and finally ask open ended questions to find the root cause of the change.

For example, you may walk into a room and find two people seated, both have their arms crossed while one has both feet flat on the floor and the other has her legs crossed at the knee. You might assume that the closed off body postures mean they are both are upset, and perhaps the female is even more upset because her legs are crossed as well. This may be true, but probably not. Jumping to conclusions so quickly and, for example, immediately putting your guard up or responding with your own closed off body language may start you off on a bad foot (no pun intended) by eliciting defensive behavior from these clients. In this example, crossed arms might be this gentleman’s natural baseline, and the female may simply be cold!

Remember, reading body language is about observing someone’s baseline, finding where there are deviations from that baseline, and using powerful questions to find the underlying cause of the deviation.

THE BASICS

The basics of body language are pretty simple. Across species lines, animals (human and non-human), use adaptations to increase or decrease their physical presence. A bear stands on his back legs to appear taller, cobras expand their hood when they are threatened, and the mantis lifts her front limbs while displaying a conspicuous eyespot in order to scare or distract a predator.

Humans present similar non-verbal “tells” by puffing their chest and standing taller when an attractive woman walks by or throwing both hands up in the air after accomplishing a huge milestone (even humans who have been blind since birth exhibit these behaviors).

The opposite is true as well; a dog cowers in the back of a cage or tucks his tail, an embarrassed child covers her face. We tend to minimize our physical presence when we want to disappear!

Each unique area of our body displays our emotions differently. The face is the most important when it comes to first impressions, and the feet most important when you want to know whether a negotiation is being tipped in your favor.

PERSONAL CURB APPEAL

When you want to make the most positive impression possible on a client, there are 4 main areas to consider: Initial facial expressions, the introduction to the client, non verbals while speaking, and physical appearance. Each of these areas have been proven to influence the impression someone has on another person.

1. Facial Expressions
Judgements based on facial appearance or expression play a very powerful role in how we get treated (2). In fact, in a court of law, it’s been shown that “mature faces” receive harsher judicial outcomes than those with a “baby-faced,” and having an face that is thought to be “competent” (as opposed to trustworthy or likable) may be highly predictive of whether a person gets elected to public office (3). Also, like it or not, attractive people are more favorably viewed in general, leading to overall better outcomes in life in addition to being thought of as more trustworthy (4).

What is a good way to use your facial expressions to improve your curb appeal? Smile. Yes, simply smile. Of course we have all been subjected to the “fake smile” versus “genuine smile”! This distinction has been researched for quite some time; so much so that a genuine smile is now described with the name “Duchenne smile” after the French physician Guillaume Duchenne, who studied the physiology of facial expressions in the nineteenth century (5).

The *Journal of Personality and Social Psychology* described the difference from the anatomical perspective (5):

A. The Duchenne smile involves both voluntary and involuntary contraction from two muscles: the zygomatic major (raising the corners of the mouth) and the orbicularis oculi (raising the cheeks and producing crow’s feet around the eyes).

B. A fake smile involves the contraction of just the zygomatic major since we cannot voluntarily contract the orbicularis oculi muscle.

Interestingly, the fake smile is controlled by the motor cortex while more complicated emotion-related expressions, like the Duchenne smile, are controlled by the limbic system.

Yes, our clients can tell the difference! A genuine, warm, sincere expression of happiness that conveys a welcoming greeting is related to emotion, while the cheesy grin is simply a forced muscle action. So make sure your greeter (whomever that might be) smiles because they are happy to be there, not because they are forced to!

2. **The Non-Verbals of Introduction**

Upon being greeted with the warm, genuine smile, the customary introduction ensues. Even if this is a long standing client, there is still a formal greeting ritual we all engage in. The first 7 seconds may be too long for a first impression, but it’s the perfect amount of time for a good introduction.

In our current Western society, the handshake occurs first and, as long as it’s a good one, is the universally accepted sign of professionalism, politeness, and confidence. A good handshake is an art! Whether you’re the veterinarian or the support staff, make sure you initiate the handshake before the client does to show a confident welcome. Remember, they are coming into your “home” (the clinic) and you want them to feel that you genuinely appreciate their presence. Make hand contact palm to palm, web to web (the “web” is the flap of skin between your thumb and pointer finger) while keeping the angle of your hand either perpendicular to the ground, or palm facing slightly up. Palm down in a handshake indicates power. Don’t squeeze too tightly,
nor too loosely, and maintain consistent tension as you say your greeting. Also, make sure to
shake everyone’s hand in the pet’s family, not just the primary owner, even the children. (What
a way to inspire a new generation of veterinarians!)

While shaking the client’s hand, maintain good eye contact and introduce yourself, even if you
believe they know your name (but not with close friends of course!). They may have forgotten
your name since their last visit, and setting your client up for success by knowing your name
helps build their confidence. (More on verbal techniques, including how to say the client’s
name, in another lecture.)

Since the introduction is about 7 seconds long, make sure it’s meaningful. Step in front of the
receptionist’s desk to shake their hand, use a two-handed handshake (both of your hands around
their one hand), lean gently forward to show appreciation for them coming in, and/or bend down
to pet their dog (cats may not appreciate this though!).

3. Non Verbals to Gain Rapport

After you’ve made an amazing first impression, followed by a confident introduction, it’s times
to complete the circle so that the client builds the trust, rapport, satisfaction, and connection with
the entire veterinary team. These skills all enforce the concepts of active listening, engaged
interaction, and supporting the client’s concerns.

These concepts are broken into 3 anatomical areas, top, middle, and lower body regions.

A- Body Language in the Top ⅓

Eye contact is incredibly important! But how much is too much? At what point does it start to
become creepy? One study in the Royal Society Open Science (6) found that, when asked to
stare at a video of an actor staring back at them, participants had a “preferred gaze duration” of
3.3 seconds (give or take 0.7 seconds). They also found that the rate of pupillary dilation (an
automatic reflex) was a good indicator of how long they wanted to gaze; the longer their
preferred gaze, the faster their pupils expanded. (Don’t get too attached to this difference,
however. The change was so subtle that it was only seen with eye tracking software, which
would be awkward to follow in real life!)

Make your eye contact consistent by looking only inside the imaginary triangle between the two
points about 1 inch above each eye and the tip of the nose; going further down to the mouth or
chin is more indicative of a social or amorous relationship.

Aside from the eyes, do not bite, tense, purse, or conceal your lips. Janine Driver, re-known
body language expert, says “when we don’t like what we see or hear, our lips disappear.” This is
evidenced by turning both lips into our mouth, similar to spreading chapstick once it’s been
applied.
When nodding your head, a gentle, 1 second nod implies active listening, whereas faster head nods may tell your listener “hurry up, I don’t have time for this.” Make your nods slow and small with a closed mouth (which indicates you are listening).

Hands and arms are the second component of this category. Many of us will find ourselves wringing our hands or picking at our fingernails at any given moment. This may increase when we are nervous and evolve from a normal, baseline behavior into what is considered “pacifying” behavior. This is a normal reaction to nervousness or discomfort. (Again, we don’t know WHY someone may be nervous or uncomfortable, but we can simply make the observation then follow up with a powerful question.)

CONCLUSION

Curb appeal does not stop at the clinic’s entrance. And fortunately for veterinary professionals, those clinic doors are human sized, not small doggy-doors (until pets earn a monetary income, this will be the case)! We have to interact with, connect with, and ultimately, win the trust of our clients if our professional knowledge is to be put to good use. Without that rapport with our clients, something every person of the veterinary team is responsible for upholding, our treatment plans may not be accepted and/or compliance may not be achieved. Only through immediate, consistent, and appropriate maintenance of this bond will the patients receive the best possible medical care, and our clients happy to see us again!

SOURCES:

(1) - Willis J1, Todorov A. Psychol Sci. 2006 Jul;17(7):592-8. First impressions: making up your mind after a 100-ms exposure to a face.


(6) - Pupil dilation as an index of preferred mutual gaze duration, Royal Society Open Science Nicola Binetti, Charlotte Harrison, Antoine Coutrot, Alan Johnston, Isabelle Maresch Published 6 July 2016.
DELRIVERING A CONSISTENT CLIENT EXPERIENCE –BY FOCUSING ON UPSERVING NOT UPSELLING

Mary Gardner, DVM

Learning Objective:
This course will provide attendees tools to enhance their customer service skills by looking at some of the best in multiple industries. Leading a conversation, finding out what’s important to the owner and providing outstanding customer service – from all team members will build trust with your clients and therefore encourage them to do what is best for their pet within their means.

Proceedings:

Like it or not, we are all in sales - not in the traditional sense of the word ‘sales’ - but in the broader sense we are all trying to get others to part with resources – these resources are not just monetary; they include resources like time, attention and trust. Leave aside the physical exam, reading bloodwork and radiographs – veterinarians spend a lot of their time in sales. Whether it is to get the owner to clean the ears and apply medications twice a day, the technician to help during surgery when they would rather go to lunch, negotiating with suppliers or gaining trust with clients to allow for diagnostics – veterinarians need to learn the art of sales and how to build trust. And the first step is learning to Up-Serve instead of Up-Selling.

If building relationships is the key to sales success, then trust is the foundation. Most top sales performers will say that the factor that contributes to their success most is building trust with customers. But how do you build trust? Usually, it's the little things you do over time that make the difference but sometimes, in our industry – we have 5 minutes to build trust. There are 5 secrets that I like to follow to building trust.

1. Truth: We can do many things to lose business: not deliver on time, not communicate effectively, not follow up. But from your customers' point of view, lying is the number-one way to lose their trust and business forever. Do not lie about their pet’s condition or the treatment options. Period!

2. Reliability: You build trust every time you get back to the client with the information they requested, every time you follow up after the customer receives your service, and every time you respond to a problem immediately and solve it right away. If you forget to call back with bloodwork results or not send the information you promised – you broke that trust.

3. Understanding through uncommon efforts: When you invest the time to understand your client’s needs, concerns, thoughts, what is important to them, etc - you are building the trust by making the effort to see the world through their eyes.

4. Service: There's no better way to build and maintain your client’s trust than through ongoing personalized service.
Look around your practice and figure out ways to be personalized and earn your client’s trust. And ask yourself the following questions about your clients:

- If one of my clients leaves, do I know why?
- If I don't know why, do I ask?
- Do I ask every client I have, "Is there anything I'm not doing that I could be doing to serve you better?"
- Do I consider myself a resource for my clients?
- Do I create added value for my clients by going beyond what's expected?
- Do I look for ways to help my customers increase their bottom line?

5. **Take your time:** Building trust does not happen overnight but rather a long relationship of building that trust. The follow-up calls and visits, solved problems, on-time delivery of promises, and caring about them and their pet – honestly – will build trust.

To build trust, your customers need to believe three things about your company:
1. You have their best interests at heart.
2. You are capable of delivering on your promises.
3. You are honest and authentic.

This session will be interactive and go over ways great companies build trust and therefore Upserve vs Upsell!