

Over-the-Counter Medications for Pets

By Tara Marmulak, PharmD; Valerie Wiebe, PharmD, FSVHP, DICVP;
Maureen Perry, RPh, FSVHP, DICVP; and Elaine Blythe, PharmD

Feb. 3, 2014 (expires Feb. 3, 2017)

Activity Type: Knowledge-based

To earn continuing education credit:

**ACPE Program 207-000-14-002-H01-P;
207-000-14-002-H01-T**

Upon successful completion of this article, the pharmacist should be able to:

1. List common conditions for which dog and cat owners may seek to treat with over-the-counter drugs commonly stocked in community pharmacies.
2. Identify over-the-counter drugs that are unsafe for cats, dogs and specific breeds of dogs.
3. Counsel dog and cat owners to determine an appropriate dose for over-the-counter drugs and describe how to measure and administer the dose.

Upon successful completion of this article, the pharmacy technician should be able to:

1. List common conditions for which dog and cat owners may seek to treat with over-the-counter drugs commonly stocked in community pharmacies.
2. Identify over-the-counter drugs that are unsafe for cats, dogs and specific breeds of dogs.
3. Identify ingredients in over-the-counter drug products that are unsafe for cats, dogs and specific breeds of dogs.

FREE ONLINE CE. To take advantage of free continuing pharmacy education (CPE) for this program, pharmacists and pharmacy technicians must achieve a passing score of 70% on the online continuing education quiz for the program. If a passing score is not achieved, one free reexamination is permitted. To take this test, go to www.pharmacistelink.com and click on the CE tab. Click on the CE Center, which will take you to the online activities that are available. If you have not registered with Pharmacist eLink, you must do so before being able to access the CE Center. You will receive immediate online test results and credits will be posted to CPE Monitor within six weeks. To obtain your CPE Monitor e-Profile ID, please go to www.cpemonitor.com to register.



NCPA® is accredited by the Accreditation Council for Pharmacy Education as a provider of continuing pharmacy education. NCPA has assigned 1.5 contact hours (0.15 CEU) of continuing education credit to this article. Eligibility to receive continuing education credit for this article expires three years from the month published.

INTRODUCTION

Pets have become an integral part of our families. As such, demand is increasing for pharmacists to be informed about over-the-counter products suitable for use in our pets. Dosing recommendations do not rely on simply decreasing the dose for the size of the animal but also taking into consideration differences in metabolism, drug sensitivities, vehicle and anatomy. As with any over the counter product recommendation, caution should be exercised as there is always the possibility that a product can exacerbate or mask a more serious condition.

According to the American Veterinary Medical Association, in 2007, 37 percent of American households have dogs, and 32 percent of American households have cats (AVMA). Companion animals have become an important member of the American family and it is not surprising that people are willing to spend money on products to maintain the well-being of their loved ones. Increasingly, retail pharmacists are being asked by consumers for drug recommendations for their pets. It is imperative that pharmacists be well informed about which medications are safe to use in pets before making such recommendations.

Aside from the obvious size and hair coat differences, animals truly are unique, including the ways that medications affect them. It cannot be assumed that drug metabolism is the same as in humans nor even amongst breeds within a species. It has been shown that pigs cannot sulfonate, dogs cannot acetylate and that cats cannot glucuronidate (Baggot, 2001). These differences, alone, can dictate what drugs can and can not be given to a species.

Even within a species, there may be differences in metabolism that have developed through breeding practices. Some breeds of dogs have a genetic deficiency in the p-glycoprotein, a drug transporter in the blood brain barrier which pumps drugs out of the brain. Because of this deficiency, certain medications can build up in high concentrations in the brain, leading to toxicities including seizures. Breeds that are affected by the genetic deficiency include common herding breeds such as collies, Australian Shepherds, English Shepherds, Shetland Sheepdogs, Old English Sheepdogs, McNabs, longhaired Whippets, and Silken Windhounds (Neff et al., 2004). Animals of these breeds may be susceptible to neurotoxicity from several drugs, including ivermectin, a commonly used heartworm medication, loperamide, digoxin, and ondansetron (Mealey, 2004).

Not only do they potentially metabolize drugs differently, but they may also have differences in product absorption. When recommending products, dosage forms must also be considered. Total GI transit time is 6-8 hours in a dog versus 20-30 hours in humans (Martinez, 2009). Knowing that, it's not surprising that

enteric coated products designed for humans don't have the same efficacy in dogs. One study found that enteric coated aspirin tablets were retained in the stomachs of beagle-sized dogs and were often vomited intact, or found partially dissolved in the feces (Nap et al. 1990). Therefore, enteric coated products intended for humans may fail therapeutically in dogs.

Tablet strength can also be an obstacle. Small dogs and cats may require doses that are well below what is available as an OTC product, making it impossible to split or cut the tablet accurately.

SOLVENTS

The drug vehicle is another consideration when making recommendations. Propylene glycol is used as a solvent in many medications. Although not generally considered a harmful substance, it is known that cats are more sensitive to this product. Doses of 1.6 g/kg of bodyweight of propylene glycol fed to cats caused Heinz body anemia (Christopher, 1989). Serum hyperosmolality has been reported in burn patients who absorb propylene glycol from topically applied medications (Fligner, 1985). Oral ingestion in kids leads to central nervous system depression (CNS) depression, seizures, respiratory depression and cardiac dysrhythmias (Pediatrics, 1997). Another ingredient to be wary of is alcohol. Animals are very susceptible to the intoxicating effects of alcohol. Be wary when recommending some liquids. Cats have an aversion to alcohol and will foam at the mouth and attempt to spit out elixirs, which can upset their owners. Pharmacists should review the ingredients of brand and generic liquids and make recommendations based on alcohol-free and propylene glycol-free products. Stores that frequently sell commercially manufactured products for animal use might find it helpful to create a veterinary section or end cap or use a tagging system to identify products that veterinarians are recommending.

Table 1. Common Liquids That Contain Propylene Glycol

- Loratadine syrup
- Docusate solution
- Aluminum/Magnesium/Simethicone antacid suspension
- Loperamide suspension

Xylitol is a sugar substitute, use of which is becoming increasingly popular in sugar-free and low-carbohydrate foods and confectionaries. It is a sugar alcohol similar to sorbitol and mannitol that is as sweet as sucrose but has only two-thirds as many calories. In humans, xylitol is considered to be relatively safe. As much as 130 g/kg can safely be consumed with no adverse effect oth-

er than diarrhea (Dunayer, 2006). In dogs, however, xylitol can be lethal at much lower doses. Xylitol stimulates the pancreas more potently than glucose. As a result, insulin is released in higher concentrations and for a longer duration (Asano et al., 1977). Symptoms of hypoglycemia can be seen within 30 minutes of ingestion. These symptoms include ataxia, seizures, coma, lethargy and weakness, vomiting, tachycardia, hypokalemia, hypomagnesemia and hypophosphatemia (Dunayer, 2006). Additionally, xylitol ingestion can also be toxic to the liver. Doses as low as 0.5 g/kg have been associated with liver failure (Dunayer, 2006). Owners of pets who have consumed xylitol should be advised to take their pets for medical treatment immediately.

Table 2. Common Products That Contain Xylitol

- Flintstones Vitamins
- Sugar-free gum (select Trident, Orbit, Stride flavors)
- Sugar-free mints and breath fresheners
- Beano drops
- Meloxicam, gabapentin and other commercially manufactured suspensions

PAIN RELIEVERS

Pain relievers are a commonly found product in all households and account for the most common cause of poisonings in dogs and cats in the United States (Meadows, 2006). In general, human pain relievers are not well tolerated in companion animals because of problems metabolizing the medication and due to increased sensitivity to the gastrointestinal side effects of NSAIDs.

Ibuprofen is a commonly used pain reliever in humans, known to cause stomach irritation and stomach ulceration. Dogs and cats are even more prone to these effects. Clinical signs of ibuprofen ingestion include nausea, vomiting, abdominal pain, gastrointestinal ulceration, renal compromise, CNS depression, liver toxicity, and hematopoietic problems (Fitzgerald, 2006). Because of the adverse effects associated with this medication, it is not used in dogs and cats.

Naproxen is another commonly used medication in humans. However, it is not recommended for use in dogs and cats because of gastric ulceration and the difficulty of giving accurate dosage due to tablet strength.

Aspirin is used worldwide and can be found in a variety of products. It can be used to treat symptoms of pain in dogs. Doses for dogs begin at 10 mg/kg twice daily (10-25 mg/kg every 8-12 hours). Symptoms of aspirin overdose include nausea, vomiting, melena and restlessness that progresses into seizures and coma (Villar, 1998). There is one report of a greyhound suffering gastric

hemorrhage after 3 doses of aspirin at therapeutic doses (Shaw, 1997).

Since cats are not able to efficiently metabolize and excrete salicylates, aspirin has a much longer half life in cats than in humans or dogs and must be monitored closely for signs of toxicity. Symptoms include: vomiting, anorexia, and GI bleeding. A typical aspirin dose for a cat is 10 mg/kg every other day or every third day.

Buffered aspirin is recommended for both dogs and cats to help prevent gastric irritation. Enteric coated products are not recommended due to fluctuating absorption. Meat flavored chewable buffered aspirin tablets are available from veterinary supply companies and national or local compounding pharmacies. Otherwise regular buffered aspirin may be used and piller or crushed as needed to ease administration.

Dosing the cat or small dog can be difficult as they require such low doses. Aspirin is not stable in suspension, but just prior to administration, the tablet may be crushed and dissolved in a small amount of water and dose titrated from there. For example, at our hospital, we advise clients to crush an 81 mg tablet and suspend in 5 ml of water. Each ml then contains 16 mg of aspirin and the animal can be dosed from there. The client is instructed to discard the remnants as the product is not stable for any length of time. Or a 325 mg aspirin effervescent tablet (Alka-Seltzer regular strength) can be dissolved in 90 ml of water and is stable for 90 hours if refrigerated. (McEvoy, 2007)

Aspirin may also be used for its anticoagulant properties. A dose of 5 mg/cat was found in one study to provide superior anticoagulant activity than higher doses with the fewest adverse events (Smith, 2008).

- Analgesia dose: dogs 10-25 mg /kg every 12 hours with food; cats 10 mg/kg every 48 hours
- Anticoagulant dose: dogs 0.5 mg/kg every 12-24 hours; cats 5 mg per cat every 72 hours

Bismuth subsalicylate can be used for pain management as well. It has been shown in man that greater than 90 percent absorption of salicylate occurs (Bierer, 1990). Typical dosing is 1-3 mL/kg daily, in divided doses. In addition, some veterinarians may prescribe the product for treatment of gastritis.

Acetaminophen is a common product sold separately and as part of many combination analgesic products. In humans, it is relatively safe at therapeutic doses. In dogs and cats, it can be lethal. Acetaminophen is contraindicated for use in cats at any dosage. Since cats are unable to glucuronidate the acetaminophen, its toxic metabolites lead to methemoglobinemia, hematuria and icterus. Dogs can tolerate low doses of acetaminophen only. Dosing begins at 10 mg/kg twice daily.

GASTRIC PROTECTANTS

H2 Antagonists

Famotidine and ranitidine can be safely used in dogs and cats. Doses of famotidine for dogs and cats begin at 0.5 mg/kg once daily. These drugs are relatively well-tolerated with few side effects. As in humans, doses should be reduced with renal dysfunction. As ranitidine undergoes hepatic metabolism, caution should be used in patients with hepatic dysfunction. Doses of ranitidine in dogs and cats begin at 1 mg/kg by mouth twice daily.

Proton Pump Inhibitors

Omeprazole has been used in dogs with esophagitis and gastrointestinal ulcers. It is dosed as 0.5-1 mg/kg daily. Generally well-tolerated, some adverse reactions that may be seen with this medication include nausea, vomiting and anorexia. Doses for cats begin at 0.7 mg/kg orally once daily.

Antacids

Calcium carbonate antacids can be used for GI upset and treatment of hyperphosphatemia of renal failure. The unflavored tablets are recommended over the flavored tablets because dogs find the unflavored tablets more palatable.

There are also anecdotal reports of using Tums to prevent tear staining in small dogs: one-half of a 200 mg, regular strength tablet orally daily. Frequent dosing of calcium antacids has potential for kidney stone formation and constipation.

Aluminum hydroxide is used as a phosphate binder in dogs. The antacid dose is 5-30 mL by mouth every 12-24 hours and the hyperphosphatemia dose is 30-90 mg/kg per day. Evaluate levels after 10-14 days.

Milk of magnesia can also be used for GI upset. The dose for dogs is 5-30 mL orally every 12-24 hours. Cats are dosed 5-15 mL orally every 12-24 hours. Side effects that can be experienced include diminished appetite, diarrhea and possibly electrolyte imbalances.

EMETICS

It is always recommended to have an emetic in a household with pets. Since syrup of ipecac has been removed from the market, the only option is hydrogen peroxide 3 percent. Dosing for dogs and cats: 5-10 mL orally, repeat once in 10 minutes, if needed.

ANTIHISTAMINES

Antihistamines are often tried for animals with dermatitis to relieve itching. **Diphenhydramine** can be used in animals for its antihistamine, sedative, antiemetic or motion sickness prevention effects. Only one trial has tested the efficacy of diphenhydramine in controlling pruritus in dogs. In that trial only 7 percent of owners felt that

the itching was controlled with diphenhydramine alone (Scott 1988). The most common side effect is sedation. Dry mouth and urinary retention may also occur. In cats, diphenhydramine may cause excitement. In dogs, doses are 2 mg/kg three times a day. Cats are dosed at 2 mg/kg 2-3 times daily. Animals may find the liquid formulation unpalatable. Hyperactivity or depression, hypersalivation, tachypnea, and tachycardia are the most common adverse effects reported with these antihistamines, generally within one hour of exposure.

Dimenhydrinate is often used for motion sickness in dogs, dosed at 2-4 mg/*pound* by mouth every eight hours. Cats are dosed at 12.5 mg per *cat* by mouth every eight hours. Dimenhydrinate may have fewer side effects if given with food. Common side effects include sedation, dry mouth, and inability to fully empty the bladder. Diarrhea, vomiting, and loss of appetite are less commonly seen.

Loratadine is another antihistamine that is being used in pets. The syrup contains propylene glycol and should not be used in cats. Pseudoephedrine is not safe for use in dogs or cats; do not recommend loratadine-pseudoephedrine combination products. Loratadine doses for dogs range from 0.125 to 0.25 mg/kg once daily to twice daily. Side effects include hyperactivity, depression and tachycardia.

Clemastine fumarate is available as tablet (1.34 mg and 2.68 mg) and syrup (0.672 mg/tsp). Clemastine may be the most effective OTC antihistamine for pruritus caused by atopic dermatitis in dogs. Studies showed a 27-30 percent improvement in pruritus as noted by owners (Paradis 1991, Paradis 1991, Miller 1993). Another study found only a 10 percent improvement (Paterson s. 1994). Doses for dogs are 0.05-0.2 mg/kg twice daily. Cats are dosed as 0.03 mg/kg twice daily but look for formulations free of propylene glycol. Side effects include sedation, lethargy, paradoxical excitation, diarrhea and decreased appetite.

Two trials examined the efficacy of **chlorpheniramine** in relieving pruritus in dogs with atopic dermatitis (Scott 1988, Paterson 1995). Overall, a satisfactory reduction in itching was observed by 10 percent of owners. The most common side effect observed was sedation. This medication has anti-nausea properties which may make it useful for motion sickness. It's also sometimes used for feline asthma. Dogs are dosed at 2-8 mg every 8-12 hours. Cats are dosed at 1-2 mg every 8-12 hours.

EYE DROPS

Owners may come into the pharmacy asking for eye drops for their animal at the recommendation of a veterinarian. Dogs and cats, like humans, can develop allergic conjunctivitis. Often it initially presents in a young animal as seasonal allergies. The allergens are

often inhaled pollen, molds or dust. In dogs, females are more likely than males to present with these symptoms. Some dog breeds that are more predisposed to allergic conjunctivitis include Cairn terriers, Scottish terriers, West Highland terriers, Dalmatians, pugs, and Irish setters (Glaze, 1991).

Antihistamine/decongestant (redness relief) combination eye drops are commercially available OTC but the sympathomimetic decongestant ingredient may not be tolerated by pets. It's been shown that 10 percent phenylephrine drops are systemically absorbed from the eye and can result in elevated blood pressure and reflex bradycardia (Herring, 2004). Several previously prescription-only drops are also available OTC but ophthalmic antihistamines have not been evaluated in the dog and cat for efficacy.

Any artificial tear product can be used in dog and cat eyes provided that there are no "extra" ingredients. The long acting type drops should be avoided. Sterile, ophthalmic petrolatum ointment labeled for veterinary use is available from veterinary wholesale suppliers and labeled for human use from pharmacy wholesalers.

LAXATIVES

Pumpkin

Veterinarians will often advise owners with a constipated dog or cat to feed canned pumpkin. Instruct owners to shop for "pure" canned pumpkin and to avoid pumpkin pie filling, which contains spices. Pumpkin is high in fiber. Some animals will eat it plain, but it can be mixed into food for pickier eaters. 1-2 Tbsp/day

Psyllium husk powder (unflavored; Metamucil) can be used in dogs at low dosages. One-quarter teaspoon per 20 pounds of body weight twice daily is appropriate. Water intake should be encouraged with all psyllium products. Feeding wet food is an easy way to increase water consumption. If the animal won't consume the coarser psyllium products, flavorless, soluble wheat dextrin powder (Benefiber) may be more palatable to the animal.

Polyethylene Glycol 3350 (Miralax) may be used in cats with the following directions: mix powder (1/8-3/4 teaspoon twice daily) with food. Adjust based on feces 24-48 hrs later.

Because of the risk of intestinal obstruction, bisacodyl and senna products are not recommended unless used under the supervision of a veterinarian. Doses for dogs are 5-20 mg per dog orally once daily while cats are dosed at 5 mg per cat orally once daily.

Never recommend the use of phosphate enemas. They cause severe electrolyte abnormalities and death in cats and dogs (Jorgensen, 1985, Atkins, 1985, Tomsa, 2001).

Docusate may be used as a stool softener. In small animals, the pediatric liquid docusate should be used

(propylene glycol-free for cats). Dosing of docusate sodium for small dogs is 25 mg orally once to twice daily and for medium and large dogs 50 mg orally once to twice daily (Morgan, 1988). Dosing for cats is 100 mg cap every other day or 25 mg once to twice daily (Morgan, 1988).

ANTI-DIARRHEALS

Loperamide is a synthetic opiate used to slow gastrointestinal motility in diarrhea. Caution should be used when recommending its use since it can adversely affect animals suffering from infectious diarrhea. Opiates are known to cause excitation in cats and so loperamide is not recommended in cats. Some veterinarians don't recommend using this medication in dogs weighing less than 10 kg. This is probably because of the difficulty in accurately splitting the tablets that small. Also, herding breeds of dogs such as collies, shelties, Australian Shepherds, Old English Sheepdogs, Longhaired Whippets, and German Shepherds should not use loperamide as they may have a genetic defect that allows the drug to cross the blood brain barrier and cause profound sedation (Sartor, 2004, Hugnet, 1996, Staley, 1996). Sedation is reversible with naloxone, but requires an emergency trip to the vet. Usual dosage for dogs is 0.08-0.2 mg/kg every 8-12 hours. Adverse effects of this medication in dogs include constipation, bloat, and sedation.

Bismuth subsalicylate is another product that can be used for diarrhea. The salicylate is thought to be helpful in treating enteritis, and this product has been shown to be effective in treating spirochete intestinal infections when given with antibiotics (Jergens, 2008). Low doses of 0.25 mL/kg body weight given three times daily in dogs and cats can be used. Cats are more sensitive to salicylates. Overuse in cats should be avoided as the salicylates are systemically absorbed. Inform owners that this medication can cause black or green-black stools.

COUGH MEDICATIONS

In a study examining dextromethorphan use in dogs with atopic dermatitis, it was found that dogs receiving the drug had a significant decrease in scratching, self-biting and licking. However, dextromethorphan does have a short half-life of between 2-3 hours in dogs. In the study, some animals did drop out due to side effects which include sedation, diarrhea and vomiting. Dogs received 2 mg/kg in a capsule twice daily (Dodman 2004).

Owners may sometimes come in looking for a cough medicine for their dog. If it is an acute onset cough, it may be kennel cough, the whooping cough of dogs, which requires antibiotic treatment. For recent onset cough, make a recommendation to seek care at a veterinarian. For dogs with a chronic cough due to allergies or bronchitis, plain dextromethorphan is appropriate.

Table 3.

Drug	Dogs	Cats	Comments
Pain Relievers			
Acetaminophen	10 mg/kg BID	contraindicated	
Aspirin	10-25 mg/kg every 8-12 hours	10 mg/kg every 48-72 hours	
Anti-Coagulants			
Aspirin	0.5 mg/kg po every 12-24 hours	5 mg per cat every 72 hours	Dissolve in small amount of water to administer small doses, discard excess
Gastrointestinal			
Famotidine	0.5 mg/kg po once daily	0.5 mg/kg po once daily	
Ranitidine	1 mg/kg po BID	1 mg/kg po BID	
Omeprazole	0.5-1 mg/kg po once daily	0.7 mg/kg po once Daily	
Anti-Diarrheals			
Loperamide	0.08-0.2 mg/kg every 8-12 hours	N/A	Not for use in these breeds: Collies, Shelties, Australian Shepherds, Old English Sheepdogs, Longhaired Whippets, and German Shepherds. Some formulations contain propylene glycol
Bismuth subsalicylate	of 0.25 mL/kg; TID	of 0.25 mL/kg; TID	Use in cats on under close vet supervision
Anti-Gas			
Beano	1/2-1 tablet		Drops contain xylitol.
Simethicone	25-200 mg daily; 1-2 mg/pound every 6 hours	0.3 ml - 0.5 ml of infant simethicone products BID-TID	Drug poorly absorbed
Constipation			
Psyllium	1/4 tsp per 20 lbs of body weight twice	N/A	
Canned pumpkin	1-2 tablespoons once daily	1-2 tablespoons once daily	Avoid spiced pie filling
Polyethylene Glycol 3350	N/A	1/8-3/4 teaspoon BID	Give with wet food. Adjust dose based on feces after 24-48 hours
Motion Sickness			
Dimenhydrinate	2-4 mg/pound by mouth every 8 hours	12.5 mg per cat by mouth every 8 hours	
Itching/Allergies			
Diphenhydramine	2 mg/kg TID	2 mg/kg BID-TID	Sedation, diarrhea, vomiting

Table 3. (Continued)

Clemastine	0.05-0.2 mg/kg BID	0.03 mg/kg BID	Check liquid for propylene glycol
Chlorpheniramine	2-8 mg every 8-12 hours	1-2 mg every 8-12 hours	
Dextromethorphan	2 mg/kg BID	N/A	
Loratadine	0.125-0.25 mg/kg once daily to BID.	N/A	Some formulations contain propylene glycol
Cough			
Dextromethorphan	0.5-2 mg/kg every 6-8 hours	0.5-2 mg/kg every 6-8 hours	Sedation, vomiting
Guaifenesin	3-5 mg/kg every 8 hours	3-5 mg/kg every 8 hours	
Phosphate Binders			
Calcium carbonate (Tums)		60-100 mg/kg/day divided	
Aluminum hydroxide (Mylanta)	5-30 ml every 12-24 hours		Some formulations contain propylene glycol
Magnesium hydroxide (Milk of Magnesia)	5-30 ml every 12-24 hours	5-15 ml every 12-24 hours	

Dosing for dogs and cats is 0.5-2 mg/kg every 6-8 hours but has not been studied for efficacy (Papich, 2007). Side effects of this medication include sedation and vomiting (Kukanich, 2004). Warn pet owners against the use of cold medicines, which may contain other ingredients that may be harmful to the pet such as acetaminophen and decongestants.

It is less likely that owners will come in looking for decongestants for their animal. Decongestants including phenylpropanolamine have been used to treat urinary incontinence and for bronchodilator effects. Once widely available over-the-counter, it may only be available to veterinarian offices. However, decongestants are known to have detrimental effects in dogs and cats and there is a narrow dosing range between therapeutic efficacy and toxicity. Therefore, it is recommended that decongestants such as pseudoephedrine or phenylephrine be used only under the supervision of a veterinarian. Side effects related to the excitatory effects may be experienced (rapid heart rate and arrhythmias, excitement, hypertension). Pseudoephedrine dosing in dogs is 0.2- 0.4 mg/kg orally every 8-12 hours. Phenylephrine dosing is 1mg/kg orally every 8 hours and may be increased to 1.5- 2mg/kg every 8 to 12 hours as needed.

In veterinary medicine, guaifenesin is generally used intravenously as a muscle relaxant during anesthesia, in horses especially. However, it may also be used as an oral expectorant in dogs and cats, although its efficacy

has never been proven in neither animals nor humans. In dogs and cats, the dose is 3-5 mg/kg every 8 hours. This medication is generally well-tolerated.

TOPICALS

Fungal Infections

Clotrimazole, miconazole cream, and tolnaftate creams may be used for treatment of ringworm. Creams should be applied twice daily to the area. For best results, the area should be clipped, per veterinarian instructions, being careful not to irritate the skin. Ringworm is contagious between people and pets, so care should be taken to wash hands after contact with the infected animal.

PARASITIC INFECTIONS

Pinworms and head lice are not dog or cat parasites and thus are not the source of transmission. There are lice species which infest dogs and cats but they are not transferrable to humans.

WOUND CARE

Triple antibiotic creams and ointments (Neosporin, Polysporin) can be used topically in the initial stages of wound healing to kill any bacteria at the surface and help prevent further bacterial contamination. The cream may penetrate deeper into the wound than ointment. The ointment may stimulate epithelialization because of

its zinc content. It's not recommended that the products with lidocaine be used due to possible toxicity with large amounts ingested.

Bacitracin is another topical antimicrobial that is safe to use on dogs. It is poorly absorbed orally and would require large amounts for adverse effects (Donoso 1970).

HYDROCORTISONE CREAMS

Hydrocortisone creams (0.5 percent OTC) initially may be applied sparingly 1-4 times a day and used for short periods of time. Veterinary products containing higher strengths may be prescribed. Local skin reactions, skin atrophy may occur. Veterinary products list pregnancy and tuberculosis of the skin as contraindications.

ANALGESIC CREAMS/GELS

There are several reports of methemoglobinemia associated with the use of topical benzocaine products in infants, dogs and cats (Wilkie 1988, Logan 2005, Tush 1996, Davis 1993). Benzocaine spray and ear drops containing benzocaine were implicated. Therefore, do not recommend its use in household pets.

Topical analgesics containing methyl salicylate (Bengay, IcyHot) an analog of aspirin, are especially toxic to cats.

Camphor in these products may pose an additional risk. It has been reported to cause seizures in children exposed to camphor products via inhalation, dermal and gastrointestinal routes (Khine 2009).

SUNBLOCKS/SUNSCREENS

Dogs and cats are susceptible to sunburn and skin cancer. Tips of the ears, nose, around the lips and bellies are all key areas – any area that may not be pigmented or covered by fur. Pet owners may come in looking for a sunscreen. Keep in mind that any topical applied should be non-toxic if ingested, because inevitably it will be ingested as the animal licks it off. Banana Boat Baby Sunscreen Stick spf 50 contains avobenzene, octocrylene, and oxybenzene. It might be a good choice for its ease of application and safety. It may be helpful to remind owners shopping for sunscreen that pets need to be offered adequate water when they are active in the heat and sun.

When recommending a sunscreen, avoid products that contain large amounts of zinc. Signs of zinc toxicity include vomiting, depression, lethargy, and possibly hemolytic anemia. Other common ingredients in sunscreen products that may be potentially toxic in sunscreens are octisalate and homosalate. These products may be metabolized to salicylic acid, to which cats are particularly sensitive. Like aspirin, cats are unable to efficiently metabolize this product.

Pets are an expanding population of patients for pharmacists. With differences in drug metabolism, anatomy and sensitivities, it is clear that these patients are not just “small humans.” It's the pharmacist's responsibility to be able to make safe and accurate recommendations of OTC medications for these four-legged patients. ■

Tara Marmulak, PharmD, is with the University of California at Davis School of Veterinary Medicine's department of Medicine and Epidemiology.

Valerie Wiebe, PharmD, is director of pharmacy services at the Veterinary Medical Teaching Hospital at the University of California, Davis.

Maureen W. Perry, RPh, is pharmacy supervisor at the Veterinary Teaching Hospital at the Virginia Maryland Regional College of Veterinary Medicine, Virginia Tech, Blacksburg, Va.

Elaine Blythe, PharmD, is associate professor of Veterinary Pharmacology at St. Matthews University School of Veterinary Medicine, Grand Cayman, British West Indies. She is also adjunct, University of Florida College of Pharmacy Veterinary Pharmacist to National Veterinary Response Team (NVRT).

Editor's Note: For the list of references used in this article, please contact *America's Pharmacist* Managing Editor Chris Linville at 703-838-2680, or at chris.linville@ncpanet.org.

Continuing Education Quiz

Select the correct answer.

1. A pet owner comes to your pharmacy complaining of his dog's frequent urinary accidents.
 - a. You indicate that the problem should be evaluated by a veterinarian to determine cause of incontinence.
 - b. Suggest phenazopyridine tablets to reduce the urge to urinate.
 - c. Suggest an antihistamine with anti-cholinergic effects.
 - d. Suggest phenylpropanolamine tablets.

2. A customer is purchasing some sugar-free candy and mentions how much her dog enjoys sharing them with her. You should:
 - a. Sell her another bag so she doesn't run out.
 - b. Suggest she only give a few pieces to the dog.
 - c. Check the ingredients on the package for xylitol to be sure she doesn't exceed 1.5 grams in 24 hours.
 - d. Check the ingredients on the package for xylitol and counsel her to avoid this ingredient.

3. A dog owner approaches the pharmacy counter with an aspirin dose recommendation from a vet and asks which of three products she should buy. Which do you recommend?
 - a. 325 mg buffered aspirin
 - b. 81 mg enteric coated aspirin
 - c. 325 mg enteric coated aspirin
 - d. None, dogs cannot absorb aspirin

4. A dog owner comes to you, stating that her dog just ate a box of chocolates which she knows is toxic to the dog. What over-the-counter item is most useful to initiate emesis?
 - a. Syrup of ipecac
 - b. Hydrogen peroxide 3 percent
 - c. Hydrogen peroxide 10 percent
 - d. Carbamide Peroxide 6.5 percent

5. A dog owner has seen her veterinarian to treat her 10-pound dog for itching. She brings in a prescription for diphenhydramine 50 mg. You sell or dispense:
 - a. Diphenhydramine 25 mg tablets (OTC) and explain the veterinarian's instructions for use
 - b. Diphenhydramine 50 mg capsules (Rx) and counsel accordingly
 - c. Contact the veterinarian and suggest a dose of 12.5 mg.
 - d. Contact the veterinarian and advise against antihistamine use to avoid paradoxical excitation.

6. A cat owner asks your advice for treatment of his cat's itchy skin. The veterinarian sent him in to get an antihistamine. You recommend:
 - a. Diphenhydramine elixir
 - b. Diphenhydramine cream
 - c. Loratadine syrup
 - d. Clemastine tablets

7. A local veterinarian calls and asks your advice about eyedrops that she will send a client to buy for his dog's irritated eyes prior to visiting her office. You suggest:
 - a. OTC drops with tetrahydrozoline
 - b. OTC ketotifen drops
 - c. OTC 5 percent NaCl ophthalmic ointment
 - d. Artificial tear solution

8. A client asks you to recommend the right psyllium laxative for their 18.5 kilogram dog. Based on pet's weight:
 - a. One-quarter teaspoon of orange flavored powder per 20 pounds twice a day
 - b. One-quarter teaspoon of unflavored powder per 20 pounds twice a day
 - c. One-half teaspoon of unflavored powder per 20 pounds twice a day
 - d. One-half teaspoon of orange flavored powder per 20 pounds twice daily

9. A client is inquiring about topical treatment of her dog's skin infection. Her veterinarian told her it is ringworm. You suggest she apply:
 - a. Hydrocortisone 1percent twice a day
 - b. Bacitracin twice a day
 - c. Triple antibiotic ointment twice a day
 - d. Miconazole cream twice a day

10. An avid hiker stops by. He is preparing a first aid box for himself and his dog. Along with his adhesive bandages he should include:
 - a. Zinc oxide ointment
 - b. Triple antibiotic ointment with lidocaine
 - c. Triple antibiotic ointment
 - d. Ibuprofen suspension

11. The hiker also wants to get some sunscreen. To assure safety, he should get:
 - a. Lotion containing zinc oxide for natural protection
 - b. Lotion containing cocoa butter
 - c. Lotion labeled "baby safe" with avobenzone
 - d. Lotion containing octisalate for UVB coverage

- 12.** A customer comes in complaining that his cat is awake all night and wants to give an OTC sleep aid. You recommend:
- A 2 mg/kg dose of diphenhydramine
 - A 12.5 mg/kg dose of dimenhydrinate
 - Remind the client that cats are nocturnal, advise against medication and send them to their vet if this is a change in normal behavior for his cat.
- 13.** Your customer is preparing to move to a new town and wants to get some medication to treat her dog for motion sickness to make the trip easier. You recommend:
- Travel-sickness wrist bands
 - Chlorpheniramine
 - Dimenhydrinate
 - Meclizine
- 14.** A dog owner comes to you for a recommendation for medicine for her dog. Her veterinarian has sent her to get an antacid. You suggest:
- Tums, regular or fruit flavored, advising that it may cause diarrhea
 - bismuth subsalicylate suspension, advising that it may cause diarrhea
 - Tums, regular flavor, advising that it may cause constipation or stone formation
 - Milk of magnesia suspension, advising that it may cause constipation
- 15.** A cat owner asks for a recommendation for his cat for its breathing difficulties. You recommend:
- Chlorpheniramine 1-2 mg every 8 to 12 hours
 - Diphenhydramine 2 mg/kg twice or three times a day
 - Loratadine 5 mg/5 mL solution, 2 mL once daily
 - Veterinarian evaluation
- 16.** A dog owner approaches the counter with an antihistamine eye drop stating he intends to use it on his dog who appears to be rubbing its eyes. What recommendation do you make?
- Dose the antihistamine drops at half the dose on the packaging.
 - Diphenhydramine will provide the dog better relief; dose at 2 mg/ kg.
 - Artificial tears solution 1-2 drops as needed
 - The owner should visit their veterinarian for diagnosis of the dog's medical problems.
- 17.** A cat owner comes to you seeking medication for pain for her cat. Her veterinarian told her to avoid:
- Aspirin
 - Acetaminophen
 - Acetaminophen suspension
 - Both B and C
- 18.** A dog owner wants to know how much diphenhydramine to give to their dog. Their veterinarian told them to give a dose of 12.5 mg to treat their 10-pound dog. You recommend:
- 25 mg tablets and provide her with a tablet cutter for accurate dosing
 - 25 mg capsules because they are less expensive
 - 25 mg capsules because the contents can be sprinkled on wet food
 - 12.5 mg/5 mL diphenhydramine suspension, sugar-free
- 19.** Your customer breeds Collies and wants to treat them all for heartworm disease. She would like you to help her figure out the amount of ivermectin 1 percent to give them, instead of buying heartworm tablets. Her vet told her the dose is 6 mcg/kg once a month.
- You assist the customer by calculating the correct volume of 10 mg/ml solution she purchased from feed store and demonstrate accurate measurement
 - You tell her you regret not having the product she needs in stock, but would be happy to order it.
 - You inform owner that collies may be genetically predisposed to ivermectin toxicity and advise her to ask the vet for an alternative.
 - You inform the owner that collies may be genetically predisposed to ultra-rapid ivermectin metabolism and advise her to ask the vet for an alternative.
- 20.** A client calls you and says that she gave her Old English Sheepdog a dose of loperamide for diarrhea. His diarrhea is gone but he seems very lethargic.
- You tell her that this drug makes people lethargic too and there is nothing to worry about.
 - You tell her that the drug has a long half-life and he will be better tomorrow.
 - You tell her to call her vet right away, since this breed of dog may not be able to take loperamide and may need emergency care.
 - Both A and B