

Pharmacist's Guide to Veterinary Prescriptions: A Whole Different Animal



From the Desk of:

Donald C. Plumb, Pharm D

Dogs are not furry versions of people, and cats are not small dogs.

Veterinarians may prescribe approved animal and human drugs in an extralabel (off-label) manner for therapeutic purposes to their patients as long as there is no threat to public health and certain other criteria are met, including a valid veterinarian–client–patient–relationship (VCPR). Because often there are significant differences in the use of medications in animals versus humans, pharmacists must understand that information applicable to human patients may not be valid for veterinary patients. Following are some essential points to consider.

Pharmacokinetics/Pharmacodynamics

The pharmacokinetics/pharmacodynamics can differ significantly for many drugs used in veterinary versus human patients. Some key species-specific examples follow.

Dogs

- Dogs have nearly 30% more blood/kg than humans do, which can affect drug concentrations in the blood.
- Dogs have a faster glomerular filtration rate, so renal elimination of drugs may be more rapid.

Cats

- Cats are deficient or limited in several metabolic pathways, including hepatic glucuronidation, hydroxylation, and demethylation.
- As compared to humans, animals (specifically cats) may use different hepatic CYP isoenzymes to metabolize drugs.
 - For example, cats may not adequately convert prednisone to prednisolone.

Of Note

- Doses and dose frequency can differ radically between humans and animals.
 - Thyroid supplementation: Levothyroxine doses for hypothyroid dogs can be 10 times (or more) than

doses used in hypothyroid humans and may be given twice daily (q12h).

- Seizure control: Doses for seizure medications can be much higher than those prescribed for human patients.
- Antibiotics: Some antibiotic doses are very large (eg, ciprofloxacin dose for dogs) as compared to doses needed for human patients.
- Different breeds of a species may have varying pharmacokinetics for a given drug.

Toxicities/Adverse Effects

Compounds that are considered relatively nontoxic for human patients can cause serious toxicity or adverse effects in veterinary patients. Key examples follow.

Cats

- Acetaminophen in cats: As little as 40 mg (one-half of an 80-mg chewable tablet) can cause fatal methemoglobinemia.¹
- Cats can develop serious renal toxicity from the use of NSAIDs.
- Dry-pilling doxycycline in cats can cause esophageal erosions and strictures.
- Permethrin can be toxic to cats.

Dogs

- Over-the-counter NSAIDs (eg, ibuprofen, naproxen, aspirin): Relatively low dosages can cause serious GI bleeding and/or renal toxicity.
- Xylitol (common sweetener, sugar alcohol) can cause life-threatening hypoglycemia and acute hepatic failure in dogs.
- Phenobarbital can cause hepatotoxicity in dogs.

Of Note

- Be wary of client requests to give their pets food with oral medications (to increase patient acceptance) without

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seeking a veterinarian's guidance. Many common foods (eg, chocolate, grapes/raisins) can be toxic to animals.

Understanding the Prescription

Veterinarians use different terminology and abbreviations than physicians and often prescribe drugs differently than pharmacists are accustomed to seeing.

Of Note

- Pet owners are usually referred to as "clients."
 - The pet is the patient.
- Veterinarians are taught to use the abbreviation SID (derived from the Latin *semel in die*, meaning *once a day*) in dosing instructions.
 - Do not confuse with other abbreviations.
- Veterinarians will rarely prescribe oral liquids as per 5 mL.
 - Example: Amoxicillin 250 mg/5 mL suspension may be prescribed as 50 mg/mL.

Key Information

A few key reminders and do not's may help pharmacists avoid medication errors and ensure animal health in partnership with the veterinarian and animal owner.

Key Reminders

- What applies to human patients may not be relevant or valid for veterinary patients.
 - Refer to a trusted veterinary drug reference or contact the prescribing veterinarian if you have any questions or concerns about a prescription as written.
 - Do not assume that take-home information intended for human patients, including patient information sheets, is appropriate for animal patients.
- Some drugs are used exclusively in animal patients.
 - Veterinary-only drugs could potentially interact with human-labeled drugs being concurrently administered extralabel.

- All insulin products require a prescription when used in animals.

Key Do Not's

- Do not substitute drug products (especially insulins) or dose forms without first contacting the veterinarian.
 - 10% of veterinarians responding to recent polls indicated that some patients had been harmed when outside pharmacies made unauthorized substitutions.²
- Do not recommend use of human over-the-counter (OTC) products or supplements in animal patients without seeking a veterinarian's guidance.
 - Drugs sold for OTC use in humans require a prescription for animals because veterinary use of the drugs is extralabel.
- Do not ask veterinarians for their NPI number.
 - It is illegal for veterinarians to have one.
 - DEA number is not an appropriate substitution.

References

1. **Household drugs.** Osweiler G. *The Handbook of Small Animal Practice*, 3rd ed—New York: Churchill Livingstone, 1997, pp 1279-1283.
2. **JAVMA News: Substitution errors.** Cima G. *JAVMA* 245[5]:462-465, 2014.

For more information:

Guidelines for Veterinary Prescription Drugs. American Veterinary Medical Association; avma.org/KB/Policies/Pages/Guidelines-for-Veterinary-Prescription-Drugs.aspx; accessed March 23, 2015.

Veterinary Pharmacy Education (Resolution No: 110-5-14). National Association of Boards of Pharmacy; nabp.net/news/veterinary-pharmacy-education-resolution-110-5-14; passed May 30, 2014, NABP 110th Annual Meeting, Phoenix.