

## PHARMACIST CE:

# The Pharmacist Role in Veterinary Pharmacy

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**P**armacists are a vital resource for patients and providers when it comes to prescribing the correct medication, and the correct strength, quantity, withdrawal time, and directions for use. One interesting and important subset of pharmacy practice is in veterinary pharmacy. Veterinary pharmacy is a growing field that is rapidly changing, thanks to powerful advocacy from those connected to the profession. Animals, just like humans, may require medication to treat acute or chronic illnesses, and often require a prescription to fulfill these needs. Community pharmacies are easily accessible to pet owners, and are often able to fill veterinary prescriptions. In addition to dispensing veterinary medications at a traditional outpatient pharmacies, some people choose to go into clinical veterinarian pharmacy work, where they serve at a veterinary hospital for inpatient and outpatient animals. Not all commercially made products can be used for animals; some may need to have flavor adjustments; some may need adjustments for the correct weight of the species; some may need to be compounded to be administered a different way (i.e. oral vs. rectal administration). Compounding pharmacists have a unique opportunity to formulate medication for easy administration to their patient population.

Although this is not an all-encompassing list of the ways pharmacists have a vital impact on veterinary medicine, it

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### Learning Objectives

- Identify resources pharmacists can use to review veterinary prescriptions
- Describe what is unique about veterinary pharmacy
- List the different roles a veterinary pharmacist can have within veterinary medicine
- Identify/describe the services that veterinary pharmacists provide
- Recognize limitations and potential harms with dispensing medications to animal patients

demonstrates the wide range of roles within this field.

The authors of this manuscript interviewed a variety of pharmacists who work in veterinary practice, to help raise awareness about their profession. These pharmacists share their experiences, unique aspects of their jobs, and the changes they'd like to see.

### Background

Pharmacists are the only healthcare professionals who can legally provide care to both human and non-human patients, yet many community pharmacists are not prepared to provide services to non-human patients. Approximately 42% of pharmacists work in a community pharmacy, but only 27% of pharmacy schools provide didactic coursework in veterinary pharmacy, and 60% provide experiential rotation opportunities for students.<sup>1,2</sup> There are currently no requirements

### Commonly Prescribed Veterinary Prescriptions

- Gabapentin**<sup>10</sup> – agent to prevent feather plucking, anti-anxiety, pain analgesic
  - Species<sup>1</sup>: Caged avian, canine, feline
- Insulin**<sup>11</sup> – for treatment of high blood glucose
  - Species<sup>1</sup>: Canines, felines, ferrets
- MethIMazole**<sup>12</sup> – antithyroid medication to treat hyperthyroidism
  - Species<sup>1</sup>: Felines and guinea pigs
- Veterinary-only non-steroidal anti-inflammatories (NSAID's)**<sup>13</sup> – relieve pain and reduce inflammation
  - Species<sup>1</sup>: Canines, equines, felines
- PredniSOLONE**<sup>14</sup> – anti-inflammatory and joint pain reduction
  - Species<sup>1</sup>: Canines, felines (cannot metabolize prednisone), ferrets
- Pregabalin**<sup>15</sup> – anti-seizure medication, neuropathic pain management
  - Species<sup>1</sup>: Canines, felines

<sup>1</sup> Species indicated is not an all-inclusive list of species prescribed this medication.

for pharmacy schools to provide this education, as the NAPLEX does not include veterinary questions.<sup>2</sup> In 2014, the American Pharmacists Association (APhA) acknowledged the need for more education for pharmacists in veterinary pharmacy and encouraged expanding knowledge of veterinary drugs and their usage. In 2021, American College of Veterinary Pharmacy (ACVP) delegates received approval to update the definition of a “patient” to include the terms human and non-human. This is a big step in expanding awareness of the growing need for more education for pharmacists.<sup>3</sup>

If a pharmacist lacks knowledge about how to review a veterinary prescription, it can cause problems for both the veterinarian prescribing the medication and the pharmacist filling the prescription. Almost all veterinary medications are dosed based on weight and are specific to the species, so it is imperative that prescriptions contain the weight and species to verify the correctness of the prescription, even though it is not required by law. In a recent study from McDaniel et al, it was found that 97.8% of veterinary prescriptions omitted the weight of the patient. This indicates that, in most cases, both the veterinarian and the pharmacist are unaware of the importance of weight-based dosing for non-human prescriptions.<sup>4</sup> Another error that can occur when verifying veterinary prescriptions is making a request for a National Provider Identifier (NPI), which is a unique identification number for covered health care providers. However, veterinarians are not eligible for NPIs, because they are not defined in regulations as healthcare providers.<sup>5</sup> Instead, pharmacists can request a DEA number or license number. Lastly, it is important that pharmacists know that they cannot legally recommend over-the-counter (OTC) medications for pets without a recommendation from a veterinarian.<sup>6</sup> For example, ibuprofen can cause severe gastrointestinal symptoms in dogs, and kidney disease in dogs and cats.<sup>7</sup> Having additional knowledge about appropriate prescription requirements, weight-based dosing, and OTC safety can help prevent medication errors and build rapport with the local veterinary community.

Pets are diagnosed with similar disease states to humans every day, and due to

## Unsafe Over the Counter Medications for Pets

### Acetaminophen (APAP)<sup>16</sup>

- Contraindicated in felines and ferrets
  - » Felines are deficient in uridine diphosphate glucuronosyltransferase (UGT) a pathway in the metabolism of APAP. APAP is more likely to be converted into p-aminophenol which can cause methemoglobinemia in felines causing tachycardia, increased respiratory rate, fatigue, cyanosis, and hypothermia.
- Caution use in canines
  - » Signs/symptoms: hepatotoxicity, hepatic failure, nausea/vomiting, jaundice, fatigue, anorexia, and abdominal pain

### Decongestants<sup>17</sup>

- Contraindicated in felines and canines
  - » Signs/symptoms: vomiting, hypertension, dilated pupils, seizures and abnormal heart rhythms and rates

### Aspirin<sup>18</sup>

- Caution use in felines
  - » Signs/symptoms: vomiting, diarrhea, seizures, CNS/respiratory depression, GI ulcers, fluid retention

### Ibuprofen and Naproxen<sup>7</sup>

- Contraindicated in felines and canines
  - » Long half-life in canines and rapidly absorbed
  - » Felines lack glucuronidation pathway
  - » Signs/symptoms: vomiting, diarrhea, seizures, anemia, GI ulcers

their size, anatomy, and pharmacokinetics, they may need customized dosage forms of common medications. That is where the art of compounding plays a big role in veterinary pharmacy. Compounding pharmacies can provide multiple formulations, including treats and suspensions in multiple flavors, transdermal gels, and long-acting antibiotic ear gels. An important aspect of having a pet is the human-animal bond, and the goal is to make administering medications and maintaining adherence easier for the owner and improve the pet’s quality of life.<sup>8</sup>

## Kevin Hoey, RPh

*Hoey Apothecary, Madison, Wis.*

Kevin Hoey, RPh, is a community and veterinary pharmacist in Madison, Wisconsin, who owns and operates his own compounding pharmacy practice. His practice, Hoey Apothecary, is a compounding-only pharmacy, but that is not where his pharmacy career began. Before Hoey Apothecary, Hoey owned Door Creek Pharmacy, where few prescriptions were compounded. At Door Creek, usually fewer than 10 compounded prescriptions were made each week. Now, at Hoey Apothecary, it’s common to see close to 1,000 compounded prescriptions weekly. Hoey Apothecary provides services in a variety of areas, including women’s health,

autoimmune disorders, hormonal health, and pain management. The pharmacy serves a whole community of patients, many of them animals.

Animals and veterinary medicine played a significant role in the evolution of Hoey Apothecary. Back when Hoey began his compounding business, he had difficulty finding providers who were interested enough to promote it. However, it was

## What Should I Counsel on for Veterinary Prescriptions?<sup>19</sup>

- Recommendations of how to administer the medication to their pet
  - » Oral
    - Pill pockets
    - Placing medication in back of throat and massaging throat
    - Pet pill gun
  - » Solutions
    - Syringe applicators
    - Mix in with food if stable
  - » Injections
    - Subcutaneous: Tent skin between shoulder blades and administer between middle of tented skin area
- Review indication with applicable resource aid for the client
- Discuss side effects
- Indicate if the medication can be taken with food or without food
- Indicate if the medication can be crush

## Prescription Reminders<sup>4,5</sup>

- Veterinarians do not have NPI numbers
- Request a weight as most medications are weight based
- Request species to verify the dose and formulation is correct

veterinarians who were most receptive to his services. From there, he formed many partnerships with veterinarians, and veterinary pharmacy has become a large part of Hoey's current practice.

Hoey mentions the benefits of treating animals with compounded pharmaceuticals, and has emphasized the uniqueness of animal requirements across all kinds of species. For example, due to physiology, rabbits, rats, and other small rodents require water-based suspensions instead of oil-based suspensions, due to their inability to vomit.<sup>9</sup> What may be therapeutic in a cat with one drug or dose may prove to be toxic in a dog or rabbit with the same drug or dose. Additionally, understanding the different biologies of each creature can help the pharmacist understand how drugs are metabolized in non-human species. An important message for pharmacy practitioners and prescribers is recognizing that compounding needs to be appropriately tailored, and knowing that there are resources available detailing what medications should and should not be given to certain animals. One suggestion Hoey has is to establish a minimum standard of care, where a certain universal level of education is met and a certification is completed, to practice compounding for animals. Achieving these credentials is one way compounding pharmacies making prescriptions for the animal population can ensure they are made correctly and safely.

Having a practice with a combination of services, treating both humans and animals, offers a unique question: What more can pharmacists do for pets and animals as far as providing quality care? For example, many studies exist about the therapeutic uses of low-dose Naltrexone in humans; however, very few studies exist explaining the potential therapeutic uses in animals. In Hoey's experience, several uses in canines have helped heal wounds, return function and mobility, and provide

extension of life. However, lack of literature is a limitation to making this treatment or similar treatments more widely known and applied. Furthermore, what is known about holistic care in humans who deal with inflammatory diseases is a subject worth exploring in animals. Hoey mentions that often the animals he treats belong to owners who consider them family members. Pharmaceutical treatments, lifestyle modifications, and counseling provided to human patients by pharmacists may also be applied by veterinary pharmacists to animal patients.

## Shelby Williams, PharmD, DICVP, FSVHP

*U.W. Veterinary Care Pharmacy, Madison, Wis.*

Shelby Williams, PharmD, DICVP, FSVHP, is a board-certified veterinary pharmacist who is currently employed at the University of Wisconsin-Madison Veterinary Care Teaching Hospital. She's been interested in veterinary pharmacy since she was in pharmacy school, and worked as a veterinary assistant, as internships were limited in availability. As a professional working in the veterinary system, Williams herself owns multiple pets. One of her pets had behavioral issues, and Williams would often need to visit the veterinarian's office to pick up prescribed medications. In her case, she discovered that most veterinarians did not have accurate knowledge about the pharmacological specificities of the medications, and how they affected various animal species. This frustrated her and made her want to change this, especially for pets whose owners aren't medically fluent. This led Williams to explore the world of veterinary pharmacy following her pharmacy school graduation from Washington State University, in the form of a veterinary pharmacist residency at North Carolina State University.

When Williams describes her site, she explains that, since it is a veterinary teaching hospital, they carry out many different specialties, including ophthalmology, critical care, emergency, primary care, and dermatology. Her practice serves large and small animals, and their partnership with the veterinary school enables them to treat a wide variety of unique cases. A few especially noteworthy patients Williams

## Valuable Resources

### Ontario Veterinary College - Firstline<sup>20</sup>

- Online: <https://app.firstline.org/en-cvma/clients/552-ontario-veterinary-college>

### Exotic Animal Formulary<sup>21</sup>

- Online: <https://www.sciencedirect.com/book/9780323444507/exotic-animal-formulary>
- Paper copy available

### Pet Poison Helpline<sup>22</sup>

- Online: <https://www.petpoisonhelpline.com/>

### Plumb's Veterinary Handbook<sup>23</sup>

- Online: <https://plumbs.com/features/drug-monographs/>
- Paper copy available

### Saunders Handbook of Veterinary Drugs<sup>24</sup>

- Paper copy available

has treated include sick exotic animals from the local zoo—like when she needed to compound anesthetic water to place a fish under anesthesia for a procedure, or compound chicken gummies for a Binturong. She also mentions that treating the local zoo animals is her favorite part of her job, as it gives her these unique opportunities, like making narcotic kits for polar bears. Animals also can have a variety of different medications which keeps Williams on her toes, especially since dosing for different animal species varies widely. Another opportunity her practice site focuses on is inpatient and outpatient services for the community. This helps Williams spread her knowledge of using medications in animals to pet owners, so they don't run into the same issue she did all those years ago. She runs a robust cancer research program as well, where she provides chemotherapy for various species. They also perform non-sterile compounding to make

## Formulation Options for Compounding

- Treats (variety of flavors)
- Suspensions
  - » Oil based (cats, dogs)
  - » Water based (cats, dogs, small mammals, reptiles)
- Transdermal gels (common for cats)
- Long acting antibiotic ear gels'
- Topical creams

## Training/Certification/Licensure Needed to Work in Veterinary Pharmacy

### Students

- Shadow
- Apply for a job at a compounding pharmacy, veterinary teaching hospital, APPE rotation at a Veterinary school, compounding pharmacy or PCCA drug information
- Veterinary pharmacy didactic course (through school or virtual course)
- PCCA veterinary compounding online course- students can attend this course after second year of pharmacy school (summer/fall)  
<https://www.pccarx.com/PCCAEducation/Institute>

### Pharmacists

- Graduate from an accredited pharmacy institution
- PowerPak- continuing education, but also good info for students  
<https://www.powerpak.com/vet/>

suspensions and capsules in addition to filling medications.

Williams stays up to date on her knowledge of medication use in animals through various organizations, such as the American College of Veterinary Pharmacists (ACVP) and Society of Veterinary Hospital Pharmacists (SVHP). She does this by attending meetings and networking with others to learn from experts in the field. Williams says that there is a variety of resources that can be used by other veterinary pharmacists or any pharmacist in the healthcare field. Some of these resources include Plumbs, Carpenters exotic formulary, Saunders Handbook of Veterinary Drugs, and the Food Animal Residue Avoidance Databank (FARAD). They provide pertinent information regarding drug interactions, dosing, withdrawal times for food animals, and pharmacokinetic and pharmacodynamic information related to animals.

Williams says that her dreams for the future of veterinary pharmacy are seeing veterinary therapeutics become a required course in pharmacy schools and seeing the implementation of required veterinary medicine continuing education. Another important point she emphasizes is improving communication with community pharmacies, because they fill many veterinary prescriptions. Education of pharmacy students is one area where Williams feels veterinary pharmacists can have an impact. Here, they can teach students about prescription safety, how to verify veterinary prescriptions, and address medication diversion that could be seen in veterinary medicine.

## Deborah Clark, RPh

### *Professional Compounding Centers of America, Charlotte, North Carolina*

Deborah Clark, RPh, is a clinical compounding and veterinary pharmacist who works for the Professional Compounding Centers of America (PCCA) with specialized knowledge and expertise in the medication formulation for and treatment of animals. She is trained in modern compounding techniques and has had vast experience applying her skills to a diverse population of veterinary patients. As a consultant, a unique part of her practice is taking phone calls from PCCA members, such as pharmacists, physicians, and veterinarians, from around the United States to answer questions related to both human and veterinary pharmacy. Topics can relate to drug dosing, formulation, or delivery. The questions specific to animals can pose an extra challenge—they require extensive knowledge of the physiology and pharmacokinetics of different species and how those factors can affect treatment outcomes.

These challenges are what make veterinary pharmacy practice unique. The care for animals is an important area of pharmacy, but knowledge about the medicinal treatment of different species is not always accessible to community pharmacists, especially those with little to no exposure to veterinary needs. Clark uses her pharmacy practice and expertise to provide guidance to help fill those knowledge gaps. If the information is not readily available, possibly due to limited studies on a particular species, she maximizes literature research and data collection to recommend

the best solution. In many cases, this allows veterinary pharmacists to become creative in their treatment strategies. For example, an aquarium shark that has sustained a wound poses a challenge for treatment. A multitude of considerations have to be taken into account: the location of the wound, the swimming needs of the shark, drug formulation and delivery requirements, and durability of the medication. Veterinary pharmacists with compounding training are equipped to address these concerns. This sort of attention to care can go a long way for animal patients. Animals suffering from disease or injury can find relief, especially when commercial products do not perfectly fit the situation. For example, a canine patient with recurrent ear infections can benefit from a compounded medication formulated and delivered to its specific needs.

Many pharmacists are in a position to provide care to both humans and animals, but the usually limited knowledge of veterinary pharmacy can lead to gaps in care and missed opportunities. A great way to educate pharmacists is to introduce them to veterinary pharmacy while in pharmacy school. This can be a challenge, because some schools do not have any form of veterinary coursework. The institutions that do, however, typically only offer vet-related courses as electives. This may be enticing to those interested in veterinary pharmacy, but it can be a difficult sell to those who have no interest or experience with veterinary pharmacy practice. If there is a way to introduce it within the required pharmacy curriculum, it may promote more interest in taking the elective. At minimum, Clark wants to keep animals safe from medication mistakes that occur when pet owners or pharmacists mistakenly assume a particular drug or formulation will help.

### What conferences are available to attend?

- American College of Veterinary Pharmacist (ACVP) Veterinary Pharmacy Conference
- Society of Veterinary Hospital Pharmacists (SVHP) Conference
- Veterinary Pharmacy Conference (VPC)
- Midwest Veterinary Conference (MVC)
- Veterinary Meeting & Expo (VMX)

An example is dispensing gabapentin that contains xylitol (a toxicity to cats and dogs), which is a formulation commonly found in community pharmacies. Animals have different dietary requirements, metabolisms, and kinetics that can cause significant toxicity and death with this formulation. Clark encourages others to use resources like her, veterinary pharmacists in the community, or a veterinary hospital that contains a pharmacy to receive credible information on the best way to care for an animal.

## Conclusion

The practice of veterinary pharmacy encompasses a wide variety of active and engaged pharmacists. Each one of the pharmacists highlighted here shared their passion for their career path and their continuous advocacy for the improvement of student pharmacist education, as well as their passion to continually engage and network with others in the profession. Lastly, each pharmacist expressed their willingness to constantly promote the improvement of veterinary medicine.

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## Assessment Questions

- What resources can pharmacists use to review veterinary prescriptions?
  - Plumb's
  - Lexicomp
  - Micromedex
  - Epocrates
- What medication is appropriate for a veterinary patient?
  - Prednisone for a cat
  - A compounded oil-based suspension for a rabbit
  - A compounded water-based suspension for a cat
  - Ibuprofen for a dog
- True or False:** Veterinary pharmacists mainly work in clinical settings.
  - True
  - False
- True or False:** compounding, outsourced consultation, and clinical pharmacy are all areas veterinary pharmacists can be found.
  - True
  - False
- True or False:** Veterinarians meet the requirements for National Provider Identifier (NPI) numbers, therefore it is required for prescriptions.
  - True
  - False
- True or False:** legally pharmacists can recommend over the counter medications if a client is recommended a product from their veterinarian.
  - True
  - False
- Which answer best describes the role of a veterinary clinical compounding pharmacist?
  - Provide guidance to community and veterinary pharmacists on the best treatment for many species

- b. To compound medications generically for various animal species
  - c. Work in a veterinary hospital alongside veterinarians
  - d. Administer compounded injectable medications to animals
8. What can pharmacy students and pharmacists do to increase their knowledge within veterinary pharmacy?
    - a. Pharmacy students can seek out a veterinary pharmacy course while in pharmacy school
    - b. Pharmacists can choose veterinary specific continuing education through PowerPaks or attendance at a Veterinary Pharmacy conference.
    - c. Use Plumb's or other drug resources when reviewing commonly prescribed veterinary medications
    - d. All the above
  9. Did the activity meet the stated learning objectives? (if you answer no, please email sarahs@pswi.org to explain)
    - a. Yes
    - b. No
  10. On a scale of 1 – 10 (1-no impact; 10-strong impact), please rate how this program will impact the medication therapy management outcomes or safety of your patients.
  11. On a scale of 1 – 10 (1-did not enhance; 10-greatly enhanced), please rate how this program enhanced your competence in the clinical areas covered.
  12. On a scale of 1 – 10 (1-did not help; 10-great help), please rate how this program helped to build your management and leadership skills.
  13. How useful was the educational material?
    - a. Very useful
    - b. Somewhat useful
    - c. Not useful
  14. How effective were the learning methods used for this activity?
    - a. Very effective
    - b. Somewhat effective
    - c. Not effective
  15. Learning assessment questions were appropriate.
    - a. Yes
    - b. No
  16. Were the authors free from bias?
    - a. Yes
    - b. No
  17. If you answered "no" to question 16, please comment (email info@pswi.org).
  18. Please indicate the amount of time it took you to read the article and complete the assessment questions.

## CE FOR PHARMACISTS

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### Quiz Answer Form

circle one answer per question

- |            |           |
|------------|-----------|
| 1) a b c d | 10) _____ |
| 2) a b c d | 11) _____ |
| 3) a b     | 12) _____ |
| 4) a b     | 13) a b c |
| 5) a b     | 14) a b c |
| 6) a b     | 15) a b   |
| 7) a b c d | 16) a b   |
| 8) a b c d | 17) _____ |
| 9) a b     | 18) _____ |

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