Veterinary Pharmacy
Ready or Not, Here It Comes!
Douglas Urban, DVM
Gigi Davidson, BSpH, Dipl.ICVP
NC State Colleges

Objectives

Describe veterinarian’s many roles and services in veterinary practice
Review role of pharmacist in supporting veterinarians
Identify contemporary veterinary pharmacy issues
Describe essential veterinary pharmacy knowledgebase
Discuss essential support systems and resources

Objectives
A Veterinarian’s View

20 yrs ago separate industries veterinarians did not use pharmacists!

Now big pharma has bought out small vet pharm companies

- 20-30 % clinic profit from drugs now much less
- 1-2 scripts to pharmacy historically is now happening daily with a much smaller practice

Much greater use of human drugs than past

$4/free Ab scripts from Kroger etc

Pharmacists taking business away from vets, sales OTC flea, tick, HW

Does the average pharmacist have the knowledge to dispense these products?

Chain pharmacies won’t stock vet drugs as they are not profitable

Evolution of Vet Pharmacy
Diabetic cataract due to pharmacist changing patient’s insulin without consulting veterinarian, has happened to Dr Urban several times.

Why Veterinary Pharmacy?

DVM: All species, specialist still very general all species (e.g. veterinary ophthalmologists)

No 3rd party subsidy: Cost of treatment is important, only do what owner can afford
• Referrals based on owner finances
• Pet Insurance rare and sometimes unobtainable

DVM: 4 yrs school then allowed to practice unless specialize,
• Performed surgeries in school, able to practice art on animals in school.

DVM: see more deaths per day than any other medical profession

DVM: spend more time with patients

DVM: Regional outlook 85% OH vets are OSU grads

DVM: May treat conditions rarely, use certain drugs rarely

DVM vs MD
Shelby: a typical veterinary clinic case

Example Shelby 15yr Mixed F/S canine
Treated Shelby since owner obtained her 15 yrs ago.

Shelby

Hats I wore,
GP did Hx Px Ddx plan Tx
Clin path, drew eval CBC; chem results,
Internal med, Ddx reeval Tx
Referral, follow up new CBC Dx splenic mass, new plan of Tx
Sx nurse pre op work Px, 450 mg Anirobe
Anesth IV place, pre anesth, intubated developed and monitored plan, O₂ anesth gas%
20mg xylazine?, 200mg ketamine IV 500ml, O₂ 2% sevoflurane/min
LL LRS 5mg/kg/hr drip rate for Sx
7% NaCl IV boluses for shock, 500 mg solu-delta cortef IV,
Sx did Sx,
no assist gloved, one person heart IV monitor, one circulating nurse
Spleen removed using cautery, hemaclip, 3 gut ligatures 50 mg gentocin w saline put into abd cavity as closed
mm closed w continuous 0-vicryl, fat closure continuous, SQ continous closure
(no sutures show why?) Nexaband on incision
Resident closed?
What major class of drugs is missing?

Shelby
Recovery post op nursing care etc: IV dextrose slow IV, aminoplex IV, various times
Infectious Dz developed infection control plan
Pharmacist, selected meds, made up solutions, dispensed meds from in house
Monitored patient overnight w/ 2 assistants, patient ambulatory that evening
Nutritionist, lixotinic, A/D food
Discharge instructions, helped patient to car, Anirobe TGH on 300 mg bid 7d – until recheck
Call backs, follow up care
Rechecks
Hats not worn: radiologist, sonographer, biopsy, etc, why not?

Shelby

splenectomy
Shelby post op house call
Shelby post op 1 wk
Shelby - 4 months later

Hospice, quality of life counselor
Euthanasia due to aplastic anemia
Grief counselor
Mortician
Hat not worn: gross pathologist,

What I have done

- general practice
- ophth,
- EENT, lots of ears
- Dentistry, oral Sx cleaning extractions, mandibular Fx
- oral Sx teeth & jaws,
- Surgeon, soft, ortho, internal- external fixation, joints, cancer, chest, abd, cosmetic,
- Emergency, Trauma, Tx and Sx, fluid/shock therapy
- Allergist, Cardiology, Dermatology, Endocrinology, Respiratory, Renal, Digestive
- Rad
- Podiatry, esp hooves
- Chiropractic
- Epidemiology
- Nutrition
- Pathologist, gross and micro, clin path,
- Pharmacist multiple species, individual and mass treatments
- Preventive/Regulatory med, fair, sale barn, health papers, intra state, interstate, international
- Physical therapy
- Therio, neonate

And all in many different species/breeds
Extra label use, done often
Anesthetics,
Abt
Vet - not pharm responsible for residues

Off label use
Recommended for the control of bacterial infections of the uterus (metritis) in horses and as an aid in improving conceptions in mares with uterine infections caused by bacteria sensitive to gentamicin.

Note Federal law warning

http://www.fda.gov/downloads/AnimalVeterinary/Products/ApprovedAnimalDrugProducts/FOIDADrugSummaries/ucm061346.pdf

Guess the percentage of labeled use I do?

Extra label use example

The good:
Back in the olden days my local independent pharmacist

What do vets think of pharm?
What do vets think of pharm?

Can you guess doses?

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<td>70 to 100 IM</td>
</tr>
<tr>
<td>ovine caprine</td>
<td>10 to 30 IV IM</td>
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<td>snakes</td>
<td>20 to 100 IM</td>
</tr>
<tr>
<td>sub human primates</td>
<td>3 to 15 IV IM</td>
</tr>
</tbody>
</table>

Careful!
Cadausus Winter Warrior I Luv
– call name “Orion”

A 7year (84m) old female Golden Retriever
Pedigree of 9+ generations on file, can request further pedigree
CGC TDI RN RA
AKC registry number and micro chipped

Hereditary eye disease free, Canine Eye Registry Foundation(CERF) checked by a DACVO

Dysplasia: hips, elbows certification - free of the disease checked by the Orthopedic Foundation for Animals (OFA) checked by three American College of Veterinary Radiology members

Subaortic stenosis (SAS) negative checked by ACVIM cardiologist

Thyroid normal blood hormone value submission

A Pharmacist’s View
Are you trained to provide legally and clinically competent care and therapy for these patients?

What about these patients?
**Why Veterinary Pharmacy?**

**Human-animal Bond**

Pets are achieving the same legal status as humans:

- “guardians vs owners”
- “rights vs chattel”

**Humans consume animal species as food—drug residues**

**DVM curriculum: 2 semesters in pharmacology**

- 2012-13: pharmacology course cut 40%
- Rationale: “they can look it up”

**PharmD curriculum: 0 semesters in veterinary pharmacotherapy**

- Electives (if at all)
- Post graduate self-study

**BUT: Society expects pharmaceutical expertise for all family members**

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**April 6, 2011, Jim Matheson (D-UT)**

**Force veterinarians to give written Rx whether or NOT requested by pet owner**

**Force veterinarian to provide Rx electronically or by other means if requested by pet owner**

**Force pet owner to sign waiver releasing veterinarian of responsibility if prescription is filled illegally or incorrectly**

**Bill “died” in committee in 2012**

**BUT: prompted FTC workshop to examine pet med prescriptions (Oct 2, 2012  DC public forum)**

**HR 1406-The Fairness to Pet Owners Act**
$6.8 Billion in annual veterinary pharmaceutical sales

Veterinarian’s profit margin 37% on dispensed products

#Annual prescriptions dispensed—no data

Veterinary branded drugs are NOT for sale to anyone other than licensed veterinarians

Pharmacy profession will be suddenly flooded with veterinary prescriptions

**Impact**

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How are pharmacies going to obtain branded veterinary products?

- Some veterinary drugs extremely dangerous to humans
- Segregation of products
- Counseling

Is the pharmacy profession ready for these prescriptions?

Are you ready for these prescriptions?

**Gap Analysis**
Knowledge Gaps

Veterinary Drug Info

- Evidence Based Veterinary Pharmacotherapy
- Anatomy, Physiology and Drug Disposition Non-Humans
- Drug Law for Animals

Comprehensive monographs
Hardcopy and online
Fully referenced, and consensus dosing
Veterinary pharmacists’ Bible

Concise Authoritative
Primary research results prior to publication
Veterinarian’s Bible

Veterinarians only (currently)
Online Symposia proceedings
Message Boards
Library
Rounds/Case Studies

VIN.com
Learn To Speak “Veterinarian”

**SID** - semel in die - once daily

**OD** - once daily (not right eye!)

mg/kg divided BID (TID, QID, etc)- total daily dose divided over stated frequencies

**Bolus** - strictly an oral dosage form

**Paste** - strictly an oral dosage form

**Drench** - strictly an oral dosage form

**ADR** - classic diagnostic term - “ain’t doin’ right”

Species Specifics
Species Variation in Drug Disposition

Drugs are easily “distracted” by environmental conditions. Ultimate drug disposition and effect can be altered by target species:
– anatomy
– physiology
– metabolic capacity
– behavior
– dietary habit

Drug therapy for veterinary patients must be adapted for individual species variations.

Anatomy

• Horizontal orientation
• Multiple gastric chambers populated with “working” microflora
• Variant gastrointestinal “organs
• Variant body size
• Variant body surface areas
• Body composition affecting Vd
Physiology

- Inability to thermoregulate
- Inability to vomit
- Variant GFR
- Variant total blood volume
- Renal portal systems vs hepatic portal

Metabolic Capacity

- Inability to conjugate with glucuronide
- Inability to acetylate
- Inability to conjugate with sulfate
- Variant metabolic pathways: conjugation with hippurate and ornithine
- Cecal flora from strict herbivores
- CYP450 isoenzymes are highly variable across animal species
Dietary Habit

- Obligate carnivores
  - Short, fast, acidic GIT, increased GFR
- Salivary pH
  - Diffusion across buccal membranes
- Ruminant herbivores
  - Slow, alkaline, multichambered GIT
- Hindgut fermenter herbivores
  - No gallbladder,
  - Toxic metabolism by working flora

Behavior

- Groom
- Nocturnal circadian rhythms
- Cecotrophs
- Alpha social hierarchy
- Herding instinct
- As related to human behavior:
  - Pets
  - Performance
  - Food
Drugs Behave Differently In Animals Than What You Were Taught in Pharmacy School

Legalized use of human drugs in animals
- 1968-1996 was illegal to use human drugs in animals

Legalized compounding for animals
- Did not address use of bulk chemicals for compounding for animals

Passed in 1996
- No measurable change in pharmacy school curricula

AMDUCA-enacted 1996
Regulatory Issues

Animal patients for performance (food/entertainment)
- Banned drugs
- Food animals/tissues
- Performance animals
- Withdrawal Times

Extralabel Use Algorithm
- Vet approved for species
- Vet approved for other species
- Human approved
- Compounded

Compounding
- No copies of approved products
- No bulk chemicals to compound
- Hot debate in court system

April 2009-Polo Pony Deaths
- Compounded vitamin injection—10X selenium ordered
- FDA Injunction against Franck’s Pharmacy
- Lawsuit based in Franck’s use of bulk chemicals
- Lower court ruled against FDA

September 14, 2011-Middle Court Ruling
- Judge Corrigan ruled against FDA
- FDA has no authority to regulate compounding pharmacy
- FDA cannot use CPG as basis for enforcement action
- AMDUCA does not prohibit using bulk chemicals
- FDA’s stance on use of bulk chemicals is in conflict with FDAMA and illogical

October 29, 2012—11th Circuit Court of Appeals
- Atlanta, GA
- Briefs from each side on line

October 2012-Franck’s goes out of business
- Case declared “moot”
- Lower court rulings still precedent

11th Circuit Court of Appeals Case
Veterinary Pharmacy Is On The Public and Regulatory Radar—Are You Ready?

Support Systems
Professional Organizations

American College of Veterinary Pharmacists (ACVP)
- www.vetmeds.org
- 30+ hrs annual veterinary pharmacotherapy programming
- Annual meeting in conjunction with ACA/IACP
- Comprehensive bimonthly veterinary pharmacy newsletter

Society of Veterinary Hospital Pharmacists (SVHP)
- www.svhp.org
- 20+hrs annual veterinary pharmacotherapy programming
- Monthly newsletter
- Active informational exchange listservs

Professional Compounding Centers of America (PCCA)
- www.pccarx.com
- 50+ hrs annual veterinary pharmacotherapy programming (compounding focused)
- Online veterinary pharmacotherapy course for students and postgraduate pharmacists
- Consultants available 24/7

Subscriptions

www.ijpc.com
- Compounding journal
- Monthly veterinary articles/formulas
- Equipment/Ingredient Sources

www.avma.org
- Veterinary news
- Primary research
- Guidelines/position statements
- Compounding FAQ's

www.usp.org
- Veterinary compounded preparation formulas
- General chapters on compounding
- Compounding standards
Downloads

Animal-Friendly Devices

- Adapter caps
- Syringes metered in mLs (not tsp)
- Small volume syringes
- U-40 insulin syringes
- Half-unit U-100 insulin syringes
What is animal’s job? (companion, performance, food)

If dosing is not in human range, consult reference/call DVM.

Evaluate product selected for potential animal toxins. (dyes, flavors, artificial sweeteners, preservatives, etc.)

Dispense with animal-appropriate administration devices (e.g. not teaspoons).

Counsel pet owner as to what signs are important in indicating therapeutic success, failure or toxicity.

**Checklist for Veterinary Rx**

**Sample Rx**
Sample Rx

Patient: HONEY
Case #: 125650
Client: Albert Miller
876 Hatcher Rd
Ellenboro, NC 28049

Rx Date: 08/12/10

Drug: PHENYL BUTAZONE 12 GRAM PASTE
Dosage: 5 mg/kg
Route: PO
Frequency: Q24H
Duration: FOR 14 DAYS

Comments:
Instructions: Administer 2 milliliters orally once every 24 hours for 14 days.

Lot #: 032785
Refill NR

Exp: 03/30/2011
Qty 1 SY

Mgr: SCHERING PLOHR PhEmp SA
DVM: Andrew Fidler
DEA #: N1675971-977

Sample Rx

Patient: TOPAZ
Case #: 113174
Client: Susan Lorene
975 Pittboro-Goldston Rd
Pittsboro, NC 27312

Rx Date: 07/29/04

Drug: FLUNixin 50mg/mL 1mL (from 250mL)
Dosage: 10 mL/animal
Route: INTRAMUSCULARLY
Frequency: Q12H
Duration: FOR INPATIENT DELIVERY

Comments: I gave one x 10ml banana injection sa 10mL x 2 syr w/lip caps

Lot #: NONE
Refill NR

Exp: 01/01/2100
Qty 20

Mgr: RPhEmp SA
DVM: John Smith
DEA #: N1675971-765

Sample Rx
Veterinary pharmacy practice is coming to your store!

Pack your toolkit now: CE’s, references, anatomy and physiology, law, dispensing devices, product awareness.

Equip your pharmacy with animal-friendly dispensing devices.

Summary
There has been a contemporary call from the veterinary medical community for One Medicine, the blending of veterinary medicine and human medicine for the benefit of public health and to better serve both human and animal patients. From a clinical pharmacy perspective, veterinary medicine and human medicine complement each other, with the human-trained pharmacist uniquely positioned to educate and serve veterinarians and animal owners. Opportunities for the practical application of One Medicine can occur in community pharmacy settings as most pharmacists practicing in a community setting have been presented with prescriptions for animal patients at some time during their career. The use of human-labeled pharmaceuticals prescribed in an off-label manner to treat companion animal disease states is a viable option for veterinary medicine. Opportunities for the practical application of One Medicine can occur in community pharmacy settings as most pharmacists practicing in a community setting have been presented with prescriptions for animal patients at some time during their career. The use of human-labeled pharmaceuticals prescribed in an off-label manner to treat companion animal disease states is a viable option for veterinary medicine. Opportunities for the practical application of One Medicine can occur in community pharmacy settings as most pharmacists practicing in a community setting have been presented with prescriptions for animal patients at some time during their career. The use of human-labeled pharmaceuticals prescribed in an off-label manner to treat companion animal disease states is a viable option for veterinary medicine. Opportunities for the practical application of One Medicine can occur in community pharmacy settings as most pharmacists practicing in a community setting have been presented with prescriptions for animal patients at some time during their career. The use of human-labeled pharmaceuticals prescribed in an off-label manner to treat companion animal disease states is a viable option for veterinary medicine. Opportunities for the practical application of One Medicine can occur in community pharmacy settings as most pharmacists practicing in a community setting have been presented with prescriptions for animal patients at some time during their career. The use of human-labeled pharmaceuticals prescribed in an off-label manner to treat companion animal disease states is a viable option for veterinary medicine. Opportunities for the practical application of One Medicine can occur in community pharmacy settings as most pharmacists practicing in a community setting have been presented with prescriptions for animal patients at some time during their career.

Veterinary pharmacy as a specialty practice is a growing area in the United States and pharmacy students are interested in obtaining veterinary-specific knowledge and skills. The growth in veterinary pharmacy has allowed pharmacists to apply their drug knowledge resources to veterinary situations. Pharmacists can advise veterinarians of new developments in human pharmaceuticals and discuss the therapeutic advantages or disadvantages of extra-label usage with veterinarians. Many pharmacists have easy access to text or Internet-based informatics that can be used to supply pertinent drug information to veterinarians. As one of the most accessible health care professionals, pharmacists can provide consultation and education to animal owners on pharmaceuticals and on animal disease states that have similar monitoring parameters to human disease states.

The future?

Questions?

Thank you!