

Intersection of Human and Companion Animal Antibiotic Stewardship Programs

Presidential Advisory Council on Combating Antibiotic-Resistant Bacteria
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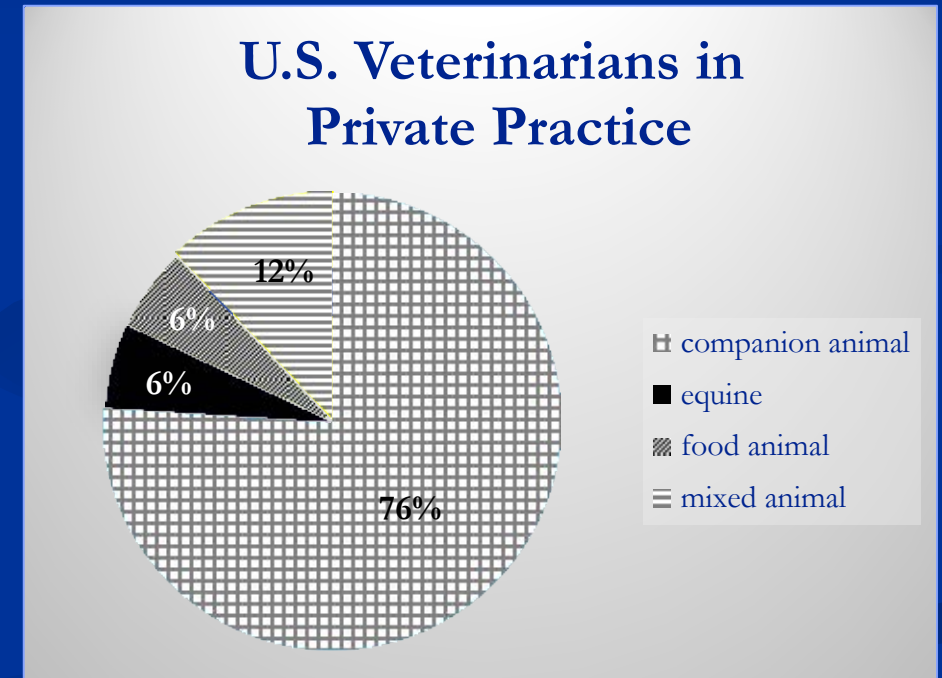
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Outline

- Companion animal background
- Framework for a model stewardship program across species
- Comparing IDSA and SHEA guidelines across species
 - Similarities, differences, strengths, and challenges
- Specific gaps in veterinary stewardship knowledge
- One Health approach to improve stewardship

Quick Overview of Veterinarians

- 110,531 U.S. DVMs in 2017
 - 71,393 in private practice, 76% in companion animal
 - 6,878 in academia
- Most are general practitioners
 - 13,035 active board-certified diplomates
 - 2922 veterinary internal medicine
 - 1381 small animal, 587 large animal internal medicine
 - 292 cardiology, 329 neurology, 409 oncology
 - 782 veterinary preventative medicine, epidemiology
 - 223 veterinary microbiology
 - 58 veterinary clinical pharmacology
 - many other veterinary specialties as well
 - Surgery, anesthesia, ophthalmology, radiology, etc.



<https://www.avma.org/KB/Resources/Statistics/Pages/Market-research-statistics-US-veterinarians.aspx>

<https://www.avma.org/KB/Resources/Statistics/Pages/Market-research-statistics-Veterinary-specialists.aspx>

Companion Animal Practice

- Types of hospitals
 - Small animal general practice hospitals
 - Referral and specialty hospitals
 - Academic teaching hospitals
- More similar to outpatient human clinics
- Integrated Approach
 - Clinical care for a variety of animal species
 - Public health and One Health (especially zoonotic disease)
 - Infectious disease prevention
 - Hospital infection control
 - Antibiotic stewardship



Resistance in Veterinary Medicine

- Multidrug resistant infections
 - Increased diagnostic and therapeutic costs
 - Poorer treatment outcomes
 - May cause prolonged hospitalization
 - Some carry risk of zoonotic transmission
- Rare for companion animal veterinarians to prescribe antibiotics used for resistant human infections due to cost and parenteral dosing
 - Vancomycin, linezolid, tigecycline, 4th generation cephalosporins, piperacillin/tazobactam
- Veterinarians want to do “the right thing” and support stewardship goals

As an overview, we have about 110,000 veterinarians in the United States. About 71,000 of them are in private practice, and the pie chart to the right shows that about 76% are companion animal veterinarians, which includes mainly dogs and cats but also pets such as birds and rabbits.

Model Stewardship Program For Any Species

■ Ideal Core Elements:

■ **Leadership and a clear commitment**

- Team approach, practical activities, necessary support (time, finances, technology)

■ **Infectious disease and drug expertise**

- Appointed up-to-date clinician who seeks consultation as needed

■ **Take action for judicious use**

- Being proactive to implement at least one recommended action

■ **Tracking and reporting**

- Monitoring and evaluating stewardship efforts is important for ultimate success
- Prescribing behavior, susceptibility results, and alternative therapy options

■ **Education**

- Educating clinicians, staff, and clients/patients about stewardship efforts

<http://www.cdc.gov/getsmart/healthcare/implementation/core-elements.html>

https://www.avma.org/KB/Resources/Reports/Documents/TFASCAP_Report.pdf

Comparisons- Diagnostic Testing

- Guideline- Diagnose first to avoid unnecessary antibiotic therapy
- Similarities:
 - We train our students and provide CE on how/when to perform and interpret testing
- Strengths:
 - Most specialists provide free case consultations to veterinarians by phone
- Differences/Challenges:
 - Diagnostic testing is costly
 - Pet insurance is rare, most clients pay for diagnostic testing out of pocket
 - Not every client can afford to or chooses to pursue testing vs. empirical therapy
 - Limited by availability of some diagnostic testing and expertise

Comparisons- Treatment Technology

- Guideline- Incorporate computerized clinical decision support
 - Document indication, dose, and duration to allow tracking and review
 - Streamline and standardize facility specific treatment guidelines for infections
 - Based on antibiograms, evidence based data, consensus statements
 - Prompts to alter behavior (delayed prescription, non-antibiotic alternative)
- Differences/Challenges
 - Many veterinarians still use paper medical records
 - This technology could improve stewardship in veterinary medicine
 - Ideally be easily applied and tailored to needs of veterinarian
 - Ideally save time and money

Comparisons- Treatment

- Guideline- Delayed prescribing/watchful waiting
- Similarities
 - Opportunities exist in veterinary medicine such as upper respiratory infections in cats
 - Increased emphasis in our guidelines, curriculum, and CE lectures
 - Psychology similar for DVMs and MDs?
 - “easier/faster to prescribe antibiotics than to explain why I want to wait and see”
 - “the client will be upset and may go elsewhere”
 - “what happens if I don’t and the patient gets sicker”
- Differences/Challenges
 - DVMs have in-house pharmacies for convenience (dispense meds not scripts)
 - Logistics and revenue challenges

Comparisons- Treatment

- Guidelines- Remove the source, empirical therapy, and de-escalate
- Similarities
 - We remove the source and sample for cytology/culture prior to treatment
 - We target therapy towards most likely causative agent and desired spectrum
 - Based on all available information (cytology, Gram stain, site of infection, antibiograms)
 - We have consensus statements to provide stewardship guidance on therapy decisions
 - We de-escalate therapy based on culture and susceptibility
- Differences
 - Wide variety of species/breeds/sizes, we dose based on body weight (mg/kg)
 - Preventing *C. difficile* is not a motivator for improving stewardship, but plenty of other adverse effects

Comparisons- Treatment

■ Guidelines-

- Optimal dosing should be based on efficacy studies and PK/PD principles
- Emphasize shortest effective duration

■ Similarities

- Research teams performing studies to improve understanding of antibiotic PK/PD and dosing in small animals...often small sample size

■ Differences/Challenges

- Lacking data on most appropriate optimal dose or duration for most infections
- Funding for research is challenging for companion animals

Comparisons- Treatment Interventions

- Guidelines-
 - Switch from intravenous to oral route of antibiotics
 - External audits, antibiotic time-outs, and prior authorization
- Similarities
 - Switch to oral antibiotics as soon as possible (more for cost and outpatient care)
- Differences
 - No formal external audits or official time-outs
 - Daily rounds to discuss in-house patient management including revisiting antibiotic need
 - Hospitals not structured for enforcement of prior authorization

Comparisons- Monitoring/Reporting

- Guidelines- Monitor and Report Antibiotic Prescribing
 - Goal: document the true efficacy of efforts and most efficient use of resources
 - Are guidelines being followed?
 - Have interventions improved antibiotic use and improved patient outcomes?
- Differences:
 - Most veterinarians lack technology for monitoring and reporting antibiotic use
 - Lack resources to analyze data in a meaningful way to alter prescribing behavior
 - Exception is Banfield Pet Hospital which is collecting and analyzing antibiotic use data
- Challenges:
 - Unproven cost benefit ratio for stewardship programs in veterinary medicine

Comparisons- Education

- Guideline- Providing Client and Staff Education
 - Similarities: AVMA and Banfield posters
 - viral vs. bacterial, when antibiotics are indicated, the value of diagnostic tests, and other stewardship concepts
 - Strength: Many veterinarians excel at client education
 - Handouts or patient specific instructions:
 - Diagnosed condition, therapy, and follow-up plan
 - Why medications were chosen, how to administer, duration, adverse effects
 - Infection control, potential for zoonotic transmission, and preventative measures

Gaps in Veterinary Stewardship Knowledge

■ Antibiotic Research

- Optimal dosing and duration studies
- Local antibiograms
- Impact of antibiotics on normal flora and shedding
- Approved vs. compounded antibiotics

■ Outcome measurements

- Ways to monitor stewardship success in companion animal medicine
 - How do we capture information and how do we use this information to change behavior and to motivate and improve future stewardship programs

One Health Approach

- Create a larger culture of commitment and accountability
 - Open mind to learn about antibiotic use in various healthcare fields, clear up misconceptions, and work together to have a positive impact
- Share Ideas and Strategies
 - Community/State/National Taskforces
 - Stewardship Conferences
 - Modify technology and other tools for veterinary use
- Integrate infection control and stewardship in our preclinical curriculums
 - Start early, building through curriculum, and continuing updates throughout career

Conclusion

- Same goals
 - To optimize patient care and effective treatment and minimize adverse effects and resistance associated with antibiotic use
- Challenges
 - Veterinarians have less evidence-based data and fewer resources
- Plan
 - To take responsibility and action to make realistic changes in our hospitals to apply foundational stewardship guidelines
 - To work together in One Health capacity to integrate efforts

Thank you!

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