Antibiotic Use in Companion Animals

Mark G. Papich
North Carolina State University
College of Veterinary Medicine
Raleigh, North Carolina
mgpapich@ncsu.edu

NC STATE UNIVERSITY

Affiliations, Conflicts of Interests, and Disclosures: Mark G. Papich

Disclosures related to my presentation:

- Employee: North Carolina State University, College of Veterinary Medicine
- Grants/Research contracts: Bayer Animal Health, Merck, Zoetis, RxActuator Inc, Skyline Vet Pharma, National Institutes of Health.
- Consulting contracts: Elanco, Bayer Animal Health, Zoetis, Merck, Dechra, Kindred Biosciences, Boehringer-Ingelheim, GSK, Schafer Veterinary Consultants, Verté Therapeutics, Philbro™ Animal Health Corporation, Animal Clinical Investigation, LLC.
- Books / Royalties: Author of books relating to drug therapy published by Elsevier and Wiley-Blackwell
- I will discuss drugs/dosages that are currently NOT approved for use in animals


ANTIBIOTIC RESISTANCE THREATS
IN THE UNITED STATES
2019
U.S. Department of
Health and Human Services
Centers for Disease
Control and Prevention

AVMA
Committee on Antimicrobials (CoA)

AVMA

Creation of antimicrobials committee among Board acts

The AVMA Committee on Antimicrobials, created by the Board of Directors this past June, will streamline a complicated and inefficient process that previously involved at least eight councils or committees. The board is also moving ahead with plans to draft federal legislation that will harmonize the patchwork of state and federal regulations on animal drug compounding.

MORE STORIES

- AVMA names 2016-2017 congressional fellows
- Committee recommends COE remain a college accreditor
- AVMA Animal Health Studies Database

https://www.avma.org/news/javmanews/pages/160815_TOC.aspx?PF=1

AVMA/Committee on Antimicrobials

ANTIMICROBIAL RESISTANT PATHOGENS AFFECTING ANIMAL HEALTH IN THE UNITED STATES

AVMA
American Veterinary Medical Association

Pathogens of Concern

Methicillin-resistant *Staphylococcus* spp.

ESBL-producing Enterobacterales

- *Escherichia coli*
- *Klebsiella* spp.
- *Proteus* spp.

Pseudomonas aeruginosa

Acinetobacter spp.

Enterococcus spp.

- *Enterococcus faecalis*
- *Enterococcus faecium*

DOGS & CATS

One of the risk factors leading to the emergence of antimicrobial-resistant bacteria is prior exposure to antimicrobial therapy. Therefore, any measures that reduce overall antimicrobial drug use in dogs and cats may help reduce antimicrobial resistance. This could include establishing infection prevention programs and developing antimicrobial stewardship plans in veterinary settings.

PATHOGEN OF CONCERN:

- *Staphylococcus* spp.
  - *S. aureus*
  - *S. pseudintermedius*
  - *S. schleiferi*
- *Enterobacteriaceae*
  - *Escherichia coli*
  - *Proteus* spp.
  - *Klebsiella* spp.
- *Acinetobacter* spp.
- *Pseudomonas aeruginosa*
- *Enterococcus* spp.
  - *Enterococcus faecalis*
  - *Enterococcus faecium*
- *Campylobacter jejuni*

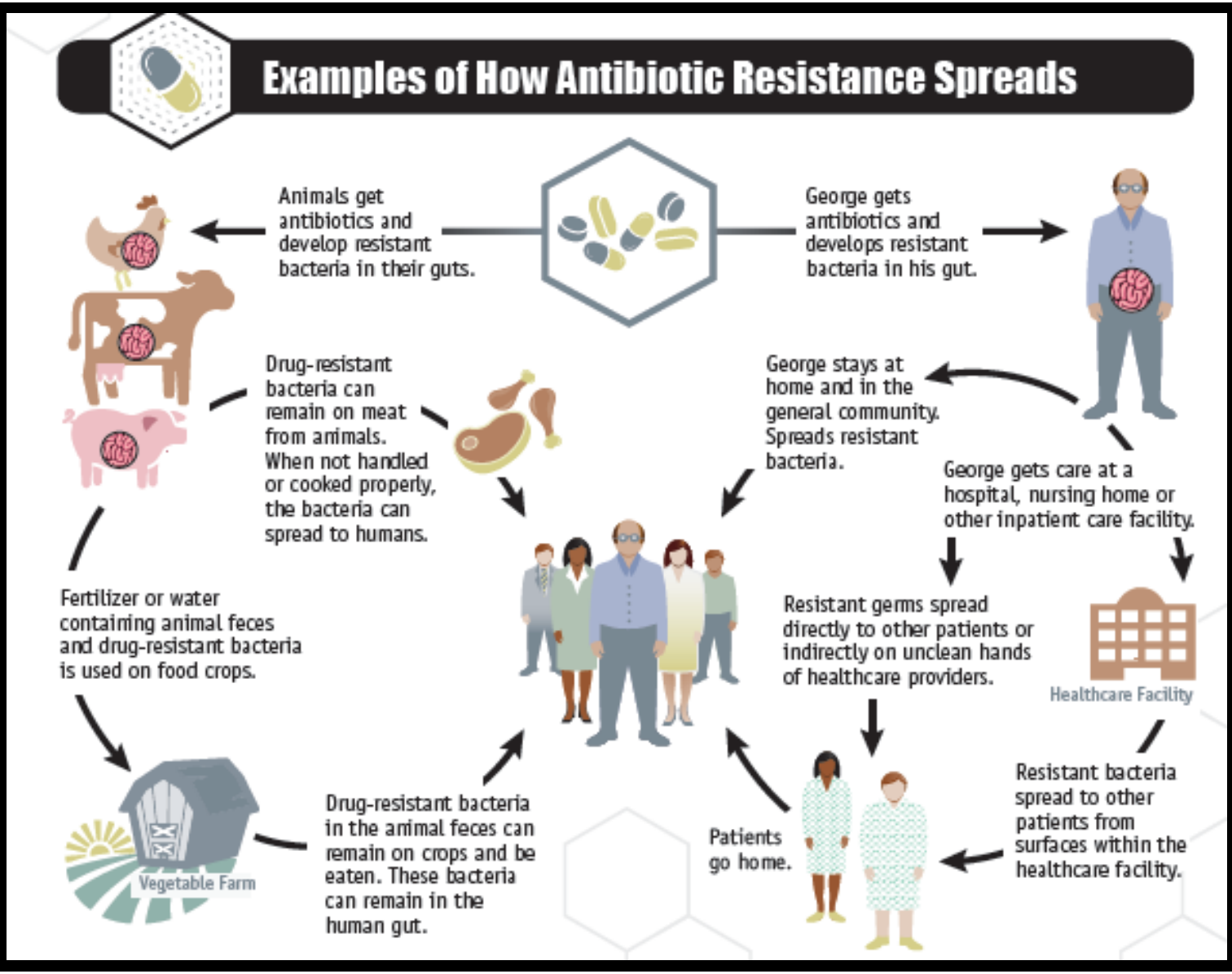
Antimicrobial-resistant infections affect dogs and cats. Preventing infections is crucial to preventing resistant infections.

What you need to know

- Prevalence of resistant pathogens in dogs and cats is largely unknown. Additional information is needed to learn more about how often resistant infections occur.
- Resistant infections can be difficult to treat.
- Antimicrobial stewardship helps to prevent development of antimicrobial-resistant bacteria.
- The International Society for Companion Animal Infectious Diseases (ISCAID) has developed clinical guidelines to highlight diagnostic and treatment choices for bacterial infections of the skin, respiratory tract and urinary tract.
- The American Animal Hospital Association (AAHA) and the Ontario Animal Health Network (OAHN) have developed guidelines to control the spread of disease within hospital environments.

WHAT VETERINARIANS CAN DO:

- Use antimicrobials only when indicated.
- Use diagnostic testing to inform treatment decisions.
- Implement infection prevention and antimicrobial stewardship programs in veterinary settings (AAHA, ISCAID, and OAHN referenced above).


Examples of How Antibiotic Resistance Spreads
Animals get antibiotics and develop resistant bacteria in their guts.
George gets antibiotics and develops resistant bacteria in his gut.
Drug-resistant bacteria can remain on meat from animals. When not handled or cooked properly, the bacteria can spread to humans.
George stays at home and in the general community. Spreads resistant bacteria.
George gets care at a hospital, nursing home or other inpatient care facility.
Fertilizer or water containing animal feces and drug-resistant bacteria is used on food crops.
Resistant germs spread directly to other patients or indirectly on unclean hands of healthcare providers.
Healthcare Facility
Vegetable Farm
Drug-resistant bacteria in the animal feces can remain on crops and be eaten. These bacteria can remain in the human gut.
Patients go home.
Resistant bacteria spread to other patients from surfaces within the healthcare facility.

What are the risks?

Challenges for Companion Animal Antibiotic Use

- In order to treat infections in companion animals, effective antibiotics are needed
- Not enough new drugs in pipeline to meet current needs (no new approvals since 2012)
- Use of some antimicrobial agents in companion animals may select for resistance and present a public health risk

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Check for updates

SPECIAL ISSUE ARTICLE

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Antimicrobial agent use in small animals what are the prescribing practices, use of PK-PD principles, and extralabel use in the United States?

Mark G. Papich

College of Veterinary Medicine, North Carolina State University, Raleigh, NC, USA

Correspondence
Mark G. Papich, Professor of Clinical Pharmacology, College of Veterinary Medicine, North Carolina State University, Raleigh, NC, USA.
Email: mgpapich@ncsu.edu

Abstract

In this review, the availability and deficiencies of current antimicrobial agents for companion animals in the United States are described. Although several active agents are FDA-approved for small animals, there are many unmet needs. These needs are greatest for cats, for the treatment of antibiotic drug-resistant infections, and to treat new or emerging pathogens that were not considered on older labels. The older agents approved before 1997 are often outdated, unavailable, or have inaccurate labeling. Subsequently, veterinarians treat dogs and cats with many unapproved antimicrobial agents that are licensed for human use. Although these drugs may be effective, there are also concerns that this use can produce drug-resistant bacteria that may be a public health risk. Although this concern is real, there is also evidence that *any* antimicrobial use in small animals can produce resistant fecal bacteria and stewardship principles should aim at reducing *any* unnecessary antibiotic use. This could be accomplished by avoiding some of the older, ineffective, or outdated agents described in this paper. There is a need for incentives to approve new agents that will be more appropriate for treating infections in companion animals without increasing the risk of drug-resistant bacteria that could potentially be transferred to humans and the environment and create a public health risk.

Availability of Antibiotics for Companion Animal

- Since 1997, only 6 new antibiotics approved for dogs and cats
  - 3 fluoroquinolones
  - 1 first- and 2 third-generation cephalosporins
- Many of the older approved drugs have outdated indications, doses, and labels
- Use of human-label drugs is common

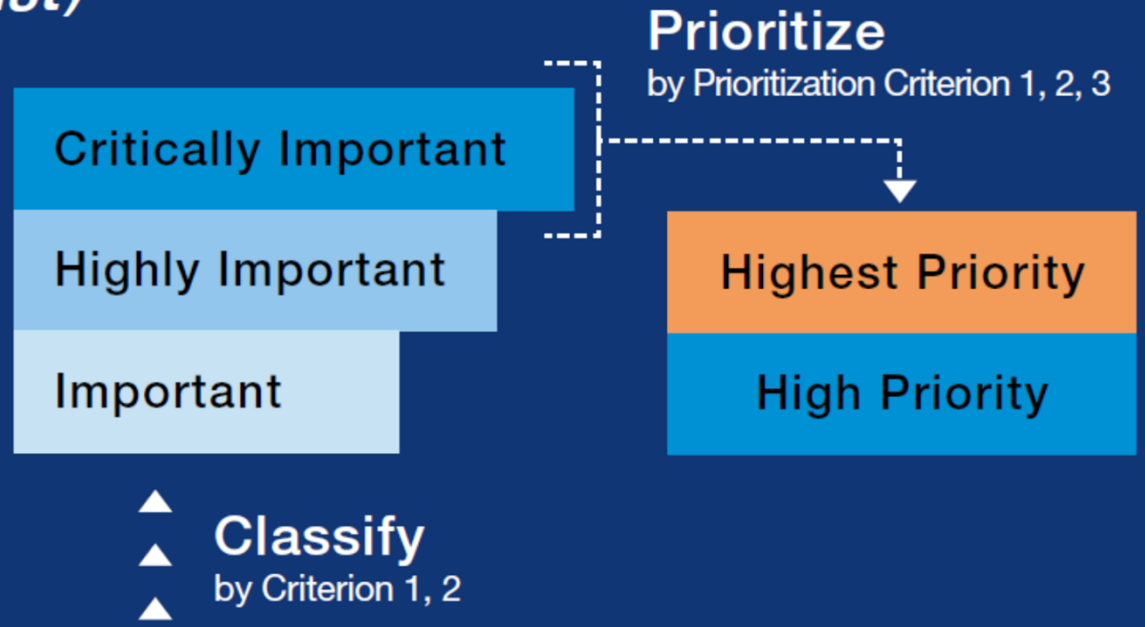
Human-label Drugs used in Dogs and Cats

- Doxycycline and minocycline (common)
- Rifampin
- Injectable 3rd-generation cephalosporins
- Generic fluoroquinolones (levofloxacin, ciprofloxacin)
- Carbapenems (meropenem)
- Aminoglycosides (gentamicin, amikacin)
- Linezolid

What are the "medically important" antibiotics?

WHO list of Critically Important Antimicrobials for Human Medicine (WHO CIA list)

Since 2005, WHO has produced a regularly updated list of all antimicrobials currently used for human medicine (mostly also used in veterinary medicine), grouped into 3 categories based on their importance to human medicine. The list is intended to assist in managing antimicrobial resistance, ensuring that all antimicrobials, especially critically important antimicrobials, are used prudently both in human and veterinary medicine.



World Health Organization (WHO) list:

- Critically Important
  - Highest priority
    - Cephalosporins: 3rd, 4th, 5th generation
    - Glycopeptides (eg, vancomycin)
    - Macrolides and ketolides
    - Polymyxins
    - Quinolones (eg, fluoroquinolones)

World Health Organization (WHO) list:

- Critically Important
  - High priority
    - Aminoglycosides (amikacin, gentamicin)
    - Carbapenems (imipenem, meropenem)
    - Oxazolidinones (linezolid)
    - Penicillins (ampicillin, amoxicillin, piperacillin)
    - Drugs for tuberculosis (rifampin)

How can we minimize the risks?

Strategies to Reduce Risk of Resistance

Stewardship Programs

- Infection control in the hospital – screening and restrictions
- Rational choice of dose, route, and frequency
- Promote good compliance
- Appropriate therapy for resistant strains
- Short course of treatment, if possible
- Rational selection of antibiotics – follow the guidelines!

ISCAID Consensus Statement Guidelines (www.ISCAID.org)

Journal of Veterinary Internal Medicine
ACVIM American College of Veterinary Internal Medicine
Open Access

Guideline and Recommendation
J Vet Intern Med 2017

Antimicrobial use Guidelines for Treatment of Respiratory Tract Disease in Dogs and Cats: Antimicrobial Guidelines Working Group of the International Society for Companion Animal Infectious Diseases

M.R. Lappin, J. Blondeau, D. Booth, E.B. Breitschwerdt, L. Guardabassi, D.H. Lloyd, M.G. Papich, S.C. Rankin, J.E. Sykes, J. Turnidge, and J.S. Weese

Respiratory tract disease can be associated with primary or secondary bacterial infections in dogs and cats and is a common reason for use and potential misuse, improper use, and overuse of antimicrobials. There is a lack of comprehensive treatment guidelines such as those that are available for human medicine. Accordingly, the International Society for Companion Animal Infectious Diseases convened a Working Group of clinical microbiologists, pharmacologists, and internists to share experiences, examine scientific data, review clinical trials, and develop these guidelines to assist veterinarians in making antimicrobial treatment choices for use in the management of bacterial respiratory diseases in dogs and cats.

Key words: Bronchitis; Pneumonia; Pyothorax; Rhinitis.

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International Society for Companion Animal Infectious Diseases (ISCAID) guidelines for the diagnosis and management of bacterial urinary tract infections in dogs and cats

J. Scott Weese[a,*], Joseph Blondeau[b,c], Dawn Boothe[d], Luca G. Guardabassi[e,f], Nigel Gumley[g], Mark Papich[h], Lisbeth Rem Jessen[i], Michael Lappin[j], Shelley Rankin[k], Jodi L. Westropp[l], Jane Sykes[l]

[a] Dept of Pathobiology, Ontario Veterinary College, University of Guelph, Guelph, ON, N1G2W1, Canada
[b] Clinical Microbiology, Royal University Hospital and the Saskatchewan Health Authority, Saskatoon, SK, Canada
[c] Departments of Microbiology and Immunology, Pathology and Laboratory Medicine and Ophthalmology, University of Saskatchewan, Saskatoon, SK
[d] Department of Anatomy, Physiology and Pharmacology, Auburn University, 36849, USA
[e] Department of Veterinary and Animal Sciences, Faculty of Health and Medical Sciences, University of Copenhagen, Stigbøjlen 4, 1870
Denmark
[f] Department of Pathobiology and Population Sciences, The Royal Veterinary College, Hawkshead Lane, North Mymm
Kingdom
[g] Cedarview Animal Hospital, 4100 Strandherd Dr, #106, Ottawa, ON K2J 0V2, Canada
[h] Department of Molecular Biomedical Sciences, North Carolina State University, College of Ve
USA
[i] Veterinary Clinical Sciences, Faculty of Health and Medical Sciences, Univers
[j] Department of Clinical Sciences, Colorado State University, 300 West
[k] School of Veterinary Medicine, University of Pennsylvania, 3
[l] School of Veterinary Medicine, Department of Medi
Davis, CA 95616, USA

New revision.

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...ase is a common clinical presentation in dogs and cats, and a common reason for ...obial prescription. This document is a revision and expansion on the 2011 Antimicrobial Use ...delines for Treatment of Urinary Tract Disease in Dogs and Cats, providing recommendations for diagnosis and management of sporadic bacterial cystitis, recurrent bacterial cystitis, pyelonephritis, bacterial prostatitis, and subclinical bacteriuria. Issues pertaining to urinary catheters, medical dissolution of uroliths and prophylaxis for urological procedures are also addressed.

Veterinary Dermatology

Vet Dermatol 2014; **25**: 163–e43 DOI: 10.1111/vde.12118

Guidelines for the diagnosis and antimicrobial therapy of canine superficial bacterial folliculitis (Antimicrobial Guidelines Working Group of the International Society for Companion Animal Infectious Diseases)

Andrew Hillier*, David H. Lloyd†, J. Scott Weese‡, Joseph M. Blondeau§, Jo[illegible]the¶, Edward Breitschwerdt, Luca Guardabassi††, Mark G. Papich**, Shelle[illegible]urnidge§§ and Jane E. Sykes¶¶**

*College of Veterinary Medicine, The Ohio State University, Colu[illegible]
†Royal Veterinary College, South Mimms, Hertfordshire, A[illegible]
‡Ontario Veterinary College, University of Guelph[illegible]
§College of Medicine, University of Sask[illegible]
¶College of Veterinary Medicine, A[illegible]
**College of Veterinary M[illegible], Raleigh, NC 27606, USA
††Faculty of Life Scien[illegible]penhagen, Denmark
‡‡University of Pennsyl[illegible] Medicine, Philadelphia, PA 19104, USA
§§Women's and Childre[illegible] Adelaide, SA 5006, Australia
¶¶University of California, [illegible]avis, CA 95616, USA
Correspondence: Andrew Hillier, 6237 Muirloch Court S, Dublin, OH 43017, USA. E-mail: andrew.hillier10@gmail.com

Undergoing revision.

Optimizing Antimicrobial Use: Encouraging Developments

1. More stewardship guidelines are available
2. More evidence-based guidelines for treatment available (eg, www.ISCAID.org)
3. Better use of PK/PD principles to optimize dosing
4. More susceptibility testing standards (clinical breakpoints) available

The Role of CLSI

CLINICAL AND LABORATORY STANDARDS INSTITUTE ™

CLINICAL AND LABORATORY STANDARDS INSTITUTE ™

(Formerly NCCLS)
Providing NCCLS standards and guidelines, ISO/TC 212 standards, and ISO/TC 76 standards

CLSI Subcommittee on Veterinary Antimicrobial Susceptibility Testing (VAST)

CLSI

Veterinary Antimicrobial Susceptibility Testing subcommittee (VAST)

- Since 1993…
- Establish Interpretive Categories and breakpoints for susceptibility testing
- Publish standard methods, breakpoints, and quality control
- Update existing standards
- Educate health care professionals

Summary
Antimicrobial Use in Companion Animals

- No new drugs in the pipeline for veterinary medicine
- Veterinarians need existing antibiotics, and other drugs used extralabel (off label) to meet needs
- We need to use our existing drugs *smarter*
- Restricted use of certain classes of drugs has not been considered for companion animals in the U.S.
- Stewardship guidelines are available to follow
- Testing standards (CLSI) are available to guide the use of new drugs, old drugs, and extralabel antibiotics

Thank you for your attention

Contact Information
Mark G. Papich
College of Veterinary Medicine
North Carolina State University
Raleigh, North Carolina, USA
E-mail: mark_papich@ncsu.edu