Antimicrobial Resistance

Role of Attending Veterinarians at Animal Facilities

Objectives

Define Antimicrobial Resistance (AMR)

Identify risk factors contributing to AMR

Determine what you can do about it

Learn about ongoing efforts and resources

Photo credit: https://flickr.com/photos/nathanreading/6855788039
What is AMR?

Microorganisms encode survival mechanisms in DNA

• Avoid inhibition and destruction by traditional antibiotics

Microbes trade and spread genes as they multiply

• The more bacteria and fungi are in the presence of antimicrobials, the more likely they will trade and spread resistance genes, becoming able to establish drug-resistant infections in humans and animals
Video of AMR

Click Here to be directed to the video clip below.
Trading Genes

- Some bacterial DNA are in small pieces called plasmids
- Easily traded between neighbors
- Fast multiplication rate means millions of copies produced and spread rapidly
Impact of AMR in Humans

• Traditional drugs no longer work! 1 in 8 MRSA, 1 in 3 *E. coli* are resistant to first-line treatments
• 2013: 2.6 million infections, 44,000 deaths
• 2019: 2.8M infections, 35,000 deaths in US; 3.1M deaths worldwide
• 18 bacteria and fungi of concern
Impact of AMR in Animals

- AMR infections cause serious threat to animal health
- AVMA reports >20 pathogens of concern with resistance patterns
- Increasing efforts to prevent infections and practice good antimicrobial stewardship
AMR is a Global, One Health Concern

Increasing infections outside of hospitals (community-acquired)

- Greater exposures (not contained)
- Difficult to track spread
- Threaten immunocompromised
Antimicrobial Stewardship

- Standards and guidance on proper use of antibiotics
- Reduce likelihood of selection pressure leading to resistance
- Prevent unnecessary or inappropriate use
- Continuous monitoring and evaluation of antimicrobial use practices
- Require veterinary oversight
- Husbandry and prevention
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AMR Risk Factors

- Expired, contaminated, or blanket prescription antimicrobials
- Written plans: “routine” prevention or group treatments
- Poor infection control strategies
- Health or environmental stressors
## AMR Risk Factors

<table>
<thead>
<tr>
<th>Risks</th>
<th>Management Strategies</th>
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</thead>
<tbody>
<tr>
<td>Immune-suppressed patients: pregnant, young, stressed, cancer, diabetes, Cushing’s, allergies, chronic steroid use</td>
<td>Ensure good welfare, closely oversee treatments, take additional infection control precautions</td>
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<tr>
<td>Poor hygiene allows infections to spread</td>
<td>Biosecurity, quarantine, infection control</td>
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<tr>
<td>Poor antimicrobial stewardship</td>
<td>Vaccinate against bacterial infections; conduct culture and susceptibility testing; avoid antibiotics as routine prophylaxis</td>
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<tr>
<td>Raw food diets (~25% contamination rate)</td>
<td>Hygiene; sanitization of food prep areas, tools and storage areas</td>
</tr>
</tbody>
</table>
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Qualifications of Attending Veterinarians

• Graduate of an AVMA accredited veterinary school, OR
• Certificate issued by AVMA Education Commission for Foreign Veterinary Graduates, OR
• Equivalent formal education as determined by the APHIS administrator;
• Training and/or experience in the care and management of the species being attended to as the veterinarian, AND
• Authority granted by the regulated facility to provide veterinary care for the animals
The Attending Veterinarian’s Authority

- Ensure adequate veterinary care
- Oversee the adequacy of other aspects of animal care and use
- Duties performed by the AV to ensure compliance with the regulations are ultimately the responsibility of the licensee, who must provide the AV adequate authority to carry out his/her functions
- Authority over all aspects of veterinary care
Licensees’/Registrants’ Responsibilities

- Hire an Attending Veterinarian under formal arrangements
- Give the Attending Veterinarian authority
- Establish and follow programs of adequate veterinary care
- Perform daily observation of all animals
- Communicate directly and frequently with the Attending Veterinarian
- Provide appropriate facilities and equipment for adequate veterinary care
Requirements of a Program of Veterinary Care

- Availability of appropriate personnel, facilities, and equipment
- Methods to prevent and control disease, including emergency care
- Daily observation of all animals to assess health and well-being
- Guidance to personnel involved in the care and use of animals
- Adequate pre-procedural and post-procedural care
Actions to Take with Individual Facilities

Preventive medicine program

- **Vaccinations**, deworming
- Screening tests

Written treatment protocols

Nutrition choices, food handling, preparation, and storage
Actions to Take with Individual Facilities

Minimize health stressors:

• Underlying conditions
  • Parasites
  • Poor body condition
  • Allergies

Manage immunocompromised patients carefully

• Infection control measures
• Emphasize communication
Actions to Take with Individual Facilities

Infection control strategies

- Animal and human hygiene
- Quarantine/isolation
- Personal Protective Equipment (PPE)
- Disinfection (contact time!)
Actions to Take with Individual Facilities

Maximize animal welfare!

• Poor welfare $\rightarrow$ chronic stress $\rightarrow$ immune suppression $\rightarrow$ more infections

Eliminate stressors from:

• Housing – sanitization, injuries, overcrowding, fighting, compatibility
• Environment – temperature, humidity, ventilation
• Nutrition – appropriate diets, animals in good body condition
• Psychological distress – enrichment, socialization
Actions to Take in Your Practice

Commit to a plan of stewardship

Judicious use of antimicrobials

• Culture and sensitivity
• Right drug, dose, duration
• Consider alternative therapies
Actions to Take in Your Practice

• Use published, accepted medical diagnostics and treatment guidelines
• Monitor and evaluate antimicrobial use practices
• Emphasize preventive strategies
• Educate clients, ensure compliance with antibiotic instructions
• Professional development on current drug recommendations
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Antimicrobial Resistance is a One Health challenge
Animal Health and Antimicrobial Resistance

Antimicrobial Use and Stewardship Monitoring

Education and Outreach

Monitoring and University Partners
Environmental Health

Crops

Wildlife
Preventing antimicrobial resistance together
Resources

- Animal Care Aids
- Centers for Disease Control & Prevention
- U.S. Antibiotic Awareness Week (USAAW)
- National Antimicrobial Resistance Monitoring System
- FDA Center for Veterinary Medicine
- World Organisation for Animal Health (WOAH) ANIMUSE
- AVMA and other VMAs: AAAP, AAFP/AAHA, AABP, APV, AAEP, AASRP, AASV
Resources

- Presidential Advisory Council on Combating Antibiotic Resistant Bacteria
- National Animal Health Laboratory Network (NAHLN) Dashboard
- National Animal Health Monitoring and Surveillance (NAHMS)
- National Institute of Antimicrobial Resistance Research and Education
- Ontario Animal Health Network
- USDA APHIS Vet Services NVAP Modules
- USDA One Health
- University of Minnesota AMR Learning Site
- World Antimicrobial Resistance Awareness Week (WAAW)
Website: Attending Veterinarians

www.aphis.usda.gov/animalwelfare
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Slide References

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Thank you!

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