Committee: Infectious Disease

Title: Recommendations for Strengthening Antimicrobial Stewardship in Veterinary Medicine and Animal Agriculture

I. Statement of the Problem:

Antimicrobials, along with improved sanitation and vaccines, are responsible for great advances in health and life expectancy in the 20th century. However, the benefits of these lifesaving drugs are at risk due to the combination of bacterial resistance and inadequate new drug development. Antimicrobial resistance is recognized today as one of the most critical threats to health and security of the world’s population. The CDC report, Antibiotic Resistance Threats 2013, identifies antibiotic resistant bacterial infections as the cause of more than 2 million illnesses and 23,000 deaths annually in the US. Use of antimicrobial agents, including those used in human medicine, veterinary practice, animal agriculture, and aquaculture, contribute to the emergence and dissemination of antimicrobial-resistant microorganisms. Resistance genes do not respect phylogenetic, geographical or ecological borders. Transmission of resistant organisms can occur not only between animals and humans, but also from food and other animal products, and through environmental routes such as effluents and sewage. Antibiotic resistant infections are accompanied by more severe illnesses, more deaths, higher healthcare costs, and increased harm to society.

The One Health Initiative acknowledges that human, animal and environmental health are closely linked, and that collaboration to achieve solutions to problems that span these realms, such as antimicrobial resistance, is imperative. Injudicious use of antimicrobials in one person or animal can harm other people and animals, making stewardship of antimicrobials not only scientifically imperative but also ethically right. Previous CSTE position statements have addressed improving surveillance for antimicrobial resistance, and promoting antimicrobial stewardship in human medicine. This position statement recommends a comprehensive and collaborative One Health approach to address antimicrobial stewardship, and suggests actions that local, state and federal public health agencies can take to improve understanding and application of stewardship strategies across the spectrum of human and animal health.

Antimicrobial use in companion animals, animal agriculture and aquaculture benefits humans through improvements in animal health. Antimicrobials are used therapeutically in companion and food animals for treatment, control and prevention of disease. Historically, antimicrobials have also been used in animal agriculture for non-therapeutic uses including growth promotion and feed efficiency (also known as production purposes) however, these production practices will be phased out as outlined in FDA’s guidances #209 and #213. These changes, including greater oversight by veterinarians, are anticipated to improve stewardship. Selection pressure and development of resistance secondary to antimicrobial use has important implications for animals and humans as
many of the same antimicrobial classes are used in both. Resistant bacterial infections may spread between animals and humans via diverse routes, including direct contact, eating contaminated food or cross-contamination during food preparation, and environmental contamination of soil and water. For example, poultry workers in the United States have been reported to be 32 times more likely to be colonized by gentamicin-resistant *E. coli* and are at a higher risk of infection by multi-drug resistant *E. coli* than residents of the community surrounding the poultry operation. The two most important resistant bacterial infections transmitted to humans from food animals through food transmission routes are *Campylobacter* and non-typhoidal *Salmonella*, which can colonize food animals without causing signs of clinical illness in the animal. MRSA from swine is another emerging threat with zoonotic transmission documented. Strains of MRSA have also been isolated from companion animals with known exposure to human owners infected with MRSA, suggesting that resistant organisms are also transferred from humans to animals. In addition, some agricultural crops are fertilized with animal manure that may contain antimicrobial resistant organisms. Multiple outbreaks of *E.coli* associated with produce were traced to contact between fresh produce and manure. As these infections may spread in otherwise healthy human hosts without healthcare exposure, the risk of transmission within the general community increases, resulting in previously treatable infections such as urinary tract, gastrointestinal, or skin and soft tissue infections that may be difficult or impossible to treat.

A challenge encountered in antimicrobial stewardship is accurate measurement of use. Better data are needed regarding antimicrobial use in human medicine, veterinary medicine and animal agriculture. Current US regulations allow over-the-counter (OTC) use of many medically important antimicrobials in the veterinary/agricultural setting, making it difficult to quantify use or determine how and for what purposes they are used—therapeutic or production. Current metrics available for tracking antimicrobials in animal agriculture are based on aggregate sales data which do not accurately reflect actual use for the animal agriculture industry. In order to target specific practices that increase the development of resistance, specific data are needed and should include accurate classifications of drugs, dosage, species and indication (treatment, prophylaxis, production) to understand how and where antimicrobials are being used. By December 2016, medically important antimicrobials delivered in feed or water will be available only under supervision of a licensed veterinarian. This action will no doubt improve judicious usage of antimicrobials in food animals.

AVMA’s general judicious antimicrobial use principles for all species have been long established and are regularly updated, as are species-specific judicious use guidelines; it is imperative to encourage adoption of these guidelines into clinical practice. Stewardship programs are generally less well developed in veterinary medicine than in human healthcare. State and local health departments should develop a forum for sharing successful examples of stewardship programs between human and animal health professionals, including examples from other countries. This type of sharing offers an opportunity to promote stewardship, conserve resources and build valuable relationships.

Several recent activities in the public and political arena in the United States demonstrate a focus on antimicrobial stewardship. Bills have been put forth in the US Congress to limit and measure use of
antimicrobials in animal agriculture, including the Prevention of Antibiotic Resistance Act, introduced in March of 2015, to address non-therapeutic uses of medically important drugs in animal agriculture.\textsuperscript{9,15-17} FDA has proposed rules which bring therapeutic use (treatment, control and prevention) of antimicrobials under veterinary supervision and eliminate use of medically important antimicrobials in animal agriculture for production purposes.\textsuperscript{9} These new rules will go into effect in late 2016. In September, 2014 the Obama administration released several documents emphasizing the need to combat antimicrobial resistance, including an Executive Order \textsuperscript{18}, the National Strategy for Combating Antibiotic Resistance Bacteria \textsuperscript{19}, and the President’s Council of Advisors on Science and Technology’s Report on Combating Antibiotic Resistance.\textsuperscript{2} In May 2015, the World Health Assembly released a statement endorsing a global action plan to combat antimicrobial resistance.\textsuperscript{20,21} Many consumers’ advocates express concern about overuse of antibiotics in animal agriculture. In response to consumer demand, McDonald’s Corporation has publically announced goals to eliminate use of medically important antibiotics in their poultry supply chains.\textsuperscript{22} Some experts and consumers support the development and implementation of alternatives to antimicrobial use, such as using vaccines and probiotics, and through adoption of new technologies and changes in animal agriculture husbandry practices.

Recognizing the importance of stewardship in all areas, the One Health Initiative highlights and endorses the complex relationship between the human, animal and environmental health systems. Action to combat antimicrobial resistance should be carefully evaluated by assessing risks and benefits of various changes, openly debated, clearly communicated, and deliberately planned and executed. However, the threat of antimicrobial resistance is real and growing, so lack of agreement from all stakeholders cannot be an excuse for inaction. While acknowledging that we need more information about what, how, how much, when, and where antimicrobials are used in animal health and agriculture, enough is known to spur progress on judicious usage and antimicrobial stewardship. When available, these additional data will be useful for assessing the impact and benefits of stewardship activities as we attempt to protect and extend the usefulness of antimicrobials for treating illness, and preventing suffering and death in both humans and animals.

One Health antimicrobial stewardship goals

1. Improved oversight and appropriate use of antimicrobials in human medicine, veterinary medicine and animal agriculture.
2. Cooperative efforts to develop multidisciplinary sustainable antimicrobial stewardship programs.
3. Educational campaigns and tools for practitioners, food animal producers, and the public which reduce the demand for empirical therapy with antimicrobials when not clearly indicated.
II. Statement of the desired action(s) to be taken:

1. CSTE recommends that CDC (e.g., One Health Office) engage state healthcare associated infection (HAI) programs and public health veterinarians to collaborate with other agencies on state and national initiatives that build relationships, and facilitate sharing stewardship strategies between human and veterinary medicine, and animal agriculture. The degree to which health departments can pursue collaborative efforts with CDC, or within their state, will depend on resources available; collaboration between states may be an alternative option for states without access to resources such as training or subject matter expertise.

2. CSTE recommends that FDA and other stakeholders such as US Department of Agriculture (USDA), American Veterinary Medicine Association, and Centers for Disease Control and Prevention (CDC), develop appropriate metrics for tracking antimicrobial use in animal agriculture and companion animal practice.

3. CSTE recommends that CDC and other federal agencies increase funding for strengthening monitoring of antimicrobial resistance. Funding should support state AR surveillance activities as well as surveillance of resistant bacteria in food.

4. CSTE recommends that federal agencies, such as CDC, FDA, and USDA, coordinate a publicly accessible electronic library where stewardship models, projects and educational tools can be easily shared across jurisdictions.

See Appendix 1 for ideas and contact information.

III. Public health Impact:

- Improve coordination and collaboration between animal health professionals, human healthcare and public health experts to advance stewardship.
- Improve measurement of antimicrobial use in animal agriculture and companion animal practice.
- Improve knowledge and understanding among prescribers across sectors regarding the antimicrobial resistance crisis and strategies to reduce and prevent resistance.
IV. References


V. Coordination

Agencies for Response:

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Appendix 1: Antimicrobial Stewardship Activities for consideration by CDC, and State or Local Health Departments

CDC and state health departments may consider implementing any number of the strategies listed below as resources allow:

1. Develop a One Health Stewardship Workgroup model that may be implemented at the state level. Workgroups could include the state veterinarian and state public health veterinarian. A multidisciplinary team can bring together varied expertise to raise awareness, build community support and infrastructure, assess and address stakeholder insights and concerns, educate stakeholders on the science of antimicrobial resistance and its management, and establish priorities for the state program to leverage combined strengths and avoid duplication. Representatives might include public health epidemiologists, human healthcare providers, animal health professionals, practicing veterinarians, animal agriculture industry stakeholders, environmental health professionals, feed mill operators, and microbiologists. Each US state and territory has a CDC-funded HAI Coordinator, which can be found here: http://www.cdc.gov/HAI/state-based/. A list of state public health veterinarians is available at: http://www.nasphv.org/Documents/StatePublicHealthVeterinariansByState.pdf

2. Collaborate with veterinary and human medicine academic institutions to strategize on ways to improve basic antimicrobial stewardship knowledge among food animal and companion animal veterinarians-in-training, and human health care providers-in-training.

3. Collaborate with food animal veterinarians and state department of agriculture to improve knowledge among food animal producers about antimicrobial resistance and the potential benefits of improved stewardship.

4. Establish pilot projects in animal agriculture operations that bring together stewardship experts from state health departments, food animal veterinarians, and industry for shared learning opportunities.

5. Identify and spotlight food animal veterinarians and the animal agriculture operations they work with that have successfully implemented stewardship practices to share successes, challenges and lessons learned.

6. Develop and distribute educational tools for stakeholders that promote stewardship and alternatives to antimicrobial therapy.
   a. For companion animal veterinarians and their clients/patients
   b. For food animal veterinarians and producers