

# Antimicrobial stewardship considerations in beef production

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## Abstract

Stewards oversee and protect something of value. On the subject of antimicrobial drugs, veterinarians must be stewards of antimicrobial effectiveness and availability. Lack of antimicrobial effectiveness or loss of the use of antimicrobial drugs would lead to increased animal illness and suffering. Lack of antimicrobial effectiveness as a result of transfer of resistance genes from animal-carried bacteria to human pathogens would lead to increased human illness, and potentially to loss of confidence in veterinary care. Therefore, veterinarians need to continue to be stewards of antimicrobial drugs for human and animal health. Our lead professional associations have committed to antimicrobial stewardship with the approval of stewardship guidance: American Veterinary Medical Association Core Principles and American Association of Bovine Practitioners Key Elements.

**Key words:** veterinarians, beef, antibiotic, antimicrobial, stewardship

## Résumé

Les intendants encadrent et protègent quelque chose de valeur. Les vétérinaires se doivent d'être des intendants de l'efficacité et de la disponibilité des médicaments antimicrobiens. Le manque d'efficacité des antimicrobiens ou la perte en permanence de l'usage des médicaments antimicrobiens entraîneraient une augmentation de la maladie et de la souffrance chez les animaux. Le manque d'efficacité des antimicrobiens en raison du transfert de gènes de résistance de bactéries présentes chez des animaux aux pathogènes humains entraînerait une recrudescence de maladies humaines et potentiellement une perte de confiance dans le soin vétérinaire. Par conséquent, les vétérinaires se doivent de continuer à gérer les médicaments antimicrobiens pour la santé animale et humaine. Nos associations professionnelles de tête souscrivent à l'antibiogouvernance avec l'approbation de principes de gérance : les principes fondamentaux de l'*American Veterinary Medical Association* et les éléments clés de l'*American Association of Bovine Practitioners*.

## Introduction

Common themes in the AVMA Core Principles of Stewardship<sup>2</sup> and AABP Key Elements for Implementing Antimi-

icrobial Stewardship Plans in Bovine Veterinary Practices<sup>1</sup> Working with Beef and Dairy Operations are 1) leadership and commitment to stewardship activities, 2) lifelong learning and continuing education about practices that reduce the need for antimicrobial drugs and that lead to judicious use of antimicrobial drugs, and 3) monitoring outcomes of antimicrobial therapy and supporting efforts to track antimicrobial use at the individual veterinarian or practice level and at broader levels. Based on these broad themes, some suggested activities are presented to provide ideas on how to actively protect antimicrobial drug effectiveness and availability.

## Activities that Represent Stewardship

One important activity is lifelong learning: veterinarians should know the latest and best scientific evidence about preventive and management interventions that effectively reduce the occurrence of bacterial disease as well as the latest and best scientific evidence about antimicrobial drug effectiveness for prevention, control, and treatment of bacterial disease. Synthesis of multiple sources of evidence can be challenging, particularly if the evidence upends traditional dogma or entrenched practices, but polishing your skills of information seeking and critical appraisal are worth the effort.

A second and related activity is the continual assessment and improvement in treatment decisions and decision-making processes. Deliberate decisions should be made about what antimicrobial drugs you keep in inventory or regularly prescribe, without undue influence from commercial or biased sources or based on reflexive rather than reflective thought processes. This also means acknowledging any cognitive biases when assessing drug effectiveness. For example, practitioners will want to avoid succumbing to the "post hoc ergo propter hoc" cognitive error. Constructing and adhering to case definitions that lead to accurate diagnosis of bacterial infections are important steps in assessment and improvement of treatment decisions. Identifying antimicrobial drug use practices that are unlikely to lead to better animal outcomes is another potentially fruitful area for assessment of treatment decisions and decision-making. Are sulfonamide drugs useful for respiratory disease? Does benzathine penicillin reach therapeutic concentrations for all the pathogens for which it is used? Does chlortetracycline in feed? Are remote delivery devices useful and prudent when used to deliver antimicrobial drugs to groups of animals? The most rewarding decisions would be the ones that pre-

vent the “ultimate antimicrobial transgression”,<sup>3,4</sup> exposure to selection pressure from an antimicrobial drug with no improvement in disease outcome.

A third activity in which practitioners can participate is to actively support the development of clinical guidelines for cattle. Clinical guidelines do not have to be prescriptive practices, but rather provide guidance and summarize best evidence for interventions likely to be effective and reduce unnecessary use of antimicrobials. Examples of successful guideline development include those from the International Society for Companion Animal Infectious Diseases.<sup>5,7</sup> Well-executed guidelines do the work of evidence-based practice for veterinarians, the biases in the recommendations are usually addressed so they can be managed, and guidelines provide external assurances about treatment decisions. Guidelines can also reduce the workload in maintaining the necessary expertise for effective and prudent antimicrobial use practices.

A fourth activity that may lead to better stewardship is to seek to understand the sociological and psychological factors that influence treatment decisions, and use proven communication and education strategies with producers to enhance the uptake of management and drug interventions. It is important to acknowledge and work within the bounds of producers’ interests in autonomy and level of comfort with shared decision-making. We are just beginning to understand what the influences are on antimicrobial drug selection and prescribing,<sup>4</sup> so veterinarians can cultivate an interest in the non-medical factors surrounding disease management and decision-making.

One final activity that may require more fortitude is banding together to be leaders in eliminating bad actors. Veterinarian-stewards of antimicrobials do not just address their own practices that may lead to reduced effectiveness and availability, they also support enforcement of practitioners and animal caretakers who are not stewards, so

veterinarians remain trusted advocates for animal health and antimicrobial effectiveness.

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