

# **ANTIMICROBIAL STEWARDSHIP: WHAT DOES IT CHANGE TO MY DAILY PRACTICE?**

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Antimicrobial resistance poses a significant challenge in both human and veterinary medicine, with the misuse and overuse of antibiotics contributing substantially to this global concern. Small animal veterinary medicine is not exempt from this issue, and ensuring the appropriate use of antimicrobials is crucial to safeguard their effectiveness in treating infectious diseases in animals. The overarching aim of antimicrobial stewardship is to optimize the use of these medications to ensure effective treatment both now and in the future, while also mitigating the development of resistance. It is imperative for veterinary professionals to grasp the principles of antimicrobial stewardship in small animal medicine to secure the best possible outcomes for animal health and, by extension, public health.

Misuse and overprescription of antibiotics represent significant challenges in both human and veterinary healthcare settings. Research indicates that antibiotics are frequently prescribed in small animal practices and veterinary teaching hospitals, with up to 45% of these prescriptions being for cases without clear evidence of infection. This presents veterinarians with a delicate balance: while antibiotics are often necessary to combat life-threatening infections in animals, many of the commonly prescribed antibiotics are classified as Critically Important Antimicrobials (CIAs) for human health. Therefore, veterinarians must exercise caution and implement appropriate antimicrobial stewardship practices to ensure effective treatment while minimizing the emergence of antibiotic resistance.

Vaccination emerges as a highly effective strategy for reducing the need for antibiotics by preventing infections. Vaccination has demonstrated efficacy in preventing various diseases in dogs, including *Bordetella bronchiseptica*, *Leptospirosis* spp., and Lyme disease. Additionally, the use of preventatives for fleas and ticks can contribute to a decrease in the incidence of tick-borne diseases, subsequently reducing the necessity for antibiotics.

One approach to antimicrobial stewardship in small animal medicine involves adopting a tiered approach to antibiotics. Recognizing the varying risks and benefits associated with different classes of antibiotics, categorizing them into tiers can facilitate more prudent use of these medications. Lower tier antibiotics, with narrower spectrums of activity and limited indications, pose a lower risk of transmitting resistant genes. Conversely, higher tier antibiotics, with broader spectra of activity, present a greater risk of resistance transmission and more severe implications. Some antibiotics are considered last-resort options in human medicine, and their use in veterinary medicine should be discouraged to mitigate the spread of multidrug-resistant organisms.

Empirical antimicrobial therapy, commonly employed in veterinary medicine, involves selecting antibiotics when the responsible bacteria for an infection is unknown. Regardless of the case's severity, encouraging the use of culture and antimicrobial susceptibility testing is essential for two primary reasons: confirmation of bacterial infections and determination of effective antibiotics. Moreover, the data obtained from cultures can inform local, national, and international guidelines, tailoring them based on local antibiograms of the bacteria present.

Recent studies underscore the importance of adjusting empirical antibiotic therapy based on microbial susceptibility testing results. For instance, research conducted at a microbiology laboratory in Massachusetts revealed that amoxicillin-clavulanate acid demonstrated greater effectiveness against urinary *E. coli* than amoxicillin alone. This highlights the significance of tailoring antibiotic selection to the specific bacterial profile present in individual cases.

A critical aspect of antimicrobial stewardship involves recognizing that antibiotics are not a panacea, particularly in the treatment of gastrointestinal diseases such as acute diarrhea or acute hemorrhagic diarrhea syndrome. Studies indicate that treatment with metronidazole or amoxicillin-clavulanic acid yields no significant differences in outcomes compared to placebo or probiotics. Moreover, the use of broad-spectrum antimicrobials like metronidazole can significantly impact the fecal microbiome, emphasizing the importance of judicious antibiotic use.

The optimal duration of antimicrobial therapy for various infectious diseases is under revision based on recent evidence. Shorter courses of antibiotics have been shown to achieve similar outcomes to longer courses in both human and canine studies. Prolonged antibiotic therapy not only imposes financial burdens on pet owners but also fosters the development of resistance among fecal flora and disrupts the microbiome. Biomarkers such as C-reactive protein and Serum Amyloid A (SAA) are being explored to guide antibiotic duration in dogs, offering promising avenues for more tailored treatment approaches.

In conclusion, antimicrobial stewardship in small animal veterinary medicine is essential for responsible antibiotic use. By adhering to evidence-based guidelines, encouraging diagnostic testing, utilizing narrow-spectrum antibiotics when possible, and considering alternative therapies, veterinarians can play a pivotal role in preserving the efficacy of antimicrobials and mitigating the risks of antimicrobial resistance in small animals.