

## Principles of Antimicrobial Stewardship

The emergence of bacteria that are resistant to antimicrobials is a serious threat to animal health, human health, and the planet.<sup>1-4</sup> Physicians, veterinarians, livestock owners, companion animal owners, and the general public all contribute in the One Health effort to fight against the development of antibiotic resistance by incorporating antimicrobial stewardship into their day-to-day activities.

Antimicrobial Stewardship Plans aim to optimize patient health and improve antimicrobial drug use in order to preserve the efficacy and ensure the availability of antimicrobials for years to come.<sup>5-11</sup>

The comprehensive antimicrobial stewardship approach in veterinary medicine includes reducing the need for antimicrobial drugs by implementing livestock management practices that aid in the prevention of infectious disease in addition to using antimicrobial drugs selectively and responsibly to optimize animal health and minimize the risk for developing antimicrobial resistance.<sup>9-11</sup> The following five principles are the foundation to a successful antimicrobial stewardship plan. Based on these principles, the CDFA Antimicrobial Use & Stewardship program is working in collaboration with university and cooperative extension experts to provide scientifically-based guidelines for veterinarians and livestock owners.

### 1. Commitment to Partnership

Californians will lead the nation in efforts to reduce antimicrobial resistance by effectively uniting the animal management expertise of livestock owners and personnel responsible for animal care with the scientific knowledge and professional training of veterinarians. Establishing a veterinarian-client-patient relationship (VCPR) is an essential first step in the development of an Antimicrobial Stewardship Plan.<sup>1,3,4,9,12-19</sup>

### 2. Animal Health and Disease Prevention

A collaborative effort between the individual livestock owner and the veterinarian to design a well-rounded animal health program will most effectively address the unique challenges faced by each operation, farm, or ranch. Animal health programs should be science-based, practical, and respect the owner's resources and values.<sup>12</sup> These programs cover fundamental areas such as low-stress animal handling, facility design, land management, sanitation, biosecurity, transportation, feeding and nutritional recommendations, animal genetics, and protocols to aid in the prevention of specific diseases based on a risk assessment and on the efficacy of available animal health products.<sup>4,12,14-16,18,19</sup> Thoughtful design and implementation of animal health programs should greatly limit the need for antimicrobial therapy while reducing economic losses and promoting animal health and wellbeing.<sup>4,7,10,12</sup>

### 3. Judicious Use of Antimicrobials

To establish the need for an antimicrobial drug, judicious use necessitates a thorough evaluation and diagnosis of disease or infection, careful assessment of the benefit, efficacy, legality and safety of an antimicrobial therapeutic regimen, and consideration of the use of effective and practical non-antibiotic treatment alternatives.<sup>1,12-17</sup> Livestock owners and personnel responsible for animal care should follow instructions to ensure proper storage and careful administration of the medications, maintain necessary records, and to carry out the designated withdrawal interval for eggs, milk, or meat food products from treated animals.<sup>1,10,13-20</sup>

### 4. Record, Reevaluate, and Report

Veterinarians and livestock owners work together to develop a record keeping system that serves the needs of the individual operation.<sup>1,10,12-19</sup> Records should include an accurate drug inventory, production performance records, livestock health records that include treatment outcomes, and results of diagnostic tests, such as culture, necropsy, and antimicrobial susceptibility testing as necessary to provide a complete picture of on-farm animal health management. Knowledge of this information will aid in monitoring the value of the animal health program and the application and outcome of treatment protocols, as well as trends in antimicrobial resistance. Routine evaluation of

records is critical to the continuous improvement of animal health programs and treatment protocols.<sup>1,5-8,16-19</sup>

Veterinarians and livestock owners are encouraged to contribute to the information gathered by the CDFA Antimicrobial Use & Stewardship program. Participation in these surveys and studies will improve our understanding of the role of strategic antimicrobial use in the fight against antimicrobial resistance.

## 5. Expertise in Antimicrobial Stewardship

A significant part of the veterinarian's role is to offer valuable, up-to-date knowledge on antimicrobial stewardship practices for their clients.<sup>1,9,10,14-17</sup> Keeping abreast of advances in scientific understanding by performing a critical review of current literature on disease prevention, efficacy of antimicrobial alternatives, and clinical guidelines for the use of antimicrobial drugs helps the veterinarian to better advise or assist livestock owners. Veterinarians and livestock owners can have a positive impact in the effort to reduce antimicrobial resistance with the application of appropriate novel practices. It is vital that livestock owners and personnel responsible for animal care maintain a level of experience and training essential to the successful implementation of these practices and ensuring judicious use of antimicrobials on the farm.<sup>1,9,10,14-19</sup>

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