

# What veterinarians need to know about ANTIMICROBIAL SUSCEPTIBILITY TESTING

## CATTLE

Antimicrobial susceptibility testing (AST) can be a powerful diagnostic tool to guide antimicrobial drug selection and to help predict clinical outcomes for infectious diseases in cattle. The following general recommendations on AST use are intended to assist veterinarians when making decisions about antimicrobial therapy for cattle, whether for an individual animal or when using samples from a small number of animals to predict outcomes for a herd.

### // SCENARIOS WHEN CULTURE ALONE MAY BE USEFUL //

#### **Calf diarrhea**

Performing bacterial culture to rule in or rule out important bacterial causes of enteritis in cattle is recommended when there is significant morbidity or mortality. However, AST should not be used to guide antibiotic selection for treating enteric disease of bacterial origin. There are no antimicrobial breakpoints approved in cattle (or any other species) to predict outcomes of antibiotic treatment for enteric pathogens.

### // SCENARIOS WHEN CULTURE IS NOT RECOMMENDED //

#### **Foot rot**

Infectious pododermatitis in cattle has a typical and consistent presentation. The primary pathogens are anaerobic, and there are no standardized methods for culture nor for breakpoint determination.

### // SCENARIOS WHEN AST IS RECOMMENDED TO IMPROVE OUTCOMES //

#### **Bovine respiratory disease (BRD)**

Established breakpoints are available for multiple antibiotics labeled for treatment of BRD. Veterinarians should consider the anatomical site from which the bacteria were isolated (e.g., lung vs. nasopharyngeal area) and stage of disease (acute vs. chronic) when interpreting the AST results.

### // SCENARIOS WHEN AST MIGHT BE USEFUL TO IMPROVE OUTCOMES //

#### **Calf septicemia**

Veterinarians might find culture and AST helpful to treat calf septicemia, particularly when significant morbidity and mortality exists. Of note, approved breakpoints might be unavailable for the bacterial species typically isolated from calves with septicemia. In addition, breakpoints for macrolides (e.g., gamithromycin, tildipirosin, tilmicosin, and tulathromycin) are based on the assumption that a high concentration of the drug in the target tissue can be achieved, specifically in lung tissue and immune cells. Therefore, those breakpoints cannot be applied with confidence to bacteria isolated from other anatomical sites.

#### **Mastitis in dairy cattle**

Considerable debate exists about the utility of culture and AST to guide the treatment of mastitis in dairy cattle. In a typical commercial mastitis AST panel, some breakpoints are approved for intramammary administration and others are not. Further, breakpoints for some drugs are unavailable for systemic use. Therefore, although culture is likely valuable, the value of AST results is specific to the isolated pathogen and susceptibility results within the context of the herd.

### // WHEN TO CHOOSE CULTURE OR AST ON BACTERIAL ISOLATES FROM CATTLE //

Indication	Culture	AST
Calf diarrhea	Yes	No
Foot rot	No	No
Respiratory disease/bronchopneumonia	Yes	Yes

Please refer to 21 CFR §530.41 for a list of antimicrobials and other drugs prohibited for extralabel use in food-producing animals,<sup>1</sup> independent of AST results.

## // ADDITIONAL RESOURCES //

AVMA Committee on Antimicrobials. What veterinarians need to know about antimicrobial susceptibility testing ([avma.org/AntimicrobialTools](https://avma.org/AntimicrobialTools)):

- General overview
- Non-culture-based antimicrobial resistance genetic panels in animals

CLSI. *Performance Standards for Antimicrobial Disk and Dilution Susceptibility Tests for Bacteria Isolated From Animals*. 5th ed. CLSI standard VET01. Clinical and Laboratory Standards Institute; 2018.

CLSI. *Performance Standards for Antimicrobial Disk and Dilution Susceptibility Tests for Bacteria Isolated From Animals*. 6th ed. CLSI supplement VET01S. Clinical and Laboratory Standards Institute; 2023.

CLSI. *Understanding Susceptibility Test Data as a Component of Antimicrobial Stewardship in Veterinary Settings*. 1st ed. CLSI report VET09. Clinical and Laboratory Standards Institute; 2019.

## // REFERENCES //

1. Code of Federal Regulations Title 21 Section 530.41. Drugs prohibited for extralabel use in animals. Accessed October 16, 2023. <https://www.ecfr.gov/current/title-21/chapter-I/subchapter-E/part-530/subpart-E/section-530.41>