CLINICAL AND LABORATORY STANDARDS INSTITUTE®

5th Edition

VET01

Performance Standards for Antimicrobial Disk and Dilution Susceptibility Tests for Bacteria Isolated From Animals

This standard covers the current recommended methods for disk diffusion susceptibility testing and the reference methods for determining minimal inhibitory concentrations of aerobic bacteria by broth macrodilution, broth microdilution, and agar dilution for veterinary use.

A standard for global application developed through the Clinical and Laboratory Standards Institute consensus process.

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Performance Standards for Antimicrobial Disk and Dilution Susceptibility Tests for Bacteria Isolated From Animals

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Abstract

Antimicrobial susceptibility testing is indicated for any organism that contributes to an infectious process warranting antimicrobial chemotherapy if its susceptibility cannot be reliably predicted from knowledge of the organism's identity. Susceptibility tests are most often indicated when the causative organism is thought to belong to a species capable of exhibiting resistance to commonly used antimicrobial agents.

Various laboratory methods can be used to measure the *in vitro* susceptibility of bacteria to antimicrobial agents. In many veterinary microbiology laboratories, an agar disk diffusion method is used routinely for testing common, rapidly growing, and certain fastidious bacterial pathogens. Clinical and Laboratory Standards Institute standard VET01–*Performance Standards for Antimicrobial Disk and Dilution Susceptibility Tests for Bacteria Isolated From Animals* describes disk diffusion, as well as standard broth dilution (macrodilution and microdilution) and agar dilution, and it includes a series of procedures to standardize the way the tests are performed. The performance, applications, and limitations of the current CLSI-recommended methods are also described. The supplemental information (VET08[1] tables) used with this standard represents the most current information for antimicrobial agent selection, interpretation, and quality control using the procedures standardized in VET01.

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CLSI, the Consensus Council, the Document Development Committee on Veterinary AST Methods Standard, and the Subcommittee on Veterinary Antimicrobial Susceptibility Testing gratefully acknowledge the Expert Panel on Microbiology for serving as technical advisors and subject matter experts during the development of this standard.

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Foreword

In this revision of VET01, several sections were added or revised, as outlined in the Overview of Changes. One of the main updates is the reformatting of the standard to follow a laboratory's path of workflow, defined as the sequential processes of preexamination, examination, and postexamination. An overview of the antimicrobial susceptibility testing process is provided in the beginning of the standard in the new Figure 1 (see Chapter 3) and at the beginning of each method chapter (Chapters 4 through 6), with various testing methods shown in easy-to-follow step-action tables throughout the standard. Other improvements have been made in VET01 by incorporating relevant updates derived from CLSI documents M02[2] and M07[3] and by adding new antimicrobial agents or testing standards for veterinary pathogens.

The most current edition of CLSI document VET08[1] (formerly VET01S), a volume of tables published every 2 to 3 years, is made available with this standard to ensure users are aware of the latest Subcommittee on Veterinary Antimicrobial Susceptibility Testing (VAST) performance standards related to both methods and the information presented in the tables. Previously published tables should be replaced with the current editions for interpreting breakpoints. Because of potential international differences that restrict use of certain antimicrobial agents, some jurisdiction-specific restrictions are described in VET08[1] Table 1 footnotes and in VET08[1] Table 2A comments.

Significant changes in the revision of the VET08[1] tables since 2013 include veterinary-specific breakpoints for categorizing methicillin-susceptible and methicillin-resistant strains of *Staphylococcus pseudintermedius,* which are different from *Staphylococcus aureus* breakpoints. Newly approved antimicrobial agents, such as the fluoroquinolone pradofloxacin, the macrolides gamithromycin and tildipirosin, and the cephalosporin cefovecin have been added to VET08[1] using data presented by the sponsors. For testing of first-generation cephalosporins in dogs, cephalothin has been replaced with cephalexin, which is more predictive of susceptibility and is also used more commonly in dogs. These and other specific changes to the VET08[1] tables are summarized at the beginning of VET08.[1]

Other important additions to the VET08[1] tables are breakpoints for antimicrobial agents that did not previously have a veterinary-specific breakpoint. These are often human antimicrobial agents that are not approved in all countries for animals but may be used legally in some countries by veterinarians in their generic forms. The new additions include doxycycline (for dogs and horses), minocycline (for dogs), amikacin (for dogs and horses), cephalexin (for dogs), cefazolin (for dogs and horses), ampicillin/amoxicillin (for dogs, pigs, and horses), amoxicillin-clavulanate (for dogs and cats), and piperacillin-tazobactam (for dogs), among others. The veterinary diagnostic and related laboratory community is encouraged to provide feedback so that VET01 and its supplement VET08[1] can be kept up to date, maintaining clinical relevance.

Many other editorial and procedural changes in this edition of VET01 were made since 2013 following meetings of the Document Development Committee on Veterinary AST Methods Standard and the Subcommittee on VAST. The most important changes in this standard are summarized below.

Overview of Changes

This standard replaces the previous edition of the approved standard, VET01-A4, published in 2013. Several changes were made in this edition, including:

- **General:**
  - To harmonize with the International Organization for Standardization, the terms for the methods for inoculum preparation have been changed. "Growth method" has been changed to "broth culture method," and "direct colony suspension method" has been changed to "colony suspension method" throughout the standard.