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## CLSI VET05™

### Generation, Presentation, and Application of Antimicrobial Susceptibility Test Data for Bacteria of Animal Origin

This report offers guidance on areas in which harmonization can be achieved in veterinary antimicrobial surveillance programs with the intent of facilitating comparison of data among surveillance programs.

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## Generation, Presentation, and Application of Antimicrobial Susceptibility Test Data for Bacteria of Animal Origin; A Report

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### Abstract

Clinical and Laboratory Standards Institute document VET05-R—*Generation, Presentation, and Application of Antimicrobial Susceptibility Test Data for Bacteria of Animal Origin; A Report* offers guidance on areas in which harmonization can be achieved in national veterinary antimicrobial surveillance programs, with the intent of facilitating comparisons of data among various national surveillance programs. CLSI veterinary antimicrobial susceptibility testing (VAST) methods are used to generate minimal inhibitory concentrations or zones of inhibition, and the laboratory interprets that information into a category of susceptible, intermediate, or resistant. The veterinarian uses this information to make an informed decision in the selection of an appropriate antimicrobial for animal treatment. However, various surveillance programs or projects use the data for many other purposes, including the drafting of risk assessments (subsequently used for risk management) or to determine the success of intervention policies. These programs include multiple national programs, several multinational programs, product-specific programs, and purpose-specific regional or local programs. Currently, there is a lack of standardized methodology describing how the data from these programs are presented in the reports and discussed with regard to the specific program objective. In keeping with the intent of CLSI document M39, this document seeks to bring the CLSI VAST perspective to these programs and projects by means of a comprehensive report that can help form the basis for a global consensus.

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## Foreword

Owing to the large number of national antimicrobial resistance (AMR) surveillance programs, harmonization among these various programs is becoming increasingly important. The aim of this report is to provide the perspective of the Subcommittee on Veterinary Antimicrobial Susceptibility Testing on the generation, presentation, and application of antimicrobial susceptibility testing (AST) data for bacteria of animal origin regarding these programs, and perhaps help form the basis for a global consensus.

This report provides guidance on aspects of AMR surveillance programs ranging from sample collection, AST methodology, data presentation, and data interpretation, including situations in which CLSI-approved veterinary-specific clinical breakpoints are not established. Efforts are made to highlight areas in which laboratories deviate from CLSI methodology and the subsequent misinterpretation of data that can occur. Comparisons are made among some of the more established veterinary AMR surveillance programs and among human AMR surveillance programs, along with indications of the usefulness of certain points of human AMR programs for veterinary programs. The anticipated users of this document are surveillance program managers, regulatory authorities, clinical laboratories, and academicians.

## Key Words

Clinical breakpoints, coresistance, cross-resistance, epidemiological cutoff values, geometric mean, harmonization, MIC<sub>50</sub>, MIC<sub>90</sub>, multidrug resistance, surveillance

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# Generation, Presentation, and Application of Antimicrobial Susceptibility Test Data for Bacteria of Animal Origin; A Report

## 1 Scope

This report provides a review of current applications of susceptibility test data generated using CLSI methodology for bacteria of animal origin and recommendations for summarizing, presenting, and applying the data. More specifically, the report provides an overview of the CLSI veterinary antimicrobial susceptibility testing (VAST) approach to the use of reference methodology, quality control (QC), and establishment and use of clinical breakpoints and epidemiological cutoff values (ECVs). Recommendations for the presentation of minimal inhibitory concentrations (MICs) or zone inhibition data in frequency histograms and scatter plots are provided, in addition to recommendations for the use of ECVs and/or CLSI clinical breakpoints. A review of various applications of surveillance programs is provided, with clarification of descriptive summary statistics of MIC frequency histograms (eg, MIC<sub>50</sub>, MIC<sub>90</sub>, geometric mean), and recommended standardized approaches.

The report also provides a review of several select programs that monitor antimicrobial susceptibility in bacteria of animal origin (eg, Canadian Integrated Program for Antimicrobial Resistance Surveillance [CIPARS], Centre Européen d'Etudes pour la Santé Animale [CEESA], Danish Integrated Antimicrobial Resistance Monitoring and Research Programme [DANMAP], GERM-Vet, Monitoring of Antimicrobial Resistance and Antibiotic Usage in Animals in the Netherlands [MARAN], US National Antimicrobial Resistance Monitoring System [NARMS]) with regard to methods and data presentation and interpretation. For comparison purposes, a similar review is provided for programs monitoring antimicrobial susceptibility in bacteria of human origin (eg, European Antimicrobial Resistance Surveillance Network [EARS-Net], SENTRY Antimicrobial Surveillance Program). This report is not intended to provide guidance for human antimicrobial surveillance programs.

Finally, consideration is given to the intended use of any antimicrobial resistance (AMR) surveillance program. The usual goal in collecting antimicrobial susceptibility data is to detect the early emergence of resistance for a given bacterial species/antimicrobial combination that may be used for the following purposes:

- Provide a basis for policy recommendations for animal and public health.
- Generate data that may guide the design of further studies.
- Provide information for prescribing practices and prudent-use recommendations.
- Determine the prevalence or trend in prevalence of reduced susceptibility (or resistance) to a certain antimicrobial in a defined population.
- Detect emergence of AMR (eg, particular phenotypes).
- Identify the need for potential intervention.
- Assess the impact of intervention(s).
- Identify the emergence of new mechanisms of resistance.