Antimicrobial Susceptibility Testing at the Animal Health Laboratory
Comments and Explanatory Notes for referring veterinarians

Version 1 January 2026

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Definitions

Breakpoint: minimal inhibitory concentration or zone diameter value used to categorize an organism as susceptible, intermediate or resistant.

Susceptible (S): a category defined by a breakpoint that implies that isolates with an MIC at or below the susceptible breakpoint are inhibited by the usually achievable concentrations of antimicrobial agent when the dose recommended to treat the site of infection is used, resulting in likely clinical efficacy.

Intermediate (I): A category defined by a breakpoint that includes isolates with MICs within the intermediate range that approach usually attainable blood and tissue levels and/or for which response rates may be lower than for susceptible isolates. Implies clinical efficacy in anatomical sites where the drugs are physiologically concentrated or when the higher than normal dosage of a drug can be used.

Resistant (R): a category defined by a breakpoint that implies that isolates with an MIC at or above the resistant breakpoint are not inhibited by the usually achievable concentrations of the antimicrobial agent with normal dose regimes and or that demonstrate MICs that fall in the range of which specific microbial resistance mechanisms are likely, and clinical efficacy of the agent against the isolate has not been reliably shown in isolates with similar phenotypes.

Minimal Inhibitory Concentration (MIC): The lowest concentration of an antimicrobial agent that prevents visible growth of a microorganism in an agar or broth dilution susceptibility test.

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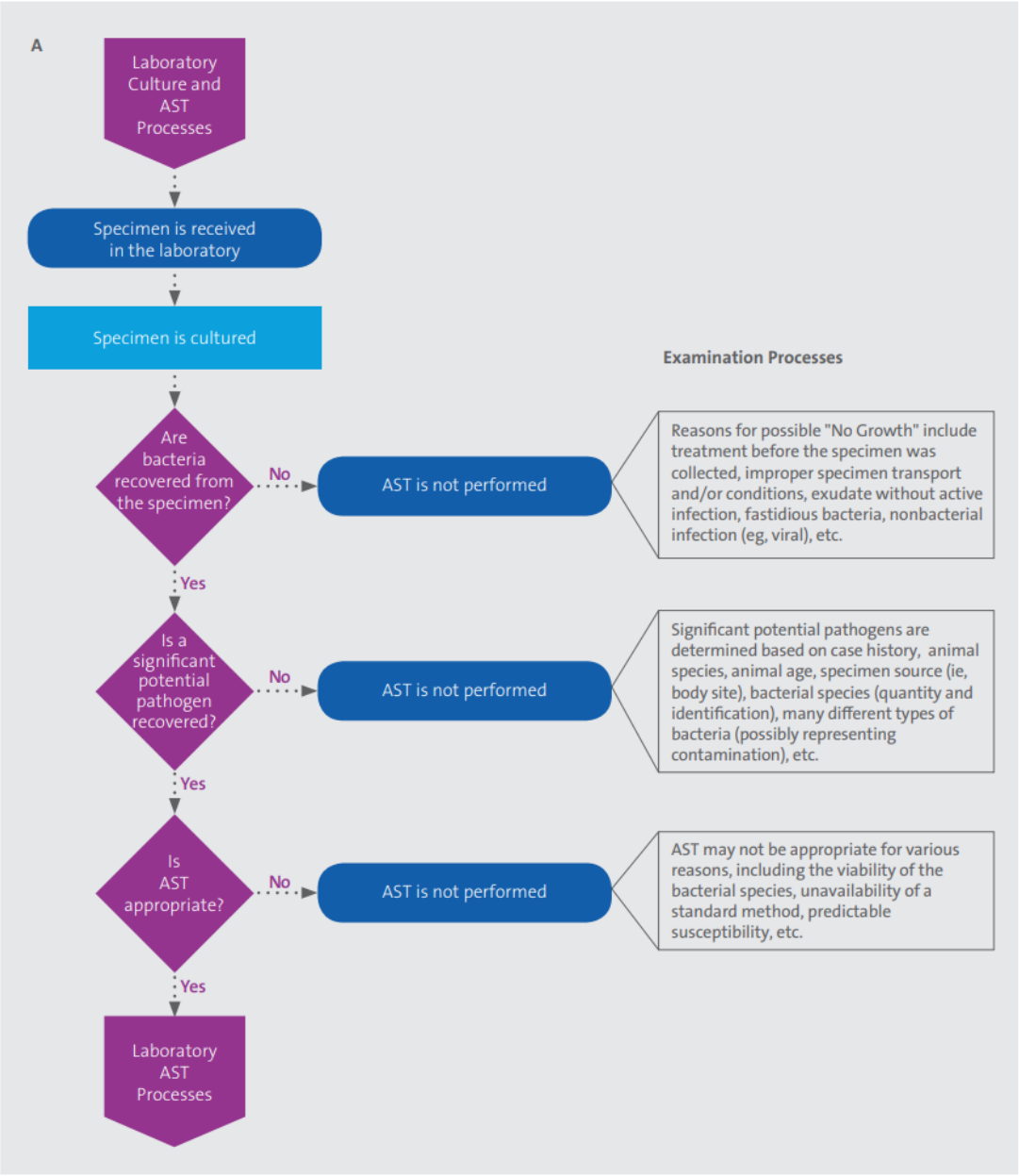
Antimicrobial Susceptibility Testing (AST) Process Overview



Source: CLSI VET09 2nd Edition: Understanding Susceptibility Test Data as a Component of Antimicrobial Stewardship in Veterinary Settings. February 2024.

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General Comments

1. Antimicrobial susceptibility testing conforms to the Clinical Laboratory Standards Institute (CLSI) documents VET01S 7th Edition, 2025 and VET 09, 2nd Edition 2024. Veterinary breakpoints for other species or sites are used when no breakpoint data exist. Where applicable, species- and site-specific breakpoints are used.
2. Veterinary specific breakpoints (MIC) have been established based on specific dosage regime(s) to achieve plasma drug exposures (in animals with normal renal functions). Dosage regimes are listed in Appendix E, Clinical Laboratory Standards Institute (CLSI) document VET01S 7th Edition, 2025. Also refer to SAVI: The Stewardship of Antimicrobials by Veterinarians Initiative – SAVI (canadianveterinarians.net) for the most updated CVMA Guidelines.
3. There are no CLSI-approved bovine-specific breakpoints for drugs administered in feed or water for cattle. Breakpoints should not be applied to the feed or water routes of administration for any antimicrobial agent.
4. Interpretation of breakpoints derived for one species (i.e. Human) and applied to isolates from another species (i.e. any veterinary species) should be made with caution.
5. The results of trimethoprim-sulfamethoxazole susceptibility tests can be used to predict susceptibility to potentiated sulfonamides containing trimethoprim.

Isolates from Feline Sources

1. When only canine or human breakpoints are available, canine breakpoints should be applied to feline isolates rather than using human breakpoints. Interpretation of breakpoints derived for one species (i.e. Human, canine) and applied to isolates from another species (i.e.. any veterinary species, feline) should be made with caution.

Isolates from Canine Sources

1. Our system is currently unavailable to test for sensitivities for Enrofloxacin and Marbofloxacin for Canine Isolates as our sensitivity card does not reach the breakpoint limits. Please contact the Animal Health Laboratory if you would like to have these antibiotics tested by an external laboratory.
2. Results for tetracycline testing can be used to predict results for oxytetracycline, doxycycline and minocycline. Organisms that are susceptible to tetracycline are also considered susceptible to other members of the class. However, some organisms

that are intermediate or resistant to tetracycline may be susceptible to doxycycline, minocycline or both.

Isolates from Bovine/Porcine/Equine Sources

1. Sensitivity testing to Macrolides (Tildipirosin, Tilmicosin and Tulathromycin) is currently unavailable in our MIC system. Please contact the Animal Health Laboratory if testing to macrolides is required as isolates will be referred out to an external laboratory.
2. Our system is unable to provide an accurate MIC result for Enrofloxacin in horses for *Staphylococcus* species as our antimicrobial sensitivity card does not reach the lower breakpoint limit.

Isolates from Ovine/Caprine Sources

1. There are no CLSI approved breakpoints for isolates from ovine/caprine sources. Our lab uses the same panel of antimicrobial agents for antimicrobial susceptibility testing of respiratory isolates for cattle, goats and sheep.

Isolates from Donkeys/Mules

1. There are no CLSI approved breakpoints for isolates from donkeys and mules. Our lab uses the same panel of antimicrobial agents for antimicrobial susceptibility testing of bacterial isolates for horses, donkeys and mules. In horses, breakpoints have been established from infections from the genital and respiratory tract and skin and soft tissue infections. Therefore, all extrapolations from equine breakpoints to horses and mules apply primarily to pathogens from the same body sites.

Enterococcus **species**

1. For Enterococcus spp., aminoglycosides (except for high level resistance testing), cephalosporins, clindamycin and trimethoprim-sulfamethoxazole are not effective clinically regardless of MIC value.

Staphylococcus **species**

1. Our system is currently unable to provide an accurate MIC result for Ampicillin as our antimicrobial sensitivity card range does not reach the lower breakpoint limit for this antibiotic.
2. Penicillin results predict susceptibility to all penicillinase-labile penicillins (ampicillin and amoxicillin). For Penicillin MIC <=0.12 in isolates

from animal sources other than pigs and swine, alternative testing for beta lactamase production is recommended before reporting the Penicillin as susceptible.

Enterobacterales

1. Our system is currently unavailable to provide an accurate MIC result for Ampicillin as our antimicrobial sensitivity card range does not reach the lower breakpoint limit for this antibiotic.
2. The *Enterobacterales* are intrinsically resistant to clindamycin, fusidic acid, glycopeptides (Vancomycin), Macrolides (Erythromycin) and Rifampin.
3. *Klebsiella* species (*K.pneumoniae, K.oxytoca,* and *K.varicola*) display natural resistance to Ampicillin.
4. The dosage regime used to establish Doxycycline breakpoints is not high enough to reach the therapeutic target, therefore all *Enterobacterales* are reported as resistant to Doxycycline.

Pseudomonas aeruginosa

1. *Pseudomonas aeruginosa* may develop resistance during therapy with all antimicrobial agents. Therefore, isolates that are initially susceptible may become resistant within 3 to 4 days after initiation of therapy. Testing of repeat isolates may be warranted.
2. *Pseudomonas aeruginosa* presents natural resistance to some beta-lactams (I and II cephalosporins, cefotaxime, ceftriaxone and aminopenicillins), tetracyclines, trimethoprim-sulfamethoxazole and chloramphenicol.