LABORATORY FOR HEALTH, OMICS AND PATHWAY EXPLORATION

Antimicrobial Susceptibility Testing (AST)

Standards, quality assurance, method selection and responsible interpretation of antimicrobial susceptibility results.

DOCUMENT	VERSION	ISSUED
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For HOPE Lab students and members: This guide records a method used in the laboratory's research and training activities so that members can readily consult the relevant principles and reporting points. It is not a substitute for local approval, training or a current SOP.

Use and responsibility: This document is a student reference, not an institutional authorization or a universally validated SOP. It does not replace supervisor instruction, current standards, local risk assessment, institutional approval, equipment-specific validation or applicable safety procedures. Anyone outside HOPE Lab who consults or adapts this material must independently assess its suitability, obtain any required approvals, validate the method for their own setting, and assume responsibility for its application and interpretation. HOPE Lab makes no guarantee of fitness for third-party use and accepts no responsibility for external implementation or outcomes to the extent permitted by applicable law.

Safety and scope boundary: This document intentionally omits organism handling, inoculum preparation, antimicrobial testing conditions, and operational AST steps. Testing involving clinical, pathogenic or potentially resistant organisms must be conducted only by authorized personnel under approved containment and current standards.

Purpose and scope

Antimicrobial susceptibility testing (AST) evaluates the in-vitro response of a defined bacterial isolate to specified antimicrobial agents using a standardized method. AST results are method-, organism- and drug-specific. This document is a standards-navigation and reporting guide, not a test procedure or clinical interpretation service.

Method principles

Method family	What it measures	Reference framework
Disk diffusion	A zone of growth inhibition around an antimicrobial disk, interpreted only using a validated organism-agent-method combination.	CLSI M02 for standardized disk diffusion procedures; current CLSI M100 tables for interpretation and QC.
Dilution methods	An endpoint such as minimum inhibitory concentration (MIC), determined using a standardized dilution framework.	CLSI M07 for aerobic bacteria and the applicable current interpretive standard.
Other organism groups	Some fastidious, anaerobic or unusual organisms require separate methods and interpretive criteria.	Use the organism-specific current standard; do not extrapolate criteria from unrelated species.

Materials and records to verify

- Authenticated organism identification and an approved laboratory risk assessment.
- Current standard and edition applicable to the organism, antimicrobial agent, method and purpose.
- Validated medium, antimicrobial disks or panels, equipment and traceable lot information as specified by the standard.

- Quality-control organism and acceptable range from the current standard; growth and sterility controls as appropriate.
- Raw zone or MIC observations, method metadata, software or table version, and any deviation record.

Quality controls

Control / record	Why it matters
Reference QC organism	Checks whether test performance falls within the acceptable range for the selected method and standard.
Growth control	Confirms adequate growth under the test conditions, where applicable.
Media / sterility control	Helps identify contamination or a medium-related failure.
Disk or panel lot record	Supports traceability and review of unexpected results.
Method-version check	Ensures zone or MIC interpretation is taken from the correct current table.

Interpretation and reporting

Do not apply a susceptible/intermediate/resistant category unless the current standard provides a valid breakpoint for the specific organism, antimicrobial agent, method and test conditions. Research screening of environmental or food-associated isolates is not automatically equivalent to clinical AST. Avoid reporting clinical categories where no recognized breakpoint applies; report the actual measurement and the limitation.

Current standards to consult

At the date of preparation, CLSI M02 is listed as the 14th edition (2024), while CLSI M100 is listed as the 36th edition (published 26 January 2026). These standards are updated; verify the latest edition and any applicable national requirements before analysis or reporting. Do not reproduce or rely on old breakpoint tables.

References and further reading

1. Clinical and Laboratory Standards Institute (CLSI). M02: Performance Standards for Antimicrobial Disk Susceptibility Tests, 14th ed. 2024. https://clsi.org/shop/standards/m02/

2. Clinical and Laboratory Standards Institute (CLSI). M100: Performance Standards for Antimicrobial Susceptibility Testing, 36th ed. 2026. https://clsi.org/shop/standards/m100/

3. U.S. Food and Drug Administration. Antibacterial Susceptibility Test Interpretive Criteria. https://www.fda.gov/drugs/development-resources/antibacterial-susceptibility-test-interpretive-criteria

4. American Society for Microbiology. ASM Guidelines for Biosafety in Teaching Laboratories (2020). https://asm.org/guideline/asm-guidelines-for-biosafety-in-teaching-laboratories

Document status: Version 1.0. This reference should be checked against current literature, institutional requirements and the approved local method before use.