Selective Reporting of Antimicrobial Susceptibility Testing Results: A Primer for Antibiotic Stewardship Programs

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Document Purpose

The primary purpose of antimicrobial susceptibility testing is to provide information that will assist healthcare professionals in the management of their patients. This document provides reasons why antimicrobial susceptibility testing data may not be reported in the electronic health record.

Highlighting these examples may assist antibiotic stewardship programs in validating, interpreting and applying antimicrobial resistance tracking and reporting at their hospitals. Examples are provided to illustrate key points and are not intended to be comprehensive or imply endorsement. For additional information, the Clinical and Laboratory Standards Institute M100 document provides further details for many of these situations.

Key Terms and Abbreviations

Term/Abbreviation	Description
AST	Antimicrobial Susceptibility Testing
ASP	Antibiotic Stewardship Program
CLSI	Clinical and Laboratory Standards Institute
FDA	Food and Drug Administration
Selective Testing	AST results for a particular bug-drug combination are not tested.
Selective Reporting	AST results for a particular bug-drug combination are obtained but results are not reported in the electronic health record.
Cascade Reporting	AST results for a particular bug-drug combination are obtained but results are not reported for broader-spectrum agents unless the bug is resistant to narrow-spectrum agents. Cascade reporting is a subset of selective reporting.

Microbiology laboratory may not *perform* AST for a particular bug-drug combination for the following reasons:

- **AST may not be performed on bacteria suspected of being contaminants or usual flora.**
  Example: Two blood cultures are performed and one of the two cultures reveals growth of *Staphylococcus epidermidis*. AST isn't performed as the isolate is a suspected contaminant.
- **AST may not be performed if susceptibility or resistance can be predicted based on the organism identification alone (i.e., no resistance yet identified or intrinsic resistance).**
  Example: AST isn't performed for ceftriaxone and *Pseudomonas aeruginosa* because *P. aeruginosa* is intrinsically resistant to ceftriaxone.
- **AST may not be performed if susceptibility or resistance can be predicted based on the results of other drugs tested.**
  Example: An isolate that is susceptible to ceftazidime can be inferred to be susceptible to ceftazidime-avibactam.
- **A particular bug-drug combination may not be tested by the laboratory**.
  Example: Laboratories often use automated instruments to perform routine AST. Certain drugs may not be on the chosen panel and thus are not routinely tested.
  Example: A recently approved drug does not yet have an FDA-cleared testing method.
- **A particular bug-drug combination may not have interpretative breakpoints.**
  Example: There are no CLSI or FDA breakpoints for *Acinetobacter baumannii* and tigecycline.

Selective Reporting may occur for the following reasons:

- **A particular bug-drug combination may be inappropriate for a given site of infection.**
  Example: Daptomycin AST results are not reported on isolates from a respiratory source.
- **A drug is not on the facility formulary.**
  Example: A laboratory's AST panel for *Enterobacteriaceae* contains three carbapenems, but only two carbapenems are on the facility formulary. The AST results for the non-formulary drug are not reported.

- **A particular testing method may have a bug-drug combination limitation.**
  Example: A penicillin disk susceptibility test on a *S. aureus* isolate can be reported if the result is resistant but a confirmatory test is required before reporting a susceptible result.

  Example: Automated test instruments may have a drug on a panel, but a lack of FDA-cleared criteria prevents results reporting for particular bug-drug combinations.

- **A drug may be inappropriate for a particular patient population.**
  Example: AST results for certain drug classes such as fluoroquinolones or tetracyclines may not be reported for children.

- **Facilities may perform selective reporting based on medical literature suggesting suboptimal outcomes with particular drugs in the treatment of specific resistance phenotypes or for serious infections.**
  Example: Some laboratories may not report piperacillin-tazobactam results for ceftriaxone- resistant *Escherichia coli* isolates from blood cultures.

  Example: Some laboratories may not report the results of an isolate that tests susceptible to carbapenems but is positive for a carbapenemase test.

- **Cascade reporting may be performed.**
  Example: Carbapenem AST results are not reported for *Escherichia coli* if the isolate is susceptible to ceftriaxone.

AST results reporting may be modified for the following reasons:

- **The performance of a secondary phenotypic test.**
  Example: A D-zone test on a *S. aureus* isolate is positive, indicating the presence of inducible resistance to clindamycin; thus clindamycin is reported as resistant even though it was susceptible based on the minimum inhibitory concentration (MIC).
  Example: Some laboratories may change the interpretation of cephalosporin results from susceptible to resistant based upon a positive extended-spectrum β-lactamase test.

- **The performance of a secondary molecular test.**
  Example: A nucleic acid amplification test (NAAT) is positive for *mecA* and thus a *S. aureus* isolate is reported as resistant to methicillin, oxacillin, and nafcillin even though it was susceptible based on the MIC result.

- **The laboratory or an automated instrument used by the laboratory follows "expert rules".**
  Example: A laboratory changes an interpretation from susceptible to resistant based on the organism identification because some species are intrinsically resistant to the drug.
  Example: Automated instrument software changes results from susceptible to resistant based upon an algorithm for a given phenotype.

Comments may be added to AST results reporting for the following reasons:

- **Adding a comment to influence prescribing.**
  Example: Third generation cephalosporins are not recommended for treating serious infections caused by *Enterobacter* spp.
- **Adding a comment to influence practice.**
  Example: ID consult recommended for *Staphylococcus aureus* bacteremia.

Resources

- Clinical and Laboratory Standards Institute, M100, Performance Standards for Antimicrobial Susceptibility Testing, S29, 2019. Accessed August 12, 2019: https://clsi.org/standards/products/free-resources/access-our-free-resources/
- Antibacterial Susceptibility Test Interpretive Criteria, U.S. Food and Drug Administration. Accessed August 12, 2019: https://www.fda.gov/drugs/development-resources/antibacterial-susceptibility-test-interpretive-criteria