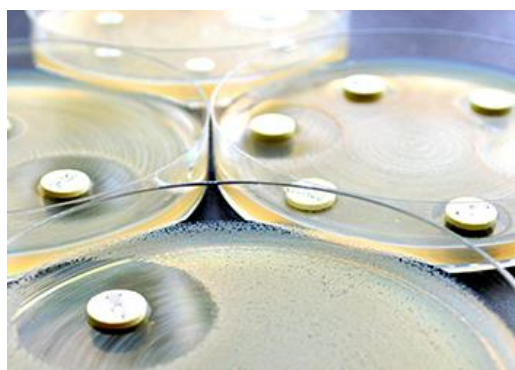


# Antimicrobial Stewardship Strategy:

## Cascading microbiology susceptibility reporting

*The selective suppression of an organism's susceptibility to broader-spectrum or more expensive secondary agents when it is susceptible to preferred primary agents.*



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Priority Level: **A**

Difficulty Level: **2**

### Program Stage:

- Early
- ✓ Intermediate
- Advanced

For more information on these criteria and how they were developed, please see the [Antimicrobial Stewardship Strategy Criteria Reference Guide](#).

## Description

**This is an overview and not intended to be an all-inclusive summary. As a general principle, patients must be monitored by the health care team after changes to therapy resulting from recommendations made by the antimicrobial stewardship team.**

Cascading microbiology laboratory reporting, as defined by the Clinical and Laboratory Standards Institute, is a “strategy of reporting antimicrobial susceptibility test results in which secondary (e.g., broader-spectrum, more costly) agents may only be reported if an organism is resistant to primary agents within a particular drug class (cascade reporting is one type of selective reporting).”<sup>1</sup> In this way, susceptibilities are performed for a panel of antimicrobials, but reported for only the narrowest-spectrum drugs (primary agents) while suppressing the susceptibilities of more broad-spectrum agents, higher-cost agents, high-toxicity agents or those with the potential for overprescription (secondary agents). The rationale behind cascade reporting is that if the secondary agents are not reported, it is less likely they will be prescribed (“out of sight, out of mind”).

Generally, susceptibilities from at least two different classes of antimicrobials are reported<sup>2</sup> to ensure options are

available in case of allergy or contraindications to a certain class and based on the site of infection. The susceptibility of secondary agents can be made available by contacting the microbiology laboratory in cases of allergy, toxicity, drug interaction, co-infections etc. In uncommon situations where the primary agent is susceptible and the secondary agent is resistant, the unexpected resistant result should always be reported, if it is confirmed.

An example of a cascade reporting algorithm is as follows: “1) if an *E. coli* is susceptible to gentamicin, amikacin is not reported; 2) if an *E. coli* is susceptible to ceftriaxone, then meropenem is not reported.”<sup>1</sup> (see the Clinical and Laboratory Standards Institute guideline M100-S25 for more details).

Cascade reporting is recommended by laboratory standard groups<sup>1,2</sup>; as such, at least some form of cascade reporting has been implemented by most microbiology laboratories.

Ideally, the institution’s microbiologist and microbiology laboratory should decide which agents to report routinely and which to report selectively. These decisions should be made in consultation with the institution’s antimicrobial management committee, subcommittee of pharmacy and therapeutics, and/or the antimicrobial stewardship team. Institutions with outsourced laboratory services should understand how their laboratory performs cascading and if necessary, inquire about customization.

## Advantages

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- Decreased use of unnecessarily broad-spectrum, expensive and/or more toxic antimicrobials and encourages clinicians to select more narrow-spectrum and cost-effective antimicrobial agents.
- May aid in reduction of antimicrobial resistance to suppressed/secondary agents.
- Minimal intervention required once the system is set up if cascade reporting can be automated by the microbiology laboratory.

## Disadvantages

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- Depending on the availability of expertise and degree of collaboration, some laboratories may have more robust reporting algorithms than others.
- May be labour-intensive at first to set rules for reports.
- Basing cascade algorithms for selective reporting on acquisition cost alone and not on spectrum of activity could lead to unnecessary broad-spectrum use.
- Depends on the prescriber’s ability to interpret the susceptibility report; may lead to overuse of redundant therapy if a full list of susceptibilities is not provided (e.g., from misinterpretation that an unlisted antimicrobial equals resistance).
- Use of specific cascade reporting algorithms may be more difficult, expensive or impossible if a hospital’s microbiology laboratory services are outsourced.

## Requirements

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- Collaborative relationship between the antimicrobial stewardship team, microbiologist and microbiology laboratory to allow input on selection for antimicrobials for susceptibility reporting.
- Technology (automation of cascading rules/algorithm) for generation of susceptibility reports in the microbiology laboratory.
- Regular review of cascading rules and choice of reported antimicrobial susceptibilities.
- Education of physicians, pharmacists and other health care professionals on interpretation of the reports and when to call the microbiology laboratory for additional susceptibilities.

## Associated Metrics

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- Broad-spectrum antimicrobial use.
- Restricted antimicrobial use.

## References

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1. Clinical and Laboratory Standards Institute. Analysis and presentation of cumulative antimicrobial susceptibility test data: approved guideline. 4th ed. CLSI document M39-A4. Wayne, PA: CLSI; 2014.
2. Quality Management Program–Laboratory Services. Consensus practice recommendations—antimicrobial susceptibility reporting on bacteriology. Toronto, ON: QMP-LS QView; c2011.

## Additional Useful References

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**Select articles to provide supplemental information and insight into the strategy described and/or examples of how the strategy was applied; not a comprehensive reference list. URLs are provided when materials are freely available on the Internet.**

- Clinical and Laboratory Standards Institute. Performance standards for antimicrobial susceptibility testing; twenty-fifth informational supplement. Wayne, PA: CLSI; 2015. CLSI document M100-S25.
- Ryback MJ. Cooperative antimicrobial stewardship: partnering with the microbiology laboratory [Internet]. New York, NY: Medscape Education; 2012 [cited 2015 Jun 20]. Available from: <http://www.medscape.org/viewarticle/767070>

## Links with Other Strategies

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- [Strategic microbiology results reporting](#)

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## Citation

Ontario Agency for Health Protection and Promotion (Public Health Ontario). Antimicrobial Stewardship Strategy: Cascading microbiology susceptibility reporting. Toronto, ON: Queen's Printer for Ontario; 2016.

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## For further information

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Public Health Ontario acknowledges the financial support of the Ontario Government

