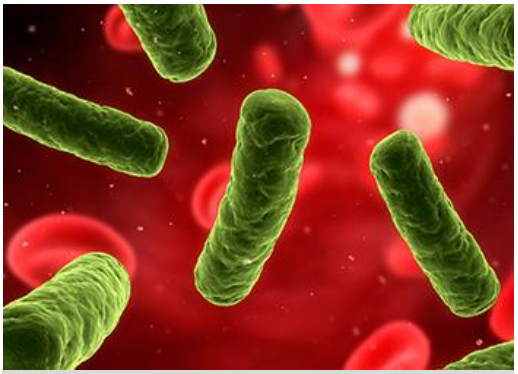
Antimicrobial Stewardship Strategy:

Targeted review of patients with bacteremia/fungemia

Review of positive blood cultures to assess empiric therapy for appropriateness, as well as de-escalation once culture and susceptibility results are available.



@istock.com/Eraxion

Priority Level: **B**

Difficulty Level: **3**

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.

Rationale

Because of the morbidity and mortality associated with bacteremia/fungemia, patients with positive blood cultures are prime candidates for stewardship interventions. Ensuring patients with bacteremia are receiving adequate and appropriate (active against the organism identified) therapy is an important quality and patient safety issue. Such patients are also prime candidates for de-escalation to a more narrow-spectrum antimicrobial once organism identification and susceptibility are available, as well as for a recommended treatment duration.

Implementation

The antimicrobial stewardship team systematically reviews all patients with positive blood cultures or blood cultures with specific organisms identified to:

- Ensure patients have been prescribed an antimicrobial.
- Assess whether the empirically chosen antimicrobial(s) is/are expected to cover the organism(s).
- Assess whether the therapy can be de-escalated once culture and susceptibility results are available.
- Recommend an appropriate duration of therapy.
- Encourage ordering of necessary diagnostic tests (e.g., echocardiogram for *Staphylococcus aureus* bacteremia) and follow-up.

- Help identify whether the culture represents skin flora and likely contamination, and discontinue therapy accordingly.

It is important to note that *Staphylococcus aureus* bacteremia in particular can lead to significant morbidity and mortality if it is not appropriately managed. Consultation with an infectious diseases specialist is generally recommended.

Rapid diagnostic tests can be used in conjunction with the antimicrobial stewardship program to improve the time to appropriate therapy.

Advantages

- Potential to significantly improve patient outcomes.
- May decrease unnecessary antimicrobial use (e.g., by limiting treatment of blood cultures that represent contamination, narrowing spectrum to the pathogen identified, and identifying patients in whom a shorter duration of therapy is appropriate).

Disadvantages

- Requires trained personnel.
- Trained personnel may not be available to review results on evenings or weekends, depending on staffing.

Requirements

- Collaboration with microbiology laboratory for notification of positive blood cultures.
- Personnel to review cultures and patient history and make recommendations.
- Access to patient-specific information (e.g., clinical, laboratory, microbiology data).

Associated Metrics

- Percentage of patients with bacteremia/fungemia requiring intervention.
    - Patient outcomes (e.g., length of stay, mortality, clinical cure rates) (advanced).

Useful References

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.

- Bauer KA, West JE, Balada-Llasat JM, Pancholi P, Stevenson KB, Goff DA. An antimicrobial stewardship program's impact with rapid polymerase chain reaction methicillin-resistant *Staphylococcus aureus/S. aureus* blood culture test in patients with *S. aureus* bacteremia. Clin Infect Dis. 2010;51(9):1074–80. Available from: http://cid.oxfordjournals.org/content/51/9/1074.long

- Nagel JL, Huang AM, Kunapuli A, Gandhi TN, Washer LL, Lassiter J, et al. Impact of antimicrobial stewardship intervention on coagulase-negative *Staphylococcus* blood cultures in conjunction with rapid diagnostic testing. J Clin Microbiol. 2014;52(8):2849–54. Available from: http://jcm.asm.org/content/52/8/2849.long

- Box MJ, Sullivan EL, Ortwine KN, Parmenter MA, Quigley MM, Aguilar-Higgins LM, et al. Outcomes of rapid identification for gram-positive bacteremia in combination with antibiotic stewardship at a community-based hospital system. Pharmacotherapy. 2015;35(3):269–76.

- Pogue JM, Mynatt RP, Marchaim D, Zhao JJ, Barr VO, Moshos J, et al. Automated alerts coupled with antimicrobial stewardship intervention lead to decreases in length of stay in patients with gram-negative bacteremia. Infect Control Hosp Epidemiol. 2014;35(2):132–8.

- Timsit JF, Soubirou JF, Voiriot G, Chemam S, Neuville M, Mourvillier B, et al. Treatment of bloodstream infections in ICUs. BMC Infect Dis. 2014 Nov 28;14:489. Available from: http://www.biomedcentral.com/1471-2334/14/489

  Review on the diagnosis, empiric treatment, de-escalation and duration of therapy for bacteremia in intensive-care patients

- Mermel LA, Allon M, Bouza E, Craven DE, Flynn P, O'Grady NP, et al. Clinical practice guidelines for the diagnosis and management of intravascular catheter-related infection: 2009 update by the Infectious Diseases Society of America. Clin Infect Dis. 2009;49(1):1–45. Erratum in: Clin Infect Dis. 2010;50(7):1079. Dosage error in article text. Clin Infect Dis. 2010;50(3):457. Available from: http://cid.oxfordjournals.org/content/49/1/1.long

Tools and Resources

- Scottish Antimicrobial Prescribing Group. *Staph aureus* bacteraemia [Internet]. Glasgow, UK: Scottish Medicines Consortium; [cited 2015 Sep 23]. Available from: http://www.scottishmedicines.org.uk/SAPG/Quality_Improvement/Staph_aureus_bacteraemia

  Algorithm to support best practices for the management of Staphylococcus aureus *bacteremia.*

Samples/Examples

- Example 1: Peterborough Regional Health Centre - Policy and Notification Procedure for Reporting Results to Antimicrobial Stewardship
- Example 2: The Scarborough Hospital - ICNet System Sample Automated Alerts

These documents have been generously shared by various health care institutions to help others develop and build their antimicrobial stewardship programs. We recommend crediting an institution when adopting a specific tool/form/pathway in its original form.

Examples that contain clinical or therapeutic recommendations may not necessarily be consistent with published guidelines, or be appropriate or directly applicable to other institutions. All examples should be considered in the context of the institution's population, setting and local antibiogram.

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Links with Other Strategies

- De-escalation and streamlining
- Identification of inappropriate pathogen/antimicrobial combination ("bug-drug mismatch")
- Improved diagnostics
- Prospective audit with intervention and feedback

Disclaimer

Citation

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For further information

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Public Health Ontario acknowledges the financial support of the Ontario Government.

Example 1: Peterborough Regional Health Centre - Policy and Notification Procedure for Reporting Results to Antimicrobial Stewardship

Results Reporting . Reporting Results to Antimicrobial Stewardship

PRHC Peterborough Regional Health Centre

LTR25292
Revision: 1
Last Approved By: Chiu, Wayne (7/2/2015 3:36:36 PM)
Last Updated Time: 7/2/2015 3:36:36 PM

Folder Name: Microbiology\Post analytical
Next Review: 4/1/2014

Printed copies may not be valid.

POLICY

The Antimicrobial Stewardship (ASP) team must be notified of:

1. Any microorganisms (bacterial, viral, fungal) that have been identified in normally sterile sites. Samples from sterile sites include Blood cultures, normally sterile body fluids (CSF, synovial, etc…) and tissue samples such as biopsies.

   Notify ASP of all Positive Gram Smears
   AND
   Positive cultures if the smear was initially negative

2. All Group A Streptococcus isolated from invasive and non-invasive sites (excluding throat cultures)

3. All positive C. difficile toxin DNA results.

Please print External Reports to printer KPHA804 and document that external report was sent using canned text **MASPR.** This includes all results from in-house testing as well as from referral laboratories such as PHOL and Sick Kids Hospital.

NOTIFICATION PROCEDURE

1. Broadcast print results to Antimicrobial Stewardship printer (KPHA804).
2. Add canned text comment (**MASPR**) to the patient report to indicate that a copy has been sent to Antimicrobial Stewardship.
3. A phoned report is not required.

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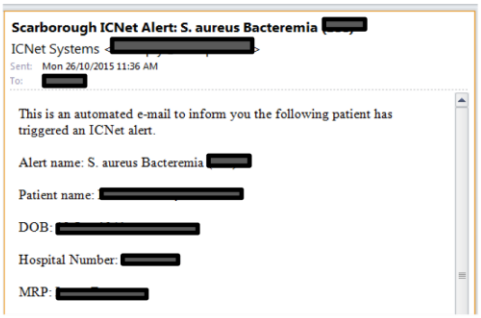
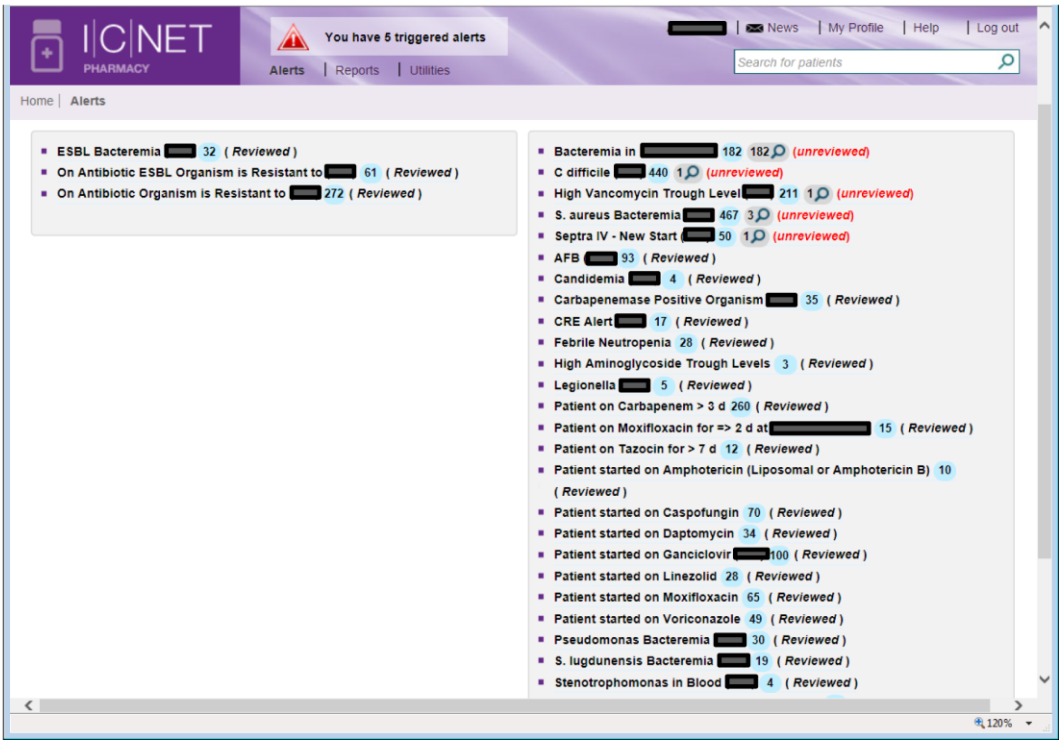
Example 2: The Scarborough Hospital - ICNet System Sample Automated Alerts

Sample Automated Email Alert for +ve cultures



Other alerts (browser view)



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