

Antimicrobial Stewardship Strategy:

Preventing treatment of non-infectious conditions

Stewardship interventions that target specific situations when antimicrobials are not indicated but frequently prescribed, to help decrease unnecessary antimicrobial therapy for non-infectious conditions.



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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](#).

Updated June 2016

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.

The clinician is often faced with the challenge of identifying whether an infection is present when the diagnosis is not straightforward. This may include instances when non-infectious conditions exhibit symptoms also seen in infectious illnesses, or when a microorganism is isolated from a patient with vague or no symptoms.

Unnecessary antimicrobial prescription may be due to either uncertainty or fear of missing a diagnosis or misinterpretation of microbiology results. Examples of the former include acute exacerbations of chronic obstructive pulmonary disease, drug fever and edema resembling cellulitis. Examples of the latter include asymptomatic bacteriuria, contaminated blood cultures and colonization of wounds without signs of infection.

There may also be concerns about diagnosing infection in some elderly patients, as they can present atypically with infectious conditions; however, there are guidelines to

clarify the clinical presentation that is consistent with infection in this group.¹

Stewardship interventions may target specific conditions when antimicrobials are not indicated but frequently prescribed. These include asymptomatic bacteriuria (including catheter-associated urinary tract infections), blood cultures contaminated with skin organisms (e.g., coagulase-negative staphylococcus) and acute exacerbations of chronic obstructive pulmonary disease that do not fulfill the criteria for an antimicrobial prescription.

Institutions may minimize unnecessary use by targeting one or a number of the above conditions and doing the following:

- Educating clinical pharmacists and prescribers about the issue.
- Educating nurses about cultures (appropriate number and technique for blood cultures; performing urine cultures only when clinically indicated [not for changes in characteristics of urine]).
- Developing criteria for assessment of patients or culture results.
- Developing an algorithm to guide clinical interpretation.
- Auditing practice and providing feedback to prescribers.
- Developing a means of identifying such situations and providing education during [prospective audit and feedback](#).
- Using serum biomarkers such as procalcitonin (although not commonly used in Canada) to help differentiate between infectious and non-infectious causes of symptoms (e.g., in acute exacerbations of chronic obstructive pulmonary disease).

Advantages

- Reduces unnecessary antimicrobial use.
- Potential to reduce adverse effects and antimicrobial complications in patients prescribed unnecessary antimicrobials.
- Educates prescribers.

Disadvantages

- May be resource-intensive to audit practice.
- Often difficult to determine whether a patient's symptoms are due to an infectious process.
- Can be perceived as interfering with the physician autonomy.

Requirements

- Clinicians with expertise to develop algorithms.
- Staff resources to review culture reports and patient charts and make recommendations.

Associated Metrics

- Dependent on target of intervention (assess before and after):
 - Asymptomatic bacteriuria: percentage of patients meeting definition of asymptomatic bacteriuria who are treated with antimicrobials.
 - Acute exacerbations of chronic obstructive pulmonary disease: percentage of patients prescribed antimicrobials who do not meet the criteria.
 - Contaminated blood cultures: percentage of patients with likely contamination receiving treatment, or avoidable vancomycin use.

References

1. High KP, Bradley SF, Gravenstein S, Mehr DR, Quagliarello VJ, Richards C, et al. Infectious Diseases Society of America. Clinical practice guideline for the evaluation of fever and infection in older adult residents of long-term care facilities: 2008 update by the Infectious Diseases Society of America. Clin Infect Dis. 2009;48(2):149–71. Available from: <http://cid.oxfordjournals.org/content/48/2/149.long>

Defines what should be classified as a fever in this group and provides clinical criteria that can exclude commonly overdiagnosed conditions, such as urinary tract infections.

Additional Useful References (updated June 2016)

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.

- Nicolle LE, Bradley S, Colgan R, Rice JC, Schaeffer A, Hooton TM; Infectious Diseases Society of America; American Society of Nephrology; American Geriatric Society. Infectious Diseases Society of America guidelines for the diagnosis and treatment of asymptomatic bacteriuria in adults. Clin Infect Dis. 2005;40(5):643–54. Erratum in: Clin Infect Dis. 2005;40(10):1556. Available from: <http://cid.oxfordjournals.org/content/40/5/643.long>
- Lipsky BA, Berendt AR, Cornia PB, Pile JC, Peters EJ, Armstrong DG, et al. Infectious Diseases Society of America. 2012 Infectious Diseases Society of America clinical practice guideline for the diagnosis and treatment of diabetic foot infections. Clin Infect Dis. 2012;54(12):132–73. Available from: <http://cid.oxfordjournals.org/content/54/12/e132.long>

Provides clinical criteria for determining if infection is present.

- Global Initiative for Chronic Obstructive Lung Disease. Global strategy for the diagnosis, management and prevention of chronic obstructive lung disease [Internet]. [location unknown]: Global Initiative for Chronic Obstructive Lung Disease; 2015 [cited 2016 Jun 20]. Available from: <http://goldcopd.org/gold-reports/>

Recommends antibiotics for exacerbations of chronic obstructive pulmonary disease only when signs of bacterial infection are present (i.e., increased purulent sputum and at least one of increase in sputum volume or increase in dyspnea).

- Trautner BW, Bhimani RD, Amspoker AB, Hysong SJ, Garza A, Kelly PA, et al. Development and validation of an algorithm to recalibrate mental models and reduce diagnostic errors associated with catheter-associated bacteriuria. BMC Med Inform Decis Mak. 2013;13:48. Available from: <http://www.biomedcentral.com/content/pdf/1472-6947-13-48.pdf>
- 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.full?sid=aa2677c2-e6b4-464b-adac-9ffc427eb684>

Tools and Resources

- Public Health Ontario. Urinary tract infections (UTIs) [Internet]. Toronto, ON: Ontario Agency for Health Protection and Promotion; c2015 [cited 2015 Nov 19]. Available from: http://www.publichealthontario.ca/en/BrowseByTopic/InfectiousDiseases/IPAC/Pages/IPAC_Urinary_Tract_Infections.aspx

Contains resources (directed towards long-term care homes) for asymptomatic bacteriuria

Samples/Examples

- [Example 1: The Ottawa Hospital - Algorithm for the Assessment of Coagulase-Negative Staphylococcus Bacteremia](#)
- [Example 2: Alberta Health Services Antimicrobial Stewardship Background - Understanding Asymptomatic Bacteriuria](#)

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

- [Disease-specific treatment guidelines, pathways, algorithms and/or associated order forms](#)
- [Improved diagnostics](#)
- [Prescriber education](#)
- [Prospective audit with interventions and feedback](#)
- [Scheduled antimicrobial reassessments \("antibiotic time outs"\)](#)

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For further information

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Example 1: The Ottawa Hospital - Algorithm for the Assessment of Coagulase-negative Staphylococcus Bacteremia

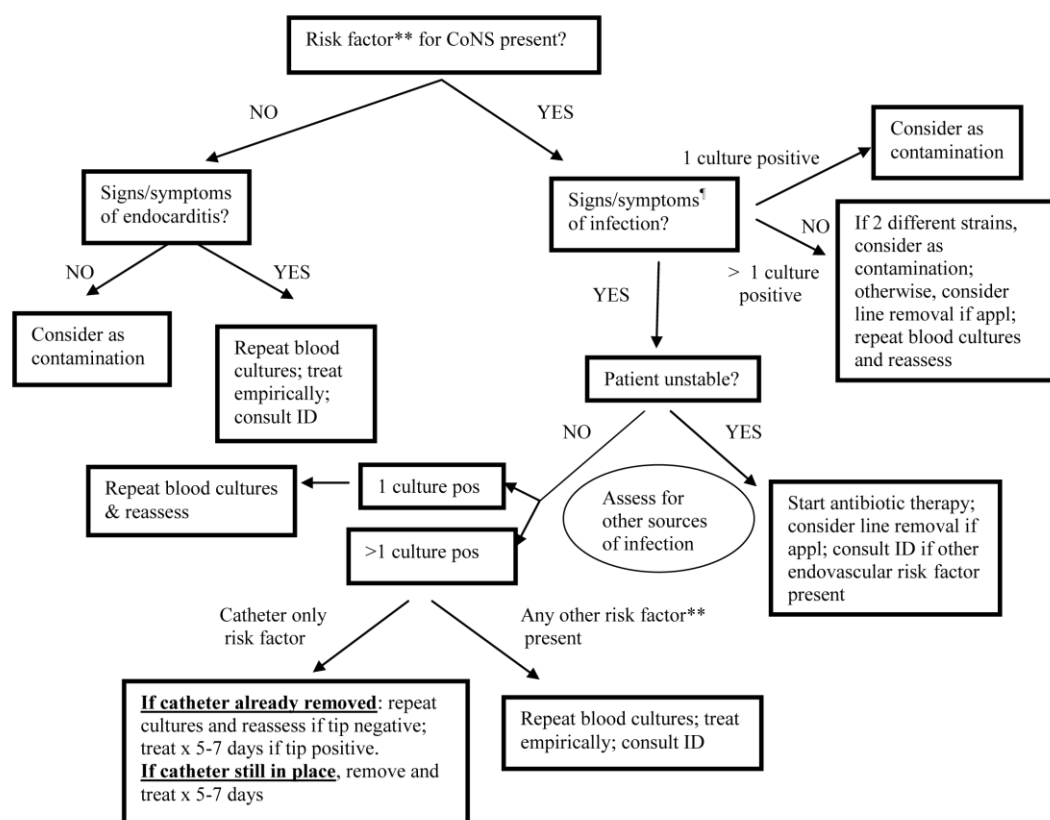


The Ottawa Hospital
L'Hôpital d'Ottawa

ALGORITHM FOR THE ASSESSMENT OF COAGULASE-NEGATIVE STAPHYLOCOCCUS BACTEREMIA

Rev: 04/2013

Blood Culture(s) Positive For Coagulase-negative Staphylococci (CoNS):



**Risk factors for CoNS include presence of: intravascular catheters, hemodialysis catheters, vascular grafts, recent prosthetic joints or hardware, presence of a pacemaker, prosthetic cardiac valves.


[†] Signs/symptoms of infection include any 2 of: increased temperature >38.3° C, increased white blood cells, respiratory rate, signs of local inflammation; or any one of: unexplained hypotension, disseminated intravascular coagulation
N.B. a single venipuncture represents one culture, but may consist of an aerobic and anaerobic bottle.

Reference: Info-Pharm 2006; Vol. VII, No. 3 (May-Aug).

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Example 2: Alberta Health Services Antimicrobial Stewardship Backgrounder - Understanding Asymptomatic Bacteriuria



Issue 4 – August 2014

Antimicrobial Stewardship Backgrounder

Understanding Asymptomatic Bacteriuria

BOTTOM LINE: In the majority of cases, asymptomatic bacteriuria should not be treated with antibiotics.

However, 80% of people with asymptomatic bacteriuria get antibiotics.¹ *This is antibiotic misuse.*

Asymptomatic bacteriuria (ASB) is the presence of bacteria in the bladder WITHOUT symptoms/signs of urinary tract infection (UTI). It may be accompanied by pyuria (white blood cells (WBC) in the urine).

It is important to differentiate between ASB and a true UTI as ASB does not require antibiotic treatment, except in a few select circumstances (see below). ASB is very common in elderly patients, in catheterized patients, and in those with an abnormal urinary tract. Treatment of ASB is a major cause of unnecessary antibiotic use.¹ Unnecessary antibiotic treatment exposes patients to excess adverse effects, and increases the potential of antibiotic resistance and *C. difficile* infection.

Do not screen for or treat ASB except:

- o in pregnancy or
- o prior to any genitourinary procedures likely to cause mucosal bleeding.²


To reduce unnecessary antibiotic treatment of ASB:

1. **UTI must be diagnosed clinically by patient symptoms and signs**
 - Non-catheterized patients with UTI (including the elderly) typically present with specific or localizing symptoms/signs to the urinary tract, e.g. dysuria, increased frequency, urgency or incontinence, suprapubic or flank pain, +/- fever or rigors.
 - Catheterized patients with UTI usually present with specific symptoms (new suprapubic or flank pain) also. When catheterized patients present with non-specific symptoms (e.g. fever or rigors alone, new onset delirium), the diagnosis of UTI MUST be a **DIAGNOSIS of EXCLUSION**, i.e. made AFTER all other infectious and non-infectious causes for the presentation (e.g. dehydration, new medication, trauma, hypoxia, etc.) have been ruled out.
 - A urinalysis showing bacteria or WBC, or urine culture showing bacteria, is NOT diagnostic of UTI in patients where ASB is common.
 - When the clinical diagnosis of UTI is certain, there is NO additional benefit of doing a urinalysis to look for bacteria and WBC.
 - If the clinical diagnosis is uncertain, a urine microscopy should be requested. If negative for pyuria, this excludes UTI.
 - A negative dipstick is not reliable enough to exclude UTI in all cases as it is not as sensitive as urine microscopy.

Did you know...?

When the clinical diagnosis of UTI is uncertain, a urine microscopy negative for pyuria excludes the diagnosis of UTI.

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Issue 4 – August 2014

Antimicrobial Stewardship Backgrounder

Available online from:

<http://www.albertahealthservices.ca/assets/Infofor/hp/if-hp-antimicrobial-asb-issue-4-2014-08.pdf>

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Example 2: Alberta Health Services Antimicrobial Stewardship Backgrounder - Understanding Asymptomatic Bacteriuria (continued)

Antimicrobial Stewardship Backgrounder

2. Send urine for culture only AFTER a clinical diagnosis of UTI is made

- The role of urine culture is to guide the selection of antibiotic therapy.
- A negative result will exclude UTI in most cases.
- Urine for culture should ideally be sent AFTER the clinical diagnosis of UTI is made. If a urine culture is sent as part of the initial panel of investigations (not recommended), a positive culture should not result in antibiotic treatment if another cause for the presentation is found or if symptoms resolve. In the elderly, symptoms often resolve with adequate hydration.

3. Do NOT order "ROUTINE" or screening urinalysis or urine culture in patients without symptoms/signs of UTI

- If a urinalysis or urine culture is sent in a patient who has NO symptoms/signs of UTI (not recommended), and the result is positive, the patient should NOT be given antibiotics as the risk of antibiotic treatment exceeds any possible benefit.
- A change in the appearance or smell of urine, in the absence of other symptoms/signs of UTI, does NOT indicate infection. These changes are usually due to dehydration, changes in diet or medication, or catheterization. They are NOT an indication for urine testing or antibiotic treatment.

When urine culture is indicated, a GOOD QUALITY specimen, collected before antibiotics are given, is essential for an ACCURATE result:

1. For midstream urine (MSU) collection, clear VERBAL and WRITTEN instructions MUST be provided to the patient.
2. For patients unable to provide a MSU, urine can be collected with an in/out catheter for females or a condom catheter for males.
3. For collection from indwelling catheters, if the device has been in place for more than 14 days, it MUST be removed first, and an MSU collected. Alternatively, if re-insertion of the catheter is justifiable, the specimen should be collected aseptically from the catheter side port.
4. Transfer of the specimen from the collection container into the preservative tube should be done within 20 minutes, to prevent bacterial overgrowth.
5. To ensure proper testing and interpretation of laboratory results, list the patient's symptoms and any recent antibiotics on the laboratory requisition.
6. Transport to the laboratory as soon as possible is important for an early and accurate result.

References

1. Trautner BW. Asymptomatic bacteriuria: when the treatment is worse than the disease. *Nat Rev Urol*. 2012;9:85-93.
2. Nicolle LE, Bradley S, Colgan R, et al. Infectious Diseases Society of America (IDSA), American Society of Nephrology, American Geriatric Society. IDSA guidelines for the diagnosis and treatment of asymptomatic bacteriuria in adults. *Clin Infect Dis* 2005;40:643-54.
3. Canadian Geriatrics Society. <http://www.choosingwiselycanada.org/recommendations/canadian-geriatrics-society-2/> cited June 17, 2014.
4. Hooten TM, Bradley SF, Cardenas DD, et al. Diagnosis, prevention, and treatment of catheter-associated urinary tract infection in adults: 2009 international clinical practice guidelines from the Infectious Diseases Society of America. *Clin Infect Dis* 2010;50(5):625-663.

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