Laboratory Stewardship – a Component in Antibiotic Stewardship

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Objectives

- Review the basics of, and available tools for, Antibiotic Stewardship Implementation focusing on the use of laboratory testing and laboratory result interpretation.
- Establish the concept of Laboratory Stewardship, as a component in a facility’s Antibiotic Stewardship Program.
- Improve understanding of certain laboratory tests used in infection control and prevention surveillance programs, factors that may affect laboratory results and thus interpretation, and review tips on how to collate laboratory data for optimal utilization.
- Introduce concept of Competency Testing for Microbiology Test Utilization.
- Review appropriate use of an Antibiogram.
Before We Begin...

• Antibiotic Stewardship Implementation – How are you doing?
  – CDC Core Elements?
  – AHRQ Tools?
  – Is laboratory testing a topic currently included?
Look for the “Consider” Signal

Tips during the presentation:

• Consider this idea for the first time
• Consider thinking about this differently
• Consider doing this more

• Consider implementing
• Consider learning more
• Consider seeking help
QUESTIONS FOR YOU

1. Does your facility utilize standardized Assessment Tools to help decide when a microbiology test in warranted?

2. Do you provide training on microbiology specimen collection requirements for your staff in accordance with your laboratory’s requirements?

3. Are you completely confident in your staff’s skills in collecting, handling, and storing a microbiology specimen accurately and in accordance with your laboratory’s requirements?

4. Do you perform competency testing on your staff’s skill level when collecting microbiology specimens?

5. Are you completely confident that your staff exhibits competency in reading / relaying microbiology results to the ordering provider?
Let’s Start With Antibiotic Stewardship
§483.80(a) Infection prevention and control program.

3) An antibiotic stewardship program that includes antibiotic use protocols and a system to monitor antibiotic use.

➤ [§483.80(a)(3) will be implemented beginning November 28, 2017 (Phase 2)]

“New” F-Tags
F880 Infection Prevention & Control
F881 Antibiotic Stewardship Program

NOTE: It is important that all infection prevention and control practices reflect current Centers for Disease Control (CDC) guidelines.
Centers for Disease Control and Prevention’s (CDC)

Core Elements for Antibiotic Stewardship in Nursing Homes
September 15, 2015
Empower the **director of nursing** to set the practice standards for assessing, monitoring and communicating changes in a resident’s condition by front-line nursing staff.

Nurses and nurse aides play a key role in the decision-making process for **starting an antibiotic**. (Emphasis added)

The knowledge, perceptions and attitudes among nursing staff of the role of **antibiotics** in the care of nursing home residents can significantly influence how information is communicated to clinicians who are deciding whether to **initiate antibiotic therapy**.

Therefore the importance of **antibiotic stewardship** is conveyed by the expectations set by nursing leadership in the facility. (Emphasis added.)
Empower the director of nursing to set the practice standards for assessing, monitoring and communicating changes in a resident’s condition by front-line nursing staff. Nurses and nurse aides play a key role in the decision-making process for obtaining an order for a microbiology test.

The knowledge, perceptions and attitudes among nursing staff of the role of microbiology testing in the care of nursing home residents can significantly influence how information is communicated to clinicians who are deciding whether to initiate a microbiology test order. Therefore the importance of laboratory stewardship is conveyed by the expectations set by nursing leadership in the facility.
Establish best practices for use of microbiology testing.
Inappropriate use of microbiology tests in nursing homes may drive unnecessary antibiotic treatment.

Identifying and reducing inappropriate use of laboratory testing may be a high-yield effort for improving antibiotic use and reducing other management costs.
Do You Agree?

• Families of residents may be drivers of laboratory testing

• Physicians / Non-Physician Practitioners (NPPs) may not see or assess the resident before ordering tests

• Prescribers rely heavily on the assessment and accurate reporting of resident’s clinical condition, signs, symptoms by nurses

• If laboratory tests are ordered, prescribers may also rely heavily on the accurate reporting of laboratory findings

Consider...

Is there opportunity to improve your facility’s handling of the above?
Mrs. Smith, age 92, with diagnosis of dementia and CHF woke up this morning more confused than usual.

Mrs. Smith’s daughter tells nurse she suspect’s her mother may have a urinary tract infection (UTI), because she seems “different” today.

Nurse collects “clean catch” urine sample and notes cloudiness and darker color of urine.

Nurse calls Mrs. Smith’s physician explaining the above and the physician orders a urinalysis and urine culture test.

Is this appropriate?
Let’s Consider Details of Scenario

Mrs. Smith has a known diagnosis of dementia.

- Could her “symptom” of increased confusion be the result of something other than a UTI?

Do you think the turbidity and color of Mrs. Smith’s urine may have influenced the nurse’s decision to call the physician?

- This is a common misconception. Do you discuss urine collection and testing routinely with staff?

Were other clinical signs/symptoms documented in Mrs. Smith’s medical record and communicated to her physician?

- Do you routinely review microbiology test orders for medical necessity documentation in patient’s medical records?

Does the facility utilize evidence-based algorithms to determine necessity for urine specimen testing?

- Would increased patient confusion and odd-colored urine meet needs for a culture test order in an evidence-based algorithm?
Let’s Take a Closer Look at What Occurs BEFORE a Laboratory Test is Performed

• What leads up to a test order?
  - Policies?
  - Protocols?
  - Evidence-based Tools?
  - Medical Record Documentation?
    - Are these audited for compliance?

• Who is responsible for specimen collection?
  - Is specific training offered?
  - Is competency testing performed?
Excerpt from CDC’s Core Elements Appendix A: Broad Interventions to Improve Antibiotic Use²

Develop and implement algorithms for the assessment of residents suspected of having an infection using evidence-based guidance.

Utilize a communication tool for residents suspected of having an infection. Barriers to effective telephone interactions between physicians and nurses, such as inadequate preparation or feeling rushed on the phone, likely impact the quality of information exchange. Implementing structured communication tools to guide nursing-physician interactions may improve the quality of communication and the subsequent management process when an infection is suspected.
Examples of Algorithms for Resident Assessment
Example 1: Evidence-Based Algorithm

Excerpt from INTERACT 4.0

Care Path Symptoms of Urinary Tract Infection (UTI)

https://interact2.net/tools_v4.html
Nursing Home Antimicrobial Stewardship (AS) Guide

Overview of the Guide
The Nursing Home Antimicrobial Stewardship Guide provides toolkits to help nursing homes optimize their use of antibiotics.

Browse Antimicrobial Stewardship Toolkits
Toolkits on four topic areas are available.

Implement, Monitor, and Sustain a Program
Two toolkits help nursing homes start and maintain antimicrobial stewardship programs.

Released October 2016

www.ahrq.gov/nhguide/index.html
What Toolkits Does the Guide Include?

Toolkits To Determine Whether It Is Necessary To Treat a Potential Infection With Antibiotics

- Communicating and Decision-making for Four Infections
  - Urinary Tract Infections
  - Lower respiratory infections
  - Skin and soft tissue infections
  - Gastrointestinal infections

- Suspected UTI SBAR

  www.ahrq.gov/nhguide/toolkits.html
Example 2: Evidence-Based Algorithm

Excerpt from AHRQ’s Nursing Home Antimicrobial Stewardship (AS) Guide

Toolkit 2. Common Suspected Infections: Communication and Decision Making for Four Infections

Tool 4. Tools To Improve Communication and Decision Making

Tools for Communicating Patient Assessment to Physician or Non-Physician Practitioner
Example 1: Communication Tool

Excerpt from INTERACT 4.0

SBAR Communication Form and Progress Note for RNs/LPN/LVNs

https://interact2.net/tools_v4.html
Continued:
Example 1: Communication Tool

Excerpt from INTERACT 4.0
SBAR Communication Form and Progress Note for RNs/LPN/LVNs

https://interact2.net/tools_v4.html
Example 2: Communication Tool

Excerpt from AHRQ’s Nursing Home Antimicrobial Stewardship (AS) Guide

Toolkit 1. Determine Whether It Is Necessary To Treat a Potential Infection With Antibiotics

Tool 1. Suspected UTI SBAR Toolkit

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**Suspected UTI SBAR**

Complete this form before contacting the resident’s physician.

<table>
<thead>
<tr>
<th><strong>Situation</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>I am contacting you about a suspected UTI for the above resident.</td>
</tr>
<tr>
<td>Vital Signs</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Background</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Active diagnoses or other symptoms (especially, bladder, kidney/genitourinary conditions)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Assessment Input (check all boxes that apply)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Resident WITH indwelling catheter</strong></td>
</tr>
<tr>
<td>The criteria are met to initiate antibiotics if one of the below are selected</td>
</tr>
<tr>
<td><strong>No</strong></td>
</tr>
<tr>
<td>□ Fever of 100°F (38°C) or repeated temperatures of 99°F (37°C)*</td>
</tr>
<tr>
<td>□ New back or flank pain</td>
</tr>
<tr>
<td>□ Acute pain</td>
</tr>
<tr>
<td>□ Rigors /shaking chills</td>
</tr>
<tr>
<td>□ New dramatic change in mental status</td>
</tr>
<tr>
<td>□ Hypotension (significant change from baseline BP or a systolic BP &lt;90)</td>
</tr>
<tr>
<td><strong>Yes</strong></td>
</tr>
<tr>
<td>□ 1. Acute dysuria alone</td>
</tr>
<tr>
<td><strong>OR</strong></td>
</tr>
<tr>
<td>□ 2. Single temperature of 100°F (38°C) and at least one new or worsening of the following:</td>
</tr>
<tr>
<td>□ urgency</td>
</tr>
<tr>
<td>□ frequency</td>
</tr>
<tr>
<td>□ back or flank pain</td>
</tr>
<tr>
<td><strong>OR</strong></td>
</tr>
<tr>
<td>□ 3. No fever, but two or more of the following symptoms:</td>
</tr>
<tr>
<td>□ urgency</td>
</tr>
<tr>
<td>□ frequency</td>
</tr>
<tr>
<td>□ incontinence</td>
</tr>
</tbody>
</table>

**Nurses:** Please check box to indicate whether or not criteria are met

□ Nursing home protocol criteria are met. Resident may require UA with C&S or an antibiotic.†

□ Nursing home protocol criteria are NOT met. The resident does NOT need an immediate prescription for an antibiotic, but may need additional observation.‡

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www.ahrq.gov/sites/default/files/wysiwyg/nhguide/4_TK1_T1-SBAR_UTI_Final.pdf
Continued:
Example 2: Communication Tool

Excerpt from AHRQ’s *Nursing Home Antimicrobial Stewardship (AS) Guide* ⁶

Toolkit 1. Determine Whether It Is Necessary To Treat a Potential Infection With Antibiotics

Tool 1. Suspected UTI SBAR Toolkit

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**Request for Physician/NP/PA Orders**

- Orders were provided by clinician through: □ Phone □ Fax □ In Person □ Other___________
- □ Order UA
- □ Urine culture
- □ Encourage ______ounces of liquid intake ______ times daily until urine is light yellow in color.
- □ Record fluid intake.
- □ Assess vital signs for ______ days, including temp, every ______ hours for ______ hours.
- □ Notify Physician/NP/PA if symptoms worsen or if unresolved in ______ hours.
- □ Initiate the following antibiotic
  - Antibiotic: ___________
  - Dose: ________
  - Route: ________
  - Duration: ________
- □ No □ Yes ☑ Pharmacist to adjust for renal function
- □ Other ________

**Physician/NP/PA signature** ____________________________ Date/Time __________

**Telephone order received by** ____________________________ Date/Time __________

**Family/POA notified (name)** ____________________________ Date/Time __________

[www.ahrq.gov/sites/default/files/wysiwyg/nhguide/4_TK1_T1-SBAR_UTI_Final.pdf](www.ahrq.gov/sites/default/files/wysiwyg/nhguide/4_TK1_T1-SBAR_UTI_Final.pdf)
Don’t let paperwork or electronic documentation get in the way of COMMUNICATION!
Let’s Take a Closer Look at the Role of Laboratory Testing in Antibiotic Stewardship Initiatives

- Patient-Specific Information
- Specimen and Reporting Quality
- Antibiogram Reporting
Purpose of Microbiology Culture Tests

The job of the clinical microbiology laboratory is to test specimens from patients for microorganisms that are, or may be, a cause of the illness and to provide information (when appropriate) about the in vitro activity of antimicrobial drugs against the microorganisms identified.

Physician needs answers to:
- Is my patient’s illness caused by a microbe?
- If so, what is it?
- What is the susceptibility profile of the organism so therapy can be targeted?

Microbiology laboratory needs:
A specimen that has been appropriately
- Selected,
- Collected, and
- Transported to the laboratory for analysis.
Patient-Specific Information: The Life of a Microbiology Culture Test

Specimen is Collected from Patient

Laboratory receives Specimen and begins Culture Testing

Culture is Incubated

If Organism Grows, it is Isolated and Identified

Identified Organism is Tested for Antibiotic Sensitivity

Antibiotic Sensitivity Report is Resulted

24-48 hours

24 hours
Patient-Specific Information: Limitations in Microbiology Culture Testing

- Improper or inadequate specimen collection, handling, storage, and transport.
  - Not enough specimen
  - Contaminated specimen
  - Incorrect or improper use of or specimen collection materials
- Temperature too hot or too cold for specimen storage/transport
- Delays in transport to laboratory testing site
- Use of antibiotics before specimen was collected
- Incorrect test ordered (Ex. Aerobic versus anaerobic tests.)
Specimen and Reporting Quality

Impact of Specimen Management
Microbiology specimen selection and collection are the responsibility of the medical staff, not usually the laboratory, although the certified specialist may be called upon for consultation or assistance.\textsuperscript{10}

The impact of proper specimen management on patient care is enormous.\textsuperscript{10}
(Emphasis added.)
Specimen and Reporting Quality

Even with the advent of laboratory automation and the integration of genomics and proteomics in microbiology, **interpretation of results still depends on the quality of the specimens received for analysis.**¹⁰ (Emphasis added.)

All microbes grow, multiply, and die very quickly. If any of those events occur during specimen collection, transport, or storage, the results of analysis will be compromised and interpretation could be misleading.

Therefore, **attention to preanalytical specimen management in microbiology is critical to accuracy.**¹⁰ (Emphasis added.)

“Garbage in”

“Garbage Out”
Excerpt:

Each laboratory should have a set of agreed criteria for specimen rejection to ensure results are consistently reliable and accurate. Criteria for rejection may include broken containers, poorly sealed and leaking specimens, all of which put laboratory staff at risk, unlabelled specimens, unacceptable delay between specimen collection and arrival at laboratory, incorrect storage conditions, incorrect container or transport medium, or inadequate quantity of specimen. Whenever a specimen is rejected, the reasons for rejection should be documented at the laboratory and the clinical team who submitted the specimen should be informed.
Specimen and Reporting Quality

Enhancing the quality of the specimen is everyone’s job, so communication between the physicians, nurses, and laboratory staff should be encouraged and open with no punitive motive or consequences.

Questions for you!

How do you and your staff collaborate with your laboratory partners on specimen collection, handling, and transport requirements?

Do you perform annual competency on laboratory testing specimen collection, handling, and transport?
Urine Specimens and Laboratory Stewardship
Common Urine Collection Techniques

**Straight catheter**
- Not indicated clinically for most patients
- Is invasive and can be uncomfortable
- Can introduce bacteria into the bladder (and thereby cause UTI)

**Clean-catch midstream**
- Neither invasive nor uncomfortable
- Is simple and inexpensive
- No risk of introducing bacteria into the bladder by catheterization
- Highly susceptible to contamination

**Indwelling catheter** – Should NOT be used

**Consider...**
How are urine specimens collected in your facility?
Asymptomatic Bacteriuria (ASB)
Asymptomatic Bacteriuria

According to the CDC:

• The point prevalence of asymptomatic bacteriuria in LTC residents can range from 25%-50%.  
• True symptomatic UTIs account for 20%-30% of all infections reported by LTCFs.

DEFINITION OF ASYMPTOMATIC BACTERIURIA

In a patient without signs and symptoms of urinary origin, the presence of bacteria in a noncontaminated urine specimen is defined as asymptomatic bacteriuria (ASB).

The definition of ASB requires isolation of the same organism in two consecutive voided urine specimens for women, one voided urine specimen for men, and, in addition, from a single urine specimen collected via urinary catheter in both sexes.
Asymptomatic Bacteriuria

The unreliable clinical assessment for infections in nursing home residents coupled with the diagnostic uncertainties in differentiating ASB from infection contributes greatly to inappropriate antibiotic use and its related complications.

Implementing a set of diagnostic testing and management algorithms to help providers differentiate ASB from symptomatic UTI has been shown to reduce inappropriate antibiotic use for ASB.
Asymptomatic Bacteriuria: What Can Lab Tests Tell Me?

Urine tests have limited power to discriminate between residents with asymptomatic bacteriuria/colonization and those with a symptomatic infection.\textsuperscript{14}

Neither the type of bacterial species isolated from the urine nor presence of pyuria can be used to determine whether the patient has ASB or UTI.\textsuperscript{12}
<table>
<thead>
<tr>
<th>Test</th>
<th>Description</th>
<th>Considerations</th>
</tr>
</thead>
</table>
| Leukocyte Esterase (LE)                   | Test for enzyme present in white blood cell (WBC).                                                                                                  | • Positive results typically indicates presence of neutrophils > 4 WBCs/hpf<sup>3,4</sup>  
• Results not valid in neutropenic patient.<sup>3,4</sup>  
• Decreased sensitivity with increased urinary glucose concentration, high urinary specific gravity, and/or presence of antimicrobial in urine.<sup>3,4</sup>  
• Pyuria accompanying asymptomatic bacteriuria is not an indication for antimicrobial treatment<sup>10</sup> |
| Nitrites                                  | Presence indicates bacterial reduction of dietary nitrates to nitrites by select Gram-negative bacteria.                                           | • Best done on well-concentrated urine such as first AM void.<sup>3,4</sup>  
• Urine should be held in bladder for ≥ 1 hour for nitrate-to-nitrite conversion to take place<sup>3,4</sup>  
• Dietary nitrate intake must be adequate.<sup>3,4</sup>  
• False negative possible with low colony-count infections.<sup>3,4</sup>  
• Normally absent in sterile urine<sup>3,4</sup> |
| Urine Culture                             | Presence of bacteria isolated from urine specimen                                                                                                 | • Does not determine pathogenesis of host.<sup>13</sup> |

Consider…

What do you have in place addressing ASB?
What are the differences between colonization and infection?

The Centers for Disease Control and Prevention defines each as follows:

Colonization
• Patient tests positive for microorganism
• Patient exhibits NO clinical symptoms

Infection
• Patient tests positive for microorganism
• Patient exhibits clinical symptoms
Other Microbiology Lab Tests to Consider in Laboratory Stewardship
Although obtaining specimens for wound culture can help guide antimicrobial treatment, reliance on superficial swab cultures alone may drive inappropriate or unnecessary antibiotic use.

Superficial wound swabs cannot differentiate bacterial colonization from infection and there may be a lack of correlation between organisms identified by superficial swab cultures compared with deep tissue cultures.

Reviewing the indications for obtaining cultures in residents with chronic wounds and assessing the type of specimen submitted for culture (swab vs. tissue specimen) may identify opportunities for improving antibiotic use in residents with wounds.
Blood Cultures

**Blood Cultures (BC)** - can be one of the most important microbiology specimens to process, as bloodstream infection (BSI) in the elderly have a mortality rate of 50%-60%.

Blood culture (BC) remains the gold standard for detecting BSIs.

Challenges:

- **Negative Blood Culture Results** can occur when:
  - An inadequate amount of blood is collected.
  - An inadequate number of blood culture sets are drawn during a septic episode.

- **Positive Blood Culture Results** can occur when:
  - Blood cultures become contaminated with skin flora during the actual specimen collection process. Studies reveal contamination rates between 2% - 6% of blood cultures are often resulted as positive with skin contaminants.
It is important to understand:

- The relationship between antibiotic use and the risk factors for *C.Diff* infection.
- The differences among laboratory tests for *C.Diff* tests and their limitations.
- The appropriate types of specimens for C.Diff testing.
- The appropriate specimen storage requirements needed for accurate testing and results.
- The difference between *C.Diff* colonization and infection.

All of these points are a vital aspect of Laboratory Stewardship, as well as Antibiotic Stewardship, as misunderstanding or misinterpretation of test results may lead to inappropriate antibiotic dosing.
Communicating Results
Notification of Significant Findings

Laboratories should notify facility and/or treating physician/non-physician practitioner when certain microbiology results are identified.

Goals of prompt response and containment should include:

1. Identifying if transmission/dissemination is occurring
2. Identifying affected patients
3. Ensuring appropriate control measures are promptly initiated/implemented to contain potential spread
4. Characterizing the organism or mechanism in order to guide further response actions, patient management, and future responses

Consider...

What processes do you have in place for laboratory notifications?
Another common mistake is not developing a nursing policy for microbiology reports, says Marx. “When nurses receive a microbiology report, they need to understand how to interpret it so they can make sure that it is consistent with the antibiotic that the resident is receiving. In addition, if the antibiotic the resident is receiving isn’t effective in treating that specific organism, there needs to be a process in place to address that with the prescribing clinician.”
F881

§483.80(a)(3) An antibiotic stewardship program that includes antibiotic use protocols and a system to monitor antibiotic use.

GUIDANCE
Antibiotic Stewardship

Antibiotic Stewardship Review
Determine whether the facility’s antibiotic stewardship program includes antibiotic use protocol(s) addressing antibiotic prescribing practices (i.e., documentation of the indication, dose, and duration of the antibiotic; review of laboratory reports to determine if the antibiotic is indicated or needs to be adjusted; an infection assessment tool or management algorithm is used when prescribing) and a system to monitor antibiotic use (i.e., antibiotic use reports, antibiotic resistance reports).

https://www.aadns-ltc.org/Resources/details/post/f881-keys-to-a-compliant-antibiotic-stewardship-program/2017-08-21
An Example of Severity Level 4 Non-Compliance: Immediate Jeopardy to Resident Health or Safety includes but is not limited to:

The facility failed to develop and implement an antibiotic use protocol which included reporting results of laboratory data to the ordering practitioner. Medical record review indicated the prescribing practitioner had ordered a culture and sensitivity for a resident and prescribed an antibiotic for treatment of pneumonia prior to receipt of the results of the lab test. The facility received the results of the lab test which indicated that the bacteria was resistant to the antibiotic prescribed, however, they did not provide this information to the practitioner. As a result, the antibiotic was not adjusted accordingly and the resident was hospitalized for complications related to the pneumonia.
What is the goal of Antibiotic Sensitivity or Susceptibility reports?

The goal of in vitro (outside of the body such as in the lab) antibiotic susceptibility testing is to predict the in vivo (in the body) success or failure of antibiotic therapy.

• The growth response of an isolated organism to a specific drug is measured.
• Tests are performed under standardized conditions so that results are reproducible.
• Test results are typically used to guide antibiotic choice.
• Results of antimicrobial susceptibility testing should be combined with specific patient clinical information when selecting the most appropriate antibiotic.
Important Limitations of Antibiotic Susceptibility Testing

It is important to remember that antibiotic susceptibility testing reflects how the organism reacts with the antibiotic in the laboratory.

Multiple factors can impact the clinical efficacy of the antibiotic in the body such as:

- Site of infection
- Effect of host responses
- Toxin production by bacteria that is independent of antimicrobial susceptibility
- The presence or absence of biofilm
  - (A biofilm is a bacterial community living in a thin layer, creating a slimy, glue-like substance that can anchor them to all kinds of material – such as metals, plastics, soil particles, medical implant materials and, most significantly, human or animal tissue.)
- Drug pharmacodynamics
- Other factors

wwwnc.cdc.gov/eid/article/8/9/02-0063-f2
Antibiogram Reporting
Consultant laboratory

Examples of laboratory support for antibiotic stewardship include:

• developing a process for alerting the facility if certain antibiotic-resistant organisms are identified,

• providing education for nursing home staff on the differences in diagnostic tests available for detecting various infectious pathogens (e.g., EIA toxin test vs. nucleic amplification tests for *C. difficile*), and

• creating a summary report of antibiotic susceptibility patterns from organisms isolated in cultures
Antibiogram Reporting: What is an Antibiogram?

An antibiogram is an “overall profile of antimicrobial susceptibility results” of bacteria to a battery of antimicrobial agents.\textsuperscript{15}
Antibiogram Reporting: What is an Antibiogram Used For?

• An Antibiogram is an essential tool for any clinician when treating an infection empirically.\(^{16,17}\)
  - Empiric treatment occurs prior to determination of a causative bacterial agent or its susceptibility results are known.\(^{16,17}\)

• An Antibiogram can serve as an alternative to a C&S report until the results of a C&S are available.\(^{16,17}\)

• An Antibiogram can serve as an alternative to a C&S report if no organism is grown out of a C&S despite high clinical suspicion of an infection.\(^{16,17}\)
## Antibiogram Reporting: What is an Antibiogram Used For?

<table>
<thead>
<tr>
<th>Type of Antibiotic Treatment</th>
<th>Description</th>
<th>Usefulness of Antibiogram</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prophylactic</td>
<td>Prevention (Ex. Preoperative)</td>
<td>Yes, for selection of antibiotic</td>
</tr>
<tr>
<td>Empiric</td>
<td>Directed at a particular condition without knowledge of the offending organism</td>
<td>Yes, for selection of antibiotic or combination of antibiotics</td>
</tr>
<tr>
<td>Pathogen-directed</td>
<td>Organism is known, susceptibility is unknown</td>
<td>Yes, for selection of antibiotic</td>
</tr>
<tr>
<td>Susceptibility-guided</td>
<td>Organism and susceptibility are both known</td>
<td>No. Specific organism and susceptibility profile should be used.</td>
</tr>
</tbody>
</table>
Antibiogram Reporting: Parts of an Antibiogram

The greater the number of isolates, the more accurate the sensitivity results for the given organism. \textsuperscript{16,17}

Minimum should be 10 isolates. \textsuperscript{17}
Antibiogram Reporting: Parts of an Antibiogram

The % Susceptible reflects the percentage of times a specific bacteria was found to be sensitive or susceptible to a specific antibiotic that the bacteria was tested against in the laboratory. 16,17
Antibiogram Reporting: Limitations of an Antibiogram

• Concentration differences of antibiotics between site of infection in the body and in vitro (in the lab).\textsuperscript{16,17}
  - Penetration to the site of infection
  - Inactivation of drug at site of infection
  - Declining levels in vivo vs. continuous level in vitro

• Inaccurate information due to small isolate number.\textsuperscript{16,17}

• Repeat data from the same patient may skew susceptibility percentages.\textsuperscript{16,17}
Take-Aways...

• Antibiotic Stewardship is a national priority requiring a multidisciplinary approach for optimal success.

• Your laboratory partner can help you with Laboratory Stewardship initiatives; a component in an Antibiotic Stewardship Program.

• Improving the understanding of certain laboratory tests used in infection control and prevention surveillance programs and the factors that may affect such laboratory results may improve test utilization and interpretation, leading to overall improved patient care.

• Consider asking about, learning more about, and implementing many of the ideas discussed today as you embark on your own Laboratory Stewardship initiatives.
How Prepared Are You To Implement Laboratory Stewardship?
...“selecting the right test for the right patient at the right time.”

American Society for Clinical Pathology (ASCP), which represents more than 100,000 pathologists and medical laboratory scientists worldwide, is one of 37 medical societies participating in the American Board of Internal Medicine’s Choosing Wisely campaign for test utilization and is the only one representing both pathologists and laboratory professionals. Choosing Wisely is about doing the right thing for patients and avoiding harmful care. ASCP is a major proponent of patient-centered care and evidence-based medicine.

www.mlo-online.com/choosing-wisely-selecting-the-right-test-for-the-right-patient-at-the-right-time.php
QUESTIONS?

Thank you,
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References

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