Disclosures

- The speaker has provided consultative services to the following:
  - The CASPR Group
  - BD
  - Nanosonics
Lecture Objectives

- Describe the impacts of blood and urine cultures have on healthcare outcomes
- Describe the potential entry points for contaminant organisms in current collection and handling practices
- Review studies that indicate control of urine and blood cultures leads to reduced antibiotic use and negative outcomes

The Effects on Healthcare When Proper Culture Management is Not Implemented

Systematic review on costs (BC Contamination):
- Pharmacy: $210-$12,611
- Labs: $2397-$11,151
- Hospital costs: $16,200-$111,627
- LOS: 1-22 days

Dempsey C, et al. Economic health care costs of BC contamination, AJIC 2018
"...don't perform urinalysis [or] urine culture...unless patients have signs and symptoms of infection...tests can be falsely positive leading to overdiagnosis and overtreatment."

Hosted by Paul Webber  paul@webbertraining.com
www.webbertraining.com
Antibiotic Stewardship & IP Facts

- AS and IP are bound by a common goal: to keep patients safe and improve outcomes, regardless of where care is rendered
- A significant world-wide concern are the development of MDROs
- Clinicians often order tests for patients without symptoms specific for the disease process, e.g., urine cultures among patients without symptoms of a UTI
- AS programs along with IP interventions such as hand hygiene are more effective than AS alone

Goals of AS & IP Programs

- **Antimicrobial stewardship** refers to a collaborative, multidisciplinary program designed to improve (conserve) antimicrobial prescribing to optimize clinical outcomes while minimizing unintended consequences of antimicrobial use

- **Infection Prevention** programs aim to identify significant pathogens, reduce the transmission of organisms and MDROs by emphasizing aseptic technique, hand hygiene, environmental decontamination, and establishing prevention bundles to reduce the occurrence of HAIs

What is Diagnostic Stewardship?

- **Diagnostic Stewardship** is a coordinated system or user-based interventions designed to promote evidence-based utilization of diagnostic tests, with the primary goals of improving value and care quality and safely reducing costs.

- DS involves modifying the process of ordering, performing, and reporting diagnostic tests in order to direct appropriate antimicrobial therapy.

- The Microbiology laboratory provides information that identifies if a patient is infected, what the pathogen is, and which antibiotics may be effective in treatment of true infection.

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Key Considerations


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The 4 Moments for Improving Antibiotic Use

- Moment 1: “Does the patient have an infection that requires infection?”
- Moment 2: “Have I ordered appropriate cultures before starting antibiotics? What empirical antibiotic therapy should I initiate?”
- Moment 3: “A day or more has passed. Can I stop antibiotics? Can I narrow therapy? Can I change from intravenous to oral therapy?”
- Moment 4: “What duration of antibiotic therapy is needed for this patient’s diagnosis?”

Tamma PD, et al. Rethinking how antibiotics are prescribed incorporating the 4 moments of antibiotic decision making into clinical practice. JAMA 2018;12/27/18.

Diagnostic Stewardship

- DS practices are increasingly common among hospitals, often classified as quality improvement or under the umbrella of AS
- DS has a potentially important role in HAI surveillance: HAI surveillance based on current surveillance definitions may over-diagnose HAIIs (e.g., CAUTI, CLABSI) by including colonized rather than clinically infected patients or by including organisms that are contaminants rather than true pathogens.
- Within the Micro community, the three stages of DS include:
  - Pre-analytic – test-related decision making and specimen collection
  - Analytic – relating to lab practices including reflex test algorithms
  - Post-analytic – includes selective reporting of results


Hosted by Paul Webber  paul@webbertraining.com
website: www.webbertraining.com
Examples of HAI-Related DS Strategies

<table>
<thead>
<tr>
<th>HAI</th>
<th>Guidelines</th>
<th>Diagnostic Stewardship Strategies</th>
</tr>
</thead>
<tbody>
<tr>
<td>CAUTI</td>
<td>ACCP/IDSA guidelines for evaluation of new cases in critically ill patients</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Most cultures should only be obtained from critically ill patients when</td>
<td></td>
</tr>
<tr>
<td></td>
<td>the patient is suspected of having a urinary tract infection (UTI) that</td>
<td></td>
</tr>
<tr>
<td></td>
<td>is not related to catheter use.</td>
<td>Multifactorial approach involves an ICU setting including &quot;shock index&quot; to predict antibiotic use;</td>
</tr>
<tr>
<td></td>
<td>Risk factors include:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>High age, diabetes, renal failure, dementia, obesity, and sepsis.</td>
<td>culture protocol for uncomplicated UTI patients with associated factors.</td>
</tr>
<tr>
<td>MRSA CLSI</td>
<td>IDSA clinical practice guidelines for intravascular catheter-related</td>
<td></td>
</tr>
<tr>
<td></td>
<td>infections.</td>
<td>Clear interpretation language (eg. &quot;likely contaminant&quot;) attached to result.</td>
</tr>
<tr>
<td></td>
<td>Blood cultures should be obtained by a specialized phlebotomist.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Blood cultures should be obtained by a specialized phlebotomist.</td>
<td>Policy-discouraging routine blood cultures proven to improve costs and patient outcomes.</td>
</tr>
<tr>
<td></td>
<td>Blood cultures should be obtained by a specialized phlebotomist.</td>
<td>Use of molecular microscopy for diagnosis of Gram-positive blood cultures identified and appropriate</td>
</tr>
<tr>
<td></td>
<td>Blood cultures should be obtained by a specialized phlebotomist.</td>
<td>antibiotic therapy for patients with VRE bacteremia.</td>
</tr>
<tr>
<td></td>
<td>Blood cultures should be obtained by a specialized phlebotomist.</td>
<td>Rapid turnaround results coupled with bedside infectious disease consultation for positive Gram-</td>
</tr>
<tr>
<td></td>
<td>Blood cultures should be obtained by a specialized phlebotomist.</td>
<td>positive cultures reduced mortality due to S. aureus bacteremia.</td>
</tr>
</tbody>
</table>


Examples of HAI-Related DS Strategies

Review Article on Blood Culture Collection and Handling

Multidisciplinary team review of best practices for collection and handling of blood cultures to determine effective interventions for increasing the yield of true-positive bacteremias, reducing contamination, and eliminating false-positive central line–associated bloodstream infections.

Robert A. Garcia BS, MT(ASCP), CIC, FACP, Eric D. Spitzer MD, PhD;
Josephine Beaudry RN, BSN, MS, CNS-A, CNS-N, ANP-C, Cindy Beck BSN, RN;
Regina Ditchless BSN, RN, GCNS;
Michelle Guthery-Rubalcaba BS, MT(ASCP), SES;
Carol Haagazart RN, MSN, ANP;
Stacy Heuchemer MDNP, NP-C, ACNS-BC, CCRN;
Barbara F. Kranz CIC, Karen McLean RN, Katherine L. Morales RN, CCRN, MSFN;
Susan Owens RN, BS;
Mary E. Paciella RN, MS, CCRN, ANP, ACNS-BC, PCRN;
Edwin Torregrossa RN, BSN, CCRN.

Reasons for Optimizing Blood Culture Collection & Handling

- Identifying true pathogens
- Avoidance of blood culture contamination
- Avoiding false positive CLABSIs
Need for Maximizing True Pathogens

- Septicemia is the 11th leading cause of death in the U.S. accounting for more than 41,000+ lives per year
- Sepsis is currently the most expensive hospital condition ($23.6 billion) among inpatients
- ...has accounted for a 32 percent increase in hospitalizations in recent years
- ...and is the leading cause of admission to a hospital for adults aged 45 to 84 years after an Emergency Department (ED) visit
- Guidelines recommend blood cultures to be obtained within three hours of presentation and prior to administration of antibiotics

Surviving Sepsis Campaign. Updated Bundles in Response to New Evidence. Available at: http://www.survivingsepsis.org/SiteCollectionDocuments/SSC_Bundle.pdf

Blood Culture Collection Methods

“Drawing blood for culture may be performed by obtaining the blood peripherally of from an existing intravascular device…..however, both methods have substantial risk of introducing microorganisms that are not present in the blood into the blood specimen”

Blood Culture Contamination

- Contaminated BCs are associated with severe financial and clinical consequences
- Landmark study by the College of American Pathologists (CAP) of 497,134 BCs obtained in 640 hospitals reported mean contamination rate of 2.5% among all BCs drawn
- Approximately 50% of positive BCs represent contamination
- Most U.S. hospitals use a BCC benchmark of ≤3.0% as derived from CAP Q-Tracks Monitor data, although this is not a validated benchmark
- BCs are considered contaminated if one or more of the following organisms are found in only one bottle in a series of BC sets (e.g., 1 of 1; 1 of 2, etc.):
  - CoNS, Micrococcus, alpha-hemolytic viridens strep, Propionibacterium acnes, Corynebacterium sp., Bacillus sp.


BC Utilization Study

- Study intended to describe pattern of BC utilization in an academic medical center
- In total 38,939 BC sets were drawn over a one-year period (diversion discard tube used)
  - No growth – 35,823 (92.0%)
  - Pathogens – 2755 (7.1%)
  - Contamination – 358 (0.91%)
- In 2.5% of BC draws, catheter-related infections were principle diagnosis

Define & Measure (Surveillance): NHSN CLABSI Definitions, 2019

NHSN Footnote: Blood Specimen Collection
In LCBI criteria 2 and 3, the phrase “two or more blood specimens drawn on separate occasions” means:

a. blood from at least two separate blood draws was collected on the same or consecutive calendar days, and
b. two separate site preparations (decontamination steps) were performed during specimen collection.

This will reduce misidentification of contaminated blood specimens as LCBI1s. For example, aseptic technique indicates that separate site decontaminations would be performed for blood specimens drawn from different sites (in other words, different venipunctures, a combination of venipuncture and lumen withdrawal, or different lumens of the same central line), or at different times. Specimens collected in this manner would therefore be considered “separate occasions”.

Specimen Collection Considerations: Blood specimens drawn through central lines can have a higher rate of contamination than blood specimens collected through peripheral venipuncture.3,4 However, all positive blood specimens, regardless of the site from which they are drawn or the purpose for which they are collected, must be included when conducting in-plan CLABSI surveillance (for example, weekly blood cultures performed in hematology and oncology locations).

BCC Effect on CLABSIs

- LCBI1: so called NHSN “recognized pathogens” such as S. aureus or Enterococcus have been identified as contaminants (6.4% and 16.1% respectively) in major study; when a “pathogen” is not related to an infection at another site, as occurs when a contaminant is identified, then the event is a CLABSI

- LCBI2: clinical situations, e.g., patient’s venous condition, limited CVAD lumen access, clinician’s workload may restrict “ideal” blood draws from separate sites or at different times.

- There exists no “gold standard” for determining true infection vs. contamination of BCs….this limitation may impact the variability in identifying reportable CLABIs

BC Issues Affecting Optimal Outcome

- Clinical indications
- Site draws: venipuncture vs. intravascular lines
- Handling of needleless connectors
- Use of pre-packaged kits for BC Drawing
- Use of sterile gloves
- Use of masks
- Skin antisepsis
- Disinfection of BC bottle septums
- Discarding of initial volume of blood
- Recommended volumes of blood
- Order of draw
- Inoculation of aerobic and anaerobic bottles
- Labeling (site of draw)
- Transport

Garcia R, Spitzer E. Multidisciplinary team review of best practices for collection and handling of blood cultures to determine effective interventions for increasing the yield of true-positive bacteremias, reducing contamination, and eliminating false-positive central line-associated bloodstream infections. AJIC 2015;43:1222-37.
Effects of UC on Admission

Urine Culture on Admission Impacts Antibiotic Use and Length of Stay: A Retrospective Cohort Study

Molly J. Homem, MD, MPH, Andrew M. Spiegelman, MD, PhD, Amurad D. Nabi, MD, MPH, Barbara W. Truant, MD

OBJECTIVE: To examine the impact of urine culture testing on day 1 of admission on inpatient antibiotic use and hospital length of stay (LOS).

METHODS: We performed a retrospective cohort study using a national dataset from 2009 to 2014. We randomly sampled 218 hospitals in the United States.

RESULTS: Admissions for adult 18 years and older were included in the study. Hospitalizations were matched with Pearson’s exact test using the following variables: hospital, year, and a random intercept. The urine culture mean inpatient antibiotic use was 0.41% (95% CI: 0.39-0.43) and resulted in an additional 0.59 days of inpatient antibiotic treatment. Urine culture admission resulted in a 2.1% increase in LOS (95% CI: 1.9-2.3). The predicted difference in bed days of care between admission with and without a urine culture resulted in 6.87 additional bed days of care. The impact of culture testing on antibiotic use was statistically significant.

CONCLUSIONS: Patients with a urine culture on day 1 of hospital admission receive more days of antibiotics and have a longer hospital stay than patients who do not have a urine culture. Targeted interventions may reduce the potential harms associated with low yield urine cultures on day 1.

Reasons for Inappropriate UC and UA Ordering

- Multi-hospital survey of internal medicine resident physicians designed by 6 board-certified ID physicians
- 100 total responses, overall knowledge 48%

Reasons for Inappropriate UC and UA Ordering

- Survey of 354 nurses at 5 hospitals
- Sample of incorrect responses: 58.4% observed others compliant with not obtaining specimen for culture from drainage bag; 78.4% would obtain sample in patients with chronic urinary catheter on admission; 3.1%-24.7% agreed with taking culture when patient has pyuria

Evidence for Inappropriate Ordering of UC/UA Testing

- Randomized study of 208 newly admitted patients over 1 year at the University of Michigan Health System
  - 120 (57.7%) did not meet guideline-based criteria for a urine culture
  - Of these, 75 patients (62.5%) had a reason documented that was inconsistent with current guidelines, including for bacteriuria before an orthopedic procedure and altered mental status
  - No documented reason for ordering a UC was found in 37.5% of patients
  - Fever was the sole indication for obtaining a UC in nearly three-quarters

Asymptomatic Bacteriuria

- IDSA defines ASB as “isolation of a specified quantitative count of bacteria in an appropriately collected urine specimen obtained from a person without symptoms or signs referable to urinary infection”
- ASB occurs in more than 30% of nursing home patients and 100% of those who are chronically catheterized
- 23% to 50% of antibiotic days for UTI are unnecessary treatment of ASB
- ASB is a benign condition that generally does not require treatment
- When patient symptoms are not considered or when non-urinary symptoms are attributed to bacteriuria, “…unwarranted events may occur including unnecessary urine testing…leading to false-positive results…followed by over-treatment with antibiotics”

Trautner BW. Asymptomatic bacteriuria: when the treatment is worse than the disease. Not Rev Urol 2012;9:85-93
Garcia R, Spitzer E. Promoting appropriate urine culture management to improve health care outcomes and the accuracy of catheter-associated urinary tract infections. AJIC 2017 (pending publication)

Inappropriate Treatment of Catheter-Associated ASB

- Veterans Affairs Hospital, all UC over 3-months, patients with indwelling urinary catheter
- Determined Catheter-associated Asymptomatic Bacteriuria (CAABU) vs. CAUTI
- Results: 164 CAABU vs. 116 CAUTI
- Of 164 CAABU, 32% inappropriate Rx w/antibiotics

Redefining the Antibiotic Stewardship Team

- 2017 American Nurses Association/Centers for Disease Control and Prevention (ANA/CDC) White Paper
  - Purpose: inform RNs regarding the issue of antibiotic resistance and facilitate engagement in AS activities
  - Jan 2017 – TJC requiring inter-professional of hospital AS programs
  - Workgroup convened: 30 nurses from around the United States
- Recommendations for Education
  - Microbiology
    - How specimens for microbiology testing should be obtained
    - How to interpret microbiology test results, especially susceptibility reports
    - How to interpret the hospital antibiogram
    - Basics of distinguishing asymptomatic bacteriuria from urinary tract infection and colonization from active infection.

My appreciation to Joan Hebden for her contribution
Redefining the Antibiotic Stewardship Team

- Recommendations for Education
  - Pharmacology
    - Considerations for IV-to-PO conversion: what antibiotics and patients are good candidates
    - General information on antimicrobial spectra for various classes of antibiotics
    - Antibiotic interactions and incompatibilities
    - Common adverse reactions to antibiotics, with a special emphasis on recognizing and responding to suspected C. difficile infections
  - Information on therapeutic drug monitoring
  - How to assess a patient for a potential allergy to penicillin

The Diagnostic Pathway

The diagnostic pathway begins when the patient presents at the health-care facility. It covers the initial interaction between the patient and clinicians and other frontline healthcare workers providing care and responsible for diagnostic sampling, through to the role of the laboratory staff responsible for processing the sample and reporting the results back to the clinician. The different steps along the pathway are illustrated in Figure 2.

"Have I ordered appropriate cultures before starting antibiotics?"

Have they been obtained properly?

Has the specimen been preserved properly and transported in a timely manner?
Implementing Diagnostic Stewardship


Antibiotic Decision Making

Four Moments of Antibiotic Decision Making Adapted for Nurses

1. Does the patient have an infection that requires antibiotics?
2. Have appropriate cultures been ordered before starting antibiotics? What empirical therapy should be initiated?
3. A day or more has passed. Can antibiotics be stopped? Can therapy be narrowed? Can a change be made from IV to oral therapy?
4. What duration of antibiotic therapy is needed for the patient’s diagnosis?

Moneses et al. Infection Control & Hospital Epidemiology (2019), 1-6.
### The Role of Nursing in AS Programs

#### Nurses “Unrecognized” Role in ASP on Admission

<table>
<thead>
<tr>
<th>ASP Tasks on Admission</th>
<th>Core Element</th>
<th>&quot;Unrecognized&quot; Nursing Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triage &amp; isolation</td>
<td>A, DE, E</td>
<td>Identifies need isolation</td>
</tr>
<tr>
<td>Allergy History</td>
<td>A, DE, E</td>
<td>Takes allergy history</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Medication reconciliation</td>
</tr>
<tr>
<td>Cultures</td>
<td>A, DE, E</td>
<td>Collects before antibiotics</td>
</tr>
<tr>
<td>Timely antibiotics</td>
<td>DE, A, T</td>
<td>Monitors results</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Checks allergies, administers</td>
</tr>
</tbody>
</table>

*Note: A = Action, DE = Drug expertise, D = Education, T = Tracking.*

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#### The Role of Nursing in AS Programs

#### Nurses “Unrecognized” Role in ASP During Stay

<table>
<thead>
<tr>
<th>ASP Tasks on Progress &amp; Patient safety</th>
<th>Core Element</th>
<th>Unrecognized Nursing Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Progress reporting</td>
<td>DE, A, T</td>
<td>Monitors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Communication patient progress</td>
</tr>
<tr>
<td>Antibiotic adjustment</td>
<td>DE, A, T</td>
<td>First to get results</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Communicates to team</td>
</tr>
<tr>
<td>Adverse event</td>
<td>A, T, E</td>
<td>Monitors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Communicates (e.g., diarrhea)</td>
</tr>
<tr>
<td>Antibiotic orders</td>
<td>DE, A, T, E</td>
<td>Review changes in patient &amp; orders</td>
</tr>
<tr>
<td>Antibiotic resistances</td>
<td>DE, A, T, E</td>
<td>Reviews cultures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sees bug – drug mismatch</td>
</tr>
<tr>
<td></td>
<td></td>
<td>OR need for isolation</td>
</tr>
</tbody>
</table>

*Note: A = Action, DE = Drug expertise, D = Education, T = Tracking.*
The Role of Nursing in AS Programs

Nurses “Unrecognized” Role in ASP on Discharge

<table>
<thead>
<tr>
<th>Task at Discharge</th>
<th>Core Element</th>
<th>Unrecognized Nurse Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV to PO OR Outpatient therapy</td>
<td>DE, A, T, E</td>
<td>Monitors, Assesses ability to take orals</td>
</tr>
<tr>
<td>Length of stay</td>
<td>A, T, E</td>
<td>Monitor progress</td>
</tr>
<tr>
<td>Patient Education &amp; Med Rec</td>
<td>DE, A, E</td>
<td>Educates patient &amp; Family</td>
</tr>
<tr>
<td>Outpatient visits/ transitions/ readmissions</td>
<td>A, T, E</td>
<td>Communicates patient diagnosis, management &amp; medication to VN5/LTCF/other facilities</td>
</tr>
</tbody>
</table>

Perceived Barriers for Nursing

<table>
<thead>
<tr>
<th>Perceived Barriers</th>
<th>Potential Solutions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse workload</td>
<td>Nurse feedback, Algorithms, Educational materials</td>
</tr>
<tr>
<td>Lack of physician support</td>
<td>Clinical and administrative champions, Invite nurses as part of ASP</td>
</tr>
<tr>
<td>Limited knowledge</td>
<td>Identify knowledge gaps</td>
</tr>
<tr>
<td>Lack of experience &amp; confidence</td>
<td>Identify unit champions, Share successes</td>
</tr>
<tr>
<td>Nurse input not valued</td>
<td>Tools for nursing communication (SBAR), Clear support for nurse role in ASP</td>
</tr>
</tbody>
</table>

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What the Nursing Staff Didn’t Know…

- Reducing blood culture contamination rates: A systematic approach to improving quality of care
  - Formation of a system-wide interdisciplinary group – nursing, IP and lab – to develop 3 evidence-based nursing protocols for blood culture collection: from CVC, from new PIV, with peripheral blood draw.
  - Lessons learned: lack of knowledge regarding
    - Proper use of CHG for skin prep
    - Need to disinfect bottle tops
    - Removal and change of needleless connector
    - Scrub the hub of CVC


BC Issues Affecting Optimal Outcome

- Clinical indications
- Site draws: venipuncture vs. intravascular lines
- Handling of needleless connectors
- Use of pre-packaged kits for BC Drawing
- Use of sterile gloves
- Use of masks
- Skin antisepsis
- Disinfection of BC bottle septums
- Discarding of initial volume of blood
- Recommended volumes of blood
- Order of draw
- Inoculation of aerobic and anaerobic bottles
- Labeling (site of draw)
- Transport

Garcia R, Sipper E. Multidisciplinary team review of best practices for collection and handling of blood cultures to determine effective interventions for increasing the yield of true-positive bacteremias, reducing contamination, and eliminating false-positive central line-associated bloodstream infections. AJIC 2015;43:1222-37.
Use of Departmental Report Cards

- Prospective, controlled, before-and-after, 18-month study conducted at a 1000-bed university-affiliated hospital
- Hospital issued a monthly *departmental blood culture report card* on contamination rate
  - **Control** period - 49,403 cultures: 9.3% had growth; true positive 5.6%; contaminants 4.0%
  - **Study** period – 53,287 cultures: 8.3% had growth; true positive 5.2% (p = <0.02); contaminants 3.3% (p = <0.001)
- Analysis by division showed either a significant contamination reduction or a trend to reduction in all major divisions

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Do We Need More Than Education?

Blood culturing technology: Specimen Diversion Devices
Use of Information Technology to Optimize Ordering of Urine Cultures
Blood Culturing Technology

1. Human Factor(s): Risk of contamination during assembly and preparation of supplies, and skin prep

2. Skin Flora: You can disinfect but not sterilize. Up to 20% of skin flora remain viable in the keratin layer of the skin even after skin prep.

3. Skin Plug and Fragments: When present, will ALWAYS enter the culture specimen bottle, and commonly will contain viable microorganisms.

Mechanical diversion of the initial 1.5-2.0 mL of blood using a closed system has been clinically proven to virtually eliminate blood culture contamination.1-3

3. Data on file

Specimen Diversion Devices for Blood Culturing

Prior to use

Initial 1.5-2.0mL of blood diverted and sequestered prior to culture bottle inoculation

- Reduction in false positives up to 82%1,2
- Sustained contamination rate as low as 0.2% (P=0.001)1
- Positive predictive value as high as 97%1
- Reduction in vancomycin DLT as much as 37% (P<0.0001)1
- Shorten length of stay by average of 2 days (P=0.0001)1
- Reduce HAIs/HACs by as much as 23%5
- Four studies, avg. annualized cost savings of $848,0007

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www.webbertraining.com
Specimen Diversion Devices for Blood Culturing

- Reducing blood culture contamination using an initial specimen diversion device
  - 6-month prospective controlled pragmatic study on a medical ward; historical contamination rate of 4%
  - Intervention: initial specimen diversion device (integrated needle or attachment to a newly placed IV); controls – standard method. 671 BCs included
  - 464 cultures taken without device: 5.2% contamination rate; 207 cultures taken with the device: 1.0% contamination rate \( p = 0.008 \)
  - No significant difference in true positive rates


Specimen Diversion Devices for Blood Culturing

- Preventing Blood Culture Contamination using a Novel Engineered Passive Blood Diversion Device
  - Pre-post intervention design conducted in the ED with phlebotomy and ED staff: outcome metric - total blood culture contaminants
  - Pre-intervention – 1953 cultures; contamination rate of 0.025, 95% CI [0.019, 0.033]
  - Post-intervention - 2267 cultures; contamination rate of 0.012, 95% CI [0.008, 0.017] \( p < 0.05 \)
  - Intervention was utilized in only 50% of blood draws during the post intervention period; first 3 months the device was only designed for vacutainer use; redesign allowed for use with newly placed lines

Optimizing the Ordering of Urine Cultures

- Strategies used by AS programs generally focus on modulating antimicrobial use after their initiation.
- By contrast, DS aims to reduce unnecessary detection of ASB.

Optimizing the Ordering of Urine Cultures

- Study conducted on admitted patients, 1250-bed academic medical center.
- Interventions: notification to providers, changes to order sets, inclusion of new urine culture reflex tests to CPOE.
- Results:
  - 45.1% decrease in rate of inpatient UCs.
  - Reduction of $103,845 in lab charges to patients.

<table>
<thead>
<tr>
<th></th>
<th>Pre-intervention</th>
<th>Post-intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pos UCs (%)</td>
<td>4021 (35.5)</td>
<td>2621 (29.7)</td>
</tr>
<tr>
<td>UCs per 1000 PDs</td>
<td>38.1</td>
<td>20.9</td>
</tr>
<tr>
<td>Catherized UCs per 1000 PDs</td>
<td>7.8</td>
<td>1.9</td>
</tr>
<tr>
<td>CAUTI per 1000 CDs</td>
<td>1.25</td>
<td>1.27</td>
</tr>
</tbody>
</table>


Summary

- Inter-disciplinary development of evidence-based culturing procedures, which address collection and handling, is necessary to ensure standardized practices.
- IPs can play a major role in educating nursing staff on the patient safety implications of improper culturing techniques and unnecessary antibiotic use.
- Technology has a role in optimizing the ordering and accuracy of culturing techniques.

Thank you!

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robert.garcia@sbumed.org
Cell 516.810.3093
Diagnostic Stewardship: Modified Culture Testing to Enhance Antibiotic Stewardship
Robert Garcia, Stony Brook Medicine, New York, NY
A Webber Training Teleclass

www.webbertraining.com/schedulep1.php

<table>
<thead>
<tr>
<th>Date</th>
<th>Title</th>
<th>Speaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>August 15, 2019</td>
<td><strong>Bed Bug Prevention in the Healthcare Setting</strong></td>
<td>Dr. Marcia Anderson, Environmental Protection Agency, United States</td>
</tr>
<tr>
<td>August 22, 2019</td>
<td><strong>How to Engage and Educate Nurses in Evidence-Based Practice</strong></td>
<td>Eileen J. Carter, Columbia University School of Nursing</td>
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<td>September 6, 2019</td>
<td><strong>Measures to Prevent and Control VRE: Do They Really Matter?</strong></td>
<td>Dr. Hilary Humphreys, The Royal College of Surgeons in Ireland</td>
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<td>September 12, 2019</td>
<td><strong>Meat, Monkeys, and Mosquitoes: A One Health Perspective on Emerging Diseases</strong></td>
<td>Prof. Laura Kahn, Woodrow Wilson School of Public and International Affairs, Princeton University</td>
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<td>September 22, 2019</td>
<td><strong>Cottrell Lecture – Challenges and Opportunities in Infection Prevention and Control</strong></td>
<td>Prof. Brett Mitchell, Avondale College of Higher Education, Australia</td>
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<td>September 24, 2019</td>
<td><strong>Avirita Lecture – Pneumocystis, an Important Healthcare...</strong></td>
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