The metric of appropriateness is meaningful for both orthopedic surgeons and AMS programs. Targeted quality improvement projects are needed for orthopedic surgical procedures and to study the engagement between orthopedic surgeons, AMS, and guideline developers to support optimization of antimicrobial use in the surgical setting.
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Presentation Type:
Oral Presentation

Bloodstream Infections with Typical Probiotic Organisms

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Background: Probiotics are protective against *Clostridioides difficile* infection and antibiotic-associated diarrhea, and they may decrease risk of infections following complex abdominal surgeries. Infectious risks associated with probiotic use are not well described in the literature. We describe probiotic use among patients with bloodstream infections (BSIs) due to organisms typically found in probiotics. **Methods:** Patients with positive blood cultures with *Lactobacillus* spp, *Saccharomyces* spp, and *Bifidobacterium* spp at our large academic hospital from October 2016 through October 2019 were identified using Theradoc, a clinical surveillance tool. Clinical data and orders for probiotics, including probiotic capsules, probiotic yogurt, and kefir, were extracted from the electronic medical record. Cases were considered distinct if the cultures were collected 7 or more days apart. True infections were defined as positive cultures which were treated with antimicrobials and had provider documentation outlining clinical relevance of culture data. **Results:** Among 26 distinct episodes of BSI, 16 (62%) were considered true infections. The remaining 10 cases were interpreted as contaminants or of unclear significance. Of the 16 cases representing true infection in 14 patients, 6 (38%) had received probiotics in the hospital in the preceding month. Among these patients, 5 had *Lactobacillus* bacteremia and had received *Lactobacillus* capsules, probiotic yogurt, and/or kefir. One patient had *Saccharomyces* fungemia following receipt of probiotic yogurt and kefir. All 6 patients with BSI possibly related to probiotic use had an antecedent gastrointestinal procedure or surgery within a month of the BSI, and 2 had intra-abdominal abscesses from which the same organism was cultured. Of the 16 true BSIs, 9 occurred in immunocompromised hosts, but antecedent probiotic use was confirmed in only 1 of these cases. Two episodes caused by different organisms occurred within the same month; all other episodes were >60 days apart. **Conclusions:** In our retrospective review of BSIs with organisms typically found in probiotics over a 3-year period at a large academic hospital, more than one-third of those with clinically relevant BSIs had antecedent probiotic use within the hospital. All patients with infections possibly related to probiotic use had recent gastrointestinal procedures or surgery, raising concern for probiotic use following interventions that increase the risk for gastrointestinal tract leakage or translocation. Further research is necessary to assess the risk of bloodstream infection in postoperative patients treated with probiotics.
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Bright STAR Collaborative Consensus Guidelines for Blood Culture Use in Critically Ill Children

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Background: Blood cultures are essential diagnostic tools used to identify bloodstream infections and to guide antimicrobial therapy. However, collecting cultures without clear indications or that do not inform management can lead to false-positive results and unnecessary use of antibiotics. Blood culture practices vary significantly in critically ill children. Our objective was to create a consensus guideline focusing on when to safely avoid blood cultures in pediatric intensive care unit (PICU) patients. **Methods:** A panel of multidisciplinary experts, many participating in the Blood Culture Improvement Guidelines and Diagnostic Stewardship for Antibiotic Reduction in Critically Ill Children (Bright STAR) Collaborative, engaged in a 2-part modified Delphi process. Round 1 consisted of a preparatory literature summary and an electronic survey sent to subject matter experts (SMEs). In the survey, SMEs rated a series of recommendations about when to avoid blood cultures on a 5-point Likert scale, 1 being the lowest score and 5 being the highest score. Consensus was achieved for each recommendation if 75% of respondents chose a score of 4 or 5, and these were included in the final guideline. Any recommendations that did not meet these a priori criteria for consensus were set aside for discussion during the in-person expert panel review (round 2). An outside expert in consensus methodology facilitated round 2. After a review of the survey results and comments from round 1 and group discussion, the SMEs voted on these recommendations in real time. Voting was blinded. Participants included Bright STAR site leads, national content experts, and representatives from relevant national societies. **Results:** We received 29 completed surveys from 34 invited participants for an 85% response rate. Of the 27 round 1 recommendations, 18 met predetermined criteria for consensus. Round 2 included 26 in-person voting participants who (1) discussed and modified the 9 recommendations that had not met round 1 consensus, and (2) modified for clarity or condensed from multiple into single recommendations the 18 recommendations that had met the round 1 consensus. The final document contains 19 recommendations that provide guidance on how to safely improve blood culture use in PICU patients (Table 1). Also, 8 recommendations discussed did not reach consensus for inclusion. **Conclusions:** Using a modified Delphi process, we created consensus recommendations on when to avoid blood cultures and prevent overuse in critically ill children. These guidelines are a critical step in disseminating diagnostic stewardship and reducing unnecessary testing on a wider scale.
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RECOMMENDATIONS TO BE INCLUDED IN GUIDELINE	
General Recommendations	
1	Clinicians should review a patient's clinical data (such as vital signs, existing laboratory/imaging data, urine output, recent cultures, current antimicrobial therapy) prior to making the decision to order or not order a blood culture.
2	Clinicians should perform a physical exam prior to making the decision to order or not order a blood culture.
3	Clinicians should discuss a patient's clinical status with bedside nurse to inform the decision to order or not order a blood culture.
4	Avoid surveillance blood cultures (e.g. daily screening blood cultures) in all patients. 4a Avoid surveillance blood cultures (e.g. daily screening blood cultures) for patients on ECMO (extracorporeal membrane oxygenation). 4b Avoid surveillance blood cultures (e.g. daily screening blood cultures) for patients on continuous renal replacement therapy. 4c Avoid surveillance blood cultures (e.g. daily screening blood cultures) in immunocompromised patients WITH or WITHOUT central venous catheters.
5	Avoid blood cultures in asymptomatic patients who experience an inadvertent central venous catheter disconnection.
6	Avoid blood cultures in asymptomatic patients who have a broken or cracked catheter.
7	Avoid drawing blood cultures from peripheral IVs.
Symptomatic, immunocompetent clinical scenarios	
8	Avoid blood culture in patients with a viral syndrome (such as bronchiolitis), NEW fever, no signs of sepsis in patient, and WITHOUT central venous catheter in place.
9	Avoid blood culture in patients with a viral syndrome (such as bronchiolitis), PERSISTENT fever within expected time course for viral infection, no signs of sepsis, and WITHOUT central venous catheter in place.
10	Avoid repeat blood cultures in patients with a symptomatic viral infection (such as bronchiolitis), PERSISTENT fever within expected time course for this viral infection, no signs of sepsis, and who has already had at least one negative blood culture obtained since the start of fever, WITH central venous catheter in place.
11	Avoid blood culture in patients with a localized bacterial source of infection (ex: urinary tract infection or focal pneumonia), PERSISTENT and expected fever, no signs of sepsis, and at least one negative blood culture obtained since the start of fever, and WITHOUT a central venous catheter.
12	Avoid blood culture in patients with a documented localized bacterial infection (ex: urinary tract infection or focal pneumonia), PERSISTENT and expected fever, no signs of sepsis, and who has a blood culture that is negative to date obtained within the last 48 hours, and WITH a central venous catheter.
13	For PERSISTENT fever in immunocompetent patients WITH a central venous catheter, suspected non-infectious etiology of fever and no documented source of infection, without signs of sepsis, and initial set of blood cultures were negative, avoid additional blood cultures.
14	Avoid blood culture in patients with NEW fever, no signs of sepsis, and with symptoms of withdrawal while undergoing wean of sedative/opioid infusions WITHOUT a central venous catheter in place.
15	Avoid blood culture in patients with NEW fever, no signs of sepsis, and with symptoms of withdrawal while undergoing wean of sedative/opioid infusions, WITH a central venous catheter in place, who defervesces in response to treatment for withdrawal.
16	Avoid blood culture in patients with NEW fever within 24 hours after surgery, with no signs of sepsis, WITH or WITHOUT a central venous catheter in place.
17	For PERSISTENT fever in patients with central catheter and without signs of sepsis, if a recent set of blood cultures from the catheter is no growth to date, then subsequent cultures, if indicated, do not need to be drawn from the catheter.
Symptomatic, immunocompromised clinical scenarios	
18	After repeated negative-to-date blood cultures, avoid additional blood cultures in immunocompromised patients with PERSISTENT fever but without signs of sepsis or infection in whom you do not plan to change/broaden the current antimicrobial regimen.
19	For PERSISTENT fever in immunocompromised patients without signs of sepsis, if initial set of blood cultures from all lumens of central venous catheters were negative, avoid repeatedly culturing more than one lumen of that central venous catheter.

Fig. 1.

Presentation Type:
Oral Presentation

Building/Campus Characteristics and *Legionella* in Potable Water Systems at Veterans Health Administration Facilities

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Background: When control mechanisms such as water temperature and biocide level are insufficient, *Legionella*, the causative bacteria of Legionnaires' disease, can proliferate in water distribution systems in buildings. Guidance and oversight bodies are increasingly prioritizing water safety programs in healthcare facilities to limit *Legionella* growth. However, ensuring optimal implementation in large buildings is challenging. Much is unknown, and sometimes assumed, about whether building and campus characteristics influence *Legionella* growth. We used an extensive real-world

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