Decreasing Blood Culture Contamination at a Children’s Hospital

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Background

- Blood culture contaminations lead to unnecessary admissions, antibiotic administration, costs, and extended hospitalization\(^1\).
- Standardized blood culture collection protocols, optimizing blood volume collected, is an established best practice method in the pediatric literature.
- At the Children’s Hospital of Savannah (CHOS), a standardized blood culture collection protocol does not exist.
- In contrast, protocols at other children’s hospitals or as outlined by the Infectious Diseases Society of America (IDSA), break down weight brackets further into 3-4 subsections for children less than 45 kg\(^2\).

Objective

Investigators seek to determine the prevalence of blood culture contaminations at CHOS. Standard benchmark for blood culture contamination is less than 3\%. We aimed to identify methods of process improvement that will reduce current pediatric blood contamination rates by 50%.

Methods

- Study Period: 1/1/2020 – 1/11/2023
- Study Population: All patients seen at CHOS for which blood cultures were collected in the study period. Patients in newborn nursery and neonatal intensive care unit were excluded.
- Definitions used:
  - **Blood Culture Contamination:** Blood culture contaminant, defined as cultures which resulted in a common contaminant and did not require treatment
  - **Common Contaminants:** Coagulase-negative staphylococci, Corynebacterium species, Bacillus species other than Bacillus anthracis, Propionibacterium acnes (Cutibacterium acnes), Micrococcus species, Viridans group streptococci, Clostridium perfringens, Aerococcus species.
  - The first phase of the project was to determine rates of blood culture contamination and determine most frequent locations of blood culture contamination
  - We utilized retrospective chart review with epic query to gather data and determine rates of blood culture contamination
  - We have begun to meet with nursing and nursing leadership to determine potential pitfalls, deviations from suggested guidelines, or inconsistencies seen with blood culture acquisition.
  - Investigators plan for multiple PDSA cycles to improve specific aspects of obtaining blood cultures.

Results

**Number of Blood Cultures by Department**

- **Overall Contamination Rate by Department**
  - **Total blood cultures collected:** 3,767
  - **Total positive blood cultures:** 364 (9.7\%) resulted positive
  - **Total contaminated blood cultures:** 138 (37.9\%) were contaminants
  - Of the 138 blood culture contaminants, 124 (90\%) were peripheral blood specimens versus 14 (10\%) from central lines

**Patient Demographics:**

<table>
<thead>
<tr>
<th>Patient Demographics: All Positive Blood Cultures (n = 364)</th>
<th>Likely Contaminated Blood Cultures (n = 138)</th>
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</thead>
<tbody>
<tr>
<td>Average Age (yrs)</td>
<td>5.07</td>
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<tr>
<td>Average weight (kg)</td>
<td>27.95</td>
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<tr>
<td>Percent Male</td>
<td>52.47%</td>
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<td>56.52%</td>
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**Number of Positive Blood Cultures by Department**

- **Goal < 1\%**

**References**


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