Antimicrobial Stewardship Implementation of *Staphylococcus aureus* Bacteremia Bundle at a Large Multi-hospital Health System

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### Background
- *Staphylococcus aureus* is a commensal and pathogenic organism common in both community and hospital-acquired infections
- Leading cause of bacteremia, infective endocarditis and metastatic complications
- Associated with significant morbidity, mortality and health care costs
- Reported mortality rate ~ 30%
- Studies have demonstrated a benefit to the management of *S. aureus* bacteremia (SAB) with the establishment of the following:
  - Care bundles
  - Infections Disease (ID) consultation
  - Pharmacist-led stewardship oversight
- ID consultation became available at all primary enterprise facilities through expansion of telemedicine in 2015
- Atrium Health has a robust antimicrobial stewardship program, the Antimicrobial Support Network (ASN), in place since 2013

### Purpose
To improve the management of SAB through implementation and adherence to an evidenced-based bundle led by the Division of ID and ASN

### SAB Bundle Components
1. Required ID consultation
2. Appropriate IV antibiotics within 24h of *S. aureus* result
3. IV vancomycin for MRSA bacteremia, unless severe allergy documented or with persistent bacteremia requiring combination/alternative therapy
4. IV beta-lactam therapy for MSSA bacteremia, unless severe allergy documented
5. Repeat blood cultures every 48–72h until clearance is documented
6. Obtaining of an echocardiogram
7. Appropriate duration of therapy (from documented bacteremia clearance)

### Project Goals
- Outcomes related to the SAB bundle are part of the Patient, Providers and Pathogens (3P) ASN A3 and the Division of ID annual goals
  - Data also shared quarterly at site-specific Infection Prevention meetings and several other patient quality and safety meetings
- Summary of project goals:
  - Primary: target bundle adherence rates:
    - 2016: 80%
    - 2017: 82%
    - 2018: 90%
  - Secondary:
    - 30-day SAB-related readmissions
    - 30-day all-cause mortality (from initial positive *S. aureus* blood culture)

### Conclusion
- Since launch of SAB bundle, adherence rates have steadily improved with ongoing efforts in quality improvement
- Mortality rates are down from 19% to 14% and 30-day SAB-related readmissions have ranged from 4 – 11%
- Initiative supported use of a care bundle, promoting a multifaceted approach to patient care with evidence-based components
- Project also highlighted the impact and importance of telemedicine to provide best care across a wide range of acute care settings
- Based on the success of the SAB bundle outcomes, it is expected that ASN will lead more care-bundled stewardship projects in the future

### Resources

### Contact Info
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**Table 1: SAB Outcomes**

<table>
<thead>
<tr>
<th>Overall Bundle Adherence</th>
<th>2016 Q3</th>
<th>2016 Q4</th>
<th>2017 Q1</th>
<th>2017 Q2</th>
<th>2017 Q3</th>
<th>2017 Q4</th>
</tr>
</thead>
<tbody>
<tr>
<td>defaulted</td>
<td>37.4%</td>
<td>40.5%</td>
<td>50.6%</td>
<td>48.8%</td>
<td>58.9%</td>
<td>58.9%</td>
</tr>
<tr>
<td>1. ID consult</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>2. Empiric antibiotic in 24h</td>
<td>100%</td>
<td>90.0%</td>
<td>90.0%</td>
<td>90.0%</td>
<td>88.1%</td>
<td>88.1%</td>
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<tr>
<td>3. Repeat blood cultures</td>
<td>91.5%</td>
<td>98.6%</td>
<td>98.6%</td>
<td>98.6%</td>
<td>98.6%</td>
<td>98.6%</td>
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<tr>
<td>4. Echocardiogram</td>
<td>98.0%</td>
<td>98.5%</td>
<td>98.5%</td>
<td>98.5%</td>
<td>98.5%</td>
<td>98.5%</td>
</tr>
<tr>
<td>5. Duration of Antibiotics</td>
<td>91.5%</td>
<td>98.3%</td>
<td>98.3%</td>
<td>98.3%</td>
<td>98.3%</td>
<td>98.3%</td>
</tr>
<tr>
<td>6. ID-related Blood Cultures</td>
<td>54.7%</td>
<td>51.3%</td>
<td>50.1%</td>
<td>50.1%</td>
<td>49.3%</td>
<td>50.8%</td>
</tr>
<tr>
<td>7. Duration of Therapy</td>
<td>96.0%</td>
<td>96.0%</td>
<td>96.0%</td>
<td>96.0%</td>
<td>96.0%</td>
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</tr>
</tbody>
</table>

**Overall Bundle Adherence:**
- 2016 Q3: 37.4%
- 2016 Q4: 40.5%
- 2017 Q1: 50.6%
- 2017 Q2: 48.8%
- 2017 Q3: 58.9%
- 2017 Q4: 58.9%

**Definitions:**
- **Inpatient:** Patient admitted to the hospital with an initial positive *S. aureus* blood culture and remained inpatient throughout the duration of initial positive SAB. Discontinued a blood culture after discharge with documented blood culture clearance.
- **Progressive:** Improves infection at original infectious foci(s).
- **Related:** Related to the current SAB bundle component listed above.
- **Unrelated:** Pathogen not related to any component of the SAB bundle.

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**Atrium Health**