Central Line Bundle
Prevent catheter-related bloodstream infections by implementing the five components of care in the IHI Central Line Bundle.

Domain

Patient Care Processes:
Clinical processes that ensure delivery of high-quality care to individual patients

Aims

Safe:
Delivery of care in a manner that minimizes any risk of harm to a patient

Process Attributes

<table>
<thead>
<tr>
<th>Cost to Implement</th>
<th>The monetary resources required to implement this process</th>
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<tbody>
<tr>
<td>Minimal:</td>
<td>Just the cost of the improvement effort itself</td>
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<tr>
<th>Time to Implement</th>
<th>The amount of time, from months to years, it will take on average to establish this process</th>
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<tbody>
<tr>
<td>Fewer than 12 months</td>
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<table>
<thead>
<tr>
<th>Difficulty to Implement</th>
<th>The challenges of implementing this process</th>
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<tbody>
<tr>
<td>Moderately Challenging:</td>
<td>Either involves multiple units or disciplines OR requires a substantial shift in culture and/or operations, but not both of these</td>
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<thead>
<tr>
<th>Level of Evidence</th>
<th>The degree to which the actions in this process are supported by research and experience; based on the Cochrane scale</th>
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<tbody>
<tr>
<td>Some Evidence:</td>
<td>Level III — Studies published with some control included</td>
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Details

Elements

- Implement the Central Line Bundle:
  - Hand hygiene
  - Maximal barrier precautions upon insertion
  - Chlorhexidine skin antisepsis
  - Optimal catheter site selection, with avoidance of using the femoral vein for central venous access in adult patients
  - Daily review of line necessity, with prompt removal of unnecessary lines
• Make the process for delivering all bundle elements more reliable:
  • Keep standard equipment for central line placement stocked in a cart or kit to avoid the difficulty of finding necessary equipment to institute bundle elements.
  • Use an insertion checklist that includes all bundle elements for central line insertions.
  • Empower nursing to stop insertion if element(s) of the bundle are not being executed.
  • Include assessment for removal of central lines as part of daily goal sheets.
  • State the line day (e.g., “line day 6”) during rounds as a reminder of how long the line has been in place.
  • Keep soap or alcohol-based hand gel dispensers prominently placed in or near patient rooms, and make universal precautions equipment such as gloves only available near hand sanitation equipment.
  • Measure bundle compliance using an “all or nothing” measurement and share compliance data with staff.

Outcomes

• Mortality (HSMR): Decreased mortality (hospital standardized mortality ratio, or HSMR)
• Harm: Decreased harm to patient (e.g., Harms per 100 patient days, as measured by the IHI Global Trigger Tool)
• Cost of Care: Decreased cost per inpatient case

Service Lines and Critical Functions

• Emergency Department
• Hospital Medicine, Adult
• Infection Prevention and Management
• Intensive Care
• Nursing
• Surgical

Key Measures

• Central Line Bloodstream Infections
  • Numerator: Central line bloodstream infections
  • Denominator: 1000 central line days
• Compliance with Central Line Bundle
  • Numerator: Number of patients with central lines for whom all elements of the central line bundle are documented
  • Denominator: Total number of patients with central lines

Reasons and Implications

Importance for Patients and Families
Patients who require central lines are usually critically ill. If an infection develops with these patients, they are at great risk of dying. Preventing infections reduces the risk of dying, as well as the risk of getting other infections. It also reduces the time patients spend in the hospital.

Requirement, Standards, Policies, and Guidelines

• [Agency for Healthcare Research and Quality (AHRO)](http://app.ihi.org/imap/tool/#process=e876565d-fd43-42ce-8340-8643b7e675c7)
• [Centers for Disease Control and Prevention (CDC)](http://app.ihi.org/imap/tool/#process=e876565d-fd43-42ce-8340-8643b7e675c7)
  2011 Guidelines for the Prevention of Intravascular Catheter-Related Infections
• [National Quality Forum (NQF)](http://app.ihi.org/imap/tool/#process=e876565d-fd43-42ce-8340-8643b7e675c7)
  Safe Practice for Better Healthcare—2010 Update
  Safe Practice 11: Intensive Care Unit Care
  Safe Practice 21: Central Line-Associated Bloodstream Infection Prevention
• [The Joint Commission (TJC)](http://app.ihi.org/imap/tool/#process=e876565d-fd43-42ce-8340-8643b7e675c7)
  2011 National Patient Safety Goals - Goal 7
Financial Implications

- Expense reduction due to decreased costs of treating infections and decreased length of stay.
- Expense increase due to use of supplies for all insertions if previously not used consistently.

Prerequisites

None for this process

Resources

Additional Resources

- **Victorian Government Health Information**
  Preventing central venous catheter related-bloodstream infections

- **HCA Patient Safety**
  Safe Critical Care Project: Testing Improvement Strategies : A toolkit site in collaboration with the Agency for Healthcare Research and Quality

- **World Health Organization (WHO)**
  Bacteriemia Zero

- **American Hospital Association (AHA)**
  Hospitals in Pursuit of Excellence – Individual Case Studies
  Best Practices for Central-Line Use
  Children’s Hospital of New Jersey at Newark Beth Israel Medical Center

- **On the CUSP: Stop BSI**

- **Association for Professional Infection Control and Epidemiology**

- **American Hospital Association (AHA)**
  Hospitals in Pursuit of Excellence – Individual Case Studies
  Reducing CLABSI With Nursing Help
  Albany Medical Center

- **Society for Healthcare Epidemiology of America (SHEA)**
  Strategies to Prevent Central Line–Associated Bloodstream Infections in Acute Care Hospitals

- **American Hospital Association (AHA)**
  Hospitals in Pursuit of Excellence – Individual Case Studies
  The Bug Stops Here
  Allegheny General Hospital

- **Central Line Bundle Implementation in US Intensive Care Units and Impact on Bloodstream Infections**

- **Centers for Disease Control and Prevention (CDC)**
  Making Health Care Safer - Latest Findings
  Bloodstream Infections in Patients with Central Lines

Information Compiled By

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