

Prevention of Central Line-Associated Bloodstream Infection

**GOAL: PREVENT CENTRAL VENOUS CATHETER-RELATED BLOOD-
STREAM INFECTION (CR-BSI) AND DEATHS FROM CR-BSI BY IMPL-
EMENTING A SET OF INTERVENTIONS KNOWN AS THE “CENTRAL LINE
BUNDLE” IN ALL PATIENTS REQUIRING A CENTRAL LINE.**

BACKGROUND

- Forty-eight percent of ICU patients have central venous catheters, accounting for about 15 million central venous catheter days per year in ICUs.
- There are approximately 5.3 CR-BSIs per 1,000 catheter-days in ICUs.
- The attributable mortality for CR-BSIs is approximately 18%. Thus, there are probably about 14,000 deaths annually due to CR-BSIs in ICUs. Some estimates have put this figure as high as 28,000 deaths per year.
 - Pittet D, Tarara D, Wenzel RP. Nosocomial bloodstream infection in critically ill patients. Excess length of stay, extra costs, and attributable mortality. *JAMA*. 1994;271:1598-1601.
 - Saint S. Chapter 16. Prevention of intravascular catheter-related infection. Making health care safer: a critical analysis of patient safety practices. AHRQ evidence report, number 43, July 20, 2001. www.ncbi.nlm.nih.gov/books
 - Berenholtz SM, Pronovost PJ, Lipsett PA, et al. Eliminating catheter-related bloodstream infections in the intensive care unit. *Crit Care Med*. 2004;32:2014-2020.
- The Centers for Disease Control and Prevention (CDC) issued a guideline for prevention of CR-BSI in 2002.
 - O’Grady NP, Alexander M, Dellinger EP, et al. Guidelines for the prevention of intravascular catheter-related infections. *MMWR Morb Mortal Wkly Rep*. 2002;51(RR-10):1-29.
- The Institute of Medicine has identified the prevention of nosocomial infections, including CR-BSI, as a priority area for national action.
 - Adams K, Corrigan JM, eds. *Priority areas for national action: transforming health care quality*. Washington, DC: The National Academies Press, 2003.
- The Joint Commission on Accreditation of Healthcare Organizations (JCAHO) has included reducing the risk of health-care associated infections, including CR-BSI, in its 2005 National Patient Safety Goals.

www.jcaho.org

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INTERVENTION – CENTRAL LINE BUNDLE

The power of a “bundle” is that it brings together those scientifically grounded concepts that are both necessary and sufficient to improve the clinical outcome of interest. The focus of measurement is the completion of the entire bundle as a single intervention, rather than completion of its individual components.

- The “central line bundle” has five components: hand hygiene, maximal barrier precautions, chlorhexidine skin antisepsis, appropriate catheter site and administration system care, and no routine replacement.
- The various components of the central line bundle are all part of a broader guideline for the prevention of CR-BSIs developed by the Centers for Disease Control and Prevention (CDC).
- O’Grady NP, Alexander M, Dellinger EP, et al. Guidelines for the prevention of intravascular catheter-related infections. *MMWR Morb Mortal Wkly Rep.* 2002;51(RR-10):1-29.
- ICUs that have implemented multifaceted interventions similar to the central line bundle have nearly eliminated CR-BSIs.
- Berenholtz SM, Pronovost PJ, Lipsett PA, et al. Eliminating catheter-related bloodstream infections in the intensive care unit. *Crit Care Med.* 2004;32:2014-2020.

SUCCESS STORIES

- Baptist Memorial Hospital-Memphis, Memphis, TN, has reduced CR-BSIs and ICU length of stay by implementing the central line bundle and other measures to improve care in ICUs.
www.ihl.org/IHI/Topics/Improvement/ImprovementMethods/ImprovementStories
- Allegheny General Hospital, part of the Pittsburgh Regional Healthcare Initiative (PRHI), Pittsburgh, PA, has virtually eliminated CR-BSIs by implementing measures included in the central line bundle.
www.prhi.org

RESOURCES

- Pittsburgh Regional Healthcare Initiative
www.prhi.org

We welcome your comments, suggestions for revision, and enhancements to this document. Please send suggestions, with contact information when possible, to 100k@IHI.org.