Proven strategies successful in reduction of deadly hospital-acquired infections

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(Medical Xpress)—A new study by researchers from the Johns Hopkins University's School of Medicine and the Bloomberg School of Public Health reveals that combining several tested and proven practices for preventing central line-associated bloodstream infections (CLABSI) with a program to improve safety, teamwork and communication can dramatically reduce the infection rates. The study was funded by the Robert Wood Johnson Foundation's Interdisciplinary Nursing Quality Research Initiative (INQRI) and published online in *Critical Care Medicine*.

Central lines are tubes that are inserted into patients' veins to deliver crucial fluids or medications. They deliver life-saving care, but infections associated with central lines are among the most deadly and costly hospital associated infections in the U.S. They account for 31,000 deaths annually and cost our health system an estimated $9 billion. These infections are also among the most preventable, and, in recent years, infection rates have been significantly reduced thanks to concerted prevention efforts.

Led by David Thompson, DSNc, MSN, RN, and Jill Marsteller, PhD, MPP, associate professors at Johns Hopkins University School of Medicine and Bloomberg School of Public Health, respectively, and by J. Bryan Sexton, PhD, now at the Duke University Health System Patient Safety Center, the interdisciplinary research team conducted a randomized trial in 45 intensive care units at 35 hospitals in 12 states.

One group of hospitals adopted a bundle of evidence-based bloodstream infection prevention practices coupled with the Comprehensive Unit-Based Safety Program, which includes having staff:

- evaluate their culture of safety
- undergo science of safety training to understand systems and safe design
- identify how patients are or could be harmed and suggest solutions
- partner with a hospital executive to support safety efforts
- regularly learn from identified system defects and implement tools to improve teamwork and communication
- re-evaluate the culture

The evidence-based practices included: hand-washing before line placement; full barrier precautions (full-body drape, hat, gloves, mask and gown); avoiding line placement at the femoral site; using chlorhexidine to cleanse the site; and removing unnecessary lines. An observer, usually a nurse, used a checklist to ensure that the evidence-based practices were followed when central lines were inserted into patients' veins. While health care teams using the bundles were interdisciplinary, in each unit, nurses were responsible for ensuring adherence to the intervention.

The mean rate of infection in the intervention group decreased from 4.5 infections per 1,000 days using central lines to 1.3 infections per 1,000 central line days, a 70 percent reduction. The control group also saw a decrease in infection rates, but it was not as steep. The mean rate of infection in the control group decreased from 2.7 infections to 2.2 infections per 1,000 line days, a 21 percent reduction. Following the trial, the intervention group continued to use the protocols and the control group adopted them. Both groups were able to reduce infection

rates to less than one per 1,000 line days and were able to sustain the results over time.

"This study shows that not only are most central line-associated blood infections preventable, but that an evidence-based approach to prevention, along with a program focused on changing culture and promoting safety and communication, is highly effective in reducing infection rates," said Thompson. "We would strongly recommend further research into using a combination of a program of culture change along with evidence-based practice interventions to improve patient care."

"It's important to note that this was a nurse-led intervention," added Marsteller. "The units' success in reducing infections not only demonstrates the effectiveness of the intervention, but also confirms that nurses can have and should play a central role in quality improvement interventions."

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