

# Intensive Care Unit Interventions Developed at Johns Hopkins Sharply Reduce Bloodstream Infections in Abu Dhabi Hospitals

**Release Date: April 20, 2015**

A bundled intervention focused on evidence-based infection prevention practices, safety culture and teamwork, and scheduled measurement of infection rates considerably reduced central line-associated bloodstream infections (CLABSIs) across intensive care units (ICUs) in seven Abu Dhabi hospitals, researchers from the [Johns Hopkins Armstrong Institute for Patient Safety and Quality](#) report.

The intervention, undertaken by 18 ICUs, achieved an overall 38 percent reduction in these infections; and the number of units with a quarterly CLABSI rate of less than one infection per 1,000 catheter days increased by almost 40 percent. The results were published last week in the journal [Infection Control & Hospital Epidemiology](#).

These hospitals were able to show significant improvements in infection rates and have been able to sustain the improvements a year after we finished the project,” says lead study author [Asad Latif, M.B.B.S., M.D., M.P.H.](#), an assistant professor of anesthesiology and critical care medicine at the Johns Hopkins University School of Medicine, and a faculty member at the Armstrong Institute. “Our results suggest that ICUs in disparate settings around the world could use this program and achieve similar results, significantly reducing the global morbidity, mortality and excess costs associated with CLABSIs,” Latif says. “In addition, this collaborative could serve as a model for future efforts to reduce other types of preventable medical harms in the Middle East and around the world.”

For the study, a collaborative effort by the Armstrong Institute, [Johns Hopkins Medicine International](#) and the Abu Dhabi Health Services Company (SEHA), which operates the government health care system in Abu Dhabi, ICUs were instructed to assemble a Comprehensive Unit-based Safety Program team — called a CUSP team — comprising local physician and nursing leaders, a senior executive, frontline health care providers, an infection control provider, and hospital quality and safety leaders.

The ICUs included 10 adult, five neonatal and three pediatric ICUs, accounting for 77 percent of the adult, 74 percent of the neonatal and 100 percent of the pediatric ICU beds in Abu Dhabi.

Starting in May, 2012, the SEHA corporate quality team and ICU CUSP teams attended 14 weekly live webinars by Armstrong Institute faculty, followed by content and coaching webinars every two weeks for 24 months. The webinars were recorded by SEHA and posted on a local, shared computer drive, along with educational and training materials.

Armstrong faculty also conducted four site visits in Abu Dhabi at the beginning of the study, visiting each ICU to meet the CUSP team and tour the units. A year later, they conducted a three-day patient safety workshop for participating hospitals.

CUSP teams implemented three interventions as part of the program: an effort to prevent CLABSIs that targeted clinicians’ use of evidence-based infection prevention recommendations from the Centers for Disease Control and Prevention; a CUSP process to improve safety culture and teamwork; and measurement of monthly CLABSI data and feedback to safety teams, senior leaders and ICU staff.

The overall mean “crude” CLABSI rate for participating ICUs decreased from 2.56 infections per 1,000 catheter days to 1.79 per 1,000 catheter days by the end of the study, corresponding to a 30

percent reduction. By unit type, CLABSI rates decreased by 16 percent among adult ICUs, 48 percent among pediatric ICUs and 47 percent in neonatal ICUs. The percentage of ICUs that achieved a quarterly CLABSI rate of less than one infection per 1,000 catheter days increased from 44 percent to 61 percent after the interventions — a relative increase of 39 percent.

CLABSIs are a burden in hospitals around the world, increasing length of stay, hospital costs, morbidity and mortality, says senior study author [Sean M. Berenholtz, M.D., M.H.S.](#), a professor of anesthesiology and critical care medicine at the Johns Hopkins University School of Medicine, and physician director of inpatient safety and quality for the Armstrong Institute. The World Health Organization (WHO) estimated the incidence of these infections to be 12.2 infections per 1,000 central-line days — a rate two- to threefold higher than rates reported among intensive care units in Western countries, and associated with a crude excess mortality of 14.7 percent to 23.6 percent, he says.

“Despite growing awareness, many hospitals around the world continue to struggle in their efforts to meaningfully reduce their CLABSI rates in a sustained manner,” Berenholtz says. “In addition, hospitals and health care systems in the Middle East have unique barriers to implementing quality improvement programs, such as challenges with staff recruitment and retention, and personnel fearful of punitive repercussions from speaking up regarding patient safety concerns. In our study, bringing all stakeholders to the same table allowed everyone to share their concerns and ensure their voices were heard.”

In addition, SEHA leadership provided ongoing support, such as establishing a commitment to a goal of zero CLABSIs, updating the requirements for infection prevention specialist nurses to be in line with international standards, and convening a new CLABSI taskforce and developing a CLABSI prevention policy across hospitals.

The work builds on earlier efforts by Johns Hopkins patient safety experts to reduce CLABSIs at Johns Hopkins hospitals and elsewhere, using steps that went beyond using a checklist of evidence-based practices and a comprehensive safety program to address culture change and performance feedback. In one example, the Keystone ICU Project, adopting these measures resulted in a 66 percent reduction in CLABSIs across 103 Michigan ICUs. These results were sustained for more than three years, and they were associated with significant decreases in mortality and costs, along with improvements in the safety climate, according to Armstrong Institute specialists.

The Keystone ICU Project’s success prompted spread of the CLABSI prevention program to more than 1,000 ICUs in 45 U.S. states, and in the United Kingdom and Spain, in partnership with the WHO. The U.S. portion of the program, completed in 2012, reduced the rate of bloodstream infections in ICUs by 40 percent, saved more than 500 lives, prevented more than 2,000 bloodstream infections and averted \$34 million in health care costs.

The current study was supported by SEHA. Co-authors were Bernadette Kelly, Hanan Edrees, Paula S. Kent, Sallie J. Weaver, Kristin K. de Grouchy and Christine A. Goeschel of Johns Hopkins; and Branislava Jovanovic, Hadeel Attallah and Ali Al-Obaidli of SEHA.