average of 37 mL per patient day in the first semester to 49 mL per patient day in the second semester. After the product change and the new hand hygiene campaign, a second relevant and sustained increase has took place: the first 4-month average in 2019 was 67 mL per patient day. In the second survey, conducted with 187 HCWs, there was an increase in preference for alcohol-based product from a wall dispenser (from 38% to 62%).

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Strengthening Adherence to a Central-Line–Associated Bloodstream Infection Prevention Bundle in a Surgical ICU in Vietnam

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Background: Central-line–associated bloodstream infections (CLABSIs) increase the length of hospital stay, healthcare costs, and patient mortality. **Objective:** We conducted a quality improvement (QI) approach with plan-do-study-act (PDSA) cycle to strengthen adherence to a central-line (CL) maintenance bundle and to reduce CLABSI rate in a surgical intensive care unit (ICU) of children's hospital 1 (CH1). **Methods:** The baseline CLABSI rate per 1,000 CL days and the ratio of CL days to patient days (device utilization ration; DUR) were captured for 12 months preceding the intervention. Baseline process indicators were captured for 2 months preceding implementation, including hand hygiene adherence, sterile technique for dressing change and CL access, CL hub cleaning, dating of CL components and daily chlorhexidine bathing. A multimodal intervention of clinician training, bedside checklist, and poster reminders of best practices was implemented. Process and outcome measures were monitored over 12 months of implementation. Z-test was used to calculate statistical significance before and after intervention. **Results:** Among 46 clinical ICU staff trained on a CLABSI maintenance bundle, mean pre- and posttest knowledge scores increased from 63% to 86%. Staff adherence to each CL care bundle element improved significantly ($P < .001$) and sustainably over the intervention period: hand hygiene adherence increased from 54% to 82%; sterile technique for dressing increased from 60% to 94%; sterile technique for CL access increased from 51% to 97%; hub scrubbing increased from 52% to 93%; dating of CL elements increased from 63% to 85%; daily chlorhexidine bathing increased from 52% to 87%. During the first 9 months, the CLABSI rate and the DUR decreased from 5.8 to 3.7 and from 0.43 to 0.41, respectively. In the following 2 months, the CLABSI rate increased to 12.7 while bundle adherence remained high. A root-cause analysis identified inadequate environmental hygiene and use of multidose saline bottles for multiple patients as potential factors. A PDSA cycle to improve these elements (enhanced cleaning; single-patient saline bottles) led to a decrease in the CLABSI rate from 12.7 to 3.0 after these efforts. **Conclusions:** This is the first time CH1 has used quality improvement methodology to implement an HAI prevention enhancement, which proved effective at creating and sustaining adherence to a multimodal CL maintenance bundle and an overall decrease in CLABSI rates. A 2-month increase in CLABSI rates highlights the unique challenges faced in low-resource settings and demonstrates the need for IPC elements not captured in a typical CLABSI prevention bundle. The quality improvement methodology provided a structured approach to implementing change. This methodology will be used for additional patient safety improvements at CH1 and other Viet Nam hospitals interested in CLABSI prevention.

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Substance Use Diagnoses Among Persons with Community-Onset Methicillin-Resistant *Staphylococcus aureus* Bloodstream Infections

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Background: In recent years, the historic declines in the incidence of methicillin-resistant *Staphylococcus aureus* (MRSA) bloodstream infections (BSIs) in the United States have slowed. We examined trends in the incidence of community-onset (CO) MRSA BSIs among hospitalized persons with and without substance-use diagnoses. **Methods:** Using data from >200 US hospitals reporting to the Premier Healthcare Database (PHD) during 2012–2017, we conducted a retrospective study among hospitalized persons aged ≥18 years. MRSA BSIs with substance use were defined as hospitalizations having both a blood culture positive for MRSA and at least 1 *International Classification of Disease, Ninth Revision, Clinical Modification* (ICD-9-CM) or ICD-10-CM diagnostic code for substance use including opioids, cocaine, amphetamines, or other substances (excluding cannabis, alcohol, and nicotine). MRSA BSIs were considered community onset when a positive blood culture was collected within 3 days of admission. We assessed annual trends and described characteristics of CO MRSA BSI hospitalizations, stratified by substance use. **Results**: Of 20,049 MRSA BSIs from 2012 to 2017, 17,634 (88%) were CO. Overall, MRSA BSI incidence decreased 7%, from 178.5 to 166.2 per 100,000 hospitalizations during the study period; However, CO MRSA BSI rates remained stable (152.7 to 149.9 per 100,000 hospitalizations). Among CO MRSA BSIs, 1,838 (10%) were BSIs with substance-use diagnoses; the incidence of CO MRSA BSIs with substance use increased 236% (from 8.2 to 27.6 per 100,000 hospitalizations) and represented a greater proportion of the CO MRSA rate over the study period (Fig. 1). The incidence of CO MRSA BSIs without substance use decreased 15% (from 144.5 to 122.4 per 100,000 hospitalizations). Patients with CO MRSA BSIs with substance use were younger (median, 40 vs 65 years), more likely to be female (50% vs 40%), white (79% vs 69%), and to leave against medical advice (15% vs 1%).

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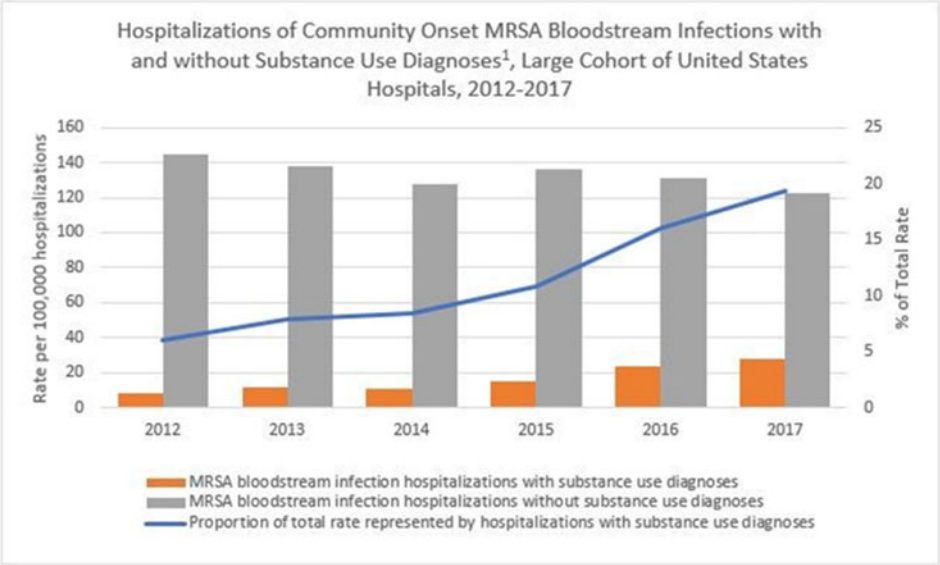
Figure 1.



[1] Substance use diagnoses: opioids, cocaine, amphetamines, stimulants, hallucinogens, and other unspecified drug use

MRSA: Methicillin Resistant *Staphylococcus aureus*

CO: Community Onset

Fig. 1.

Among patients not leaving against medical advice, CO BSI patients with substance-use diagnoses had longer lengths of stay (median, 11 vs 9 days), lower in-hospital mortality (9% vs 14%), and higher hospitalization costs (median, $22,912 vs $17,468) compared to patients without substance-use diagnoses. **Conclusions:** Although the overall CO MRSA BSI rate remained unchanged from 2012 to 2017, infections with substance use diagnoses increased >3-fold, and infections without substance use diagnoses decreased. These data suggest that the emergence of MRSA associated with substance-use diagnoses threatens potential progress in reducing the incidence of CO MRSA infections. Additional strategies may be needed to prevent MRSA BSI in patients with substance-use diagnoses, and to maintain national progress in the reduction of MRSA infections overall.

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Successful Control of a Norovirus Outbreak in a Chilean Pediatric Intensive Care Unit

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Background: Noroviruses are nonenveloped, single-stranded RNA viruses belonging to the *Caliciviridae* family; they cause high-profile outbreaks in healthcare settings, due to their contagiousness, prolonged viral shedding, and ability to survive in the environment. **Methods:** Description of a norovirus outbreak in a pediatric ICU with multibed rooms. We report the epidemiology, molecular diagnosis, and control. **Results:** In August and September 2019, an outbreak of acute gastroenteritis affected 13 patients and 26 healthcare workers at an intensive care unit of Roberto Del Río Children's Hospital, which consists of 22 beds in a multibed-room format. Patients manifested self-limited non-dysenteric diarrhea; other symptoms were vomiting (54%) and fever (23%). Healthcare workers reported diarrhea, nausea, vomiting, fever, malaise, and abdominal cramps. The mean age of the patients was 1 year old, all diaper users. The average days of diarrhea in patients was 4 days (2–6 days). There were 87 exposed patients, with an attack rate of 14.9% and 107 exposed staff, with an attack rate of 24.3%. Rotavirus and bacterial etiology were ruled out, and norovirus was subsequently diagnosed in 10 of 13 patients using qRT-PCR; 80% (8 of 10) corresponded with GII norovirus and 20% with a GI (2 of 10). Control measures included enforcement of standard precautions, strict adherence to contact precautions (use of gloves and gowns), hand hygiene before and after patients contact, and mask use if exposure to vomitus. Healthy staff were assigned for patients care. Environmental disinfection twice daily with 1.000 ppm sodium hypochlorite solution was encouraged and supervised with focus on cleaning high-touch surfaces, such as bathrooms, sinks, tables, floors and patient-care items. Active and prospective surveillance were conducted to search for new cases. Infection control practices were coupled with education to staff, patients, and visitors. The outbreak was controlled on September 18, 2019, after 23 days and several interventions,

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