Abstract # 593

Burden of Healthcare-associated Infections among Hospitalized Children within Community Hospitals

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Abstract

Background: Within community hospitals with targeted infection prevention efforts, participation in an infection control network has led to significant decreases in device or procedure-related infections among adult patients. The impact of these interventions has not been assessed in pediatric patients admitted to community hospitals.

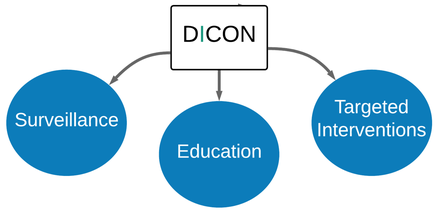
Methods: We conducted a retrospective cohort study to describe the burden of healthcare-associated infections (HAI) among hospitalized children (< 18 year old) within 45 community hospitals participating in the Duke Infection Control Outreach Network (DICON) from 2013-2018. We determined the frequency of device related HAI, central line-associated bloodstream infections (CLABSI), catheter-associated urinary tract infections (CAUTI) and hospital-associated pneumonia or ventilator-associated events (HAP/VAE) using National Healthcare Safety Network (NHSN) definitions; and the burden of HAI among hospitals with neonatal intensive care units (NICU). Log-linear longitudinal Poisson model was used to measure the association between NICU CLABSI rates and calendar year. All analyses were performed with SAS version 9.4.

Results: Forty-five hospitals reported 109 HAIs over the 6-year period. Median (Interquartile range, IQR) time to infection was 12 days (8, 20) days from admission or surgical procedure. CLABSI represented 47% of HAIs, SSI were 28%, HAP/VAE were 23% and CAUTI were <2%. Participating community hospitals with a NICU accounted for 98% of pediatric CLABSI. The most frequently isolated primary organism for all HAI varied by calendar year and was commonly *Staphylococci* species. A sensitivity analysis of 5 DICON centers with NICUs that participated during the entire study period and provided Central line (CL) use data reported a median (IQR) rate of 1.74 (1.4, 1.9) CLABSIs/1000 central line days. There was no linear relationship between year and CLABSI rate. There were no significant differences in the incidence of CLABSI between one year and any other year.

Conclusion: CLABSI, most commonly caused by *Staphylococci* species, represented the majority of HAI reported from hospitalized children within community hospitals participating in an infection control network. Further research into device utilization practices may inform future interventions to reduce HAI.

Background

- Healthcare associated infections (HAI) have the highest morbidity and mortality among hospitalized children
- HAI are 2-3 times higher in limited resource settings than in more resourced settings
- Participation in a network with targeted interventions decreases HAI. This effect has not been assessed in pediatric patients admitted to community hospitals



Methods

- Retrospective study of 45 DICON participating hospitals (13 NICUs) that reported Pediatric HAI from 2013 – 2018
- All located in Virginia, North Carolina, South Carolina, Georgia, Florida and West Virginia
- Evaluated HAI based on CDC National Healthcare Safety Network criteria reported from <18 year old patients
- Excluded CDI due to inconsistent reporting and low numbers during the study period
- Used log-linear longitudinal Poisson model to measure association between NICU CLABSI rates and calendar year
- HAI: Central Line Associated Bloodstream Infection (CLABSI); Catheter-associated urinary tract infection (CAUTI) Healthcare-associated / ventilator-associated pneumonia (HAP/VAP); Surgical Site Infections (SSI); *Clostroides difficile* Infection (CDI)

Results

Table 1. Pediatric HAI Frequency in Community Hospitals within an Infection Control Network (2013 - 2018)

	All Participating Hospitals	Hospitals with Neonatal Units
Total #	45	13
HAI	109	
HAP/VAP	25	
CAUTI	2	
CLABSI	51	50
Central Line (CL) Days*		28308
CLABSI rate per 1000 CL days		1.77
SSI	31	
Surgical Procedures	53325	
SSI rate/100 Procedures	0.06	

***Only hospitals with NICUs reported CL days**
Key. CLABSI, Central Line Associated Bloodstream Infection; CAUTI, Catheter-associated urinary tract infection; HAP/VAP, Healthcare-associated/Ventilator-associated pneumonia; SSI, Surgical Site Infection

Figure 1. CLABSI Rates From Participating Community Hospitals with Neonatal Units

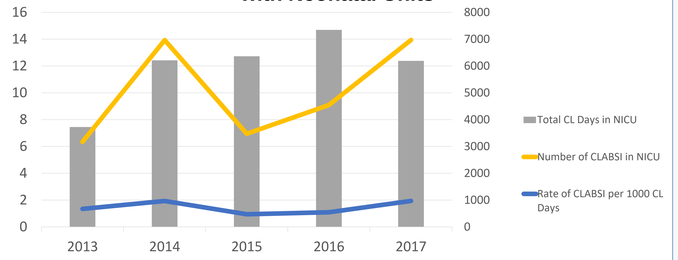
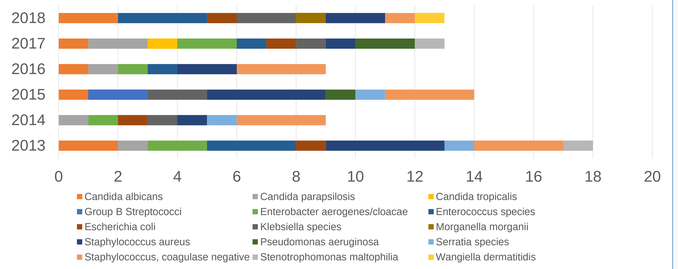


Figure 2. Frequency of Pathogens Isolated from Pediatric HAI



Results

- CLABSIs accounted for majority (47%) of HAI
- CLABSIs frequently occurred in NICUs and rates remained unchanged during study period (Figure 1)
- Median time to HAI from admission or surgery was 12 days (Interquartile range 8, 20)

Conclusions

- CLABSIs, most commonly caused by *Staphylococci* species, represented the majority of pediatric HAIs reported from hospitals participating in DICON
- Neonatal CLABSI rates in community hospitals are notably higher than published rates in resourced settings
- HAI data from a large network of community hospitals provides opportunities to study the epidemiology and identify interventions to reduce pediatric HAI