Financial Cost, Length of Stay, and Patient Experience Associated with Healthcare Associated Infections Across a 48 Hospital Network

Rachel E. Kast Ph.D., Cole M. Grabow MPH, Michelle L. Fitch BA, Sandra L. Tobar MBSA BSN, Anurag N. Malani M.D., FIDSA and Russell N. Olmsted MPH, CIC, FAPIC

Background

- Reduction of healthcare associated infections (HAIs) is critical to improve safety and quality
- Prior studies estimate the impact of HAIs to be $10 billion annually[2] with additional length of stay and decreased revenue[3-6]
- Reduction of HAIs is a priority; however, the impact of reduction is not fully understood
- We examined the financial, length of stay (LOS), and patient experience[1] impact of HAIs

Methods

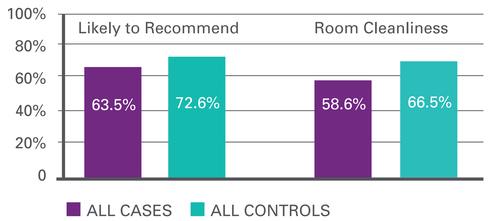
- NHSN-reported CAUTI, Clostridium Difficile Infections (CDI), CLABSI, MRSA, and colon (SSI-COLO) were queried for the first nine months of 2016 from 48 member hospitals
- Patients with an HAI were matched to controls based on hospital and primary diagnosis to create a retrospective case-control study
- CAUTI and CLABSI control populations were limited to patients with an associated device
- LOS and total direct variable cost (TDVC) were collected for all HAI and control patients
- If patients returned a Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS) survey, their likelihood of recommending and hospital environment responses were analyzed
- T-tests (Satterthwaite or pooled) were used to compare differences between HAI and control groups for cost and TDVC. Chi-Square (X^2) was used to compare top-box rates for HCAHPS surveys

Results

- 2,053 HAIs were reported across 48 hospitals from January – September 2016
- 1,590 case control pairs were available after data cleaning
- TDVC was significantly higher among HAI cases than controls for CDI, CLABSI, and SSI-COLO
- LOS was significantly higher for HAI cases across all HAI groups studied

	CAUTI	CDI	CLABSI	MRSA	SSI-COLO
Number of Cases	265	1356	203	72	157
Number of Case-Control Pairs	123	1116	166	58	127
Average TDVC per Case	$37,053	$17,885	$46,687	$23,394	$25,149
Average TDVC per Control	$27,204	$11,401	$32,041	$13,910	$15,378
Attributable TDVC per Case	$9,850	$6,484	$14,646	$9,483	$9,771
Total Attributable TDVC	$2,610,250	$8,792, 304	$2,973,138	$682,776	$1,534,047
Case-Control t-test (p)	1.78 (0.077)	5.90 (<0.0001)	2.01 (0.046)	1.96 (0.055)	2.3 (0.023)
Average LOS per Case	22.4	15.8	31.6	22.6	16.9
Average LOS per Control	14.8	9.4	21.9	15.2	12.4
Attributable Days Per Case	7.6	6.4	9.7	7.4	4.5
Total Attributable LOS	2014.0	8678.4	1969.1	532.8	706.5
Case-Control t-test (p)	2.58 (0.010)	12.0 (<0.0001)	3.59 (0.0004)	2.03 (0.045)	2.99 (0.003)

Patient Experience: Top Box Response Rate

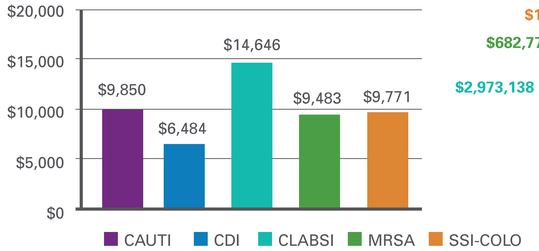


- Of 3,180 subjects, 198 retuned HCAHPS surveys: 85 HAI patients and 113 control patients
- While top box rates were lower for likely to recommend and room cleanliness, the difference in top box rates between groups (X^2) was not significant for either question

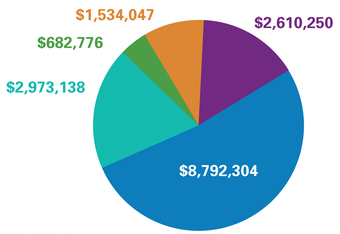
Attributable Cost

While CLABSI had the highest attributable cost per case, CDI represented over 50% of the total financial burden due to its high incidence.

ATTRIBUTABLE COST PER CASE



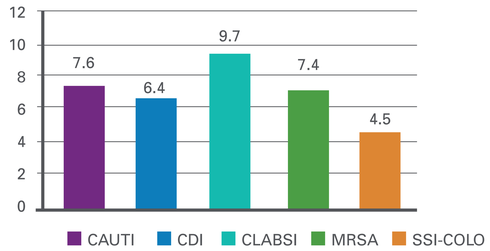
TOTAL ATTRIBUTABLE TDVC



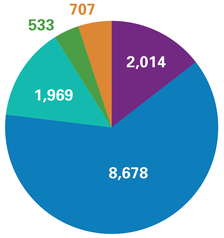
Attributable LOS

While CLABSI had the highest attributable LOS per case, CDI represented over 50% of the total LOS burden due to its high incidence.

ATTRIBUTABLE LOS PER CASE



TOTAL ATTRIBUTABLE LOS DAYS



Conclusions

- This is the first investigation to our knowledge pairing patient experience of care data with TDVC and LOS for HAI patients
- Patients with an HAI rated care lower in likelihood to recommend and room cleanliness
- HAIs have a significant impact on cost and LOS, further supporting the importance of preventing HAIs
- Reducing HAIs will impact cost, LOS, and patient experience
- Defining attributable cost and LOS values for each infection allows for tracking ROI in HAI reduction initiatives
- Additional readmissions for SSI were studied but their impact is not shown here

Limitations

- Time-fixed method used for this study tends to overestimate cost, LOS, and other aspects attributable to HAIs[3,8]
- HAI events reported to NHSN adhere to surveillance criteria, however, each event was not independently validated
- The sample size of HCAHPS survey responses received was relatively small, affecting statistical significance
- Calculation of TDVC varies between hospitals
- Case-control pairs account for intra-institutional variability, but there may be inter-institutional variability

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