HAIs and HCAHPS; are they connected?

One would expect that the number of hospital-acquired infections (HAIs) reported at a hospital would correlate with the results of the hospital's HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) surveys, where a lower number of HAIs would seemingly be associated with higher patient satisfaction scores and vice versa. But data does not necessarily support this hypothesis. To better understand the relationship between HAIs and HCAHPS, we have analyzed the data and provided recommendations on how a hospital environmental services program can successfully address each.

HAI reporting and HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) surveys both provide measurements to help assess how hospitals are performing. HAI data informs whether hospitals are providing a safe environment for patient care, while HCAHPS surveys aim to measure patients' perceptions of their hospital experience to better understand the quality of care provided. While the CMS (Centers for Medicare and Medicaid Services) penalize the lowest-performing 25% of all hospitals in HAIs each year under the Hospital-acquired Conditions (HAC) Reduction Program, it conversely rewards hospitals with high HCAHPS scores with higher reimbursements.

About the HAC Reduction Program

Launched in 2015, CMS's HAC Reduction Program assesses the performance of hospitals based on specific measures related to patient safety as compared to other hospitals. HACs include harmful conditions that patients may develop while in the hospital receiving treatment for something else, such as falls, air embolisms and HAIs. Hospitals with scores in the bottom-performing quartile are subject to a penalty of up to 1% of their Medicare payments for the year based on the following:

One claims-based composite measure of patient safety:

- Patient Safety and Adverse Events Composite (CMS PSI 90)

Five chart-abstracted measures of HAI submitted to the Centers for Disease Control and Prevention's National Healthcare Safety Network:

- Central Line-Associated Bloodstream Infection (CLABSI)
- Catheter-Associated Urinary Tract Infection (CAUTI)
- Surgical Site Infection (SSI) for abdominal hysterectomy and colon procedures
- Methicillin-resistant *Staphylococcus aureus* (MRSA) bacteremia
- *Clostridioides difficile* Infection (CDI)[1]

Assumptions

One could assume that HAIs and HCAHPS would correlate – that when a hospital performs well in one area, their overall efforts would lead to positive performance in the other, and vice versa. One particular area in which one might assume that HAIs and HCAHPS would overlap is in the HCAHPS "cleanliness" question: "During this hospital stay, how often were your room and bathroom kept clean?"

What data shows

In 2020, a study of New York acute care hospitals found that hospitals experienced 0.031 fewer cases of *C, diff* infections per 1,000 discharges for every percentage point increase in the HCAHPS cleanliness score.[2] A broader analysis by Deloitte in 2017 showed a positive association between patient experience and central line-associated bloodstream infections (CLABSI) in ICUs and select wards (in which higher patient experience correlated to improved HAI performance), but no association at all between patient experience ratings and CAUTI in ICUs and select wards, nor surgical site infections from colon surgery or abdominal hysterectomy.[3]

Studies show mixed results at best in any correlation at all between HAIs and HCAHPS.

Some studies have also looked at other dimensions of HCAHPS aside from cleanliness to establish a link between patient experience and HAIs more broadly. One found that lower HAC scores were modestly associated with a better patient experience.[4] Looking at staff responsiveness, a separate study found inpatients' hospital experiences were significantly associated with an increased risk of ICU-reported CLABSIs.[5]

Likelihood to recommend has also scored higher for patients who do not contract an HAI compared to patients who did develop an HAI. This suggests the directionality of the HCAHPS-HAI relationship may be that experiencing an HAI leads to poorer retrospective assessment of their experience. However, another study found the opposite; development of a HAC was not associated with decreased satisfaction scores in a population of orthopedic surgery patients at a private, university-affiliated specialty center.[6]

Sodexo Healthcare commissioned an independent review and analysis of public data to determine the possible correlations between HAI and HCAHPS. The findings, as detailed in Table 1, show that *C. diff* is the only HAI where a decrease in infections is correlated with an increase in HCAHPS cleanliness scores.

Table 1. Univariate OLS Regression Coefficients - HCAHPS Dependent, HAI Independent, 01/01/2019 - 12/31/2019

	Independent Variable					
Dependent Variable: Regression Coefficients Q4 2019	CLABSI	CAUTI	SSI Colon	SSI Hysterectomy	MRSA	*C. diff*
Nurse Communications	-0.45***	-0.02	0.06	-0.05	-0.69***	0.41**
Doctor Communications	-0.07	0.05	0.14	0.08	-0.50***	0.18
Staff Responsiveness	-0.72***	-0.27	-0.19	-0.22	-0.63***	0.90***
Medicine Communications	-0.13	-0.11	-0.13	-0.14	-0.63***	0.38*
Discharge Information	-0.40***	0.14	0.22**	-0.15	-0.92***	0.56***
Care Transition	-0.47**	0.09	0.29*	-0.04	-1.00***	0.16
Cleanliness	-0.52**	-0.28	-0.27	-0.54**	-0.86***	0.63**
Quiet	0.45	-1.02***	-0.38	-0.07	0.25	-0.49
Overall Hospital Rating	-0.68**	0.19	0.25	-0.33	-1.57***	0.39
Likely to Recommend	-0.87***	0.53	0.52*	-0.39	-1.77***	-0.04

* p<0.1, ** p <0.05, *** p<0.01; models are univariate only, without controlling for additional factors

While one might expect that an increase in a particular HCAHPS score would correlate to a decrease in HAIs, the data in Table 2 shows the opposite

Instead, some of the factors are both positive, showing an increase in certain HAIs correlated with an increase in certain HCAHPS scores, or both negative, showing a decrease in certain HAIs to be correlated with a decrease in certain HCAHPS scores. MRSA shows the most statistically significant results, but the correlation is still extremely weak; *C. diff* has significant results with several HCAHPS metrics, but all are positively correlated, meaning when one increases, so does the other.

Table 2. HCAHPS and HAI Correlations 01/01/2019 - 12/31/2019

Dependent Variable	Independent Variable					
Pearson Correlation Coefficients Q4 2019	CLABSI	CAUTI	SSI Colon	SSI Hysterectomy	MRSA	*C. diff*
Nurse Communications	-0.07***	-0.00	0.01	-0.01	-0.11***	0.04**
Doctor Communications	-0.01	0.01	0.03	0.02	-0.09***	0.02
Staff Responsiveness	-0.08***	-0.02	-0.02	-0.04	-0.07***	0.06***
Medicine Communications	-0.02	-0.01	-0.02	-0.03	-0.10***	0.03*
Discharge Information	-0.08***	0.03	0.05**	-0.05	-0.19***	0.07***
Care Transition	-0.05**	0.01	0.04*	-0.01	-0.13***	0.01
Cleanliness	-0.06**	-0.03	-0.03	-0.09**	-0.10***	0.04**
Quiet	0.04	-0.07***	-0.03	-0.01	0.02	-0.03
Overall Hospital Rating	-0.04**	0.01	0.02	-0.05	-0.14***	0.02
Likely to Recommend	-0.06***	0.03	0.04*	-0.05	-0.14***	-0.00

* p<0.1, ** p <0.05, *** p<0.01

Table 3 shows a correlation between *C. diff* and HCAHPS scores for Nurse Communication, Staff Responsiveness, Medicine Communication, Discharge Information and Cleanliness. However, coefficients are almost always 0.00, suggesting a very small impact. Despite statistical significance, most of the coefficients are less significant, hovering around 0.00-0.02. This suggests only marginal improvements in HAI Standard Infection Ratio associated with increases in HCAHPS performance.

Table 3. Univariate OLS Regressions Coefficients - HAI Dependent, HCAHPS Independent 01/01/2019 - 12/31/ 2019

Dependent Variable	Independent Variable									
Regression Coefficients Q4 2019	Nurse Communication	Doctor Communication	Staff Responsiveness	Medicine Communication	Discharge Information	Care Transition	Cleanliness	Quiet	Overall Hospital Rating	Likely to Recommend
CLABSI	-0.02	-0.02	0.06	-0.05	-0.02	-0.02	-0.02	-0.02	-0.02	0.41**
CAUTI	-0.07	0.05	0.14	0.08	-0.02	-0.02	-0.02	-0.02	-0.02	0.41**
SSI Colon	-0.02	-0.27	-0.19	-0.22	-0.02	-0.02	-0.02	-0.02	-0.02	0.41**
SSI Hysterectomy	-0.13	-0.11	-0.13	-0.14	-0.02	-0.02	-0.02	-0.02	-0.02	0.41**
MRSA	-0.02	0.14	0.22**	-0.15	-0.02	-0.02	-0.02	-0.02	-0.02	0.41**
C. diff	-0.47**	0.09	0.29*	-0.04	-0.02	-0.02	-0.02	-0.02	-0.02	0.41**

* p<0.1, ** p <0.05, *** p<0.01; models are univariate only, without controlling for additional factors

Why is there so much variation in the correlation data?

The following aspects of the HCAHPS cleanliness question may suggest why we see no consistent correlation between patient experience scores and HAIs:

- There are 10 questions on the HCAHPS survey with minimal focus on assessing cleanliness and the environment.
- The cleanliness question pertains only to the patient's room and bathroom, not the overall hospital environment where pathogens can be transferred.
- The cleanliness question is worded to measure perceived cleanliness and frequency of cleaning rather than actual cleanliness; for instance, normal wear and tear of flooring and outdated facilities can have an unclean appearance but still be properly disinfected.
- The cleanliness question only offers four answer options: Never, Sometimes, Usually, Always; therefore, there is no way of knowing what aspect of cleanliness the patient felt was lacking.

Based on these factors, it could be argued that the cleanliness question measures patient interactions with environmental services staff more than actual cleanliness. This also explains the correlation between a reduction in cases of *C. diff* and an increase in HCAHPS cleanliness scores while other HAIs did not; the key measures to prevent the spread of *C. diff*, proper handwashing and surface disinfection, offer patients visual cues that can lead to perceived cleanliness reported on their HCAHPS surveys.

Conclusion

Both HAIs and HCAHPS are important metrics for measuring hospital performance, however, evidence suggests that a hospital's performance on one cannot reliably predict the other. Managing HAIs is reliant on a consistent Infection Prevention strategy, while improving patient experience is reliant on identifying the expectations of patients and addressing their concerns before they complete post-discharge surveys. Therefore, hospitals require a two-prong approach that supports proper disinfection as well as patients' perceptions of cleanliness to address each.

Addressing both HAIs and HCAHPS

Preventing HAIs is important for the safety of staff and patients, while providing a positive patient experience enhances a hospital's reputation and standing in the community.

75,500 deaths each year in the U.S. from preventable HAIs

$45,000 in penalties on average from just one HAI

When it comes to addressing the cleanliness question on the HCAHPS survey, involving the environmental services team in patient engagement in the following ways can help secure high HCAHPS scores:

- Have environmental services staff introduce themselves to patients or families
- Ensure staff can be observed cleaning by the patient
- Communicate what cleanliness measures the patient can expect
- Leave messages in patient rooms stating when and how the room was cleaned

Sodexo Healthcare has two service offerings - Protecta® and Experiencia® - that, in tandem, can address both HAIs as well as enhance patient experience while patients are still in the hospital.

Visit us.sodexo.com/healthcare or talk to your Sodexo Client Executive to learn more.

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